A Brief History and Introduction to the International Conference Series

by Michael McKubre

This is a six-part history of the ICCF conferences. It was originally uploaded to the ICCF-19 website, in 2015.

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Part One - From ICCF1 to ICCF3

by Michael McKubre

Organization of this document. This history is being written in sections. The first "episode" covers the foundational years, ICCF1 through ICCF3. In perusing the rich photographic library that documents all of the eighteen ICCF conferences to date, I decided to choose content based upon those images which necessarily skews the story towards what Gene Mallove, Dave Nagel and I observed. For the first three conferences the photographic record is slight but informational content is high. This historical document is intended to be faithful and somewhat inclusive. Part of my intent is to feature the cold fusion warriors that are no longer with us. It is important to document how we came to today, to ICCF19 — what forces were put in play to make the seemingly impossible transition from one conference to nineteen. In doing this the role of the International Advisory Committee (IAC) and the roles of the chairmen throughout the years are critical.

In their introduction to the ICCF14 (2008, Washington, DC) Proceedings volumes, Dave Nagel, teacher and researcher at The George Washington University, and Mike Melich, research professor with the Naval Postgraduate School in Monterey, California (Co-Chairs), provided a short summary and table of the locations and attendance for the first fourteen conferences in the ICCF series. This is lightly adapted and extended below to include the full 18 conferences to date. That we got this far is remarkable, the stories on the following pages all the more so. Certainly many predicted that we would not proceed beyond one or two and each passing conference further secures our place in history and continues to annoy, defy and diminish the case made by a decreasing band of skeptics. We are confining our discussion to how this accomplishment was achieved and the significance of this achievement for the broader cold fusion community.

Much credit should be given to every participant of every conference. Personal credit is given to the subjects of the photos below – and to the photographers who made this possible, particularly: Gene Mallove, Dave Nagel, Barbara Dello Russo, Duy Tran. Finally I would like to express my gratitude for the inspiration and support in this, my first, historical exercise to the following people: Tony La Gatta, who provided the stimulus; Pietro Spatola who painstakingly uploaded the Histories to the website and combatted the technical glitches; and Christy Frazier, Marianne Macy and Alison Godfrey who patiently waded through my words and grammar. Thanks is given also to Jed Rothwell and Ruby Caret who have taken my text and transformed into what hopefully is its ultimate web destination.

Now let's dive back into history…

Table of Conferences ICCF1-18

#	Year	City	Country	Chair	Co-chair	Supporting Organizations
1	1990	Salt Lake	USA	Fritz Will		National Cold Fusion Institute
2	1991	Lake Como	Italy	Giuliano Preparata	Emelio del Giudice	Universita degli studi di Milano
					Tulio Bressani	
3	1992	Nagoya	Japan	Hideo Ikegami	Makoto Okamoto	The Physical Society of Japan
4	1993	Maui	USA	Tom Passell	Michael McKubre	Electric Power Research Institute, ONR*, ENEA**
5	1995	Monte Carlo	Monaco	Martin Fleischmann	Stanley Pons	IMRA-Europe
6	1996	Toya	Japan	Makoto Okamoto	Naoto Asami	MITI New Hydrogen Energy Program
7	1998	Vancouver	Canada	Fred Jaeger	George Miley	ENECO
8	2000	Lerici	Italy	Franco Scaramuzzi		ENEA**, CNR***, INFN****, SCI and SIF*****
9	2002	Beijing	China	Xing Zhong Li		Ministry of Science and Technology
10	2003	Cambridge	USA	Peter Hagelstein		MIT, NEF°
11	2004	Marseilles	France	Jean-Paul Biberian		NEF°
12	2005	Yokohama	Japan	Akito Takahashi	Ken-ichiro Ota	ISCMNS°°, Japan CF-Research Society, Thermal and
					Yasuhiro Iwamura	Electric Energy Technology Foundation, TEET
13	2007	Sochi	Russia	Yuri Bazhutov	Igor Goryachev	ISCMNS°°, Russian Physical and Nuclear Societies
14	2008	Washington	USA	David Nagel	Michael Melich	DTRA°°°, NEF°°
15	2009	Rome	Italy	Vittorio Violante	Franco Scaramuzzi	ENEA*, Energetics Technologies, , CNR**, SCI and SIF***
16	2011	Chennai	India	Chino Srinivasan	P.K. Iyengar	ISCMNS°°, Indian Physics Association, IGCAR°°°°, NEF°
17	2012	Daejeon	Korea	Sunwon Park	Frank Gordon	ISCMNS, Korea Nuclear Society, KAIST*****, NEF**
18	2013	Columbia	USA	Robert Duncan		University of Missouri, ENEA, National Instruments, NEF**

* the (US) Office of Naval Research

** Italian Agency for New Technologies, Energy, and the Environment

*** National Research Council (of Italy)

**** National Institute for Nuclear Physics (Italy)

***** the Italian Chemical and Physical Societies

° the New Energy Foundation

°° the International Society of Condensed Matter Nuclear Science

°°° the (US) Defense Threat Reduction Agency

°°°° Indira Gandhi Center for Atomic Research (india)

°°°°° Korea Advanced Institute of Science and Technology

ICCF1

The first conference was created with the name First Annual Conference on Cold Fusion (ICCF1), by Fritz Will and his staff at the National Cold Fusion Institute (NCFI) in Salt Lake City, Utah. (For the purpose of this history and continuity, I will refer to all conferences in this series as ICCF.) Fritz Will (seen below) is a famous electrochemist who had been employed by General Electric at their corporate central research laboratory in Schenectady, New York from 1960 until 1990 when he took on leadership of the NCFI. The electrochemistry community in 1990 regarded Fritz as thorough and reliable, and about that time he was appointed to be President of the Electrochemical Society, the principal electrochemical society in the U.S., and perhaps the world. It was an interesting and significant choice to see him selected as the director of NCFI, for him to leave GE, and take a senior role in this emerging and turbulent field. Perhaps part of the reason can be found in this remarkable quote published in 1991 by 21st Century Science and Technology[1]: "*One has to pose the question, what are the motivations of groups of scientists out there that are lashing out against scientists that have decided to work in this area? It makes it very unfairly difficult for those that are courageously making a commitment to this field to work in this field.*"

Photo: Fritz Will, ICCF1 Chairman (photo courtesy: Gene Mallove).

[1] http://larouchepub.com/eiw/public/1991/eirv18n15-19910419/eirv18n15-19910419_024-fritz_g_will.pdf

Obviously NCFI was intending an annual event focused on cold fusion, but not necessarily international. The first conference was located very close to the NCFI in Salt Lake City from March 26-31, 1990. The naming of the Institute and the conference tells us a lot. Clearly NCFI intended to assert leadership in this area, at least in the U.S., and hopefully continue to host the annual conferences. This was not to be. The NCFI was a solid producer of some very high quality and important results but had self-identified as the leader in a field that influential forces intended to suppress. Unfortunately they also fell victim to some poor pre-planning in respect to the roles that Fleischmann and Pons were expected to play. To the chagrin of many Utah residents, and to the detriment of the field, the NCFI closed its doors in June 1991.

The time from March 23, 1989 until March 26, 1990 (the first conference) was the most transitional, challenging, and exciting time of my research career. The group at SRI International, Menlo Park, California, about six people at that time, literally worked days, nights, and weekends to make progress in what was becoming an increasingly interesting, but also externally hostile, environment. It is worth recalling that the immediate response from the physics community was not antagonistic. A great number of physicists, in an attempt to be amongst "the first", went into their laboratories to replicate, or pounded the keys of their computers to explain Fleischmann and Pons' observations. The beginnings of public polarization can most likely be traced to the May 1989 Baltimore meeting of the American Physical Society (APS). It was there, 40 days and 40 nights after the March 23rd announcement, that the very strange George Bush type of attitude "you're with us or you're against us" began. It was in this milieu that the first major conference was held.

I attended ICCF1 with a half a dozen members of my group and an almost equal number of our sponsors from the Electric Power Research Institute (EPRI). The mood was more like a rock concert than a scientific conference, with champions and villains on display. Some of my old heroes were prominent, John Bockris, Texas A&M University, and of course Martin Fleischmann, and some new heroes: theorists Julian Schwinger, Nobel Prize winner in Physics in 1965, professor in the Physics Department at UCLA; Giuliano Preparata, Department of Physics, University of Milan, Italy; Peter Hagelstein, principal investigator in the Research Laboratory of Electronics (RLE) and an Associate Professor at the Massachusetts Institute of Technology (MIT); and the irrepressible Scott Chubb, research physicist at Naval Research Laboratory (NRL) in Washington, DC. There I met for the first time with Gene Mallove, who worked for technology engineering firms such as Hughes Research Laboratories, the Analytic Science Corporation, and MIT's Lincoln Laboratory, and later became publisher of Infinite Energy magazine. Peter and Gene can be seen below in different poses with with Martin.

Photo: Gene Mallove and Martin Fleischmann (photo courtesy: Dave Nagel).

Photo: Peter Hagelstein and Martin Fleischmann (photo courtesy: Dave Nagel).

I also met Andy Riley, who at the time was project manager of the engineering group at the University of Utah's National Cold Fusion Institute. He later became one of the early members of the SRI research team and the first of our fallen warriors (seen below with a young Dave Nagel).

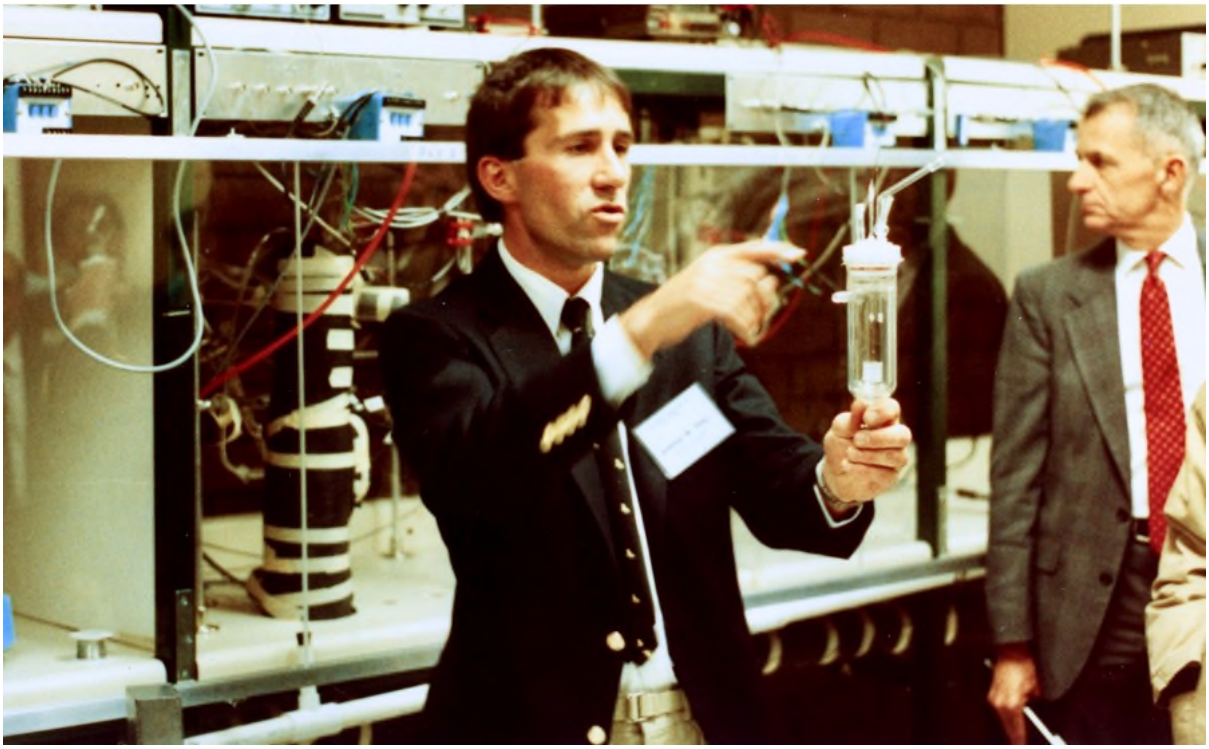


Photo: Andy Riley and Dave Nagel at NCFI (photo courtesy: Gene Mallove).

On the experimental side I was very impressed with Ed Storms, a nuclear scientist then with the Los Alamos National Laboratory, New Mexico, and Carol Talcott, Los Alamos National Laboratory, and with their thorough, no-nonsense solidity. Their evidence of tritium seemed compelling along with the near-simultaneous results of Bockris and Bhabha Atomic Research Centre, (BARC, Trombay, India), but the issue of "theoretical impossibility" had already emerged. I remember sitting on a panel and seeing the puzzled expression on the faces of a number of prominent critics in response to a question arguing the primacy of experiment. Until that point it had never occurred to me that an experimental result could be denied on the basis of theory. The only theories or laws that I held in that esteemed regard were the equivalence of mass and energy, Einstein's rule, and the First Law of thermodynamics. Since our calorimeter relied on the First Law, and commensurate nuclear product results had not been presented at that time, neither was seemingly violated. The need for explanation was forestalled by Julian Schwinger's often repeated words that "*the circumstances of Cold Fusion are not those of Hot Fusion.*"

Photo: Recent picture of Carol Talcott-Storms and Ed Storms.

John Huizenga, American physicist who helped build the world's first atomic bomb (seen below debating with Peter Hagelstein), and Douglas Morrison, physicist at CERN, European Organization for Nuclear Research, Switzerland, were very active in the discussions. One evening Tom Passell, EPRI, and I sat down with Douglas and went through all his arguments. One by one we listened to Douglas' criticisms and refuted them to the point that he agreed with our arguments, or seemed to. But by the next morning Douglas had reset himself. This process of dramatic internal conflict repeated at every ICCF until his last at ICCF8 in Lerici, Italy. I will say more about Douglas in the discussion of those following conferences but it should be stated here that his contributions were welcomed. He at least invested the energy and interest to attend and even present.

Photo: Professors John Huizenga and Peter Hagelstein (photo courtesy: Gene Mallove).

ICCF2

The first conference was really the product of Fritz Will and the NCFI. The International Advisory Committee (IAC) had not been fully formed or structured although an ad hoc group of us came together at ICCF1 over drinks to discuss the potential future of such conferences. Leading the group was Giuliano Preparata. Others included Joe Santucci, my EPRI program manager at the time (seen below with Giuliano), Martin and Stan, John Bockris (seen below with Carol White, reporter for 21st Century Science and Technology magazine) and possibly more. Out of that discussion emerged ICCF2. Also not called an ICCF at that time, it was largely crafted by the energy and enthusiasm of Giuliano, and for the first time the IAC emerged as the organization charged with ensuring conference continuity. It was not obvious to any of us then how hard this would be, and how important.

Photo: Giuliano Preparata and Joe Santucci, EPRI (photo courtesy: Dave Nagel).

Photo: George Andermann, Carol White and John Bockris (photo courtesy: Dave Nagel).

A new leader and champion had emerged in the person of Giuliano Preparata. He was always a man much larger than life and remained so until his untimely death in 2000. More or less as an act of personal will, Giuliano ensured the continuity of the field and the conference series. ICCF2 was held in a magnificent location, as can be seen from the poster below, on the banks of Lake Como in northern Italy, now making the national conference, international. The building in which the conference was located was magnificent: the Centro di Cultura Scientifica Alessandro Volta (Centre for Scientific Culture Alessandro Volta, aka Centro Volta). The situation was highly appropriate. In the home of Alessandro Volta, native of Como and the world's first electrochemist, the atmosphere was truly charged.

ICCF2 Conference Poster.

Unfortunately we have few photographs of ICCF2 but there are many spectacular and enduring memories. Situated in the building shown on the poster, a 16th century villa on the banks of Lago de Como, the conference spanned a week of perfect weather, June 29-July 4, 1991. All presentations were made in the same large room with high vaulted ceilings decorated with art from the Italian renaissance. There was no order in which the papers were presented. Theory, experimental science, materials science, electrochemistry, particle physics, nuclear measurement were mixed all together, one after another from very early in the morning (by Italian standards) until quite late in the afternoon. It was intense. I probably learned more in that one week than at any other conference or in any other week of my life. It was exhilarating and exhausting.

ICCF2 was characterized for me by constructive chaos dominated by information overload tempered by the sheer beauty of the location, environment and gastronomy. But gone was the sense that we were "all in this together" working coherently towards a common goal. There were secrets, and minders to keep the secrets. Martin and Stan were accompanied closely by representatives of their sponsors to make sure that they didn't give information away. To a lesser degree I was also accompanied by minders representing my sponsors. At one point, in order to have a private discussion with Stan, mostly about old times and not science, the two of us rented a small boat and rowed out onto the lake so we could be alone. This was the first ominous signal that things had changed.

Very likely the highlight of ICCF2 was the first public presentation by Melvin Miles, former university chemistry professor and Navy researcher, of the correlation between the appearance of excess heat and the production of helium-4. Mel is seen below at the conference with his daughter Mindy. The significance of this result was perhaps not well understood at the time, and certainly not by me. The vessels that Mel used for calorimetry were not helium leak tight and there was much discussion about the likelihood of helium in-leakage causing or affecting the result. It took some thinking to recognize the elegance of the approach that Mel had used, employing the out-gassing deuterium and oxygen to purge and scavenge helium from his system. In retrospect however, and once confirmed, Mel's results were stunning. Finally we had a product that made sense (except to those with a hot fusion mindset). This is a fact that even John Huizenga recognized in his 1992 book, Cold Fusion: The Scientific Fiasco of the Century. He was counting on non-confirmation — Huizenga was wrong.

I also became aware at ICCF2 of the infectious good nature and the formidable intellectuality of the Chubb and Chubb team, Scott and Talbot, both physicists who spent many years at the Naval Research Laboratory, shown below but no longer with us. I expect they are still working and passionately providing answers to anybody listening. Several other characters quietly showed up at ICCF2: Keiji Kunimatsu, University of Yamanashi, Fuel Cell Nanomaterials Center, Japan (who we will speak more of in the next conference); Mike Melich (Co-Chair of ICCF14); Tom Claytor, Los Alamos National Laboratory, New Mexico (very important early tritium results and still active) can be seen in the following picture. Below that is a photo of Frank Gordon, Head Navigation and Applied Sciences Department Space and Naval Warfare (SPAWAR) Systems Center, San Diego, California (Co-Chair of ICCF17) with Stan Szpak, SPAWAR (author of more publications in the cold fusion field than probably any other).

Photo: Mel Miles and his daughter Mindy (photo courtesy: Dave Nagel).

Photo: Talbot Chubb and his nephew Scott Chubb (photo courtesy: Dave Nagel).

Photo: Keiji Kunimatsu, Mike Melich and Tom Claytor (photo courtesy: Dave Nagel).

Photo: Frank Gordon and Stan Szpak (photo courtesy: Dave Nagel).

As mentioned earlier, ICCF2 occurred as the result of the efforts of Giuliano Preparata with the help of Fritz Will, along with powerful support from local organizers and others of course, but there was still no formal external oversight committee. This was born and tasked at ICCF2 as a steering advisory committee, the International Advisory Committee (IAC). The idea of a rotation of chairman (but not continental rotation) was created along with a change of title to the International Conference on Cold Fusion (ICCF) under the aegis of the IAC. We first met in a rustic restaurant perched high above the lake for a meal comprising seven courses of Polenta in various forms. It was not evident then where or when the next conference would be, but it was clear for the first time that there would be another conference — and another — and that there was a group of people — us — who would take responsibility for making that happen. This is another of Giuliano's legacies.

ICCF3

The third conference took place in Nagoya, Japan under the chairmanship of Hideo Ikegami, National Institute for Fusion Science, Nagoya, Japan. The conference took place from October 21-25, 1992 in the Nagoya Congress Center, a very modern facility. Two names stand out from that conference. The first is Professor Hideo Ikegami, who was largely responsible for the organization and high scientific standards. To this date ICCF3 remains the best attended conference (346) with the largest number of papers (102). The second major character was Minoru Toyoda, whose family founded and largely owned the Toyota Motor Company, who provided some of his support openly but a great deal more behind the scenes. By this time Martin Fleischmann and Stanley Pons were working for Mr. Toyoda at the Institut Minoru de Recherche Avancée, IMRA, in France. Almost single-handedly Minoru had rescued the baby of Cold Fusion from the dire place that the U.S. and Europe has consigned it and gave it the opportunity to grow to what it is today.

Photo: Professor Hideo Ikegami, Chair ICCF3 (photo courtesy: Dave Nagel).

ICCF3 was the conference where the ideas began to crystalize and we rolled up sleeves and began to work. I gave the first technical paper (Excess Power Observations in Electrochemical Studies of the D/Pd System: The Influence of Loading), followed by Ed Storms (Measurement of Excess Heat from a Pons-Fleischmann Type Electrolytic Cell), then Keiji Kunimatsu, IMRA-Japan (Deuterium Loading Ratio and Excess Heat Generation during Electrolysis of Heavy Water by a Palladium Cathode in a Closed Cell Using a Partially Immersed Fuel Cell Anode) and then Martin Fleischmann (Calorimetry of the Pd-D_2O System: From Simplicity via

Complications to Simplicity). The consistency between these four groups working independently was impressive even to those of us actively involved. In particular I presented a curve showing excess heat versus deuterium loading with the threshold of D/Pd ~0.875 below which excess heat was not seen. I was completely stunned to see the same curve arrived at completely independently by Keiji Kunimatsu two papers later. This was followed by another eight papers with a similar theme. At this point it was clear that the period of awe had ended and the period of science had begun. It is worth noting that Dr. Kunimatsu was the head at another IMRA facility, this one in Hokkaido, which was also sponsored by Minoru Toyoda.

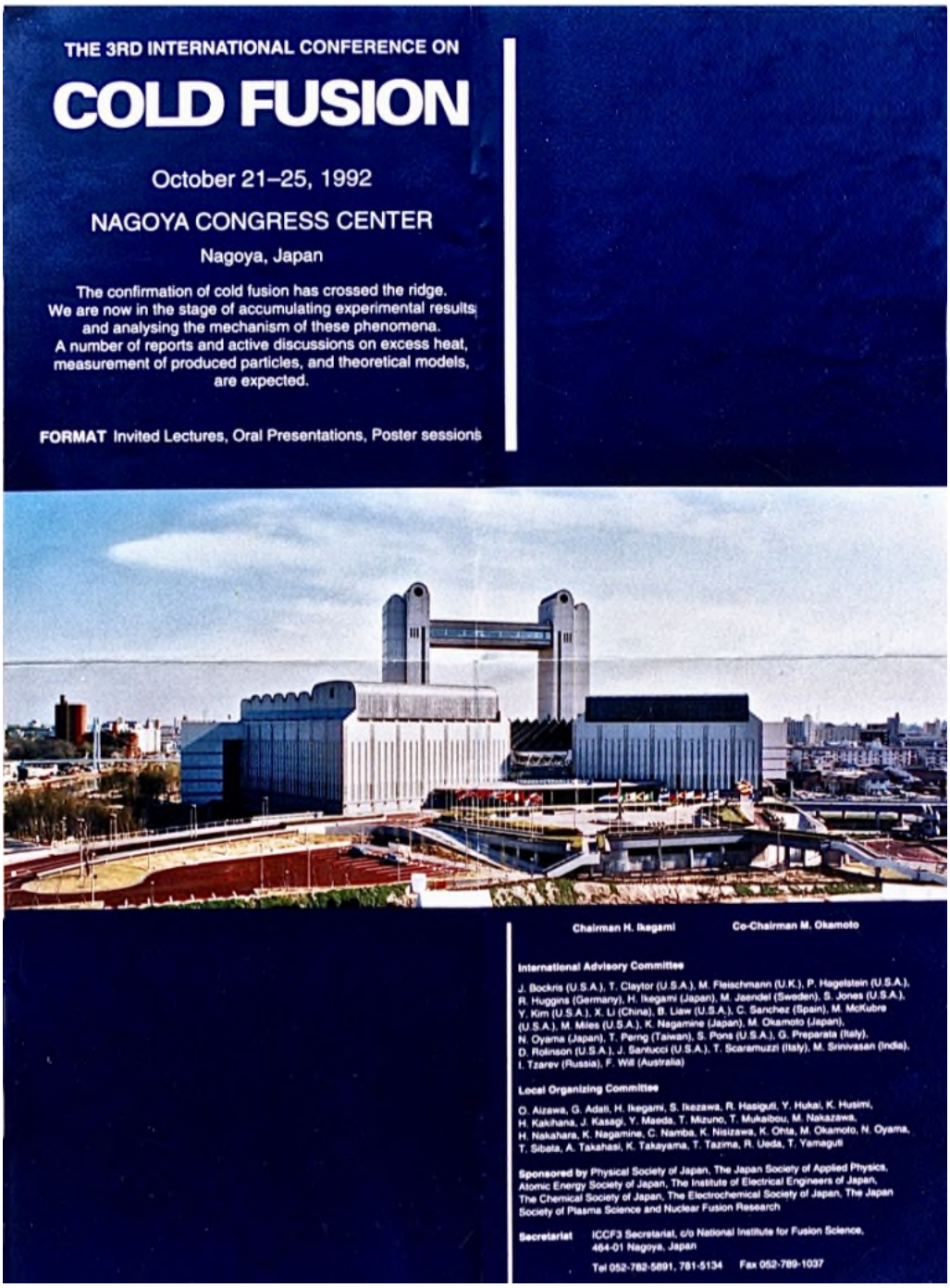


Photo: Martin Fleischmann opening ICCF3 (photo courtesy: Dave Nagel).


Photo: Stan Pons and Mike McKubre (photo courtesy: Dave Nagel).

Photo: Keiji Kunimatsu (third from right) with Akito Takahashi fourth from right and Francesco Celani fifth from right (photo courtesy: Dave Nagel).

We have photographic record of a number of other individual attendees and presenters at ICCF3, including Reiko Notoya, Catalyst Research Center, Hokkaido, Japan, with Mahadeva (Chino) Srinivasan, then Associate Director, Bhabha Atomic Research Centre, Mumbai, India, and Tom Passell, former EPRI executive, U.S., Akito Takahashi, Osaka University, Japan, with Jed Rothwell, cold fusion researcher and owner of LENR-CANR.org, a library of papers on cold fusion, U.S., seen below. Chino has been continuously active on the IAC and was Chair of ICCF16. Akito was chair of ICCF12 and Tom was Chair of ICCF4.

Reiko Notoya and Mahadeva (Chino) Srinivasan (photo courtesy: Dave Nagel).

Tom Passell, Akito Takahashi and Jed Rothwell (photo courtesy: Dave Nagel).

John Bockris (head of table), Mike McKubre (profile), Debra Rolison and Giuliano Preparata (photo courtesy: Dave Nagel).

The science at ICCF3 was extremely solid, possibly not equaled until ICCF10 in Cambridge, Massachusetts under the chairmanship of my good friend Peter Hagelstein. In addition to the science two things stand out for me from ICCF3: the most magnificent buffet banquet that I have ever attended, hosted by another of our fallen warriors, Minoru Toyoda, and the IAC meeting where the basic operating principles of the ICCF conference series and rotation were put in place. Above we have a picture of Debra Rolison (Naval Research Laboratory, NRL, U.S.) calming Giuliano Preparata (with me studying the menu) at the IAC meeting. It was Debra who proposed the continental rotation, the idea that the conference should rotate from the Americas to Europe/Africa to Asia and the Pacific in an ever-easterly cycle. In part this was needed to manage the friendly competitions that were developing to host the conference. What this meant was that the conference would come back to the Americas for "4", but it did put me and "my fellow Americans" in the hot seat. The tale of ICCF4 and subsequent conferences will be related in future "episodes" of this history.

A Brief History and Introduction to the International Conference Series

Part Two - From ICCF4 to ICCF6

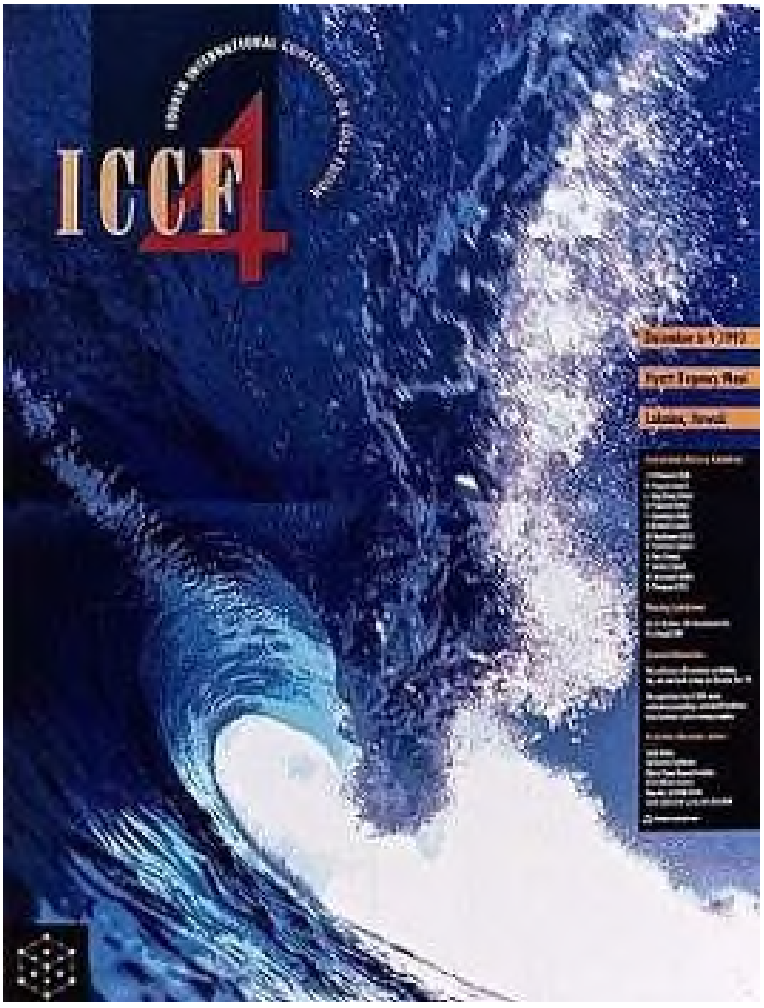
ICCF4

We have identified Fritz Will as the hero of ICCF1. Fortunately he is still with us but no longer active in cold fusion. Unquestionably the hero of ICCF2 was Giuliano Preparata, who passed away at the beginning of this century. I have stated that the heroes of ICCF3 were Hideo Ikegami and Minoru Toyoda, the latter also no longer with us. In this context the hero of ICCF4 was undoubtedly Tom Passell, my EPRI program manager at that time, and the man more responsible than any other for the work done at SRI in the early days. The continental rotational having turned back to the Americas, we volunteered, not knowing the amount of work or the amount of time that organization of such conference would take. Tom stepped up and using his formidable skills of persuasion got EPRI and EPRI conference services fully behind the conference (special credit to Linda Nelson of EPRI and Susan Creamer of SRI). Some funding was also provided by Bob Nowak of ONR in the U.S. and by ENEA in Italy.

As the principal scenes of activity in cold fusion at that time were Japan and the United States, siting the conference in Hawaii made logistical sense with the added advantage of removing the conference from my backdoor. The choice of location at the Hyatt Regency Maui in Lahaina right on Ka'anapali Beach was inspired and inspiring. Because of the luxurious setting of the conference Tom Passell took some flak from EPRI management at a time of economic retrenchment. This he weathered with his usual aplomb. Here we see Tom in a rare moment of relaxation at the conference.

Photo: Tom Passell, ICCF4 Co-Chair and EPRI Program Manager (photo courtesy: Gene Mallove).

Principal organizers of the conference were Tom Passell and the EPRI conference services group (who did a splendid job) and a group at SRI that included myself (Mike McKubre), Fran Tanzella (who is still working with me on this topic), Steve Crouch-Baker (still at SRI but working on other topics) and Stewart Smedley (no longer at SRI). Between us we took charge of everything from reading through the enormous number of submitted abstracts and organizing them into groups, taking care of the travel arrangements particularly for our Russian colleagues, and designing the conference poster seen below. I have used the analogy of a wave many times in describing the transition from research in cold fusion to engineering and development. As a researcher you want to be close to the front of the wave to benefit from its momentum when the wave breaks. You really don't want to be in front or you will be crushed and driven face first into the beach or onto the rocks. But you don't want to be so far behind that you cannot catch up. The delicate balancing act of the surfer seemed the perfect metaphor for the business that we were undertaking. By 1993 it was already clear that simple particle-particle interaction was unlikely to provide an explanation for the effects so far seen: nuclear level excess heat in condensed matter, tritium, helium-4, but very few neutrons. It seemed much more likely that the wave nature of matter would prove a more effective pathway to the answer. The wave lives on as the poster, and a few aging T-shirts — it hasn't broken yet.



ICCF4 Conference Poster.

The distractions were many with a surf beach just out the conference room door and a magnificent double swimming pool complete with waterfall, waterslide and swim-up bar. Such is the nature of cold fusion and cold fusioneers that few succumbed to these temptations. For the first and last time (so far) we experimented with parallel sessions simply as a device to accommodate the large number of people wishing to present. It was still very early in the field and very difficult to distinguish between potentially crucial presentations and papers that might otherwise be given as posters or better not presented at all. Invited full papers were presented in the morning to the full audience in plenary session, in the afternoons shorter papers were given in two parallel sessions. There were complaints that the use of concurrent sessions caused some attendees to miss hearing significant papers and did present logistical difficulties.

Fleischmann led off with the first plenary, *"Calorimetry of the Pd-D_2O System: The Search for Simplicity and Accuracy."* There he made possibly his first (public) mention of "Heat After Death" phenomenon that four talks later (in *"Loading, Calorimetric and Nuclear Investigations of the D/Pd System"*) I described as "Heat After Life." This was an observation of persistent heat production after all input power had been removed from the cell and calorimeter. The event at SRI that I spoke of had an approximately 24 hour decay time-constant so would have persisted for roughly a week had we had the patience to follow it down. As is only right, Martin's phrase prevailed, but I still prefer mine.

Martin gave a detailed presentation on their mode of calorimetry but at that time (as it remains today) very few if any had the patience to study and truly understand the mathematical basis of his method. Recently Mel Miles and I wrote up a chapter in a book dedicated to the many scientific contributions of Martin Fleischmann titled *"Developments in Electrochemistry – Science Inspired by Martin Fleischmann"* published this year (2014) by Wiley[2]. Our chapter, Melvin H. Miles & Michael C.H. McKubre *"Cold Fusion After a Quarter Century: The Pd/D System,"* attempts to address the deficiency of knowledge, understanding and appreciation of the Fleischmann-Pons mode of calorimetry. I quote from the introduction: *"In the space available the authors of this chapter have chosen to focus on two details of Martin Fleischmann's final project: the multi-threshold materials constraints that prevented easy reproducibility of the Fleischmann-Pons Heat Effect (FPHE); the brilliant but largely not understood implementation of the Fleischmann-Pons calorimeter, designed to take advantage of positive thermal feedback."*

In the second paper *"Excess Heat and Nuclear Measurements in Cold Fusion Electrochemical Cells,"* Daniele Gozzi's group presented the results of a superb experimental campaign to measure simultaneously excess heat, helium-4, tritium and neutrons. At this stage we (SRI) had not proceeded further than looking for tritium (post-test) and neutrons (with low sensitivity and no energy resolution at that point). Gozzi's work was spectacular. Although cautious the authors noted in their concluding comments that: *"the power excess per unit electrode area is in fair agreement with the general behavior first pointed out by Storms"; "a lack of neutrons and a low tritium excess in two cells out of four has been observed contrarily to what is expected on the*

[2] See review at http://www.infinite-energy.com/iemagazine/issue117/fleischmann.html

basis of d,d reactions"; and *"it cannot be left unnoticed the notable commensurate amounts of ^{4}He and heat excess found in the case of cell #10."*

Fritz Will was present (seen below with Talbot Chubb), this time representing EPRI as a Visiting Scientist. He gave a plenary talk reviewing *"Tritium Generation in Palladium Cathodes with High Deuterium Loading"* results from the now defunct NCFI. One person who was anticipated but did not attend was Kevin Wolf, my good friend (now deceased), superb experimenter and close collaborator with the SRI group. Kevin was unclearly expected but was finally dissuaded from attending by his EPRI program manager (not Tom Passell).

Photo: Fritz Will, ICCF1 Chair, and Talbot Chubb (photo courtesy: Gene Mallove).

This was not the only politics on display. I sat with Jerry Bishop, science reporter for the *Wall Street Journal*, while Steve Jones, Professor of Physics at Brigham Young University (now Emeritus), partially retracted some of his early neutron results (Steve can be seen below during his lecture). Steve was an early pioneer in the field and is still active[3]. He attended ICCF18 in

[3] The name *"cold fusion"* can be more associated with Jones and his colleague Johann Rafelski, Professor of Theoretical Physics at the University of Arizona, than with Fleischmann and Pons. Rafelski and Jones published on muon catalyzed fusion with the title *"Cold Nuclear Fusion"* in 1987*. Interestingly Rafelski was responsible for another *"cold fusion"* milestone. He was a presenter and panelist on the execution squad that the American Physics Society (APS) orchestrated in Baltimore in early May 1989, to firmly drive a stake through the heart of cold fusion 39 days after its public declaration by Fleischmann and Pons. In order to cement the *"slam dunk"* denunciation by

Columbia, Missouri. I am not sure of the present status of his neutron results. At that time Jerry Bishop was arguably the top science writer at the *Wall Street Journal*. Now deceased he has been described as a giant in the field of science journalism and was the only senior science writer to *"get it"* that cold fusion might be something big. He described to me what it was that he intended to write, in fact had already written most of, and shared with me some of the work. When the piece aired in "the Journal" it was nothing like what Jerry and I had discussed. Slightly shamefaced, Jerry acknowledge his editors had demanded "more balance." Since there was very little negative to say — our critics being mostly dilettantes (my words) — Jerry simply had to remove most of the positive. Even so the *Wall Street Journal*, and Jerry Bishop, remained the most supportive of the mainstream media, at least pre-Murdoch.

Photo: Steve Jones, BYU University (photo courtesy: Gene Mallove).

the (largely) Caltech team, the panel was asked to vote on the state of the science. Eight of the nine leading speakers stated that they considered the initial Utah claim dead (a comment reflected and reinforced by the then Editor of Nature, John Maddox). By declining to join the consensus as the one in nine, Rafelski denied the panel and APS the unanimity and *"settled science"* argument that would permit honest physicists to ignore the Fleischmann Pons claim entirely and its implications for science, and potentially for benign energy production. Rafelski's career almost certainly suffered as a consequence — undeniably in comparison to others on the panel.

* J. Rafelski and S.E. Jones, "Cold Nuclear Fusion," *Scientific American*, 257: 84-89 (July 1987).

As anticipated, after the U.S. (124 attendees), Japanese scientists represented the largest group attending and presenting at ICCF4 (62 attendees). On the first day of the conference the Japanese organization New Energy and Industrial Technology Development Organization (NEDO) announced the establishment of its "New Hydrogen Energy" laboratory under the leadership of Kazuaki Matsui and Naoto Asami (both Co-Chairs of ICCF6 — we will come back to this). Other extremely distinguished members of the Japanese science community were present and active. Below we see Professor Akito Takahashi of Osaka University (later Chairman of ICCF12 in 2005). Further down we see Professor Michio Enyo, one of the world's leading electrochemists from Hokkaido University, and Dr. Keiji Kunimatsu, President of IMRA-Japan, both situated in Hokkaido where ICCF6 would be held. Kunimatsu studied under Enyo at Hokkaido University before heading to Southampton for his post-doc.

Photo: Akito Takahashi, Osaka University (photo courtesy: Gene Mallove).

By this time, the end of 1993, research in the field was starting to diverge. Not everyone was studying the Fleischmann-Pons heat effect (FPHE) of palladium electrolyzed in heavy water. A glance at the titles of the papers printed in the official Proceedings edited by George Miley and published in *Fusion Technology*, or the much more extended full proceedings published by EPRI, display a diversity of topics. One of the more novel was presented by Jean-Paul Biberian on the subject of heat effects from ceramic proton conductors exposed to deuterium gas — no Palladium, no heavy water (or liquid at all), just solid and gas. Jean-Paul (seen below at the conference) would go on to become chairman of ICCF11 and editor of the *Journal of Condensed Matter Nuclear Science.* Work was also reported on light (or normal) water excess heat

production that was largely ignored at that time by the "old hands." This will be discussed further in the context of ICCF5 below. It is interesting to reflect that this branch of research employing "ordinary" water or H_2 gas (not concentrated D_2O or D_2), while largely shunned at ICCF4 in 1993, may now demonstrate the greater likelihood of commercial success at ICCF19 in 2015[4]. In a world increasingly concerned with *"radicalization"* perhaps for the advancement of new scientific ideas we should be equally or more concerned about *"conservativization."* A group of individuals had come together at ICCF4 (and before) allowing the possibility of deuterium participating in unknown nuclear reactions in the solid state — but not hydrogen (protons). This is an exquisitely fine discrimination but two camps were forming nonetheless.

Photo: Michio Enyo, Hokkaido University, and Keiji Kunimatsu, IMRA-Japan (photo courtesy: Gene Mallove).

In his final summation and more in the *"mainstream"* Martin Fleischmann recognized Dennis Cravens' paper as the most outstanding of the conference. On a very modest budget, Dennis had discovered many of the better methods for loading palladium with deuterium to high levels and replicating the excess heat phenomenon. I do not have a recording and my memory is imperfect

[4] Perhaps equally telling the leaders of the *"light"* water work were given acclaim as *"Fusion Scientists of the Year"* in 1991 by Fusion Facts, now no longer published after the death of another of our fallen heroes, Hal Fox — see archive at http://newenergytimes.com/v2/archives/fic/F /F199201.PDF

but I recall Martin saying something like *"If you want to know how to do these experiments properly and how to load deuterium into palladium listen to this man* (Dennis Cravens)." Too few have. Here we have a photo of Dennis with a young Mitch Swartz, JET Energy Technologies, another who we perhaps have not listened to with sufficient attention.

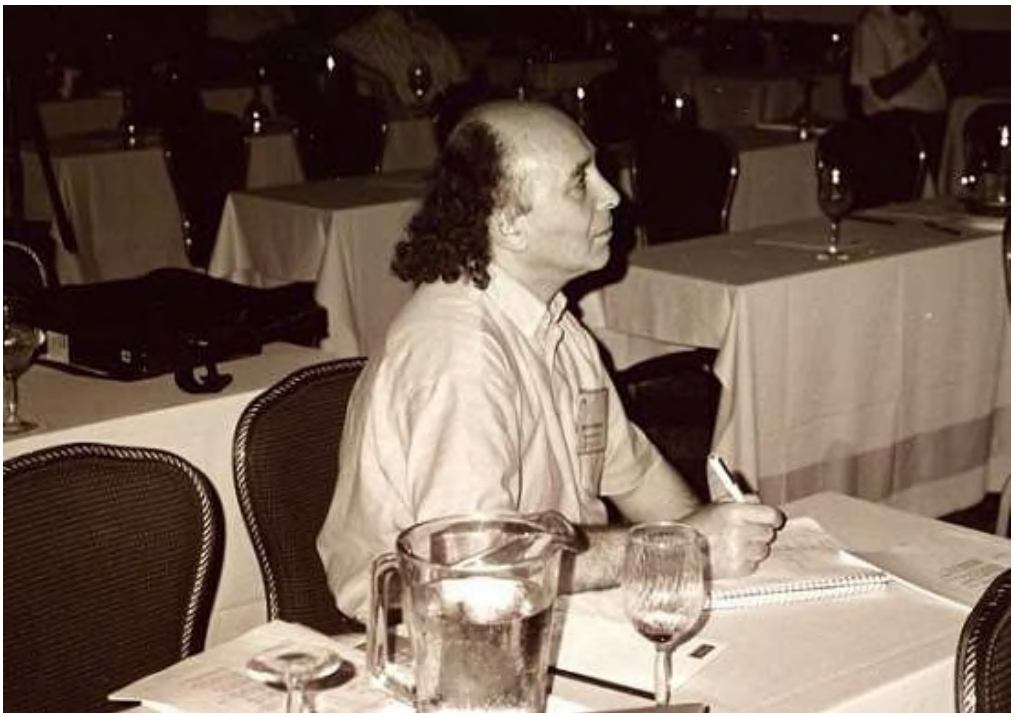


Photo: Jean-Paul Biberian, Chair of ICCF11 (photo courtesy: Gene Mallove).

Photo: Dennis Cravens and Mitch Swartz (photo courtesy: Gene Mallove).

ICCF4 continued the tradition of inviting specialists from outside the field to participate and lecture. Along with several other leading scientists, Julian Schwinger was invited to attend but his health was frail and he was unable to participate in person. He submitted a very thoughtful paper which Gene Mallove read to the audience. Setsuo Ichimaru, a world famous and widely published condensed matter physicist from the University of Tokyo, presented a deeply penetrating lecture on the constraints and enhancements that apply to nuclear interactions in condensed matter in his lecture "Nuclear Fusion in Condensed Materials." One of the giants in this field (and others), Richard Oriani from the University of Minnesota presented a very important and comprehensive review of *"The Physical and Metallurgical Aspects of Hydrogen in Metals"* with 145 references! It remains today one of the more important reference papers on the topic.

The means of publishing the conference proceedings was different for ICCF4 than any other. George Miley (University of Illinois and Editor of *Fusion Technology*) had agreed to publish a subset of papers in the American Nuclear Society's *Fusion Technology* Journal subject to its normal rigorous peer review process. Since this may, or inevitably would, exclude some papers that had been presented, EPRI agreed to publish a full set of papers without selection or peer review as a comprehensive proceedings volume. This latter work turned out to be the most massive single publication in the field of cold fusion. The work comprises 4 volumes containing 125 papers with a total of 275 authors. The mass is 4.3 kg, nearly 10 pounds. When stacked on top of each other the EPRI proceedings of ICCF4 reaches a height of 4" (10 cm) in full 8.5 x 11" format. Now available on Jed Rothwell's website at http://lenr-canr.org/acrobat/EPRIproceeding.pdf, it remains a hugely valuable resource.

The situation of the IAC at ICC4 was unusual, perhaps unique. The eastward sweep of our continental rotation would bring the conference back to Europe. Martin Fleischmann and Stan Pons indicated as members of the IAC that they would like to host the next conference with support from IMRA-Europe. Against this proposal there was no possibility of argument. The unusual situation was the siting of the succeeding conference. The primary purpose of the IAC is to decide the location of the upcoming conference; future plans are usually discussed but not finalized. The unfamiliar situation of the IAC at ICCF4 was that two strong candidates had already emerged to host ICCF6. Kazuaki Matsui and Naoto Asami of the newly formed Japanese "New Hydrogen Energy" (NHE) agency had indicated that they would like the opportunity of hosting an ICCF. But a bid by Prof. Xing-Zhong Li from Beijing University in China had already been denied by the IAC at ICCF3 based on the continental rotation. The conference was to return to Asia for ICCF6, and Prof. Li (a member of the IAC) was still eager to organize the conference in a country, China, that was active but had not hosted.

A diplomatic solution was required. The IAC agreed without a vote that ICCF5 would be hosted in Europe with Fleischmann and Pons as Chairs. Prof. Li would be encouraged and supported to look into the possibility of hosting ICCF6 in Beijing at a location and timing of his choosing — the right of *"first refusal."* Matsui and Asami of NHE in Japan were ready and willing to act as standby. This was the first time where the conference series was programmed two in advance and the only time that two candidates were identified. This was very fortunate since Prof. Li was

not able to bring resources together at that time, although he did later for ICCF9, and the NHE Institute in Hokkaido hosted ICCF6[5].

I have spoken about the mood and energy of the previous conferences but have difficulty assessing that for ICCF4 because I was so involved in organization and day-to-day running. With Tom Passell and Linda Nelson of EPRI and Susan Creamer (my SRI Administrative Assistant) we took care of the needs and concerns of over 300 attendees and spouses. This experience gave me an enormous respect and admiration for the previous and subsequent Chairs. At some point we will need to make this job easier, perhaps with better definition and possibly some level of permanent support structure. In the meantime the tasks of the Chairmen continue in their participation on the IAC to provide their individual and collective experience. Without these individuals the ICCF series would have been much weaker and very likely to have collapsed. Gentlemen, I salute you.

We started and I will end with Tom Passell as the hero of ICCF4. In his Foreword to the Fusion Technology Proceedings Tom echoed Hideo Ikegami's remarks in the preface of the Nagoya proceedings: *"It is my belief that cold fusion will become one of the most important subjects in science, one for which we have been working so patiently, with dedication and with courage, for future generations, for those who will live in the twenty-first century. In order to achieve our goal, our ultimate goal, we must continue and extend our interdisciplinary and international collaboration."* It is to our credit that this statement has become more not less true with the passing of years, and conferences, and souls.

As a final footnote to this conference Julian Schwinger died in Los Angeles on July 16, 1994, at the time of preparation of the ICCF4 conference proceedings. These were dedicated by Tom Passell with the following words: *"I was touched by the efforts of Julian Schwinger to contribute to the theoretical underpinnings of this research, even in his last days of life. It is fitting that these conference proceedings be dedicated to his memory."*

[5] On one other occasion a potential candidate was identified two conferences ahead; in this case, also, the Chairmanship was given to another — this time by a vote of the IAC.

ICCF5

If Maui was luxurious – even hedonistic – Monte-Carlo was majestic. Although faded a little from its former glory the little principality of Grace and Rainier has a charm and grace like no other place. The hotel at which the conference was situated, the Hotel Loews (now the Monte-Carlo Grand), was just down the hill from one of the grand casinos and right on the famous hairpin bend of the Monaco Grand Prix street racetrack. One of my colleagues stayed in a room that listed at $50,000/night during the race, with a balcony overlooking the hairpin bend and looking straight along the foreshore. Fortunately it was not race time.

Despite the lack of racing there was plenty of entertainment but first let me get to the conference. ICCF5 was organized and sponsored by IMRA-Europe (Minoru Toyoda) with Martin Fleischmann and Stan Pons as Chairs. Martin Fleischmann can be seen below deep in conversation with Mr. Namba, a senior Japanese diplomat, then close advisor to Minoru Toyoda and now Chairman of Earthwatch Japan.

Photo: Martin Fleischmann and Kikujiro Namba (photo courtesy: Gene Mallove).

The heroes, of course, were Martin and Stan. Not just for the splendidly organized and well executed conference but also for having created the reason we all came to be there. In retrospect that occasion was a little bittersweet for those of us who knew them well, as that conference was the last one where Martin and Stan could be seen operating as the powerful, coherent and inseparable team that they had been for at least a decade, probably longer. But that conference

had the grandeur of big ideas with the setting to sustain that mood. Martin and Stan were in command, and in their element. Including a *"Welcome"* by Martin Fleischmann and a *"Critical Overview"* by Ed Storms, 91 abstracts were accepted for oral presentation along with 131 posters. The book of Abstracts alone was 150 pages. I am not sure that all were presented but the volume and diversity was impressive. In his introduction to the Proceedings of ICCF14 Dave Nagel lists 228 authors in the Proceedings of ICCF5, a larger number than any that have followed.

For the first time there was a working demonstration of a device. Fleischmann and Pons had made an unpowered demonstration with a video of operation at ICCF3 in Nagoya but Tom Passell and I had prohibited demonstrations at ICCF4 on the grounds of safety and liability especially following the fatal accident at SRI[6]. The "new kid on the block" at Monte-Carlo was Jim Patterson of Clean Energy Technologies, Inc. (CETI) working with Dennis Cravens (by then retired from New Mexico State University but independently operating and a consultant to CETI). They brought to the conference a demonstration cell in a flow calorimeter of novel design. Jim, another of our fallen warriors, and Dennis can be seen below with their demonstration device. Although I did not make any measurements or note any numbers the demonstration was quite impressive, especially in Dennis' hands.

Photo: Jim Patterson, CETI, and Dennis Cravens with the CETI *"flow through"* calorimeter (photo courtesy: Gene Mallove).

[6] This did not prevent demonstrations being made in the parking lot outside the conference hotel and possibly elsewhere, but not as part of or authorized by the conference organization.

Jed Rothwell notes in his ICCF5 summary in Infinite Energy: "*The device output 3 to 5 times input energy, ignoring energy lost to electrolysis gases, and as much as 10 times input if you include various factors such as electrolysis gases and the heat lost from the cell container. I will describe it in detail in a later communication. Briefly, input power was usually held at about 0.4 watts (current times voltage, I*V)...When the machine was first rolled into position and turned on in the morning, there was no excess for 10 or 20 minutes, and the temperature Delta-T fluctuated around 0.2°C, indicating about 0.14 watts output. The rest was lost to known heat leaks from the cell container and to the effluent gasses from electrolysis, which were measured with a gas flowmeter. As the reaction turned on, the Delta-T gradually rose to about 2°C, and sometimes rose as high as 4°C, indicating...1.4 to 2.8 watts. Patterson's device is described in U.S. Patents 5,036,031 and 4,943,355. It is a thin-film, light water system*[7]*. It incorporates co-polymer beads with a flash coat of copper and electrolytically deposited thin film coatings of nickel, palladium, and another outside layer of nickel.*"

Much more might be said about this machine and it did represent a strong source of hope at the time. Unfortunately information unstated prevented replication which ultimately Patterson and Cravens were also unable to do when the original lot of multi-coated plastic spheres were exhausted. Although George Miley spent considerable effort exploring and attempting to develop the CETI technology this matter became sadly moot when both Patterson and his grandson Jim Redding, who was developing the business, passed away.

Until 1993 with the work of Francesco Piantelli at the University of Sienna in Italy and Bob Bush and Robert Eagleton at Cal Poly Pomona (California) and a few others, cold fusion was regarded as a heavy water activity with normal water studies being used in blank experiments. At ICCF5 light water excess heat began to be talked about as a serious possibility. This development was slightly troubling for those of us searching for a reliable blank, but if true spoke deeply to the underlying physics. Bob Bush can be seen below talking with Yeong Kim, Professor of Physics at Purdue, almost certainly on the subject of light water excess heat.

[7] It was later disclosed that Patterson added D_2O to the electrolyte to improve thermal performance. This fact was not known by those of us at the time who attempted to replicate Patterson's work. The unintended consequences of secrecy often result in a shameful, or shameless, squandering of effort and resource.

Photo: Bob Bush discussing his poster with Yeong Kim (photo courtesy: Gene Mallove).

In perhaps the most technically interesting paper of the conference Yoshiaki Arata, Professor at the Welding Institute that he founded and built at Osaka University in Japan, fully revealed his ingenious "double structured" (DS) cathode made of palladium with a sealed void containing nano-dimension palladium black. Not only was this an extremely clever concept, his results were spectacular and claimed to be fully reproducible, but confusing in light of the foregoing discussion. Prof. Arata and his colleague Prof. Yue Zhang claimed to be always able to produce excess heat, ^{3}He and ^{4}He from extended electrolysis of their DS cathodes in heavy water, but never in normal water. Arata and Zhang reported in the introduction to their ICCF5 proceedings paper that their DS cathodes: *"continuously generated more than $5x10^{4}$ times the excess energy expected in chemical reactions."* Because of the seriousness of the man and his results the SRI group immediately sought to establish a collaboration with Professors Arata and Zhang at Osaka University and we were ultimately able to reproduce their results successfully in the late 1990s.

Two other important "newcomers" showed up at ICCF5, both somewhat in "stealth" mode. Prof. Jean-Pierre Vigier (shown below with Francesco Celani) was one of France's most famous physicists (sadly no longer with us). In 1948 Vigier was appointed assistant to Louis de Broglie, a position he held until the latter's retirement in 1962. Vigier was a proponent of the stochastic interpretation of quantum mechanics, which was based on the ideas of de Broglie and David Bohm, the latter being influential in the thinking of Giuliano Preparata. At the time of ICCF5

Vigier was professor emeritus at Pierre et Marie Curie Universitat in Paris and member of the editorial board of Physics Letters A. He became convinced that cold fusion was correct (or, at least, interesting) and began to attend our conferences, particularly those in Europe and Russia where I spent many delightful hours in his company.

Photo: Jean-Pierre Vigier and Francesco Celani (photo courtesy: Gene Mallove).

The other of these *"newcomers"* was Charles Beaudette, seen below with Ed Storms. Beaudette is an MIT trained Electrical Engineer who had determined (unknown to me at the time) to write a book on cold fusion that was technical but accessible to general members of an intelligent public. By 2000 he had succeeded masterfully with the most accurate description (or decryption?) of those early years that is available to us (with a second edition in 2002). But in Monte-Carlo in 1995 Charles was in information gathering mode.

Photo: Charles Beaudette and Ed Storms (photo courtesy: Gene Mallove).

Everything about ICCF5 was on a grand scale. The hotel was swanky — one expected to encounter film stars or diplomats in the lobby. The casinos were places frequented by James Bond. On the ride in we were pointed out the hairpin bend where Princess Grace lost her life. The lunches were luxurious and the banquet spectacular. Below we have a photo of three of the original *"cold fusioneers"* enjoying lunch: George Miley, Bob Bass and Scott Chubb (with Doug Morrison between Bob and Scott at the next table). This was a first class affair.

Photo: George Miley, Bob Bass and Scott Chubb (photo courtesy: Gene Mallove).

The lunches were so good in fact that the sessions following lurched towards boisterous or soporific. Definitely in the former category was the theory session opened by Giuliano Preparata with *"Setting Cold Fusion in Context: A Reply."* I was surprised to hear my very dear friend Giuliano, one of the kindest people on earth until his death in 2000, launch the discussion of theory with an argument from memory along the lines of: *"At any time there is only room for one truth. My [theory] arguments are that truth — the rest of you are wrong."* Despite this lusty opening a robust debate was enjoyed. Here we see a great shot of Giuliano and Otto Reifenschweiler (Philips Research Laboratories, Eindhoven, The Netherlands) with matching smiles at one of the poster sessions. Reifenschweiler was a senior researcher at Philips principal research center. As first paper in the *"Nuclear Measurements"* section he presented *"Some Experiments on the Decrease of radioactivity of Tritium Sorbed by Titanium"*. His Abstract stated: *"A sharp decrease in the radioactivity of tritium was observed when the hydrogen isotope is sorbed by small monocrystalline particles of titanium and the preparation is heated to several hundred degrees centigrade"*, and his conclusion was: *"There is a strong suspicion that the two different effects, cold DD fusion and decrease of tritium radioactivity, are caused by the same or a related fundamental principle"*. A fascinating paper. Sadly neither of the characters in this photo are with us any longer.


Photo: Otto Reifenschweiler and Giuliano Preparata (photo courtesy: Gene Mallove).

At the end of the conference a session was devoted to *"Charting the Way Forward"* with talks about *"Cold Fusion Economics"* by Bruce Klein of Bechtel and *"A Model for Commercialization Utilizing Patents"* by Fred Jaeger of ENECO, who would be Chairman of ICCF7 three years later. Jaeger can be seen below with David Thompson of Johnson Matthey, who had supplied Fleischmann and Pons with essentially all of their palladium to that point, and Michael Melich of the (U.S.) Navy Postgraduate School, who maintained a watching brief on behalf of the U.S. Navy. An interesting dichotomy emerged in the discussions at ICCF5. One group, the *"old guard"* including Martin Fleischmann, myself and Ed Storms (who maintains this position to this day), continued to believe that the academic approach of doing good clear experiments following scientific method, presenting and publishing the results in peer reviewed journals (the only way we knew) was right for the field and the right path to technology. I remember arguing the irresponsibility of scaling up an effect now known to be nuclear without a full and detailed understanding of the mechanism. I believed that the journals could and would be forced to recognize the reality of new physics and allow publication. I was wrong.


Photo: David Thompson, Michael Melich and Fred Jaeger (photo courtesy: Gene Mallove).

The other group expressed frustration with the slow rate of progress in meticulous but seemingly endlessly repetitious experiments. Their "better" solution can be summed up also in Jed Rothwell's words: *"The purpose of this research should be to invent practical, profitable machines to improve people's lives and reduce pollution, not to explore esoteric aspects of metal hydrides. If the academic side of CF is emphasized, the field will wither away. Few young people are involved and there is still enormous opposition from academia. I believe that the only hope is to demonstrate working devices to industrial corporations, and to get more patents."*

The IAC was called to action at ICCF5 with Prof. Li ceding the right to hold ICCF6 to Japan under the auspices of the NHE (New Hydrogen Energy) activity of NEDO (New Energy and Industrial Technology Development Organization) and MITI (the Japanese Ministry of Industry and Technology Innovation). Several talks were given at ICCF5 by and about the New Hydrogen Energy project in Hokkaido. One paper was presented by Prof. Makoto Okamoto (Tokyo Institute of Technology and Chair of ICCF6) and another by Naoto Asami (director of the NHE Laboratory and Co-Chair of ICCF6). This laboratory was now up and running at a high level. Particularly considering the deliberations of the IAC in Maui, it was with very little difficulty that the IAC in Monte-Carlo agreed that NHE would lead the planning and organization of the next conference.

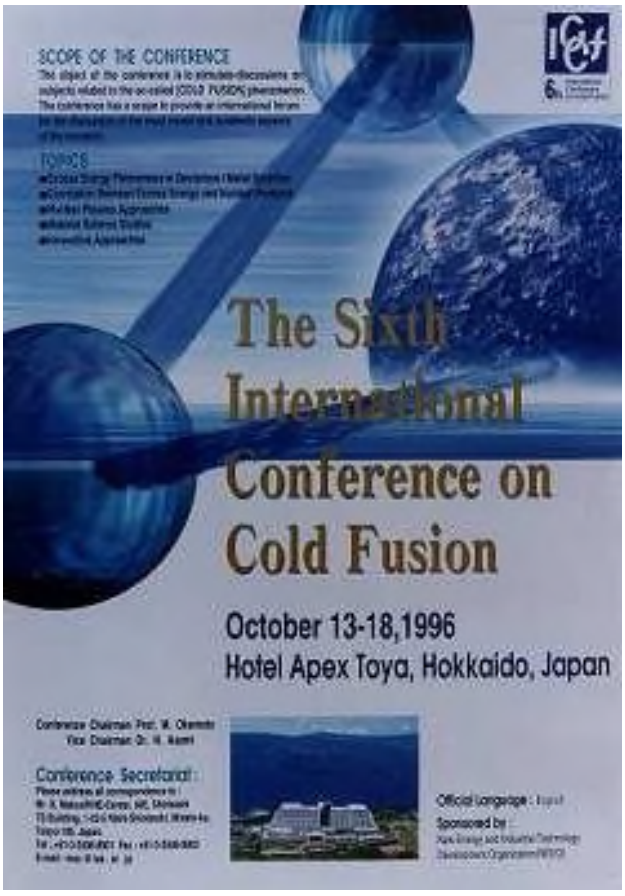
In reviewing these Histories and the photographic record much later much later (2018) I came across another "high flying" visitor to ICCF5. Buzz Aldrin (Sc.D. MIT seen below with his wife and Gene Mallove) had visited my laboratory at SRI in 1993 on an interesting mission. He wanted to in justify and stimulate interest in further moon missions and had seized on helium-3 and aneutronic (but hot) fusion of that element as his cause. The natural abundance of ^{3}He in naturally occurring helium gas on earth is only 1.38 parts per million. This is one of the reasons it is such an attractive product for "cold fusioneers" but "mining" ^{3}He for terrestrial large-scale primary energy production is considered to be impractical even if the practical difficulties of either aneutronic (hot) fusion reaction pathways: $^{2}H + {}^{3}He \rightarrow {}^{4}He + {}^{1}p + 18.3$ MeV; or $^{3}He + {}^{3}He \rightarrow {}^{4}He + 2\ {}^{1}p + 12.86$ MeV can be overcome. The abundance of helium-3 is thought to be greater on the Moon than on Earth, having been embedded and "stored" in the upper crustal layer by the solar wind over billions of years.

Buzz' problem was not practical, it was political. The same people who were anxious to squelch cold fusion research were equally opposed to any alternatives to TOKAMAK's – particularly if they offered a viable alternative and thus threat to funding. Dr. Aldrin and we had a common enemy even if not one of our choosing. He visited to express interest and support and I invited him to ICCF4 to be held later that year. He was not able to attend our conference in 1993 but was able to join us all at ICCF5 in 1995 as an expression of scientific interest and solidarity.

Photo: Buzz Aldrin and (then) wife Lois Driggs Cannon with Gene Mallove at lunch (photo courtesy: unknown).

ICCF6

The conference was chaired by Makoto Okamoto from the Tokyo Institute of Technology, ably assisted by Naoto Asami and Kazuaki Matsui, the leaders of the NEDO funded NHE Laboratory on the Island of Hokkaido. Neither Okamoto-san or Asami-san are with us any more — both are definitely classified as fallen heroes. When we come to the conference at Lake Tōya I start to run out of superlatives for the location. The Hotel Apex Tōya opened its doors in December 1993 — we were there from October 13-18, 1996. After we left it was closed for a time then reopened in July 1997 as the Windsor Hotel Tōya. The hotel was perched by itself at some altitude above Lake Tōya on the inner rim of the crater of an active volcano. I could see the lava glowing at night from my hotel window — a perfect spot for cold fusion. The level of splendor can be judged from the conference poster below and photograph of the entrance[8]. The hotel, one of the most spectacular I have ever stayed at, was situated some distance from any other activities. Contained on its premises were 13 restaurants of varying world cuisine all of high quality, and numerous Spa and other facilities inside and out (including a bowling alley). A few hundred of us were trapped together for a week, definitely in paradise but with a clear view of hell.



ICCF6 Conference Poster.

[8] The hotel was the site of the 34th G8 summit, which took place from July 7-9, 2008.


Photo: Entrance of the Hotel Apex Tōya.

This situation proved to be an apt metaphor for the technical progress reported at the conference. Good people doing new good things opening interesting possibilities, old people doing the same old things — mostly with consistent results. But *"the times they were a'changin"* to quote master Dylan. Our hosts, NEDO, had spent a lot of money setting up the New Hydrogen Energy Laboratory (NHE) in Hokkaido in part of the space occupied by IMRA-Japan. They had run a large number of experiments but were claiming very little success. IMRA-Japan also seemed to be experiencing problems. So rather than being brought together triumphantly to report great success on the northern Island, there was a fair amount of introspection in Hokkaido. Also, this is where it first became publicly clear that a schism had developed between our fathers Fleischmann and Pons. Although the issues were not discussed publicly the situation was at least distracting and somewhat worrying, especially to those of us who knew them both as friends.

The SRI group itself was coming to some heavy realizations. The mode of calorimetry that we had selected and developed for its accuracy, precision and stability had demonstrated itself to be a powerful tool to quantify small or large effects. But in the interests of accuracy and stability we were actively fighting against the effect of positive thermal feedback that Fleischmann so stressed and had designed his calorimeter to capitalize on. On top of this we had convinced ourselves (and discussed at the conference) that pure palladium was mechanically incapable of withstanding the high internal pressures at equilibrium with the very high loading needed to observe the Fleischmann-Pons Heat Effect (more on this below). This meant that we would need to investigate thoroughly the issues of alloying of and impurities in the palladium. A daunting

task. So, although the location was spectacular and the setting and services sublime, it was quickly clear that our Japanese hosts had invested a fair amount of money in serious and highly capable effort but had come up with more questions than they had answered for themselves.

The conference kicked off with a "Fundamental Session" that was split into five parts: (i) Helium and Heat Correlation, (ii) NHE Session, (iii) Excess Heat, the latter being concluded by Giuliano Preparata with a talk entitled *"Everything You Always Wanted to Know about Cold Fusion Calorimetry"*, (iv) Material Science Studies, (v) Nuclear Physics Approach. Certainly a strong set of topics and the opening session on Heat and Helium Correlation featured five strong talks from prestigious institutions on three continents: two from Italy, two from Japan and Mel Miles from the U.S. All were cautiously optimistic about the existence of such a correlation, Mel Miles the more so because of his longer experience.

The NHE Session results pointed out some interesting issues. The opening paper reported work in *"Excess Heat in Fuel Cell Type Cells from Pure Pd Cathodes Annealed at High Temperatures"* led by my good friend Naoto Asami (another of our fallen warriors, then Technical Leader of the NHE Lab in Hokkaido). Their Abstract states: *"An excess heat measured as a rise of cell temperature from a calibration curve has been observed in fuel-cell type cells using pure palladium cathodes and apparently depended on their thermal treatments. All the Pd cathodes tested were at least 99.99 ("four nines") pure, but the treatment conditions of the cathodes appear to have affected the loading ratios and presence of excess heat...The excess heat from the samples ranged from 7-18 % of the electric input power. However, these results should be confirmed with a flow calorimetry system."* As noted above the SRI group was just at this point beginning to conclude that mass flow calorimetry at near steady state, while being accurate, simple, stable and trustworthy, reduced both the likelihood and magnitude of the excess heat effect by withdrawing the heat and preventing positive thermal feedback.

Unstated at the conference were the numerous unsuccessful (mostly later) attempts to demonstrate the Fleischmann-Pons Heat Effect in the NHE Lab using locally sourced palladium of very high purity in an SRI-style and -built mass flow calorimeter. The use of high purity palladium is a completely logical starting point, and Fleischmann and Pons themselves had used such material supplied by Johnson Matthey. However the SRI and ENEA groups (led by my good friend Vittorio Violante) were just beginning to conclude that alloying (*i.e.* impurities) was crucial to allow the attainment and maintenance of deuterium loading sufficiently to demonstrate the FPHE. Pure palladium is simply too weak to withstand the stresses induced by D_2 gas pressure in internal voids at high chemical potential (loading). One has two choices in the use of bulk palladium to demonstrate the FPHE: (i) completely avoid internal voids (as Johnson Matthey apparently were able to do and provide for Fleischmann and Pons); (ii) alloy the palladium to increase its yield strength. By the time this was realized it was too late for NHE and their activity came to a premature and unfortunate end.

Stan Pons presented on "Results of ICARUS 9 Experiments Run at IMRA-Europe" in exquisite calorimetric detail. From their introduction: *"We describe herein the construction, testing, calibration and use of a high power dissipation calorimeter suitable for the measurements of excess enthalpy generation in Pd / Pd-alloy cathodes during the electrolysis of heavy water electrolytes at temperatures up to and including the boiling point of the electrolyte. With the*

present design, power dissipation up to about 400W is possible. Excess power levels of up to -250% of the input power have been observed with these calorimeters in some experiments."

Excess power of 250% in such a calorimeter is extremely impressive but for my money the best paper of the conference was presented by Jean-Paul Biberian (seen below listening to Tadayoshi Ohmori explain his poster). Jean-Paul presented on behalf of Georges Lonchampt, Centre d'Etudes Nucleaires de Grenoble, *"Reproduction of Fleischmann and Pons Experiment."* For the first time ever (before or since) somebody had taken up the task of replicating Fleischmann and Pons experiments in engineering detail without any attempts to *"improve."* I will let them speak in their own words from the Proceedings of ICCF6. *"1- Introduction. Since the announcement of the cold fusion phenomenon by Fleischmann and Pons*[9] *in 1989, various techniques have been utilized to produce excess heat. Numerous results have been obtained that are dispersed, and even sometimes contradictory with each other. Being aware of that, we have decided to "simply" reproduce the exact experiments of M. Fleischmann and S. Pons as described in their 1993 article*[10]*. The purpose of our work is to ascertain the various phenomena involved and the conditions of their apparition in order to master the experiments."*

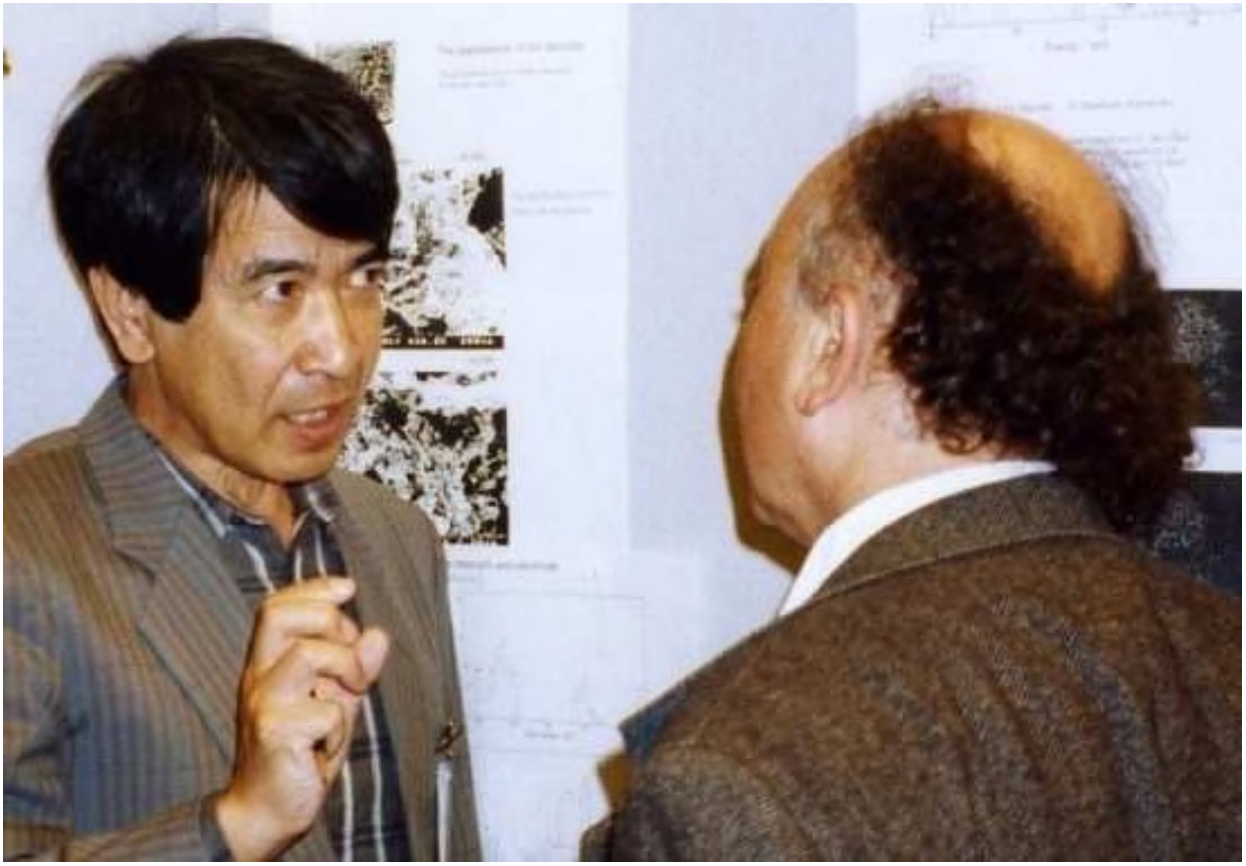


Photo: Tadayoshi Ohmori explaining his poster to Jean-Paul Biberian (photo courtesy: Gene Mallove).

[9] M. Fleischmann and S. Pons, J. Electroanal. Chem., **261**, 301 (1989).
[10] M. Fleischmann and S. Pons, Phys. Letters. A **176**, 118 118 - 129 (1993).

What a novel concept. Understand and master before you attempt to improve? Nobody else has ever managed to display this level of self-discipline — and Lonchampt *et al* succeeded admirably! As Jed Rothwell notes in his otherwise fairly harsh review of ICCF6 for Infinite Energy,

"This is exactly what cold fusion cries out for: careful, step by step replications done by people who follow directions. Biberian said that he and the other scientists in the project wanted to incorporate various 'creative improvements' but Lonchampt insisted on doing a precise replication with assistance from Pons and Fleischmann. That is why it worked, as Biberian cheerfully admits. It takes an engineer to do these things right. Everything about this work is superb, even the Abstract."

Jed can be seen below conferring with Josef Gruber and Martin Fleischmann at the conference (possibly discussing the Lonchampt paper).

Photo 18: Jed Rothwell, Josef Gruber and Martin Fleischmann (photo courtesy: Gene Mallove).

Let me conclude this section with the conclusions of Lonchampt *et al*:

"7- Conclusions. Our experience during this last three years, leads us to conclude that the Fleischmann and Pons calorimeter is very accurate and well adapted to study cold fusion phenomenon. It is simple and precise. However precautionary measures must be taken:
- the Dewar must be of excellent quality, i.e. good vacuum, in order to eliminate heat losses by conduction, and operate with radiation losses only,
- temperature calibration of the thermistors must be done very precisely,
- all electrical feedthroughs must be sealed off in order to eliminate spilling off of electrolyte by capillarity. Our results concerning the relative excess heat (percentage of excess heat to enthalpy input) can be summarized as follows:
- below 70°C, between 0 and 5%
- between 70°C and 99°C, about 10%
- at boiling, up to 150% especially in the final phase which appears as the best condition to get a large amount of excess heat.

As already done by S. Pons, with ICARUS 9, it is necessary to operate at boiling on a permanent basis to obtain the most significant results."
Note that this is exactly what Stan Pons described in his presentation of the ICARUS 9 results three paper before.

On my first trip to Hokkaido some years earlier I was surprised to find that it was "right next door" to Russia[11]. Partly for this reason[12] our Russian and former Soviet Union (FSU) colleagues were well represented in Hokkaido. A special session was devoted to *"Russian Activities"* and Vladimir Tsarev was invited to talk on "Cold Fusion Activities in Russia." Tsarev, from the Lebedev Physical Institute and Russian Academy of Sciences, is an extremely senior and well respected member of the Russian Physics establishment and his views (or overview) were (was) well considered and received. Several other of our Russian and FSU colleagues were in evidence. We see a photo below of Vladimir Vysotskii (Shevchenko University, Kiev, Ukraine). Below that we have a very nice shot of Lev Sapogin (Department of Physics, Technical University (MADl), Moscow), Andrei Lipson (Institute of Physical Chemistry, the Russian Academy of Sciences – another of our fallen heroes) and Alexander Roussetski (Lebedev Physical Institute, Russian Academy of Sciences) in a Russian pose.

Japan (and Hokkaido) science was well represented at Tōya in addition to the expected strong attendance by the NHE group. We have a picture of Reiko Notoya (Catalysis Research Center, Hokkaido University) conferring with Douglas Morrison (CERN) with a group of young Japanese scientists behind. Below that we have a shot of Takaaki Matsumoto (Faculty of Engineering, Hokkaido University).

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[11] For those as geographically challenged as I am, the major city of Hokkaido, Sapporo, is only a couple of hundred miles east of Vladivostok on Russia's east coast and very slightly to the north.
[12] And also because of the relative ease with which visas can be obtained by Russians to enter Japan.

Photo: Vladimir Vysotsky (photo courtesy: Gene Mallove).

Photo: Lev Sapogin, Andrei Lipson and Alexander Roussetski (photo courtesy: Gene Mallove).

Photo: Reiko Notoya and Douglas Morrison (photo courtesy: Gene Mallove).

Photo: Takaaki Matsumoto (photo courtesy: Gene Mallove).

To round out the story we also have pictures of Professor Xing-Zhong Li (Department of Physics, Tsinghua University, Beijing, and Chair of ICCF9) and Jacques DuFour (SHELL/CNAM, Laboratoire des Sciences Nucleaires. Conservatoire National des Arts et Metiers, Paris, France).

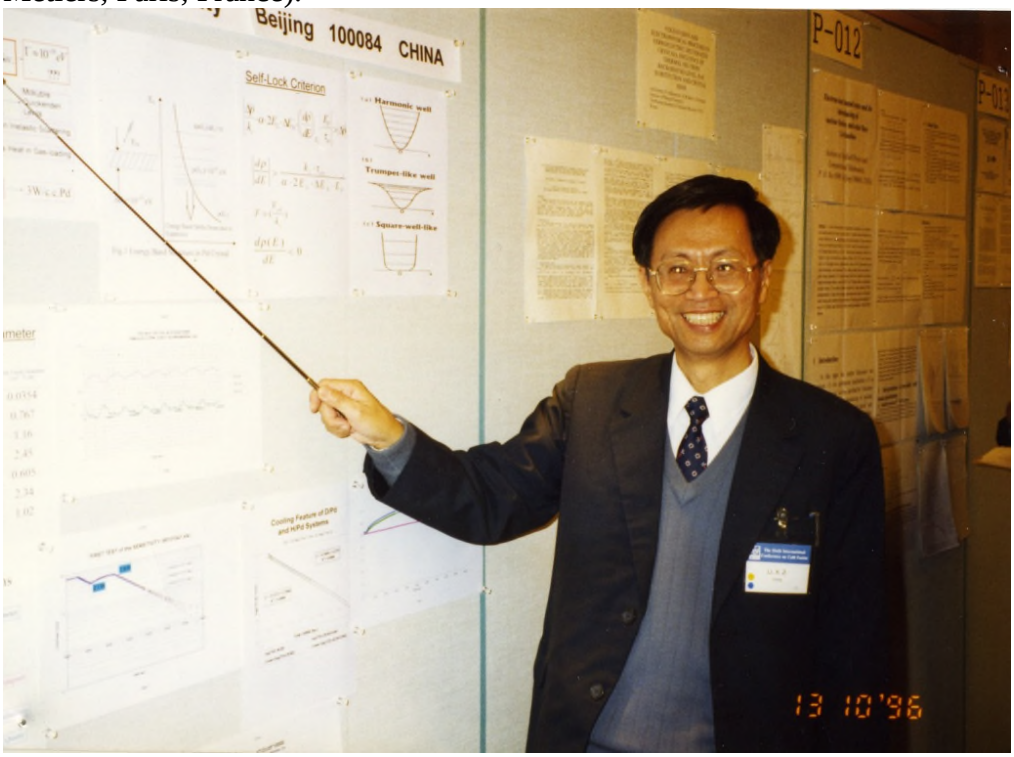

Photo: Xing-Zhong Li explaining his poster (photo courtesy: Gene Mallove).


Photo: Jacques DuFour (photo courtesy: Gene Mallove).

Footnote. A series of "National Histories" was organized and published as part of the exercise of ICCF14 in Washington DC chaired by Dave Nagel and Mike Melich in 2008. Jiro Kasagi and Yasuhiro Iwamura summarized the work done in Japan from 1989 to 2008 with the following comments on the NHE activity[13] (emphasis added by me).

"The NHE project ended in June 1998.

During this period, the NHE Laboratory carried out excess heat measurements on more than 500 specimens. The official report of the NHE R&D project was summarized for the excess heat measurements as follows:

(1) No apparent excess heat was observed over instrumentation limits after about 500 of electrolysis experiments by some kinds of well-developed cells.
(2) This means that we failed to verify the existence of excess heat ***at the level which was expected at the beginning of the project.*** *We concluded that it is* ***hard at present to utilize the "new hydrogen energy" for practical purposes*** *with the present science and technology in this field.*
(3) Of course, we do not deny the possible existence of solid state nuclear reactions being unknown up to now and its possible trace amount of heat. However the phenomena still remains within a scope of fundamental research.

An important contribution in this period was a finding of anomalously large screening potential in D+D reaction in metal observed by Kasagi et al. It should be noted here that this work benefitted a great deal from the NHE project for the basic equipments. The first result was reported at ICCF7 in April, 1998, and was published in JETP Lett. 68 (1998) 823. Prof. Bressani remarked on it in summary talk of ICCF7: 'The first "miracle" of cold fusion observed in a typical Nuclear Physics Experiment: It is a dramatic proof of the influence that condensed matter effects may have on nuclear observable.'"

I feel compelled to state that, except for the last paragraph, this *"official conclusion"* cannot be reconciled with my direct experience of the NHE project in Hokkaido, or with the words spoken and written by the NHE scientists at ICCF6. Clearly there is more to this rejection than scientific reality. The scientific results did not accord with the *"expectation"* so this was really a failure of assumption (or presumption)? And the *"failure"* was a failure of practicality, not reality. As a saving grace the last paragraph by Kasagi about his own work is of fundamental importance as recognized by Tulio Bressani at ICCF7, where we go next, to Vancouver, Canada.

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[13] Kasagi, J. and Y. Iwamura. Country History of Japanese Work on Cold Fusion. in ICCF-14 International Conference on Condensed Matter Nuclear Science. 2008. Washington, DC.

A Brief History and Introduction to the International Conference Series

Part Three - From ICCF7 to ICCF9

ICCF7

The siting of ICCF7 in Vancouver, Canada was important for several reasons. First, Vancouver is both an interesting and safe city. Armed against the rain by a very nice folding umbrella thoughtfully supplied by the organizers, we were able to wander and enjoy the city freely. More importantly, in extending the global reach of the ICCF conference series to Vancouver in Canada we were able to add another country and give truth to the rotational sequence: “the Americas; Europe and Africa; Asia and the West Pacific.” Considerably more effort is needed to extend our span to include South and Central America, the African Continent and the Islands and small countries of the Pacific west of the International Date Line. But including Canada was certainly a good start and the Chairman, Fred Jaeger of ENECO, is to be commended for demonstrating this leadership.

Fred Jaeger is a businessman, not a scientist, and he styled himself “Organizing Chairman.” Fred selected Professor George Miley of the University of Illinois and a pioneering “cold fusioneer” as his Technical Co-Chair and together they organized a splendid conference that was well attended (218 registrants) and very revealing. We don’t have any pictures of Fred but we have a fine one of George with Xing Zhong Li, Bill Collis and Vittorio Violante at the Banquet and on our cruise.

Photo: Xing Zhong Li, Bill Collis, Vittorio Violante and George Miley (photo courtesy: Gene Mallove).

The Primary funding for ICCF7 was provided by ENECO, an unusual company on which we might spend a few words. The company was configured originally as something like a "cold fusion hedge" or as Fred Jaeger preferred a "mutual fund" into which selected cold fusion researchers placed their IP in exchange for shares — the idea being that if any one of their "mutually funded" technologies "won big," all would share[14]. Despite the participation of many of the "big names" in cold fusion, this concept was effectively destroyed by intransigence of the U.S. Patent and Technology Office (USPTO) on any issue related to LENR.

In order to survive (and some time after ICCF7) ENECO turned to an invention of two of our cold fusion heroes, Peter Hagelstein (MIT and Chairman of ICCF10) and Yan Kucherov (then director of research and development at ENECO, now sadly no longer with us[15]. Yan and Peter (seen below at the conference) invented and developed an efficient means to convert heat into electricity with about 17% efficiency with the possibility of reaching 25% — a very impressive half of the theoretical limit. Because of its mechanism of operation they called this a "thermal diode." Their device was externally tested at NIST (the U.S. National Institute of Science and Technology) and was featured in the *New York Times* on November 27, 2001. While not cold fusion, this device would clearly be useful for heat-producing LENR. On January 11, 2008 ENECO, one of the oldest LENR-related firms, filed for Chapter 11 bankruptcy. The technology was bought up by Texas State University and, as far as I know, is still under development there.

But at the time of ICCF7, April 19-22, 1998, none of this was anticipated. The conference was held in the award-winning Vancouver Convention Centre, which proudly boasts to be a *"state-of-the-art facility on the waterfront in beautiful downtown Vancouver."* All true and the facilities, amenities and conference all were excellent, at least good enough to arguably support the claim of the conference subtitle "The Best Ever" (see photo below, for which the conference organizers received some gentle teasing). Very shortly after the end of ICCF7, on May 4, 1998, Professor Okamoto who was a member of the IAC and Chairman of ICCF6 passed away. In the Proceedings Fred Jaeger dedicated a Memorium to him with the words: *"He constantly strove to improve the quality and rigor of experimental design and data interpretation for this emerging field. His knowledgeable encouragement, contribution, cooperation and friendship will be sorely missed by the entire cold fusion community. Our deepest and most sincere condolences go to his family and close colleagues."*

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[14] ENECO was a follow-on to Hal Fox's Future Energy Applied Technology (FEAT) with what Fred Jaeger described as "a better business structure than what FEAT offered."

[15] Yan Kucherov spent his last years at the Naval Research Laboratory (NRL) in Washington, DC working specifically not on cold fusion. He died on my birthday December 4, 2011 at the age of 60 from pancreatic cancer. Although not a close friend, I always looked forward to quizzing Yan on my regular trips to NRL for his very penetrating and intuitive assessment of who and what makes sense. A reluctant warrior, Yan Kucherov is another of our fallen heroes. In 1993, Yan was the recipient of the cold fusion's first Truffle Prize (now called the Preparata Medal - more of this later) for his "pioneering work on transmutation induced by glow discharge."

Photo: Peter Hagelstein (photo courtesy: Gene Mallove).

Photo: Yan Kucherov (photo courtesy: Gene Mallove).

Photo: *"The Best Ever"* with Larry Forsley, Gene Mallove and Martin Fleischmann (photo courtesy: Gene Mallove).

The conference featured the now customary cosmopolitan tone with 98 registrants from the U.S., 30 from Japan, 15 from Italy and 14 each from Canada, China and Russia. We even had 4 Australians (and only one transplanted Kiwi to provide antipodean balance). Fred Jaeger had tried very hard to bring youth and new people, and "business energy" to the conference. In this he succeeded splendidly and as he notes in the Proceedings under the title "THE SPIRIT OF VANCOUVER: *Approximately one-third of the ICCF7 audience was new. Nine students were present, some of whom gave their very first presentation at an ICCF conference. One new student was elected as a 'Top Ten' presenter. New and younger persons entering the field provide vital fresh perspectives that are crucial to continuation and growth. An entire second generation of scientists and managers are now carrying on the bulk of the work that was formerly performed by early pioneers."*

This is certainly in accord with my enduring memories of the conference: youth, rain, and the most exceptional and enjoyable banquet cruise. Of 18 attended so far, this was the only one where I experienced rain (we have a pact with the relevant deity to prevent light water falling from the sky). And the vitality of youth was evident although Fred Jaeger's optimism that "the baton had been passed" proved a little premature. But the surprise of the conference for me was a "new boy," though not young. Les Case (an independent researcher from New Hampshire, now no longer with us and definitely one of our fallen heroes), supported by physical props that he most certainly would not be permitted to fly with today, presented two pieces of information that took the breath away from all in the audience. The title of the presentation itself was enough to do this: *"Catalytic Fusion of Deuterium into Helium-4."* Wow! Les Case can be seen below in an uncustomary jacket.

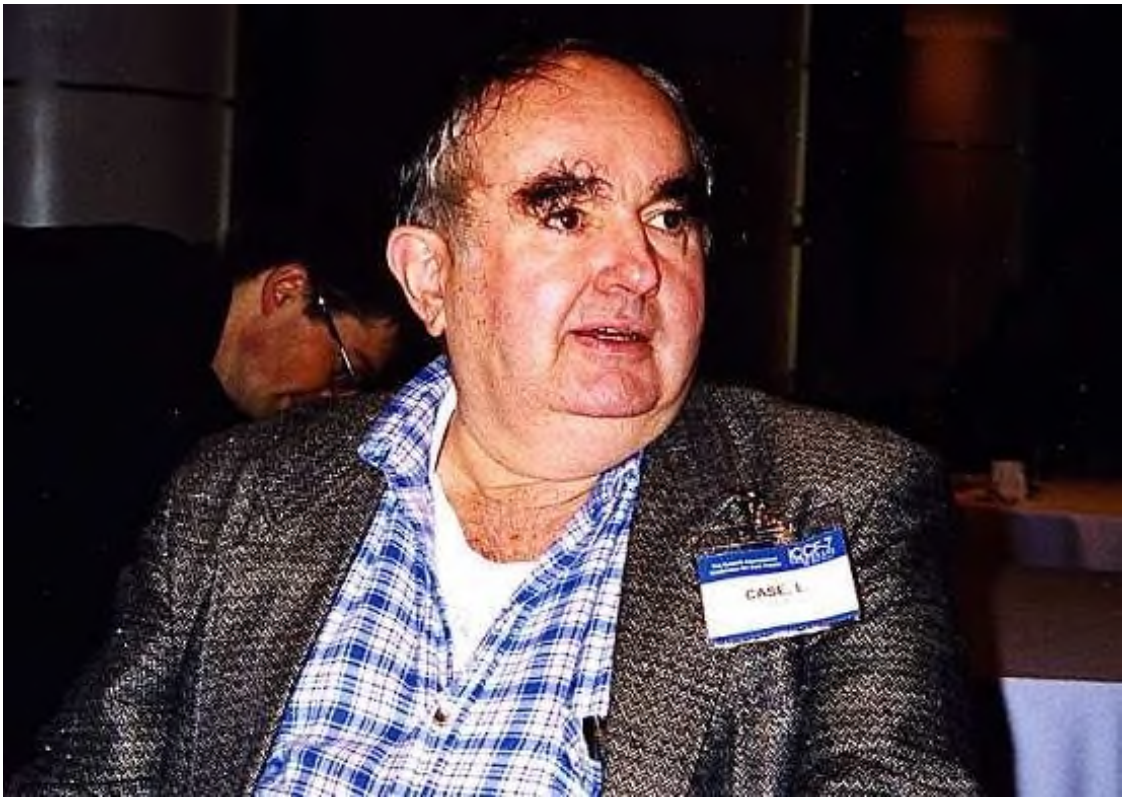

Photo: Les Case (photo courtesy: Gene Mallove).

Looking at Les I was not sure what to expect. On the basis of his presentation the SRI group determined to replicate his work (this is a long story for another time). But in the course of this ultimately successful replication we became close friends and I am sure he would not object to my characterizations or anecdotes. Les was a "bowling ball" of a man — in more ways than one. He always dressed in the same style with suspenders (for younger readers: an alternative device to hold up your trousers). He certainly did not look like a scientist— at least not one from this or the last century. Les was also brilliant. He was President of the New Hampshire Mensa Society[16] and had an encyclopedic knowledge of many things, including wines, and especially Californian wines[17]. He was also a highly capable chemical engineer with four degrees from MIT through Doctor of Science. None of this I knew before his talk at ICCF7 and I was unprepared for the power of his low-key and matter-of-fact presentation. After similar pre-treatment in hydrogen gas Les introduced deuterium at a pressure of a few atmospheres to a bed of chemical hydrogenation catalyst consisting of "coconut shell charcoal" infiltrated with approximately 0.5% platinum group metals. This was confined in a 1.7 liter stainless steel vessel of World War II vintage. In a very narrow temperature range, 150-250°C, and with a few selected catalysts Les was able to produce a 5-35°C temperature rise in D_2 compared with H_2 gas. Phenomenal! And this was apparently not related to the difference in thermal conductivity between D_2 and H_2 gas[18]. He also claimed anecdotally to have had a post-test D_2 sample analyzed by mass spectrometry at Oak Ridge National Labs (ORNL) where they observed (from memory) ~100 ppm of helium-4. Since the concentration of helium-4 in room air is 5.22 ppm, if verified this finding was stunning. Furthermore the creation of 100 ppm of helium-4 in a 1.7 liter gas volume by any nuclear means implied the production of a very large amount of excess energy.

Obviously we were interested as were many in the audience and Les was "mobbed" after his report. In my summary at the end of the conference I cited Les' paper as one of the most interesting presented. Although Fred Jaeger certainly merits this title for his hard work, vision and funding of ICCF7, I am going to break with tradition and nominate Les Case as the "hero of ICCF7." Partly because he is gone and was, in my view, significantly under-regarded during his too brief cold fusion career. But also because Les Case (with Francesco Piantelli) ushered in the gas-metal mode of CMNS that is very different from the Fleischmann Pons Heat Effect (FPHE) of liquid phase D_2O-metal heat generation. With considerable work and much time (and wine) spent with Les the SRI group was able to sensibly reproduce "the Case Effect." Although never at the very high levels of temperature differential between D_2 and H_2 gas, or the extreme value of ^{4}He production reported by Les at ICCF7, we obtained some of our most significant results

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[16] From Wikipedia, Mensa is the largest and oldest high IQ society in the world. It is a non-profit organization open to people who score at the 98th percentile or higher on a standardized, supervised IQ or other approved intelligence test.

[17] A fact that I took advantage of many times by giving Les the wine list at a restaurant, and a wine budget for the evening.

[18] Because of the large mass difference the difference in thermal conductivity between D_2 and H_2 is quite large but this could be ruled out as an explanation by Les' numerous null experiments.

studying the Case system, first without him (and failing) then with him (and succeeding), and then making progress on our own.

There is a lesson in the art of replication here that mirrors somewhat my discussion about the Lonchamp-Biberian replication of Fleischmann and Pons reported at ICCF6 in Hokkaido. Although highly technical and with a phenomenal memory, Les tended to communicate tersely both orally and even more in writing. After we failed to replicate the Case experiment many times with DARPA funds we invited Les into our laboratory and watched closely what he did. My colleague Fran Tanzella stood on one side and I on the other and simply watched without helping or speaking while Les talked and worked his way through the process. Remember, this was a man who had repeated this exercise perhaps a thousand times before and had developed a procedure that he knew worked. This does not rule out systematic error (hence the need for independent replication) but we had a duty to understand what he actually did before criticizing any result, or lack of result. The differences between the "Case process" and our understanding of the Case process were subtle, but significant, and we were rewarded by an ultimately successful replication of the Case Heat Effect (CHE). Among other things this prompted a very positive write-up in *Wired Magazine* in November 1998 "Wired 6.11: What if Cold Fusion is Real?" by Charles Platt, as shown below.

Photo: Cover of *Wired Magazine.*

The Lonchamp-Biberian effort continued and was reported at ICCF7 and was summarized by Jed Rothwell as follows: *"Jean-Paul Biberian (lecturing for Lonchampt) described two experiments now underway at the French Commissariat a L'Energie Atomique (Atomic Energy Commission—A.E.C.). The first is a continuation of the Pons-Fleischmann boil-off replication. None of the four platinum null experiments produced excess. Thirteen out of 14 experiments with palladium produced excess heat, which ranged from 5 to 29% during the final boil-off phase. These percentages are not as large as the A.E.C. reported at the last conference, or as good as Pons and Fleischmann reported, because the A.E.C. now begins measuring the final boil-off phase earlier, using a more rigorous method. They measure the waterline with a sensor. They designate the boil-off phase as the moment the water temperature reaches boiling and the water level drops according to the sensor. Formerly the onset was based on a time lapse video or visual observations of the cell. Biberian said that if you consider the boil-off performance based on the old onset, the excess is as high or higher than it ever was. In earlier phases of the experiment the sensor provides additional evidence that no recombination occurs."* Very interestingly the other effort reported by Lonchamp-Biberian was an apparently successful replication of the Patterson flow-through packed-bed experiment using 0.6 mm dia. Ni beads and lithium sulfate in normal water. Since many had tried, but few succeeded, this effort was noteworthy although little attention seems to have been paid to it.

At the conclusion of the conference I was asked to comment on the progress in excess heat, electrochemistry and materials studies reported at ICCF7 and my good friend Tullio Bressani (Professor of Physics at the University of Turin) was asked to report on the advances in our understanding of nuclear aspects of the work. I have already mentioned Les Case and the Lonchamp-Biberian effort. In addition I drew attention to several people including Mitch Swartz, Irina Savvatimova and John Bockris (the two latter seen below at the conference). This may have been John's last attendance at an ICCF or as a member of the IAC.

Tullio Bressani's summary was particularly erudite. Again as summarized by Jed Rothwell: *"The conventional wing has been reluctant to accept strong evidence for excess heat with nickel/light water and transmutations—and even more reluctant to let go of some marginal evidence for neutrons and helium. The conference summaries presented on the last day by Bressani and McKubre were interesting in that regard. I find Bressani an "extreme" conventionalist. This year he again said that helium and neutrons are the most important evidence for cold fusion. This year, for the first time, he granted that there is good evidence for transmutation as well. Perhaps he was thinking of the work at U. Illinois and Mitsubishi. He mentioned transmutation briefly, but he devoted most of his attention to neutrons and helium. I suppose he thinks the transmutations alone cannot account for the excess heat, or that transmutations cannot occur without a neutron flux. Until this year I have classified McKubre as a rock solid conventionalist, but he has broadened his perspective even more than Bressani has. He noted the transmutation evidence and he said that Mitchell Swartz presented the first convincing data showing excess heat in nickel light water systems."*

Photo: Irina Savvatimova (photo courtesy: Gene Mallove).

Photo: John Bockris (photo courtesy: Gene Mallove).

From a position of some status in the physics community Bressani was able to observe and report on the lack of basis for or potential invalidation of one of John Huizenga and Douglas Morrison's so called "miracles" of cold fusion (Morrison can be seen below flanked by Gene Mallove and Xing Zhong Li). Commenting on the first class work of Jiro Kasagi and his team to probe experimentally what actually happens when nuclear interaction energies are reduced towards (although still far above) the energies of cold fusion Bressani reported (with my emphasis): *"At ICCF-7 a spectacular result was reported. The (d+d) cross section, measured down to 2.5 KeV, is 50 times larger when d is embedded in PdO than when in pure Pd or Ti! The electron screening potential necessary to fit the data is now as large as 600 eV. By extrapolating the data at near zero kinetic energy with such an electron screening potential,* ***a fusion rate fully compatible with that necessary to explain the Fleischmann-Pons excess energy as due to cold fusion is obtained****. This experiment is very important for at least two aspects. The first one, quite obvious, is that it is a dramatic proof of the influence that condensed matter effects may have on nuclear observables. The 'Condensed Matter Nuclear Physics', whose first milestone is the Mössbauer Effect, may consider this experiment as the second milestone. The second aspect is that the enhancement of the cross section for (d + d), as measured following the method of Kasagi et al., could be considered as one of the quality parameters needed in the choice of metals/compounds/alloys best suited to reach reproducible results in Cold fusion Experiments."*

Photo: Gene Mallove, Douglas Morrison, Xing Zhong Li (photo courtesy: unknown).

This view of Bressani's strikes at the core of the "theoretical objections" to cold fusion (if such a phrase has scientific meaning). Kasagi's results demonstrate experimentally that lowering of the Coulomb interaction barrier in condensed matter is not a miracle but is an observed physical effect. Furthermore, having effectively reduced this barrier, the product branching ratio of hot fusion is changed, and is changed in the direction of our observations of Condensed Matter Nuclear Science (CMNS – the origin of which will be discussed in reference to ICCF9). It has been argued that these changes are not sufficient to explain cold fusion and would not be sufficient even if extrapolated to the limiting condition of less than 1 eV interaction energy as is present in FPHE experiments. I did not know then and do not know now what to expect from a 4 or 5 order of magnitude extrapolation through a domain not explored, but a very important part of the arguments used to deny the reality of cold fusion on theoretical grounds had been shown to be flawed, irrelevant or invalid. Many of us who consulted our nuclear physics friends in the weeks following March 23, 1989 were told with absolute certainty that we (the physics community) knew everything that there was to be known about d-d interactions from intensive and expensive study, and that nothing changed in the condensed matter state ("electrons are irrelevant to nuclear interaction") or as the interaction energy was reduced towards zero. After ICCF7 these arguments could no longer be considered as true, and more revelation might be expected. As stated by Bressani: *"On the contrary scientific efforts performed mostly by University groups and oriented towards a physical comprehension of the effect seem to be more constructive and could lead, maybe at ICCF8, to a comprehension of the second 'miracle' of Cold fusion."*

The IAC met in Vancouver to consider only one bid for the siting of ICCF8. This bid was proposed by my good friend Franco Scaramuzzi, founding member of the IAC, conference stalwart and senior researcher at ENEA, arguably the most important and relevant national laboratory in Italy for this purpose. Although Italy had hosted ICCF2 chaired by Giuliano Preparata, and Monaco (the site of ICCF5) was just "next door," there was no opposition and no competition, and Scaramuzzi's proposal was accepted unanimously. Those of us who knew Franco well and had worked in collaboration with Scaramuzzi and ENEA knew that this would be a first class organization and scientific agenda. We were not disappointed.

ICCF8

The Eighth International Conference on Cold Fusion convened May 21-26, 2000, in Lerici, Italy at the antique and beautiful Villa Marigola Conference Center. Some idea of the charm of the place can be seen in the conference poster below and the picture of me sporting my ICCF4 T-shirt. The weather was perfect, the town delightful, the gastronomy everything one would expect of Italy, and some exceedingly important results were reported. Under the watchful stewardship of Franco Scaramuzzi and ENEA conference services, this was probably the most effectively organized of all conferences to date. Determined to achieve a high academic and scientific standard, a committee was appointed to sit together and review all submissions to determine their place in the program. This exercise, a meeting of the Science Program Committee of ICCF8, took place at ENEA Frascati over a two-day period. Nothing of this level and breadth of scrutiny had been applied before and the result was a tight and consistent conference.

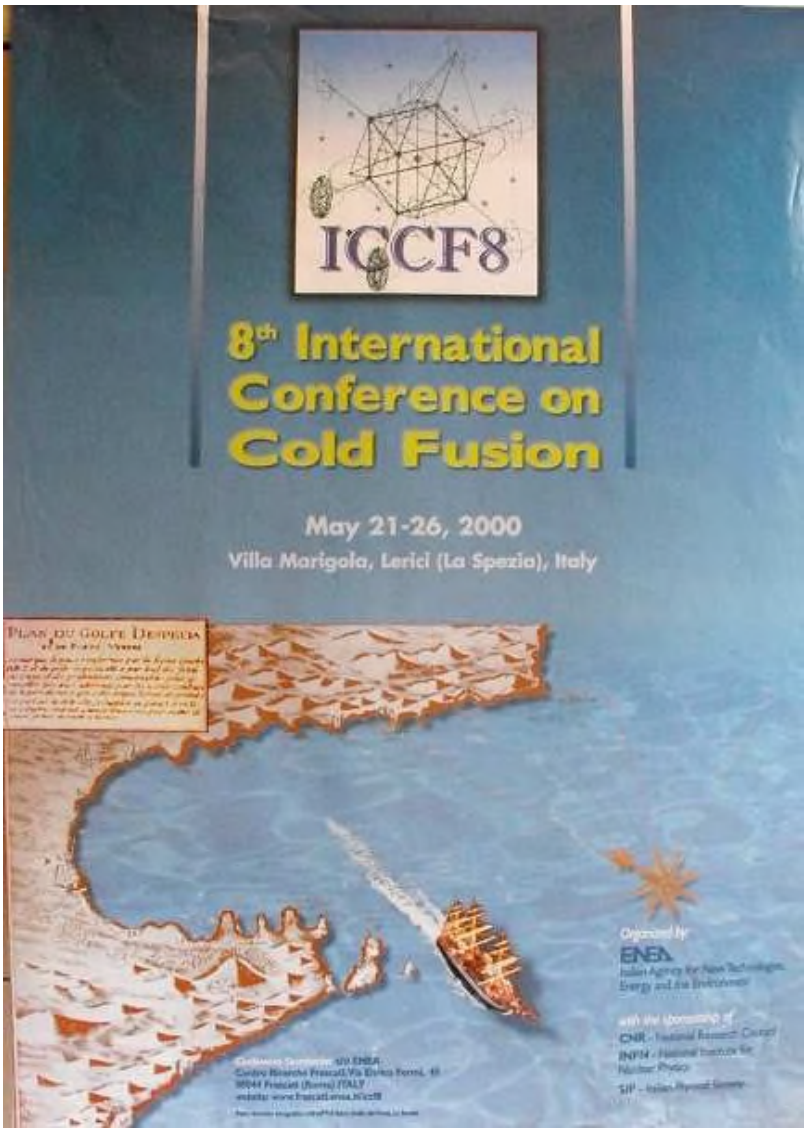


Photo: ICCF8 Poster

Photo: Michael McKubre (photo courtesy: Barbara Dello Russo).

Some comment needs to be made about the much lamented absence at ICCF8 of Giuliano Preparata, to that point the most influential man in Italian cold fusion, a towering intellect and very good friend personally and to the field. Giuliano was born in Padua (the site of ICCF19) in 1942 and died in Frascati on April 24, 2000 — one month before the conference. This sad event colored the conference and it is fair to say that the ICCF series lost a great deal when Giuliano's charm, wit, personality, love of physics, brilliance and fiery erudition were extinguished far too early. Although ICCF8 was successful in every way and the conference series continued to grow in strength, one wonders what might have been if Giuliano had remained to chide and guide us. Giuliano's right hand man, Emelio del Giudice (seen at the conference below) continued to deliver Giuliano's message as well as any could. But nobody could and Emelio, another of our fallen heroes is alas also not with us anymore.

In this light it is worth recalling in Franco Scaramuzzi's words that Giuliano Preparata *"participated in the February two-day meeting of the Science Program Committee: he was not*

well, but nevertheless he wanted to participate. He was extremely active, with his intelligent criticism, pointing out faults of the abstracts that he examined: his contribution was very important in making the proper choices for this Conference, and I am very grateful to him for his help." This exercise was the last of many that I undertook with Giuliano and I echo Franco's words. Although he was prevented from attending by the only means possible, Giuliano's presence was everywhere at the conference, and I designate him as the hero of ICCF8.

Photo: Emelio del Giudice (photo courtesy: Barbara DelloRusso).

Both Martin Fleischmann and Franco Scaramuzzi (seen below) presented lectures in memory of Giuliano Preparata, centering on his contributions to theory of coherent nuclear reactions. The technical content of the proceedings volume was preceded by papers from Franco Scaramuzzi and Martin Fleischmann honoring Giuliano Preparata . At the time of his death Preparata had taken a one-year leave of absence from his Chair at the University of Milan and was working with Italian government funding at ENEA Frascati in close collaboration with Fleischmann and Scaramuzzi. It was thus highly appropriate that these two speak of Giuliano. Scaramuzzi briefly described the Italian government initiative in cold fusion that was created almost solely through Giuliano's personal effort and was ultimately supervised interestingly by Carlo Rubbia as Director of ENEA. Fleischmann spoke of the breadth of Giuliano's ideas and hinted at work in other controversial areas such as the effect of waves and magnetism on health, which, as Martin put it, *"will make us even more enemies." In Martin's words about Giuliano: "For me he was a man who, with his breadth of vision which latterly extended from cosmology to biology (and*

which is so necessary in the development of science), who is only found once in a lifetime, perhaps only once in several lifetimes I am sure that his work will be increasingly appreciated and I am just deeply saddened that he has not lived to witness this himself."

Because of his personal stature and the status of ENEA in Italy and Europe, Scaramuzzi was able to secure the sponsorship or patronage of prestigious Italian science organizations. In addition to ENEA (Italian Agency for New Technologies, Energy, and the Environment), patronage included: CNR (National Research Council); INFN (National Institute for Nuclear Physics); and SIF (the Italian Physical Society). The ICCF8 conference proceedings were published by the Italian Physical Society in a peer-reviewed version in January 2001[19] in elegant and well-bound form. Possibly the only disappointing aspect of the conference was the relatively slight attendance, especially in view of the important scientific aspects discussed. There were 145 participants in the Conference: 41 from Italy, 40 from the U.S., 24 from Japan, 12 from Russia, and smaller numbers from 14 other countries.

Photo: Franco Scaramuzzi (photo courtesy: Gene Mallove).

[19] One significant downside to this professional and classical approach is the relative unavailability of the proceedings volume and access to the papers in it.

The conference led off with 5 papers on the observation of helium in cold fusion experiments. In his foreword to the proceedings Franco Scaramuzzi cited evidence of helium production confirming the original Miles observation as the foremost advance of the conference. In Franco's words: *"There have been quite convincing confirmations, at least three, of the detection of ^{4}He, understood to be a nuclear ash, in experiments with palladium and deuterium, obtained with different experimental procedures. In some cases the correlation with the heat produced gives support to the figure of 24 MeV per atom as a consequence of a D+D reaction. There was also an interesting evidence of ^{3}He production. The presence of these nuclei is the indubitable signature of a nuclear reaction."* This experimental observation was of particular pertinence since it was Giuliano Preparata who first had predicted that helium-4 would be the primary product of cold fusion. Franco's comment was especially heartening since my group was one of those cited. It is somewhat disappointing however to note that ICCF8 may have been the high tide mark so far for helium studies with surprisingly little experimental follow-up.

One exception to this statement is the notable work of my good friend and long-term collaboration partner Vittorio Violante (seen below at the conference with another of my good friends, and another fallen hero, Talbot Chubb). Vittorio was a protege of Franco Scaramuzzi's at ENEA and inherited many of Scaramuzzi's responsibilities and facilities when Franco semi-retired at about the time of ICCF8. It is therefore no surprise that Vittorio developed an interest in the helium question and set up a first class facility to measure helium-3 and helium-4 at ENEA with financial and political support from Carlo Rubbia.

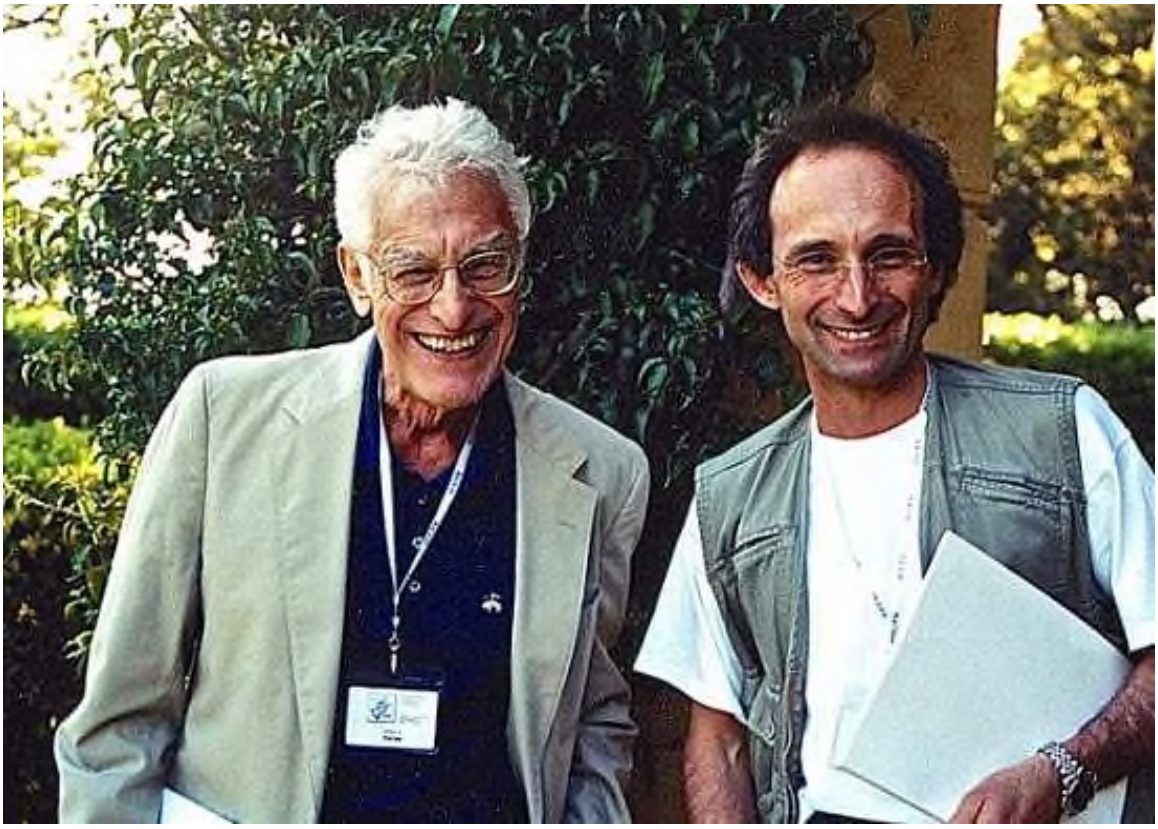


Photo: Talbot Chubb and Vittorio Violante (photo courtesy: Barbara DelloRusso).

The work of John Dash and his student John Warner received considerable attention at the conference, partly for the seemingly simple manner with which they were able to achieve modest but impressive levels of excess heat. These authors worked with cold rolled titanium cathodes in what they described as "acidified D_2O": one mole of H_2SO_4 to 99 moles of H_2O or D_2O. Their observations of excess heat by two calorimetric methods were at the 100 – 400 mW level and appeared to vary systematically with the extent of cathode mechanical deformation by rolling. Warner and Dash also expressed preliminary support for potential products of transmutation: Cr, Fe and Ni. This work was in a new direction and some of us "old hands" were waiting to see where it might lead. But two astute observers of the field, Jed Rothwell and Gene Mallove, were already impressed. In their Summary Report of ICCF8 in Infinite Energy Issue 32 Rothwell and Mallove proclaimed: *"This conference may have exposed two long-established ideas as myths: 1) High loading is essential to all forms of cold fusion (see Storms and Warner presentations below); 2) Cold fusion experiments are inherently difficult to perform (see Warner). High loading may not be needed after all, at least not with Ni, Ti, and Pt. It may be necessary with Pd, but that is probably the 'worst choice' of metals, as Storms put it."*

Because of its beautiful and world-famous location Lerici attracted what might be a record number of spouses and partners. My wife and I, and Peter Hagelstein and his (then) fiancé traveled together to the conference from Nice. Ed Storms was there with his wife Carol, as were many others. We have captured a few in the photographic record of the conference. Below we see Tom Passell and his wife Joan, Jed Rothwell and his wife Junko and Martin Fleischmann with his wife Sheila together with John Dash.

Photo: Tom and Joan Passell (photo courtesy: Gene Mallove).

Photo: Jed and Junko Rothwell (photo courtesy: Barbara Dello Russo).

Photo: Sheila Fleischmann, John Dash and Martin Fleischmann (photo courtesy: Barbara Dello Russo).

The photographic record also reveals the presence of a man who was later to become important in a parallel role. Shown below is Christos Stremmenos without his customary pipe standing outside Villa Marigola with Bill Collis. I had met Stremmenos at one or more of Bill's "Truffle" or "Asti" conferences but am not aware of him attending another ICCF. Christos Stremmenos is a retired Professor of the Department of Physical and Inorganic Chemistry at the University of Bologna. He served as Ambassador from Greece to Italy (1982-1987) for which service he was awarded the title of "Cavaliere di Gran Croce al Merito" of the Italian Republic. His academic specialization at the University of Bologna as well as in the Polytechnic of Athens was Spectroscopy and Photochemistry. He had tried but failed to reproduce the Fleischmann-Pons experiment early and then commenced to work in the field of nuclear reactions between nickel and hydrogen or deuterium. Stremmenos was the man who introduced the Greek money and political support to Andrea Rossi through the group that became Defkalion and thus is the man possibly more responsible for the non-technical part of Rossi's work and success than any other (all of which happened well after ICCF8). When Defkalion and Rossi split, Stremmenos stayed on Rossi's side.

Photo: Christos Stremmenos and Bill Collis (photo courtesy: Gene Mallove).

Although none of us knew it at the time, ICCF8 was to be the last conference for another stalwart, Douglas Morrison (seen below with Chino Srinivasan, Gene Mallove and Tom Passell). Doug had faithfully attended each of the conferences up to "8" and duly asked his same three questions and then reported each conference to his followers, somewhat less faithfully. But he was a friend and was welcomed at the conferences as an institution. Ironically through his "newsletter" Douglas made himself "famous" (in a small circle) and made us more so. I

happened to stay at the same small hotel as Douglas in the tiny town of Lerici, and we took breakfast each morning together amicably. He exhibited no indication of infirmity and each of us expected to meet again. From the "CERN Courier" of May 2001: *"A distinguished and conscientious physicist and a popular figure at CERN, Douglas R. O. Morrison died on 25 February 2001. He was born in 1929 in Glasgow."* So nine months after the conference and ten months after the death of his "bête noir" Giuliano Preparata, Douglas Morrison was also suddenly gone. The conference series would never be the same again without two of its more colorful characters of opposite polarity. But the conference and the concept would survive.

Photo: Mahadeva (Chino) Srinivasan, Gene Mallove, Tom Passell and Douglas Morrison (photo courtesy: Barbara Dello Russo).

The IAC met at Lerici to discuss the next conference and the next. The bid from China had been twice derailed, once by the continental rotation and once by circumstances outside the organizers control. Japan had hosted twice and considerable work was being done and interest generated in China. As the senior representative of that country at the conference and founding member of the IAC, Prof. Xing Zhong Li, a long time friend and ally, was well positioned to make a bid. The original proposal from Prof. Li to host ICCF9 in 2001 in Beijing was warmly accepted by the IAC. The proposed site was a brand-new conference center as yet unbuilt, associated with the very prestigious Tsinghua University. Delayed completion of the conference facility later became a problem and Prof. Li sought approval from the IAC to postpone the date of ICCF9 into 2002. After a site visit by my colleague Fran Tanzella and I, this approval was rapidly granted.

ICCF9

The Ninth International Conference on Cold Fusion was held May 19-24, 2002 in the newly opened International Convention Center at Tsinghua University, Beijing, China. The Chairman, Professor Xing Zhong Li, probably China's most eminent cold fusion scientist, was able to secure significant support and sponsorship from an impressive group of local science and government entities. In addition to the Department of Physics of Tsinghua University, sponsorship was provided by: the Fundamental Research Division of the Ministry of Science and Technology; the natural Science Foundation of China; the Chinese Nuclear Physics Society. This patronage and the splendor of the new conference/hotel facility in which we were hosted spoke significantly about the weight attached by Chinese Science and Government to our endeavor, and to Professor Li.

Impressed by this official support Gene Mallove in his summary of ICCF9 in *Infinite Energy* stated the following with partial irony: *"It is gratifying to observe the open-mindedness of these Chinese science organizations. Would that ICCF10 could be sponsored by the U.S. DOE, NSF, the American Nuclear Society, and the MIT Physics Department. But please don't hold your breath for that!"* I echoed (or "pre-echoed") this sentiment in my closing summary to the conference in the following words: *"I think that the effect we are studying here, from an energy perspective, will make the greatest difference to one country on the surface of this earth; that country is China. I suspect that China stands to take more advantage of what we are doing than any other nation. India could take advantage of it, but the work in India seems to be proceeding very slowly, and it doesn't appear to have government support. Here in China, the work is moving rapidly and effectively, and seems to have at least some level of governmental support. This makes me comfortable that there is an awareness and understanding of the potential."* I do not know what is the present state of activity in China 12 years after this observation. Certainly they have had sufficient time and incentive to capitalize on the opportunity that Prof. Li placed before them. But have they?

The opening address to the conference was delivered by Yan Kang Zhen, vice president of Tsinghua University, who welcomed participants to the city of Beijing and the university. Prof. Zhen can be seen in the photograph below with Prof. Li. Heavily influenced by Giuliano Preparata, the theme of ICCF8 was coherence and ICCF9 was organized explicitly with this same theme. As stated by Prof. Li in his introduction to the proceedings: *"the coherence between condensed mater physics and nuclear physics; the coherence between 'hot fusion' and 'cold fusion'; and the coherence between application and fundamental research."* Peter Hagelstein and several others had begun more heavily to involve quantum coherence in their thinking and the title of the paper offered by my group at ICCF8 (with Peter as co-author) was "The emergence of a coherent explanation for anomalies observed in D/Pd and H/Pd systems," suggesting that we might begin to think about rationalizing the behaviors of the two light hydrogen isotopes. And of course the title of Giuliano Preparata's seminal book was *QED Coherence in Matter.*

Photo: Yan Kang Zhen, vice president of Tsinghua University, and Xing Zhong Li, Chairman of ICCF9 and Professor of Physics at Tsinghua University (photo courtesy: Gene Mallove).

The official count was only 124 attendees with 77 listed from abroad and the remainder from China, further indicating the serious interest of that country. There was, however, an impressive and expanded national diversity as can be judged somewhat from the conference delegates photograph below. Attendees were present from Australia, Belarus, China, France, Georgia, Germany, Greece, India, Indonesia, Israel, Italy, Japan, Romania, Russia, Spain, U.K., Ukraine, and the U.S. Unannounced and unexpected a four-person group from Israel (three individuals from Israel and one Israeli resident in the U.S.) were present for ICCF9. Representing Energetics Technologies, this group was destined to dominate the cold fusion scene for the next decade but were in Beijing in information-gathering and watching mode. None of us knew this of course and the fact that they did not speak or share their intentions meant that few if any paid attention beyond the fact that a new country had been added to the cold fusion atlas.

Photo: ICCF9 Conference photo.

In the light of the sad and untimely demise of our "resident critic" Douglass Morrison, the organizers made an effort to obtain a balance in perspective by inviting Thomas Dolan, an eminent physicist and expert on fusion of all types from the Idaho National Engineering and Environmental Laboratory (INEL) in the U.S. Dolan provided valuable commentary at the conference that he summarized in a written report titled *"An outsider's view of cold fusion"* that was included in the proceedings. In that Tom made the following very valid points under the heading "NEGATIVE FACTORS: *(i) The public is swayed by the news media. The only scientific information that most people receive is from television, radio, newspapers, and news magazines. Journalists sometimes exaggerate mistakes, dangers, and controversies, because such exaggerations excite people, increase their audience, and sell more advertising. Unless journalists become more responsible, the public will continue to be misinformed. Such misinformation is responsible for the exaggerated fears of nuclear power; (ii) the name 'cold fusion' is also misleading. In some cases this phenomenon is not cold, and in some cases, such as transmutation of heavy elements, it may not be 'fusion'."* As discussed below the second of these points was addressed at the conference.

Dolan's first point was reinforced by possibly the most talked about paper at ICCF9 presented by Yasuhiro Iwamura reporting on the work of his very able research group at Mitsubishi Heavy Industries (MHI). This work had been going on for some time and was reported at ICCF8 but the presentation at ICCF9 was clearer and more confident than I had seen before. Iwamura *et al.* take the flux variable seriously. In fact the whole idea of flux — the idea that the effect we are studying is a dynamic and not an equilibrium property as predicted by Hagelstein and as my group first reported at ICCF5 in Monaco — was strongly represented at ICCF9. In my closing remarks I made the following comment: *"The flux of material is also important and was very much discussed at this conference. In fact, I did a small statistical survey this morning. Something like 50% of the papers at this conference, including both theory and experiment, discuss the issue of flux as a driving force for the effect."* For MHI the flux is a forced flow of deuterium gas through a planar specimen. The gas permeates Pd complexes consisting of a thin

Pd layer, alternating CaO and Pd layers and bulk Pd. Selected atoms deposited on the entry surface are observed to "transmute" in altogether unexpected ways. For example, cesium was reported to "up-convert" to praseodymium and Iwamura presented an astonishing graph showing the surface number of atoms of Cs decreasing as Pr increased in quantitative balance as D_2 permeation proceeded. If correct, whatever the cause was not fusion in any conventional sense. I was significantly moved by this work and the very high experimental standard of the MHI scientists, and commented on the need perhaps to take the transmutation evidence much more seriously on the basis of these seemingly irrefutable results.

At ICCF8 emphasis had been placed heavily on the heat-helium correlation and Franco Scaramuzzi began the technical reports with this topic. As such I was surprised to see essentially no discussion of this topic at ICCF9. Session 3 of the conference was titled "HELIUM AND TRITIUM DETECTION" but included very little new data with work focusing on tritium and helium-3. The SRI group reported on helium-3 production. One of the speakers in the "helium" session was one of our senior statesmen Prof. Yoshiaki Arata (seen below) who talked about *"Picnonuclear fusion generated in "lattice-reactor" of metallic deuterium lattice within metal atom-clusters."* The reason for this change of emphasis is not clear although may reflect the challenge of measuring helium-4 in the high ambient background, the level of skill needed to do so, and (not inconsequentially) the costs of such measurements. Only now, more than a dozen years after ICCF9, are we moving back to the place where replication of heat-helium experiments has achieved a priority and "cost-benefit ratio" sufficient to motivate this undertaking.

Not only was the heat-helium correlation not widely discussed at ICCF9, there was very little experimental discussion of what I described in my summary as: *"boring old palladium deuterium systems."* Instead we saw what might be described as the beginning of a renaissance of excess heat studies in natural water electrolytes. Back in 1992 and 1993 Bob Bush, Francesco Piantelli and others (including Fleischmann himself in private conversation) ushered in the slightly uncomfortable possibility that excess heat at nuclear levels might be accessed using natural water[20] or hydrogen gas at natural isotopic ratios. This information was largely ignored then but re-emerged with some impressive new results at ICCF9. As I noted in my summary of the conference: *"Professor Ota really caused me to scratch my head and reevaluate my position with his rather unambiguous and clear demonstration of a heat effect from what once was called the Patterson cell, or some derivative thereof."* In an impressive 9 out of 32 results (in 28 experiments) Ota's team was able to demonstrate greater than 25% average excess power in a relatively simple flow-through mass-flow natural-water calorimeter reaching a very impressive power density of ~2kW/cm^3 of Pd. This result perhaps needs to be reevaluated, or at least remembered, in the light of our current interest in the results of Andrea Rossi.

[20] Fresh waters of the United States contain from 0.0133 to 0.0154 mole % deuterium (roughly 1 part in 6500 – 7500). As far as I am aware nobody has performed serious LENR studies in deuterium depleted water and the question remains to what extent deuterium participates in excess heat production in natural hydrogen experiments.


Photo: Professor Yoshiaki Arata (photo courtesy: Gene Mallove).

As a break from heat, helium and transmutation on Wednesday afternoon many of the conferees were transported, as Gene Mallove notes in his conference summary, *"in two large buses through the traffic of Beijing, and outward on free-flowing superhighways toward the Great Wall of China (at Badaling). For a few hours we all walked and climbed the awesome, ancient structure, which stretches some 7,000 kilometers over mountaintops and into valleys across China. It was a relaxing interlude."* Although I had been to China before, this was my first time to experience directly the Great Wall. It is a magnificent and impressive structure, the visit made all the more memorable by being in the company of so many great cold fusion warriors. Below we have shots of Tom Passell and Jean-Paul Biberian, and Vladimir Vysotskii and Gene Mallove on the Great Wall of China.

Photo: Tom Passell and Jean-Paul Biberian on the wall (photo courtesy: Gene Mallove).

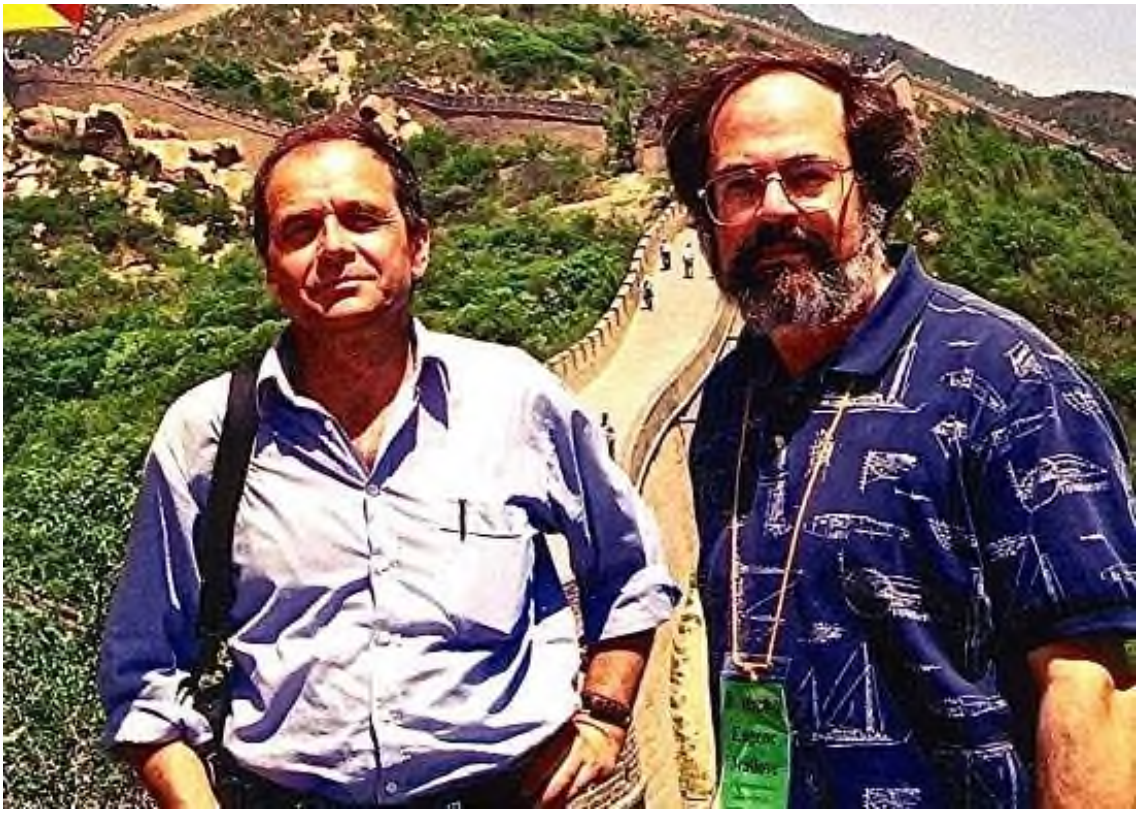


Photo: Vladimir Vysotskii and Gene Mallove on the wall (photo courtesy: Gene Mallove).

At our meeting in Beijing the IAC were encouraged for the first time to “sing for our supper.” The issue of location for ICCF10 was settled without stress or rancor. My very good friend, long time collaborator and IAC member Peter Hagelstein from MIT was confident that he could bring an organization together in the vicinity of, possible even on the precincts of MIT. Given the stature of Tsinghua University, it seemed only fitting that one of the most prestigious universities in the U.S. participate in the next rotation of the conference back to the Americas. Some of us were aware of how much work this would entail for Peter and had pangs of guilt over this decision. But we knew that Peter would do an excellent and highly professional job and would set and maintain the very highest standards of academic research. Because of technical holdups, ICCF9 occurred almost exactly two years after ICCF8. The IAC agreed that with the rapid development of the field two years was too long between conferences and it was agreed that ICCF10 would convene either in September or October of 2003 under the Chairmanship of Peter Hagelstein (seen below at ICCF9).

Photo: Peter Hagelstein (photo courtesy: Gene Mallove).

With that task formally concluded Prof. Li set us to work. For the satisfactory completion on this assigned task and its long ranging implications, as well as for the very successful implementation of the long awaited conference in China, I am going to denote Xing Zhong Li as the “hero of the conference.” Before I get to the task and its resolution, a little preamble. As commented by Tom Dolan the descriptor “cold fusion” is not everyone’s “cup of tea.” As noted previously this title

was willed onto us by Steve Jones and Johann Rafelski in their 1987 paper[21] titled “Cold Nuclear Fusion” in which they referred to muon catalyzed fusion. Many question whether “cold fusion” is an even partially correct description of our field of study. Although it seems certain that some form of fusion does take place at temperatures far less than the sun or man-made thermonuclear events, what about transmutation? What about Iwamura and MHI? What about George Miley and Tadahiko Mizuno’s “massive transmutation” results? Miley can be see below at the conference with another of the “old guard” Jacques Dufour and Mizuno can be seen with Jed Rothwell.

Photo: Jacques Dufour and George Miley (photo courtesy: Gene Mallove).

[21] J. Rafelski and S.E. Jones, “Cold Nuclear Fusion,” Scientific American, 257: 84-89 (July 1987).


Photo: Jed Rothwell and Tadahiko Mizuno (photo courtesy: Gene Mallove).

This is not a new debate. At every meeting I have attended on this topic, someone will state something to the effect that "cold fusion is a misleading, inappropriate or divisive name" — many will propose alternatives. I have been collecting acronyms proposed and used for "cold fusion" and now have a list exceeding 20. Worse than the babel that this produces between us, and the confusion it engenders on the outside, people who coin names seem dogmatically bound to them much as a theorist defends his or her model or a mother her young child — unconditionally. So it was with some trepidation that I and the assembled members of the IAC accepted that challenge of Prof. Li to create a more accurate and more accurately descriptive name for the field, potentially to be used also for a Society, and a Journal (more of this in the history of ICCF10).

The discussion was long. Every one of us (maybe 15 people of the IAC including prestigious local academics) had thoughts and an opinion — some more than one. Until the time that we had begun to see helium-4, helium-3 and tritium from our experiments with our own eyes and instruments (these isotopes being clearly products of fusion) we had not used the descriptor "cold fusion" so I was not strongly committed to its retention. But neither was I as opposed as some were. The discussion finally settled down to the following point. It was increasingly likely that Martin Fleischmann and Stanley Pons had discovered something far larger than even they imagined. Just as Julian Schwinger had speculated (and essentially every other physicist had perfunctorily dismissed) the processes of nuclear physics proceed differently in condensed matter than in free space. This statement is huge and if shown to be general (rather than confined

to the few cases studied so far) it will have very wide-ranging implications for the foundations of nuclear physics. We were not then, and are not now, in a position to specify what it is about the condensed state that conveys this new property and possibility. Some look at the crystalline order that partitions space in a solid lattice. Some look at electrons and screening. Some look at phonons. Others focus on the presence of a surface or features in that surface. It is interesting to note that Martin Fleischmann, (seen below at the conference with Chino Srinivasan, chairman of ICCF17) chose to title his ICCF9 conference paper *"Searching for the consequences of many-body effects in condensed phase systems"* — this title no doubt inspired by Giuliano Preparata.

Photo: Mahadeva (Chino) Srinivasan and Martin Fleischmann (photo courtesy: Gene Mallove).

The consensus collective view of the IAC, possibly unanimous, after half a dozen or more trials, was Condensed Matter Nuclear Science (CMNS) as an overall name for the field of study in which we are engaged. This name is intended to be broad and inclusive. If we find examples of phenomena that clearly have the same or similar origin that do not conform to CMNS then we will need to broaden or redefine our designation. But until then the name coined by Prof. Li's IAC at ICCF9 has stood the test of time. The potential range of Condensed Matter Nuclear Science and the effects that might occur if nuclear processes can be caused to take place by different pathways, with different rates and different product branching ratios, have barely begun to be explored. The Fleischmann Pons Heat Effect itself may have widespread and potentially profoundly useful applications. But in CMNS there is so much more to explore. We ended the IAC meetings at ICCF9 with a name, CMNS, that was adopted formally in future conferences in this series, and a destination for ICCF10, Cambridge Massachusetts, USA.

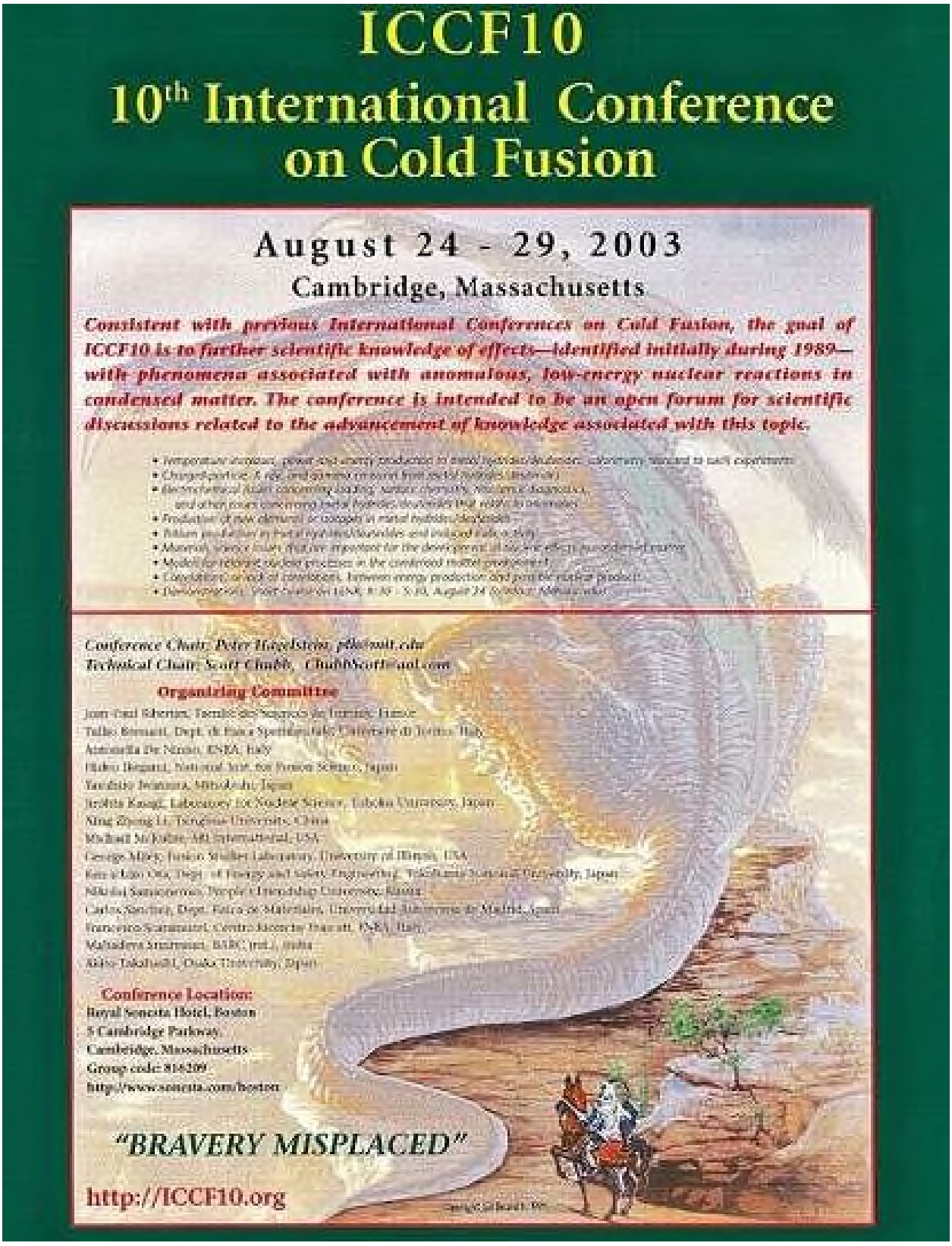
A Brief History and Introduction to the International Conference Series

Part Four - From ICCF10 to ICCF12

ICCF10

Searching for information about ICCF10 to supplement and trigger my fading memory, I came across a Danish site with words that translated as "ICCF10:*Turning point for cold fusion.*" I had not thought of it before but one might reasonably argue this. Ten conferences and a decade and a half in there was a different flavor in Cambridge and after. New powerful players openly entered the field and the scientific standard imposed (literally in some cases) by our Chairman Professor Peter Hagelstein of MIT was greater than any before. Peter can be seen below with (his now wife, then fiancée) Debbie Darago and Vittorio Violante at the banquet. ICCF10 took place under the theme of "Bravery Misplaced" (see conference poster below) from Sunday, August 24 through Friday, August 29, 2003 at the Royal Sonesta Hotel in Cambridge, Massachusetts, less than one mile from MIT. Organized at the administrative level by MIT Conference Services, the official group that handles registration and other conference mechanics for MIT professors and other campus groups, we were welcomed by a sign that read: "MIT 10th International Conference on Cold Fusion." I hope Peter kept that sign. One day perhaps he will use it to help burnish MIT's reputation in this matter (see Gene Mallove's 55 page report).

Photo: Debbie Darago, Peter Hagelstein and Vittorio Violante at the Conference Banquet (photo courtesy: Gene Mallove).



ICCF10 Conference Poster.

A useful tradition was established with initial impetus from Hagelstein (later resumed by Dave Nagel) of a "Short Course" intended as an introduction for newcomers to LENR. This was held in a jam-packed smaller conference room all day Sunday, August 24. Most appreciated were the compendious paper hand-outs that were provided by what Gene Mallove called the "*Cold Fusion Professors": John Dash, Peter Hagelstein, Mike McKubre, George Miley, Ed Storms, and Akito Takahashi*. The concisely stated course objective was: "to provide an introduction to the field for persons interested in gaining a basic background in the science and technology aspects. Both theoretical and experimental topics will be covered for deuterium and proton based reactions." The course was well subscribed and attended and was continued at ICCF11 by Jean-Paul Biberian, and later under Nagel's guidance in slightly evolving form at subsequent conferences.

At the conference proper the hoped-for opportunity to engage in substantive exchange with MIT faculty induced by proximity did not occur. Some individual physicists or academics may have attended selected talks but did not precipitate dialogue or input (or monologues in either direction). The Press were invited and a number came with one constructive report in the *Wall Street Journal*, the only mainstream outlet that had consistently maintained, from our perspective, a rational attitude to cold fusion or now CMNS (see below). But given the proximity to major cities and universities, this was well below the hopes and the expectations of the local organizing committee. However, in addition to some very interesting science, several highly auspicious happenings occurred at ICCF10: the creation of our own *Journal of Condensed Matter Nuclear Science (JCMNS)*; the attention of the U.S. Department of Energy that ultimately translated into the second review of our field by the agency officially charged with securing the energy future of the U.S.; the open and forceful entry of a new well-funded, well-motivated and highly- competent research and development organization, Energetics Technologies, Inc. The company was good and the weather pleasant as one can see from the bucolic group photo below, taken on the banks of Charles River just downstream from MIT.


ICCF10 Group photo.

The DOE review came about as a result of a two-part thrust from Peter Hagelstein at the technical level, and Randy Hekman at the political. Peter, believing (with good reason) that the results of ICCF10 were solid enough to withstand what we knew would be an aggressive DOE review, wrote on September 12, 2003 to U.S. Department of Energy Secretary Spencer Abraham (for text see Infinite Energy Issue 52). In Hagelstein's words to Abraham: "*I propose that you consider the possibility of convening a new review panel to provide an updated recommendation based on the initial tasking provided by Admiral Watkins [in 1989]*." It is clear that this letter caused something of a stir at the highest levels of DOE but it is not clear that activity would have moved forward without the serendipitous involvement of Randy Hekman. As with many things in life it is not what you know but who you know. Randy Hekman knew Spencer Abraham and Spencer respected (and had political connection to) Randy. The review was authorized with impetus from the top (Abraham) and "below" (the scientists). Randy Hekman can be seen seated to the very left of the photo below, behind one of our senior statesmen Richard Oriani asking a question of the speaker.

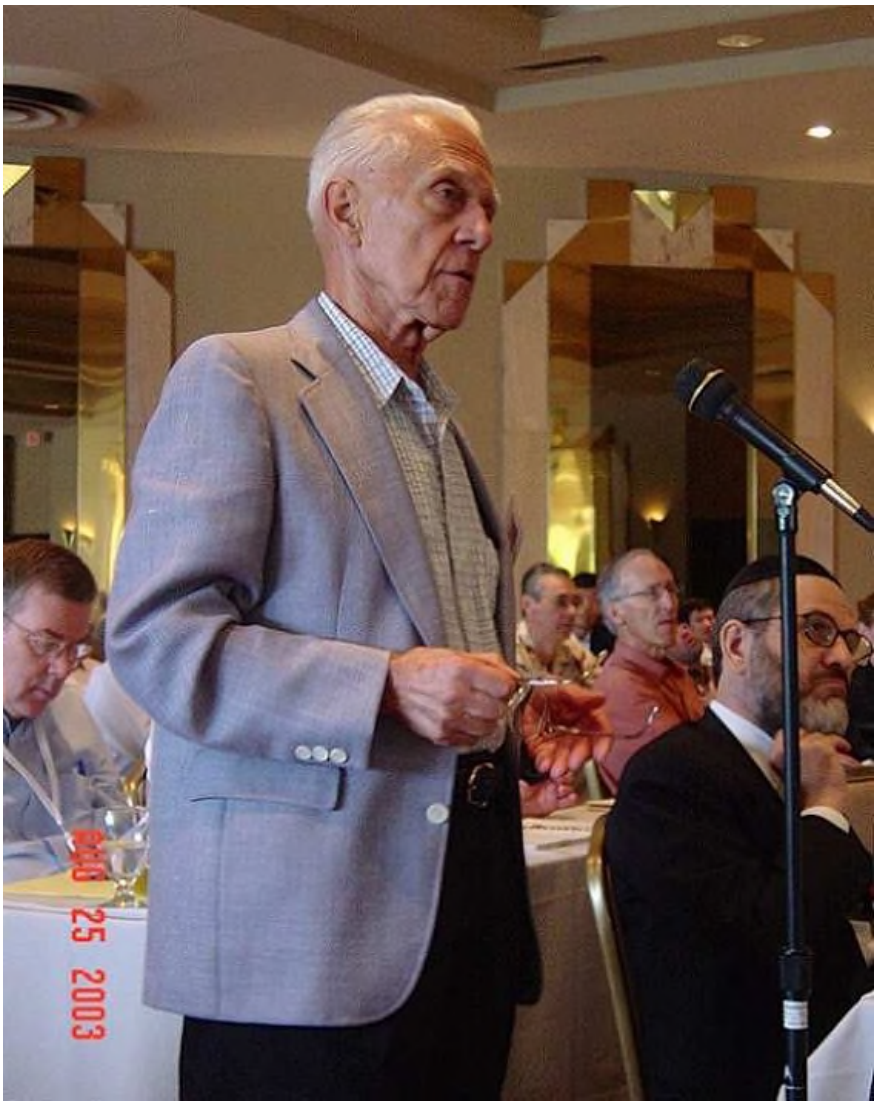


Photo: Richard Oriani at the microphone with Randy Hekman seated behind (photo courtesy:Gene Mallove).

A very big surprise at ICCF10 was the unexpected presentation by Dr. Arik El-Boher of Energetics Technologies Inc., based in New Jersey but with research facilities in Omer, Israel. El-Boher, seen below in a pose I have not seen him in again, was one of about a half-dozen individuals representing the company at ICCF10. It was obvious from his presentation that an intense program of research aimed at power generation was underway in Israel. El-Boher revealed that the company was pursuing four basic approaches: glow discharge deuterium gas systems; heavy water electrolytic cells; gas loaded catalytic cells, and high-pressure cells with ultrasonic wave excitation. Stunning in the presentation was the report of substantial excess power generation and energy gain at useful working temperatures in gas discharge cells, encountering the heat-after-death phenomenon, and the production of tritium. I was sitting next to Martin Fleischmann, who had to leave for the bulk of this talk for medical reasons. When he returned Martin asked me: “What did I miss?” I replied: “The best paper of the conference.” The results, while casually reported, were spectacular! Martin can be seen below in good form and uncustomary hat.

Photo: Arik El-Boher (photo courtesy: Gene Mallove).


Photo: Martin Fleischmann with hat (photo courtesy: Gene Mallove).

The Energetics group was led by two individuals: Dr. Irving Dardik of New Jersey, who had made a name for himself in the treatment of various illnesses using special "SuperWave" or "wave within a wave," multi-resonant stimulations. According to El-Boher, this type of input power waveform was being used to good effect in the LENR experiments being carried out in Israel. The other was Professor Hermann Branover (now deceased), a world expert in Magneto Hydrodynamics (MHD) who had been tasked to establish the research activity and had selected his former students Shaul Lesin and Arik El-Boher to lead the activity in Branover's adopted home, Israel. Tasked by whom? The surprising answer was Sidney Kimmel, who had made and lost and made again his fortune in the garment industry and who had benefited significantly (perhaps critically) from Irv Dardik's "SuperWave" health treatment. Impressed and grateful for the medical result Sidney asked Dardik "what else can SuperWaves do?" Dardik answered "cold fusion." After due diligence and scrutiny from Branover and Ehud Greenspan (consultant and Professor at Lawrence Berkeley Laboratories, LBL), Energetics was established. The essence of novelty in the four focus topics reported by El-Boher at ICCF10 was the use of "SuperWave" stimulation in physical systems.

The nature and expected effect of these waves were undefined, at least to the audience at the time of presentation and many of us were extremely dubious. Using his chairman's prerogative Peter Hagelstein demanded that Irv Dardik remove the name "SuperWave" from the title of his talk as it sounded "unscientific," which he believed would harm the credibility of the conference. This Irv refused to do and he withdrew his talk that was intended to precede (and provide context for) Arik El-Boher's. Even aware of this concern, the credibility of the results presented by El-Boher seriously piqued my interest and my answer to Martin was earnest. The glow discharge method and results reported by El-Boher was clearly a preferred way to go. If high gain could be achieved at high temperature (especially avoiding the finicky-ness of electrochemistry) then this was a clear path to technology. Implications and indications were that Dardik's "SuperWave" method, whatever it was, had the potential to allow simultaneously high loading and high flux in the electrochemical situation — something we had been struggling at SRI to achieve since reporting the important effect of the flux variable at ICCF5 in 1995, some eight years earlier.

As a result of this interest I spent considerable time in discussion with Branover (who was an extremely impressive individual), Dardik (equally and differently impressive[22] with whom I became and remain a good friend), Lesin and El-Boher (who became active colleagues although Shaul Lesin is no longer in the field). A very important member of the Energetics "hands-on" team was their electrochemist, Tanya Zilov, seen below with Irina Savvatimova. I proceeded directly from Cambridge to New Jersey to confer with members of the team and thence to Manhattan to meet their patron, Sidney Kimmel. Shortly afterwards at Sidney's behest I left for Israel to meet the full team. In the meeting in Manhattan Sidney asked me what I thought of the Energetics team, their results and the relevance of Irv Dardik's "SuperWave" ideas to this field. I explained that the team had come so far, so fast, from obscurity to being clear leaders in the field that: "*either they were the luckiest group in the world, or had divine guidance, or there was something important to what Irv was saying.*" Or perhaps all three? At that point I was not sure but I was extremely interested. This began a decade long engagement and collaboration that

[22] Irv Dardik was awarded the Preparata Medal at ICCF14.

ended only when the Sidney Kimmel Institute for Nuclear Renaissance (SKINR) was established under Rob Duncan's umbrella at "Mizzou" in Columbia, Missouri in April 2012. Since March 2013 SKINR has been led by Graham Hubler, seen below at ICCF10 in his (then) role as head of the Materials and Sensors branch at NRL.

Another new face and force if not burst but perhaps popped onto the scene at ICCF10. Steven B. Krivit, seen below, author with his (then) wife Nadine Winocur of a passable cold fusion book[23] with broad public appeal, presented himself at ICCF10 with a strong expressed desire to "do good." Peter Hagelstein had commissioned from his personal funds a film crew to document what he anticipated to be an historic occasion. So overwhelmed was Peter with his Chairmanship duties that my colleague Fran Tanzella and I, and Matt Trevithick (entrepreneur on sabbatical and later Energy Partner at Venrock) volunteered to take charge of the film crew and organize suitable interviews. Young Steve (as he seemed), looking for some way to help, tendered his services as interviewer, to which we cheerfully agreed. We muddled through several interviews of minor significance but when it came to Martin Fleischmann the questions Steve directed were so embarrassingly uninformed (perhaps some record remains?) that I took over the interview much to Martin's obvious relief. But nevertheless, a star was born in the person of Steve Krivit, that would shine for a time and contribute substantially to the field of CMNS, until crashing with the force of ego on the Scylla and Charybdis of Widom & Larsen and Andrea Rossi.

Photo: Irina Savvatimova and Tanya Zilov (photo courtesy: Gene Mallove).

[23] Steven Krivit and Nadine Winocur, "The Rebirth of Cold Fusion".

Photo: Graham Hubler (photo courtesy: Gene Mallove).

Photo: Steven Krivit (photo courtesy: Gene Mallove).

The SRI and MIT team had changed course somewhat by ICCF10. Our hope and plan was to decouple the initiating conditions of excess heat production from the trigger. Bolstered by a patent application (now long lapsed thanks, in part, to SAWS) that identified the conditions necessary for excess heat production in metal lattices, we sought to define and prepare compositions of matter that were quiescent until stimulated. From this basis technology might develop. Focus obviously turned to triggering, specifically the laser triggering of Dennis Letts, seen below. Now called the Letts-Cravens Effect— excess heat stimulated by laser light irradiation of cold fusion electrolytic cell cathodes. This effect was independently reported by three outside groups at ICCF10: the SRI group with Peter Hagelstein, Matt Trevithick and Project Cobalt; Ed Storms in New Mexico; and Mitch Swartz in Wellesley, Massachusetts. This conference and this session basically "kicked off" the pursuit of triggers that continues today with increasing urgency although the emphasis on lasers has oddly lapsed but may be in the process of recovering.

Peter Hagelstein was ably assisted at ICCF10 by his daughter Jessica, seen below with Francesco Celani. Jessica interned with us for a time at SRI and went on the complete a degree in Chemistry at MIT. Several other new faces appeared at ICCF10. I believe this was Ludwik Kowalski's first major conference in the field. Ludwik, seen below at lunch, attended several further ICCFs. He went on to self-publish over 400 short articles on the topic of cold fusion, many of which derived from correspondence engaging Ludwik with many of the top people in the field.

ICCF10 was not all "new faces" and several of the "old hands" were well in evidence. Ed Storms can be seen below with Mike Melich, and Scott Chubb in cheerful pose with Martin Fleischmann. Below that we see Vittorio Violante with his wife Giovanna and daughter Tanya. Finally Les Case can be seen below at the podium with his up-scaled "boiler" that he hoped to develop to the point of thermal self-sustainment, a goal he had been vigorously encouraged to pursue by Gene Mallove. Extremely sadly, especially considering the circumstances of both their deaths, Case called up some of us in the field a few weeks before his death claiming to have succeeded in this goal and that "*we would all be vindicated.*" This was not to be. Worse, speculation exists that Les' work with nano-nickel to achieve this goal may have contributed to the heart condition that caused his death. We will never know but this is a cautionary tale.

Photo: Dennis Letts (photo courtesy: Gene Mallove).

Photo: Jessica Hagelstein and Francesco Celani (photo courtesy: Gene Mallove).

Photo: Ludwik Kowalski (photo courtesy: Gene Mallove).

Photo: Ed Storms and Mike Melich (photo courtesy: Gene Mallove).

Photo: Scott Chubb and Martin Fleischmann (photo courtesy: Gene Mallove).

Photo: Vittorio, Giovanna and Tanya Violante (photo courtesy: Gene Mallove).

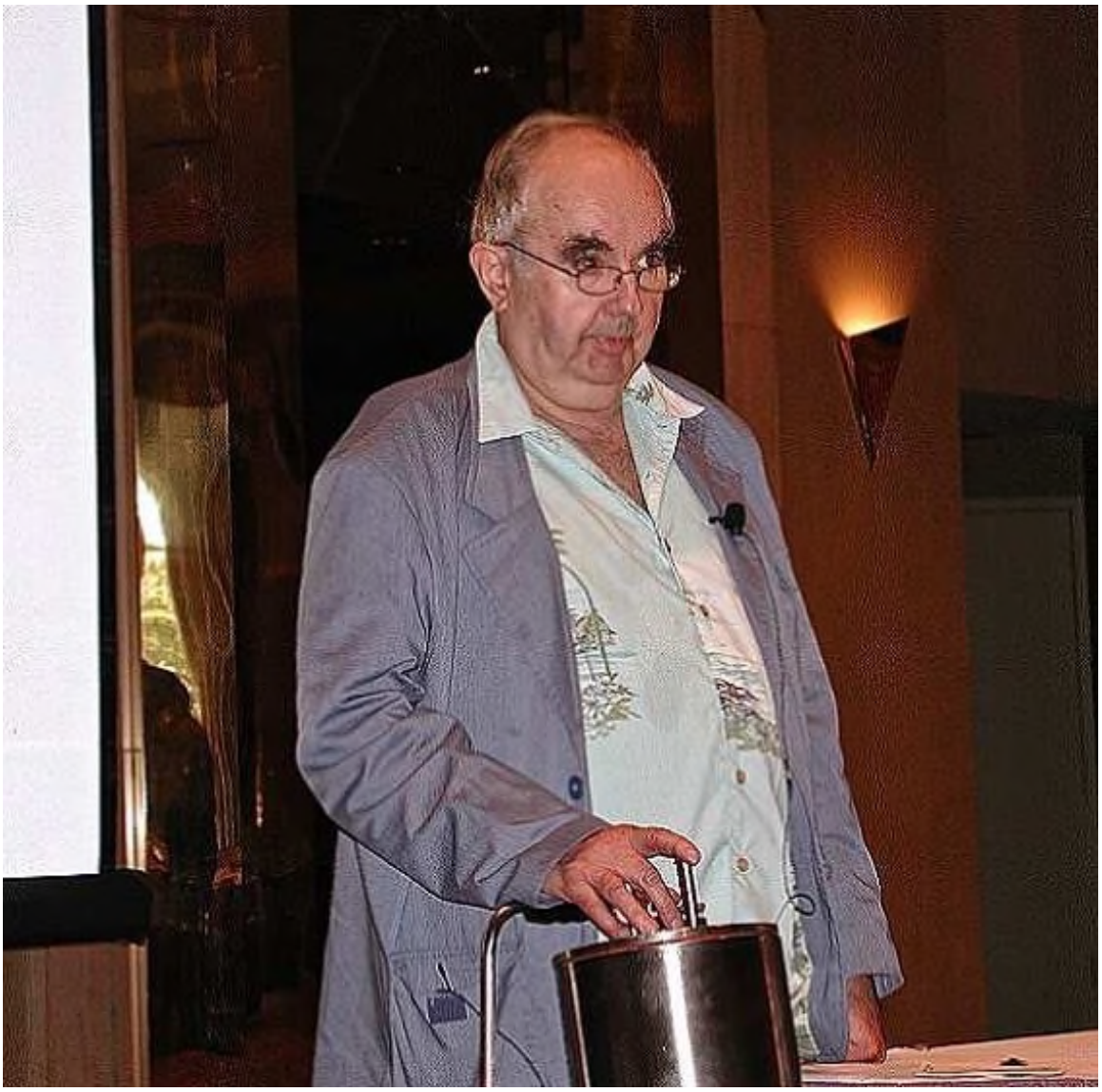


Photo: Les Case with “hardware” (photo courtesy: Gene Mallove).

One of the most confounding papers presented at ICCF10 was from the collaboration between two of our oldest, most able and most respected community members, Richard Oriani and John C. Fisher (seen below at the podium). Using Ni and Pd cathodes in Li_2SO_4 dissolved in heavy or light water, and CR-39 particle track detectors, they concluded: “*There is a causal relationship between electrolysis and energetic charged particles and that neither Pd nor D_2O is essential for the generation of a nuclear reaction.*” In light of today’s discussion of Piantelli, Rossi, Parkhomov and the other nickel natural hydrogen claims for excess heat, this statement does not sound as strange today as it did then. But what was their evidence? Fisher has a model for nuclear processes initiated by poly-neutrons that awaits experimental verification. But Oriani, one of the most venerated “classical” materials scientist with huge experimental skill and expertise in the field of hydrogen in metals, had results. One of the most intriguing results, and a reason possibly to invoke Fisher’s poly-neutrons or some other large scale “exotic” cluster, is that detectors outside the electrolytic environment and outside the cells showed signs of high

energy track etching that made it appear as if something nuclear had exploded into multiple fragments only a few mm from the detector! The detector, CR-39, went on to be important in a number of subsequent experiments, particularly at SPAWAR but also at SRI and elsewhere. We came to learn quite a lot about this detection method under the patient tutelage of Andrei Lipson and Alexander Roussetski, but I think it is fair to say that so far we have no explanation for the Oriani-Fisher observations.

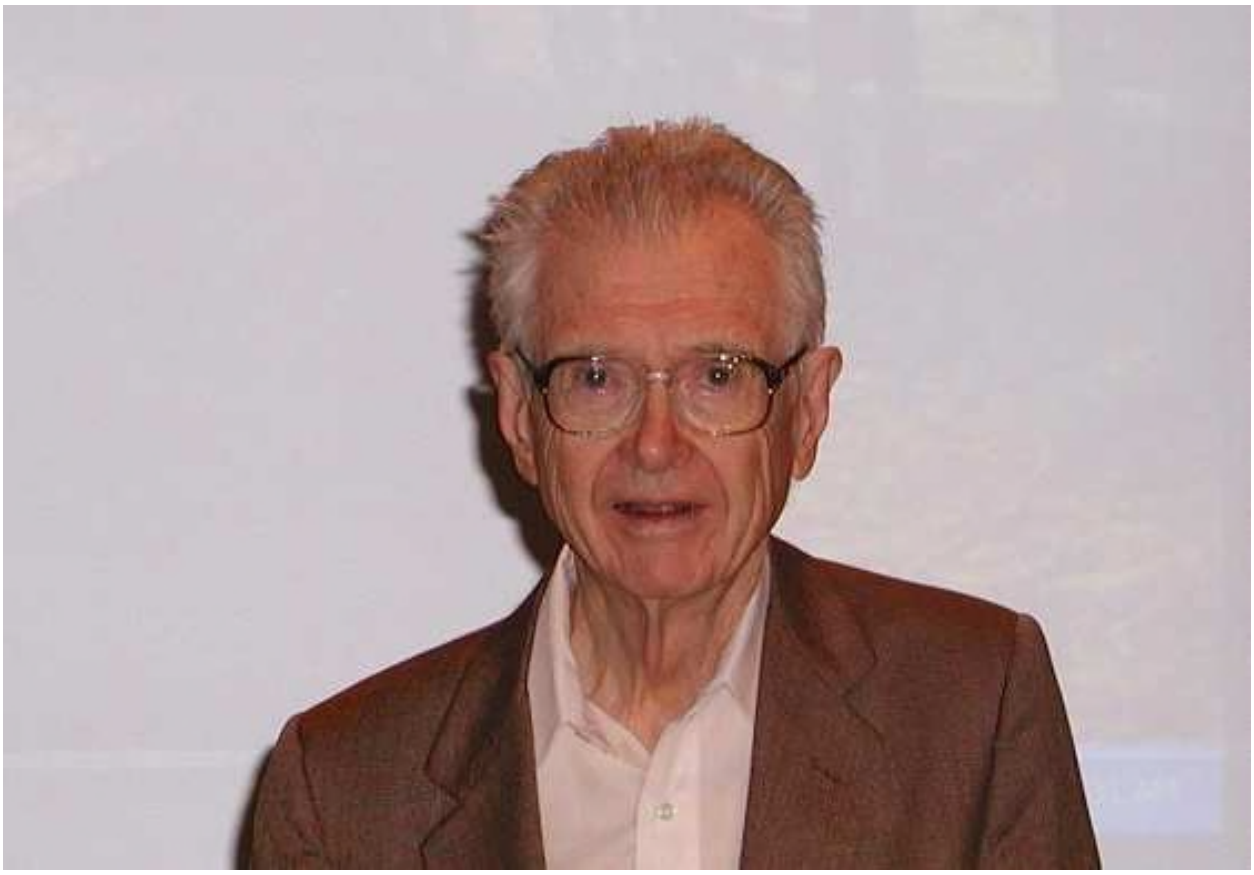


Photo: Photo: John Fisher (photo courtesy: Gene Mallove).

A strong feature of ICCF10 was the occurrence of fully functional demonstrations. Conducted "down the street" at MIT proper. Mitch Swartz hosted scores of people at a demonstration of a cold fusion cell under active operation and control. This demonstration lasted most of the week and attracted a good deal of interest and discussion. Although something similar was attempted and performed by Dennis Cravens of the Patterson Power cell at ICCF5 in Monaco, this was a bold thing to do and, with Peter's help, Mitch pulled this off ably. Mitch can be seen below demonstrating his cell to an obviously interested group.

Photo: Mitch Swartz conducting a live demonstration to a group at MIT (photo courtesy: Gene Mallove).

I commented above on the open, but largely unaccepted, invitation to the press. As noted by Gene Mallove, prior to ICCF10 invitations were sent to: *Wall Street Journal; Boston Herald; American Scientist; New Hampshire Magazine; Infinite Energy; New Energy Times.* Only one outside journalist attended the meeting sessions and actually did some reporting. That honor goes to Sharon Begley of *The Wall Street Journal*. (A few other reporters did arrive, but flitted in and then out). Ms. Begley came at Mallove's urging and wrote a fine commentary in her September 5 "Science Journal" column. Her piece was bannered appropriately: "*Cold Fusion Isn't Dead, It's Just Withering from Scientific Neglect.*" In summary, she wrote: "*What these claims need is critical scrutiny by skeptics. That is how science normally functions. But in Cold Fusion, it isn't. And that's the worst pathology of all.*" At another point she wrote, "*But the real pathology is the breakdown of the normal channels of scientific communication, with no scientists outside the tight-knit cold fusion tribe bothering to scrutinize its claims.*" A surprisingly lucid, informed and accurate report in an influential outlet that was unfortunately largely ignored.

Continuing the tradition established by Prof. Li for the IAC at ICCF9, Prof. Hagelstein made us work. Peter had a clear agenda for a path forward for the field now denominated CMNS. Peter had a vision of a *Journal of Condensed Matter Nuclear Science*, JCMNS, and an International Society, ISCMNS. The primary business of the IAC was readily concluded in designating the Chairman, and thus site, of the next conference. The continental rotation would bring ICCF11 back to Europe. Italy had now hosted two, so a bid by Jean-Paul Biberian was warmly and

welcomingly received. With little discussion or opposition Jean-Paul was appointed as future Chair and "god" of the ICCFs with Marseille as the proposed venue. Discussion turned to the establishment of a Society to provide added coherence and coordination.

The need and benefit was generally agreed and Scott Chubb and Vittorio Violante were appointed to look into the establishment of a Society on behalf of the IAC, and to report back to us at ICCF11. The need for a Journal was considered to be of much greater urgency and a robust, healthy and productive discussion occurred as to the type of Journal and Editorial Policy needed. We were fortunate in this discussion in having with us George Miley, cold fusioneer and until 2000 editor-in-chief of the American Nuclear Society's journal *Fusion Science and Technology* (George can be seen below with Gayle Verner and Mitch Swartz at the banquet). As ICCF10 concluded on Friday morning, Peter Hagelstein, in his last act as ICCF Chair, announced the founding of a peer-reviewed electronic journal for the LENR field, Condensed Matter Nuclear Science. This is a title that had been approved by the IAC at ICCF9 in Beijing (May 2002). An interim website was quickly established at http://cmns.mit.edu, on an MIT-run server. MIT no longer hosts the Journal and this link no longer functions; access to the Journal of Condensed matter Nuclear Science, JCMNS, can be found here. The appointed editors of the new journal were:

Americas — Peter Hagelstein, Michael McKubre, George Miley, Ed Storms;
Europe/Africa — Jean-Paul Biberian, Francesco Scaramuzzi;
Asia/Oceania: Xing Zhong Li, Akito Takahashi.

Perhaps unsurprisingly Hagelstein remarked that the new Journal would welcome especially "*focused theory papers on new phenomena*." In addition to his work in organizing for the next conference, Jean-Paul Biberian with considerable effort, largely single-handed, created the structure that is now *JCMNS*, one of the greatest assets we have in advancing the field. He took over the role as "Editor in Chief" with the rest of us as members of his Editorial Board[24]. For his creative work in arranging and pulling off the technically most robust conference to that date right in the lion's den with "Bravery Misplaced", in organizing the IAC to begin the constructive evolution of the field and going "above and beyond" in personal responsibility and cost, I designate my friend Peter Hagelstein as the hero of ICCF10. Now onwards to Marseilles.

[24] This board now comprises: Hagelstein, Li, McKubre, Miley, Storms.

Photo: Gayle Verner, Mitch Swartz and George Miley at the ICCF10 banquet (photo courtesy: Gene Mallove).


Photo: Scott Chubb and Martin Fleischmann at the ICCF10 banquet (photo courtesy: Gene Mallove).

ICCF11

ICCF11 occurred in 2004 between two auspicious days: October 31 (Día de Muertos) and November 5 (Guy Fawkes Day). It was attended by 163 scientists, inventors, engineers, investors, journalists, and reporters from 21 countries in a very pleasant, modern hotel in the heart of downtown Marseilles, within easy walk to the shore of the Mediterranean Sea. This was very much a Biberian family affair which Jean-Paul pulled off with his usual aplomb and contagious good humor. Jean-Paul can be seen below with his young daughter Margot. He provided the entertainment at the Thursday night banquet that was held in the floating club-house restaurant of la Natique (Société Nautique de Marseille) moored at Quai Rive-Neuve in the Vieux-Port of Marseilles since 1889. There Jean-Paul performed interpretive modern dance, a feat of which very few of us would be capable — even fewer the courage to do so. For all these things and more I designate Jean-Paul Biberian as hero of ICCF11.

Photo: Jean-Paul Biberian with daughter Margot (photo courtesy: David Nagel).

This conference was not quite “business as usual” and included a considerable element of outreach to science students and the local community. Following the tradition established by Peter Hagelstein at ICCF10, the conference commenced with a “cold fusion class” aimed at bringing science students “up to speed” and engaging them in this emerging field. Tuesday’s sessions were held in a lecture room at the University of Marseille-Luminy, attended by numerous students from the University. Both Brian Josephson (1973 Nobel Prize for Physics) and Martin Fleischmann lectured that day. On Thursday evening, we were invited to a reception in the office of the Mayor of Marseilles recognizing ICCF11 and kicking off the International Year of Physics (2005). Both Brian Josephson and Martin Fleischmann were made honorary citizens and given keys to the city of Marseilles. It was nice to get some recognition, a shame that we had to go so far to get it, but where better?

Apart from the students there were not a lot of new faces. One of the premier cold fusion scientists was unable to attend. Yoshiaki Arata from Osaka University was receiving a medal from the Emperor of Japan at the time of the conference. Arata has been mentioned as possibly Japan’s greatest living physicist, and has received at least one other medal from the Emperor. One “older statesman” Peter Gluck was able to make a rare but very welcome attendance (see photo below) and a group of “old timers” [Frank Gordon, Mike McKubre, Martin Fleischmann and Bob Smith] can be seen reinforcing the message of Frank’s T-shirt below. We also have a great shot of “old timer” Mike Melich with relative newcomer Matt Trevithick jointly honoring Nave Nagel’s poster.

Photo: Peter Guck (photo courtesy: David Nagel).

Photo: Frank Gordon, Mike McKubre, Martin Fleischmann and Bob Smith (photo courtesy: David Nagel).

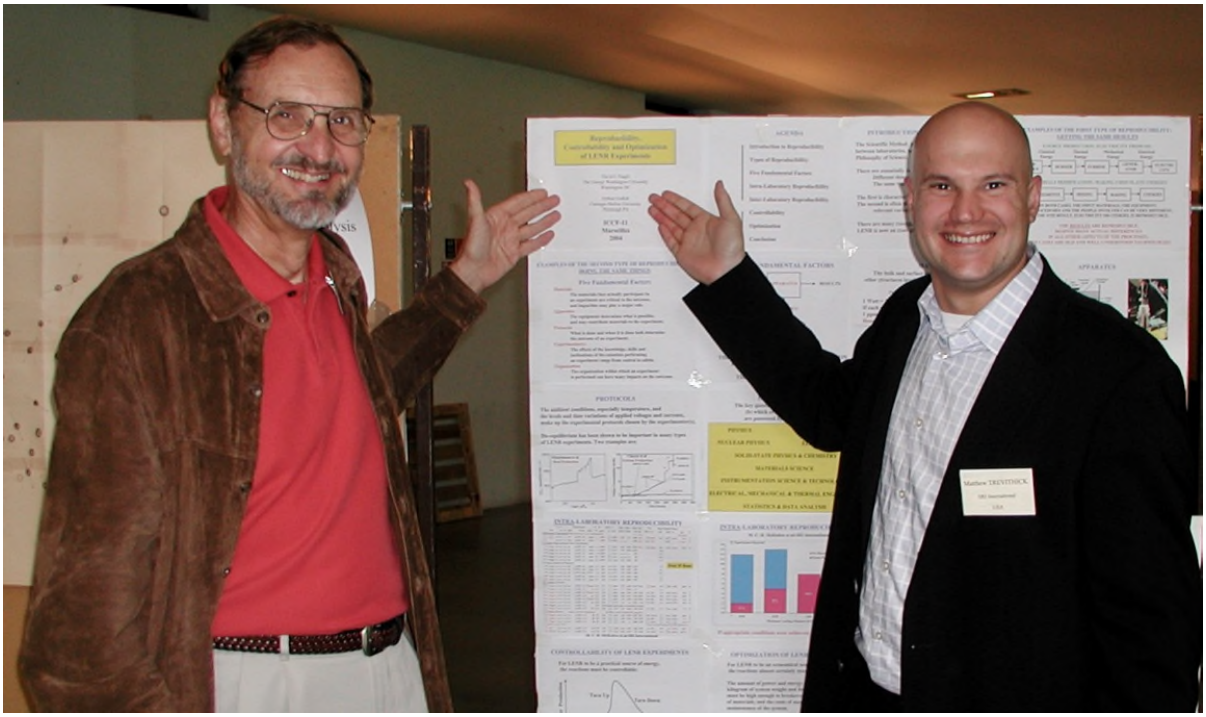


Photo: Mike Melich and Matt Trevithick (photo courtesy: David Nagel).

I attended ICCF11 in the company of Energetics Technologies Inc., headquartered in New Jersey but with research facilities in Omer, Israel. Below can be seen Alison Godfrey, CEO of Energetics Technologies, New Jersey with her husband Irving Dardik, Chief Scientist. After ICCF11 we drove in two cars down to ENEA Frascati for further meetings. A relative newcomer to CMNS, by ICCF11 Energetics had become a world leader. Energetics Technologies was clearly well-funded, with an international staff of Americans, Israelis, scientists from Russia, and others. Very wisely they chose to procure their palladium from Vittorio Violante and they retained topic experts as consultants from around the world. One of these, Ehud Greenspan, can be seen at the Energetics lecture presented by Arik El-Boher at the University of Marseille-Luminy, immediately preceding that given by Brian Josephson.

Photo: Alison Godfrey and Irving Dardik (photo courtesy: Mike McKubre).

For loading deuterium into palladium, Energetics uses a technique based on the "SuperWave" concept proposed by Irving Dardik. As explained by Dardik in his presentation, SuperWaves exist as waves within waves within waves, fractally nested in a specific non-linear manner designed to stimulate intrinsic oscillatory processes across a wide range of scales. The advantage of these waves in CMNS is that they facilitate loading and interfacial flux simultaneously — both features are needed for the Fleischmann-Pons Heat Effect. These waves have application in many other areas than CMNS. In the previous year or so, Energetics Technologies reported some of the best energy gains anywhere. Arik El-Boher began to give what would have been an extremely important talk on their latest results (including the "famous ETI-64) but was overtaken

by a “super-abundance” of slides (75) and the imminence of Professor Brian Josephson’s much anticipated presentation precisely scheduled for the press.

Photo: Ehud Greenspan at the University of Marseille-Luminy (photo courtesy: David Nagel).

Josephson made several comments that were considered newsworthy: “*Clearly, the scientific community made a big error when it determined back in 1989 that there was nothing to the cold fusion claims”; and “This potentially very important area must now move forward rapidly in order to make up for lost time.*” What was true in 2004 is all the more true in 2015. The difference is that it looks likely that the means and serious purpose will soon be made available. On the evening of the “Luminy Lectures” a few of us were treated by our Chairman Jean-Paul Biberian to a uniquely European dining experience. Unlabeled and hidden at the back of a working bookstore a tiny restaurant with perhaps a half dozen tables preparing food as only the French can – especially on the Mediterranean coast. We can see below Jean-Paul with Steve Krivit and Peter Hagelstein. Peter and Brian’s wife Carol are seen in the next shot and Brian and myself in the last of this set. All in all a delightful meal and a splendid evening. Thank you Jean-Paul, and fellow diners.

Photo: Jean-Paul Biberian, Steven Krivit, Peter Hagelstein (photo courtesy: Mike McKubre).


Photo: Peter Hagelstein and Carol Josephson (photo courtesy: Mike McKubre).


Photo: Michael McKubre and Brian Josephson (photo courtesy: Jean-Paul Biberian).

Because of Jean-Paul's more eclectic interests the topics diverged to more esoteric areas than were permitted under the strict rule of Peter Hagelstein's conference immediately preceding. This "Chairman's prerogative" is, I believe, one of the strengths of the autonomy that each Chairman wields at his (or in the future I hope, her) conference. This would seem particularly important in an emerging field for which the boundaries are not well defined. At ICCF11 we were treated to a session on "strange radiation" and a very good lecture on old-fashioned alchemy titled "Evidences of LENR type processes in alchemical transmutation" by Joaquin Perez-Pariente, a well-known and well-respected scientist in Spain. The case was argued that some of what we were seeing may have been seen before, and that we might learn from the past. I doubt that any were sufficiently convinced to overcome their native lethargy and fear of ridicule but it was an interesting perspective to hear.

In a similar vein, had it not been for Jean-Paul I would not have known that considerable work is being done in the area of "strange radiation." The Russians, especially at RECOM, a Russian Research Center "Kurchatov Institute" spinoff company, have been doing a lot of work investigating the phenomenon produced by exploding a wire or foil in water or in an aqueous liquid. The Russians seem to feel that this "strange" radiation consists of magnetic monopoles that have been postulated to exist but have never been observed. There were eight presentations at ICCF11 on "strange" radiation and/or magnetic monopoles. Several groups in France are involved in this research: Georges Lochak and Henri Lehn at the Louis de Broglie Foundation in Paris; Michel Rambaut, retired from the French Atomic Energy Commission is doing some

work. In addition, Tetsuo Sawada from the Nihon University Institute of Quantum Science in Japan presented on this topic. As Jim Corey noted in his ICCF11 trip report: " *I don't know what all this has to do with cold fusion, but it certainly was interesting.*" Thanks to Jim for his report and to NET for this quote and much of the material in this paragraph and some in others.

Following on from the initiative started by Peter Hagelstein's IAC at ICCF10, on Monday evening Scott Chubb, Akito Takahashi, Vittorio Violante, and William Collis provided an overview of the history and evolution of a new political/scientific development: the formation of a new scientific society, the International Society of Condensed Matter Nuclear Science. Scott and Vittorio had been charged in Cambridge to look into the establishment of a Society. Akito had been elected first President of the ISCMNS at the 5th Asti Workshop in March 2004 and was interested in coordinating the International Society with the Japanese regional one that already was operational. Bill Collis was influential, perhaps instrumental in overcoming the logistical issues and the associated society (the ISCMNS) held its first formal meeting in Marseilles, immediately following the presentations on November 1, 2004.

This represented a big step forward for which the four leaders [Collis, Chubb, Takahashi and Violante] deserve much credit. As reported by Scott Chubb: "*It is worthwhile to note that as in the case of a number of other societies, the ISCMNS has been created to foster both: 1) The dissemination of scientific information about a particular field; and 2) Increased funding for scientific research in this field. In order to minimize potential problems in enlisting support for the new society, the organizers deliberately decided to select a new name for the Society that seems to appropriately match the relevant scientific disciplines that appear to be involved, as opposed to using an alternative name (such as cold fusion) that not only has failed to represent the relevant science but has (as a consequence of having been used previously) impaired relevant scientific discourse.*" I am not sure if Scott or his quoted "organizers" were aware that the title CMNS was coined by the ICCF9 IAC in Beijing but this was the intended and welcome use of the term. We don't have a photo of Scott Chubb at the conference but have a very nice photo of his Uncle Talbot seen below.

The IAC met in Marseilles to appoint a Chairman and location for the next conference ICCF12. The continental rotation would bring us back to Asia/West-Pacific. Having hosted the last rotation, China was "off the hook" and all eyes turned back to Japan. As senior statesman, member of the IAC and new President of the ISCMNS Professor Takahashi agreed to form an exploratory committee and we retired, with no new tasks, confident that the next conference was in very capable hands. Despite the entrance into the field of new ideas, energy and money (specifically from Energetics), and the entrance of a new player for coordination support and funding (ISCMS) 2004 and 2005 were "doldrum years" for CMNS where overall funding and interest were low. Organizing ICCF12 in this climate was not going to be easy, but we left the task in good hands and our Japanese colleagues succeeded masterfully.

Photo: Talbot Chubb (photo courtesy: David Nagel).

ICCF12

ICCF12 took place between November 27 and December 2, 2005, in the Shin Yokohama Prince Hotel, Yokohama, Japan under the Chairmanship of Akito Takahashi (Osaka University) with co-Chairmen Ken-ichiro Ota (Yokohama National University) and Yasuhiro Iwamura (Mitsubishi Heavy Industries). As indicated at ICCF11 by the then new Chairman of ISCMNS, and now Chairman of ICCF12, this was the first conference operated under the ISCMNS banner. Takahashi opened the conference with a keynote review titled: "Progress in Condensed Matter Nuclear Science." ICCF12 was sponsored by the International Society for Condensed Matter Nuclear Science (ISCMNS), the Thermal and Electric Energy Technology Foundation (TEET), and the Japan Coherent Fusion Research Society (JCF). Consistent with ICCF10 and ICCF11, the organizers of ICCF12 published their conference Proceedings, through World Scientific[25]. Antonio Spallone can be seen below at the ISCMNS registration desk with a very welcome re-visitor Kazuaki Matsui (formerly Director of the R&D Center for New Hydrogen Energy in Sapporo, now representing one of the other sponsors, TEET). We have a nice shot of the two ISCMNS organizers Akito Takahashi and Bill Collis below.

Photo: Antonio Spallone and Kazuaki Matsui at the ISCMNS registration desk (photo courtesy: David Nagel).

[25] The "tradition" of publishing ICCF proceedings in consistent form using World Scientific was established by Peter Hagelstein at ICCF10 and continued by Jean-Paul Biberian at ICCF11. The ICCF12 proceedings were the last in this format. This is slightly sad as the World Scientific format was extremely professionally prepared and having all volumes the same looks good on the bookshelf.

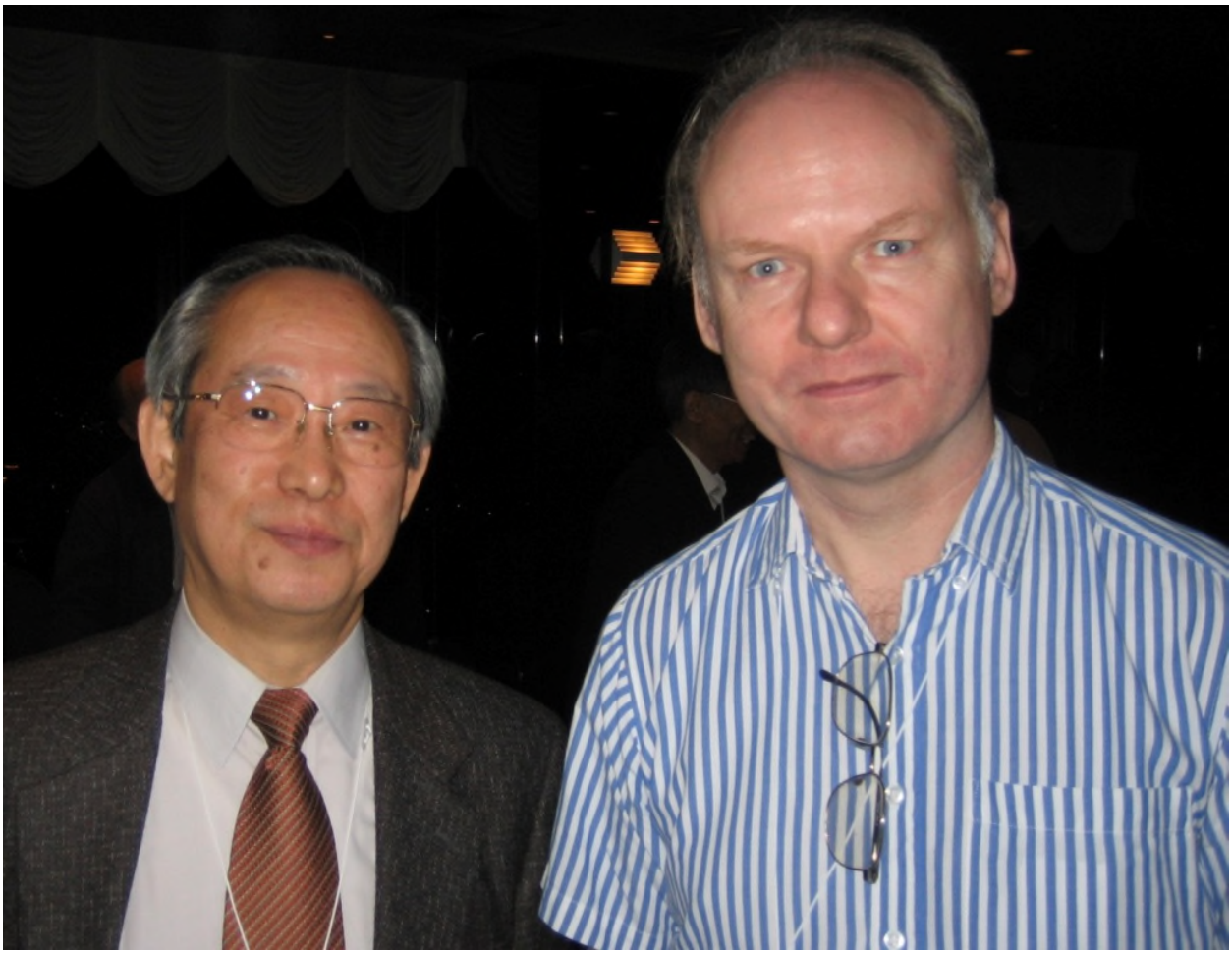


Photo: Akito Takahashi and Bill Collis (photo courtesy: David Nagel).

As might be expected from the location, our Japanese colleagues contributed a number of highly interesting talks. In the opinion of Scott Chubb writing for Infinite Energy in Issue 59: "*Yoshiaki Arata presented the most important talk of ICCF12. In it, he described an important breakthrough, involving a variant of the conventional 'double-structure' (DS) cell that he and Y-C. Zhang used previously to produce excess heat, helium-4, and helium-3 (Proc. Jap. Acad. B, 73, 62-7 (1997), Proc. Jap. Acad. B, 73, 1-6 (1997)), involving gas- (as opposed to electrolytic-) loading. An important observation, which helped them make this breakthrough, is that the key heat-producing reaction takes place in regions that contain smaller (Pd-black) particles that were separated from the portions of their cells that involved electrolysis. They also made a second important observation, involving the identification of a protocol, from their initial DS cell work: That it is possible to create extremely high pressures of D_2 gas (> 10,000 atmospheres) electrolytically, in regions that are not directly related to the production of heat.*" We have a nice picture of Prof. Arata and his wife at the banquet where we were treated to a wonderful display of Taiko Drums. Tom Passell and Ed Storms can be seen below in less relaxed mode enjoying the drumming.

Photo: Professor Arata and his wife at the ICCF12 banquet (photo courtesy: David Nagel).

Photo: Tom Passell and Ed Storms enjoying the Taiko drums (photo courtesy: David Nagel).

Jiro Kasagi continued his important work studying unexpectedly large fusion rates and cross-sections in experiments involving collisions that result when lower energy deuterons strike deuterated targets. During ICCF12, he discussed new results associated with d+d reactions in different materials and evidence for multi-body d+d+d reactions. This has several important implications. First it tells us that the DD interaction process does change as the energy is reduced. Second, the three-body result suggests that two D's in a host matrix may spend a significant fraction of their time within easy tunneling distance of each other where they can be struck simultaneously by an incoming deuteron. Third, when parameterized as an electron screening effect, the screening levels needed to explain Kasagi's observed reaction rates exceed an astonishing 300 eV[26]. All very interesting information, and clearly CMNS, but nobody was quite sure how this related to the Fleischmann-Pons Heat Effect. Kasagi can be seen below between Peter Hagelstein and Jim Gimlett (infrequent ICCF visitor and now DARPA Program Manager).

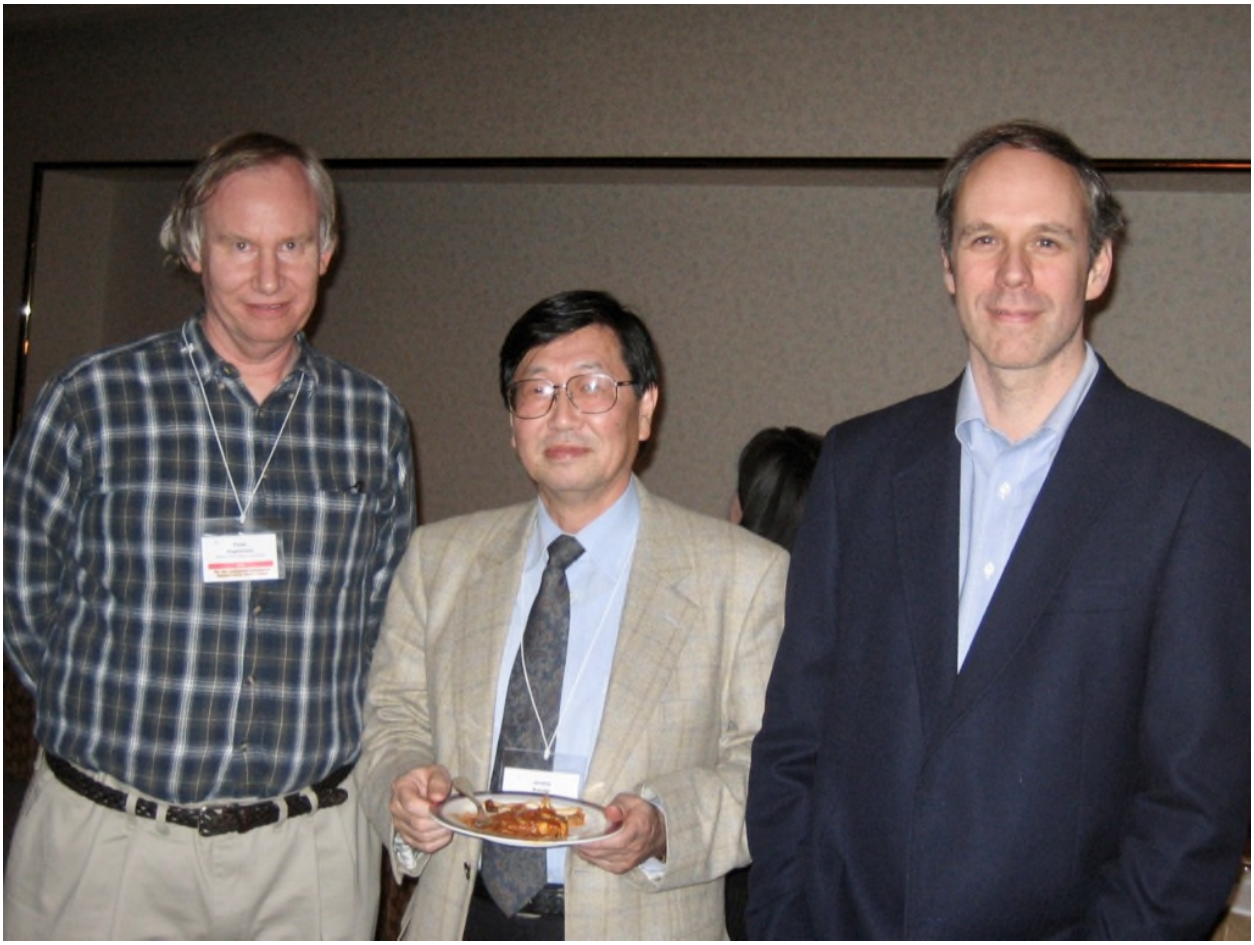


Photo: Peter Hagelstein, JiroKasagi and Jim Gimlett (photo courtesy: David Nagel).

[26] Electron "screening" levels up to 800 eV were later reported by this same group and others.

Tadahiko Mizuno (Hokkaido University — seen below with Hiroshi Yamada, Prof. Emeritus Iwate University) described the history and effects involved with a particular glow discharge experiment that apparently led to a form of positive-feedback, run-away event, in which the cathode overheated and exploded. From details associated with the explosion Mizuno was able to calculate that from an initial input energy of 300 J, the discharge- induced energy (in the form of output heat plus explosive energy) was approximately 0.24 MJ. It was difficult to isolate potential artifacts involving possible migration of material from regions external to the experiment from materials that could be relevant to transmutation reactions associated with the experiment, as a result of the explosion. Nevertheless Mizuno suggested that anomalous deposits of Ca, S, and other elements appeared on his tungsten cathode. As in most situations involving LENR, he observed no appreciable radioactivity or high-energy particles.

Photo: Tadahiko Mizuno and Hiroshi Yamada (photo courtesy: David Nagel).

Also impressing Scott Chubb and reinforcing the impression created at ICCF10 and revealed further at ICCF 11: "*The next most important results were presented in two related presentations, associated with work at the Israeli company Energetics, Ltd. and the Italian IFN Laboratory, ENEA, Frascati. In the first of these talks, Arik El-Boher from Energetics provided a detailed discussion of new results associated with a loading technique, described initially at ICCF10 and subsequently at ICCF11, that apparently also can be used to create excess heat in a*

nearly reproducible fashion. The innovative step in their work that appears to make this possible involves a form of non-linear pulsing of the applied voltages that are used to load the electrode (either in electrolytic loading or in glow discharge experiments)."

By this time I was working closely with the Energetics-ENEA team of Dardik and Violante and it was clear empirically that the multi-frequency stimulation described by Dardik as "SuperWaves" exhibited extraordinary facility to create loading, flux, and excess heat. Both during ICCF11 and ICCF12 the Israeli group reported large amounts of excess power in which output power is as much as 25 times larger than input power in the now famous experiment ETI-64. They had also observed the phenomenon of "heat after death" (in which excess power continues following cessation of electrical stimulation). During ICCF11, El-Boher reported that they had found tritium in one of their electrolytic "SuperWave" experiments, a result later confirmed independently at SRI and ENEA. As noted by Scott Chubb: "*During ICCF12, El-Boher reported significant improvements in their ability to reproduce excess heat. In particular, he reported that they could reproduce excess heat, effectively, with an efficiency of approximately 80% (eight out of ten times). Beginning during ICCF11, and continuing to the present time, Energetics has been involved with collaborations involving the Italian IFN Laboratory, ENEA Frascati, and SRI. In particular, Energetics has been using electrodes that were provided by Vittorio Violante from ENEA Frascati, Italy).*"

Russian scientists were well represented at ICCF12 (Andrei Lipson alone was author or co-author of six papers in the proceedings). One Russian work that particularly caught my eye and the imaginations of Peter Hagelstein and Scott Chubb was the claim of an "X-ray laser" reported by Alexander Karabut (FSUE – "LUCH"). In his ICCF12 report Chubb noted: "*Karabut described similar experiments, in which H_2, D_2, or Kr was discharged in the presence of a number of different cathode samples (made from Al, Sc, Ti, Ni, Nb, Zr, Mo, Pd, Ta, W, Pt), again with pulsed currents (again up to 500 mA) and discharge voltages in the same (500 - 2,500 V) range. In an invited talk (alluded to above), he observed X-rays that apparently were being created through processes that were initiated during the discharge process but persisted for periods as long as 0.1 s after the discharge current had been turned off. The associated process appears to result in the generation of coherent "beams" of X-rays (10^4 beams per second and 10^9 photons per beam) that he suggests involve a form of X-ray lasing phenomenon. (He explicitly referred to the beams as being the output of an X-ray laser.)*" Karabut can be seen below with the Russian facilitator Natalya Famina, who attended several ICCFs and was very helpful in translation.


Photo: Alexander Karabut and Natalya Famina (photo courtesy: David Nagel).

Many of the experimental reports at ICCF12 were predicated on the important role of deuterium mass flux in initiating or driving CMNS processes. Yasuhiro Iwamura (Mitsubishi Heavy Industries) presented more data on transmutations of Cs to Pr, Ba to Sm, and Sr to Mo, partially confirmed using X-ray fluorescence (XRF) spectrometry, at the SPring-8 synchrotron facility. Variants of this approach were presented by Narita, Kitamura, and Yamada but with somewhat varying results. Andrei Lipson reported additional results involving repetitive loading and deloading of H into Pd/PdO structures that suggested the onset of a potential 70°K (and possibly higher temperature) form of superconductivity. Lipson repetitively introduced and removed residual H from samples electrolytically. His conjecture (somewhat supported by thermal desorption analysis) is that H remains behind at the essentially 1-dimensional defects of dislocations cores, in a structure that may have some properties of metallic hydrogen. Measurements of resistance and magnetic susceptibility were performed that confirmed that diamagnetic response and conductivity were present consistent with the onset of a form of type-II superconductivity at 70°K, through a highly anisotropic form of conduction (and electron-phonon coupling). Lipson used this concept to develop a novel Pd/carbon nano-tube composite that was later explored successfully for excess heat production both at Energetics and SRI. Andrei Lipson can be seen below at the conference. Of all of the heroes that have fallen on the pathway to CMNS I probably miss Andrei the most, as a friend, a supporter, a warrior and as a deeply insightful and thoroughly capable scientist as his contributions at ICCF12 showed.

Photo: Andrei Lipson (photo courtesy: David Nagel).

The situation of the IAC was slightly strained at ICCF12 for several reasons. First the newly created ISCMNS asserted as one of its reasons for existence its desire to take charge of assuring the continuity of the ICCF conference series and to provide the funds and organizational structure for this purpose. This had hitherto been essentially the sole role of the IAC and the logic was in any event slightly backwards since the ISCMNS came into existence in both name and function on the recommendation and tasking of the IAC. Not that any of us minded as by now the job for some of us was getting old. The question was: “How effective would the ISCMNS be?” The ISCMNS had contributed a small amount of funding for ICCF11 and, under Professor Takahashi’s able leadership had successfully pulled off ICCF12. So far so good but none of us were willing to risk the one politically coherent factor in all of cold fusion and

CMNS, the ICCF conference series and its attendant record of proceedings, to an untried body with untested leadership.

The second issue was location. The established continental rotation would take the conference back to the Americas but no particular group or individual from the United States had expressed interest in sponsoring ICCF13 and we were short of options. One problem that had been discussed at previous IAC meetings was the issue of Russia. Where is it? When the rotation turned to Asia it was not considered Asian (although it is probably the largest Asian country) and when the rotation turns to Europe it is not considered European (ditto). Russian scientists have contributed a great deal to our community and Yuri Bazhutov had been organizing a modestly sized but successful conference annually on the Black Sea since 1991, several of which I had attended and greatly enjoyed. Obviously Russia had the demonstrated capacity to organize a conference and deserved the opportunity. Clearly Russia is not in the "Americas" but could we consider it as a special case?

The primary organizer of the Russian effort, Yuri Bazhutov, was unable to attend ICCF12 and it was not possible to finalize the schedule for ICCF13. However, the IAC did consider an alternative proposal by Professor David Nagel (of George Washington University) that was consistent with the guideline of requiring that the conference occur before the late spring or early summer of 2007 and that the subsequent ICCF conference (ICCF14) take place in the American hemisphere 12 to 18 months after ICCF13. In particular. Professor Nagel proposed that if it does not appear to be feasible for the Russian group to host ICCF13 before October 2007, the Russian group might consider hosting ICCF14 a year later (October 2008), while he would organize ICCF13 for late spring or early summer 2007, in Washington, D.C. This slightly ambiguous but redundant solution was accepted by the IAC.

It was decided that Professor Takahashi, still Chairman of the IAC as a new Chair had not been appointed, formally communicate with Yuri Bazhutov and the local organizing committee from Russia by the end of February 2006 about the discussions that had taken place. In particular, the IAC requested that Professor Takahashi indicate the consensus of the IAC was to schedule ICCF13 for the spring or early Summer of 2007. If, as a result of cost, weather, and/or related or additional factors the timing would be considerably delayed then the committee would consider an alternative proposal that the Russians delay hosting until ICCF14, at a time between 12 and 18 months after an ICCF13 meeting in Washington, D.C. to be organized by Dave Nagel.

So, from a condition of dearth we came to plenty. For the first time ever two Chairmen had been identified with the second standing ready to relieve the first should the need arise. But the need did not occur and Yuri Bazhutov was able to arrange a beautiful and memorable conference on the shores of the Black Sea in late June, 2007. This was nearly 20 months after ICCF12 — a timing only slightly longer than the IAC would have preferred — and it steered us well clear of the Russian winter. I nominate Prof. Akito Takahashi as hero of ICCF12, for his skilled organization of the conference, his leadership in bridging the gap to ICCF13, and his cardinal leadership of ISCMNS. It is still too early to see where this last experiment will end. Perhaps we will need to wait on this conclusion until we have a Society of 3000 or 30,000 as modern major scientific societies are, rather than 300. For now it was onwards to Sochi.

A Brief History and Introduction to the International Conference Series

Part Five - From ICCF13 to ICCF15

ICCF13

Sochi, site of Stalin's dacha and the 2014 Winter Olympics, was also the site of the 13th International Conference on Condensed Matter Nuclear Science (or Cold Fusion, depending on taste). This event took place between June 25 and July 1, 2007, in Dagomys, roughly 12 busy km from the center of Sochi, Russia, a bustling and beautiful city on the shore of the Black Sea. Only 80 scientists and specialists took part in the conference including 46 persons from the Russian Federation. This was the lowest attendance of any ICCF in part due to visa difficulties but mostly I expect due to "traveler anxiety." It was, however, by far the largest participation of Russian scientists at an ICCF, fully justifying the siting of the conference. Only 12 registered attendees were present to represent the U.S., the lowest number by far of any ICCF. I had visited the conference site twice before with even fewer Americans in attendance at the Russian Conference on Cold Nuclear Transmutation and (later) Ball Lightning. Then the travel was prolonged, although thoroughly enjoyable, involving a train-ride of 36 hours each way from Moscow to Sochi. This time my companions and I traveled in style from Frankfurt directly to Sochi in a brand new Aeroflot Boeing aircraft, and thence on to the conference in a black Mercedes saloon. Times had changed. Below we see the group photo.

Photo: Group photo ICCF13 (photo courtesy; ICCF13).

As Scott Chubb notes in his conference summary: *"Yury Bazhutov, Igor Goryachev, and the other members of the ICCF13 Local Organizing Committee are to be commended for their effort in making the conference such an excellent event and for picking such an extraordinary location for it. Sochi, which is located at the base of the Caucasus Mountains, on the eastern side of the Black Sea, is a stunningly beautiful city. In fact, three days after the conference ended, the Olympic Game Selection Committee announced that Sochi would be the site of the 2014 Winter*

Olympic Games." This pending decision was much discussed by the local population during the week of the conference. The conference was opened by ICCF13 Chairman Yuri Nikolaevich Bazhutov with Secretary Igor Goryachev and various dignitaries offering welcomes. These included Vladimir Bychkov on behalf of Vitaliy Mikhailin, President of the Russian Physical Society. Yuri Bazhutov can be seen below holding a copy of the conference program, and below that with Secretary Igor Goryachev working at the computer. Some idea of the majesty of the venue can be seen in the aerial view below that. The conference hotel is the large, white, pyramidal structure seen more closely in the photo four below.

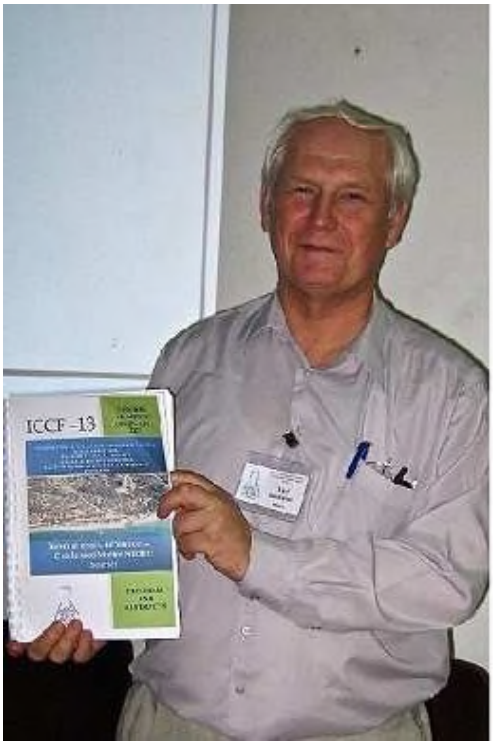


Photo: Yuri Bazhutov;
(both photos courtesy: Dave Nagel).

Yuri Bazhutov and Igor Goryachev

In reviewing the photos I was struck by the same thing that first surprised and then always delighted me in Russia — the joy expressed in genuine smiles and the ever-present shared laughter. Even the non-Russians seem influenced by this exuberance just being in contact with "Mother Russia" (see photograph of Alison Godfrey, myself and Esperanza Alvarez below at the conference). Certainly I always felt this way (even in grueling situations), and I was very glad to be back in Russia, and especially Sochi. In keeping with the tradition of the Russian National annual conferences the scope of ICCF13 was broader than any previous (with the possible exception of Jean-Paul Biberian's ICCF11[27]). The Russian conferences have a strong focus on nuclear transmutations not only in condensed matter but also in gaseous and plasma media that relate to another important investigation in modern science — the nature and potential implementation of Ball Lightning phenomena. This fresh diversity is reflected in Yuri Bazhutov's preface to the ICCF13 Proceedings: *"The present Conference is the forum in this*

[27] Jean-Paul was unable to attend ICCF13 due to the ill health of his mother.

new field of science. According to the opinion of the Organizing Committee the main subjects and goals of the Conference should incorporate consolidation of the results obtained by the scientists of many countries in investigating the physical phenomenon with the achievements in some other fields of science and technology such as nuclear engineering, mechanical engineering, electrical engineering, laser science and engineering, material science, nano-technology, bio-technology, etc. for the sake of fast solving valuable application problems."

Photo: Arial view of Dagomys and the Dagomys conference hotel, Sochi, Russia.

Photo: Alison Godfrey, Michael McKubre and Esperanza Alvarez (photo courtesy: Dave Nagel).

The ISCMNS featured significantly in the organization of ICCF13 and is mentioned in Yuri Bazhutov's list of sponsors: *"Conference organization, edition of the Program and Abstracts & Proceedings of the ICCF-13 and also partial financial support of several ICCF13 participants were provided by sponsorships of private Russian Sponsor Andrew Mozzhegorov, International Society Condensed Matter Nuclear Science & private American Sponsor Steve Krivit, New Energy Times Internet magazine Senior Editor."* It is interesting to see Mr. Krivit's name on this list and a further indication of the breadth of Steve's contributions from ICCF10 to ICCF15. On behalf of the International Society Bill Collis and Francesco Celani presented much-deserved Preparata Medals to two Russian heroes Andrei Lipson and Alexander Karabut (most regrettably now both deceased). In addition to their historical contributions both these men presented highly interesting and innovative papers at ICCF13. Andrei Lipson and his group at the Russian Academy of Sciences presented new research on the use of single-wall carbon nanotubes (SWCNT) to enhance the diffusion of deuterium/hydrogen into palladium and to create a controlled population of linear defects into which H or D could accumulate. This work was closely followed both intellectually and experimentally at SRI and Energetics. With Alexander Roussetski, Lipson also reported a rigorous method of particle detection using CR-39 plastic track detectors that showed clear indications of 3 MeV protons and high-energy alphas in a repeatable experiment. Alexander Karabut provided further illumination into the generation of coherent "beams" of X-rays that he first revealed to the ICCF community at ICCF12 in Yokohama. This excited the interest of theorists Chubb and Hagelstein in particular. In light of Karabut's very recent departure it may be wise to focus some collective thought on his observations and their implications for Condensed Matter Nuclear Science (CMNS). Karabut also presented the results of his recent replication of an early (1994) Russian excess heat experiment. Alexander and Andrei can be seen side-by-side below presenting their papers.

Photo: Alexander Karabut;

Andrei Lipson (photos courtesy: Dave Nagel).

Andrei Lipson and Alexey Roussetski presented novel results involving highly deuterium-loaded materials in multilayer structures employing the single wall carbon nanotubes encapsulated by thin Pd films electrodeposited on top of a Pd foil. They found nuclear emissions of charged particles using CR-39 films that indicate 3 MeV alpha particles were produced in these experiments. This technique was later used successfully by Energetics and at SRI to produce excess heat of a slightly unusual sort[28], lending credence to Andrei's idea that linear defect structures facilitate both nuclear emission and the Fleischmann-Pons Heat Effect (FPHE). This concept (and demonstration) is sufficiently close to Ed Storms' concept of -D-e-D-e-... linear extended polymeric structures (and analogous -H-e-H-e-...) that one wonders why the field has not collectively followed up. I would like to call out two other Russians with photographs below. Both are good friends and important members of the local organizing committee who have contributed significantly to conferences in Russia over the years: Nikolai Samsonenko (Peoples Friendship University, Moscow, and also member of the ICCF13 IAC); and Fangil Gareev (very interesting theorist, formerly member of the very important Joint Institute for Nuclear Research, Dubna, and another of our fallen heroes).

Photo: Nikolai Samsonenko;

Fangil Gareev (photos courtesy: Mike McKubre).

A very important result caught the attention of a number of us including Mike Melich and Scott Chubb for reasons Scott makes clear in his Infinite Energy summary: *"Ivan Chernov (Tomsk Polytechnic University, Russia) presented novel results associated with a new phenomenon, in which many hydrogen atoms appear to be spontaneously excited by irradiation by X-rays and/or*

[28] We refer to this as "Mode B" excess heat production that occurs with little or no initiation delay, essentially as quickly as loading, with a low electrochemical current density threshold, and which does not apparently respond significantly to current increase.

electrons. He and his collaborators propose the associated effect involves cooperative phenomena in which the hydrogen atoms/ions behave as a 'sub-system' that is excited as a single entity, similar to the kind of sub-system envisioned by Talbot Chubb (and indirectly by me) in the context of the ion band state theory that we have proposed." Basically Chernov reported that "punching a hole" in the barrier that restrained hydrogen deloading at a single point caused "instantaneous" and "coherent" deloading at all points on the surface of a charged cathode. Noting this comment by Scott Chubb I realize that I have not followed up on this phenomenon, either. Scott can be seen below with one of few other Americans present and one of the "new kids on the block" at ICCF13, Marianne Macy. Marianne went on to become an integral part of the ICCF and CMNS world in her writings for Infinite Energy and her ongoing organization of an "Oral History" of the field.

Photo: Marianne Macy and Scott Chubb (photo courtesy: Dave Nagel).

By ICCF13 the Energetics-SRI-ENEA collaboration was operating "full steam ahead" with NRL recently included. Vittorio Violante (group leader at ENEA-Frascati) was unable to attend but was very ably represented by Emanuele Castagna, seen below at dinner with others of the Energetics' "family", including Tanya Zilov, a "transplanted" Russian. Both Castagna and Zilov presented interesting reports from the collaboration. Emanuele reported on the heroic effort of the Violante group at ENEA Frascati to characterize and control the metallurgy of bulk palladium samples, allowing the possibility of simultaneous high deuterium loading and flux, and thus excess heat. Scott Chubb, reporting for Infinte Energy Magazine, lamented the withholding of details deemed proprietary by Energetics (a private corporation) but reported:

"Fortunately, in spite of the non-disclosure of some seemingly important results, progress is being made. In fact, in Zilov's presentation, new innovative results were presented. In particular, by introducing ultrasonic forms of wave-like effects, it was possible on two occasions to create effects referred to as 'heat after death,' in which heat occurred in the absence of any form of externally applied force identified as being relevant to the associated phenomenon."

Photo: Tanya Zilov, Esperanza Alvarez, Michael McKubre, Emanuele Castagna, Alison Godfrey and Arik El Boher (photo courtesy: Dave Nagel).

As noted by Steve Krivit in his New Energy Times: *"After many years of absence from the field, Toyota has re-emerged on the CMNS scene through the work of Tatsumi Hioki, Naoko Takahashi and Tomoyoshi Motohiro at Toyota Central Research and Development Laboratories Inc. in Nagakute, Aichi, Japan. The researchers have attempted to replicate the Yasuhiro Iwamura deuterium gas permeation experiment performed at Mitsubishi Heavy Industries. The Toyota team reported an experiment that showed mildly positive evidence of the low energy nuclear transmutation of cesium into praseodymium."* This work was to become important in what later generated a mini-controversy between the group of Iwamura at Mitsubishi Heavy Industries (MHI) and Ken Grabowski at NRL that is still unresolved.

Because of the significance and seeming irrefutability, initially based on an *in situ* XPS measurement of about a nano-mole of Cs to Pr transmutation results at MHI, Mike Melich (seen below with Vladimir Vysotskii) was able to attract fairly significant funding to NRL in a replication attempt. By the time the project was fully operational Iwamura had completed over 150 experiments using a post experiment analysis of the surface layer of material containing the

transmutation products and had moved on to different materials to transmute. With much effort a mutual agreement was signed, trans-Pacific interchange of personnel undertaken, and samples were sent from Mitsubishi to NRL. All of these later efforts depended upon the post-production extraction of samples taken from the foil surface. The focus of that effort was solely on the putative double-deuteron transmutation of Cesium to Praseodymium. Although old samples received from MHI by NRL were successfully analyzed for Praseodymium (at significantly lower levels than earlier results at MHI) NRL never was able to replicate the conversion themselves. A special matrix experiment was conducted to try to resolve the differences. Shared samples showed different results in the MHI extractions and the NRL extractions from different parts of the same metal foil. This dichotomy resurfaced at every ICCF from 14 to 18 and remains undetermined with NRL claiming that it found Praseodymium contamination on apparatus in Iwamura's lab and that this was the simplest explanation for the observed Pr. MHI counter-claim that this is not a possible explanation since that apparatus (a balance) was not used for all samples that exhibited the effect. Recent results from Toyota working in a beautiful and modern research facility continue to support the MHI finding. Despite the stunning significance of this result (if proven correct) the matter is still undecided with both sides talking past the other. It is to be hoped that a more complete scientific interchange will take place at some point.

Photo: Vladimir Vysotskii and Michael Melich (photo courtesy: Dave Nagel).

All in all it was a very successful, enjoyable and informative conference for which we can thankfully and fittingly declare Yuri Nikolaevich Bazhutov as the hero – unfortunately another fallen hero as he passed away in 2018. In addition to the technical program the weather was kind, the beach entertaining, and the hospitality extraordinary (below we have a shot of the "groaning table" at the welcoming reception on the 22nd floor of the Dagomys Hotel, principal site of the conference, and below that a cheerful shot of Alison Godfrey and me at the Banquet). Very appropriately George Miley made a touching and fitting tribute to Giuliano Preparata. The IAC at ICCF13 was not faced with a decision since Prof. Takahashi's IAC had already determined that the continental rotation would return to the Americas and resume normal order, and we had accepted Prof. David Nagel (George Washington University) as the Chairman-elect. The Russian tradition is to use the occasion of an "organizers closing conversation" as a vehicle to craft a "we did this" statement. Most of the rather sumptuous "Advisory Committee" meeting was spent enjoyably in this pursuit.

Photo: The welcoming reception Hotel Dagomys (photo courtesy: Dave Nagel).

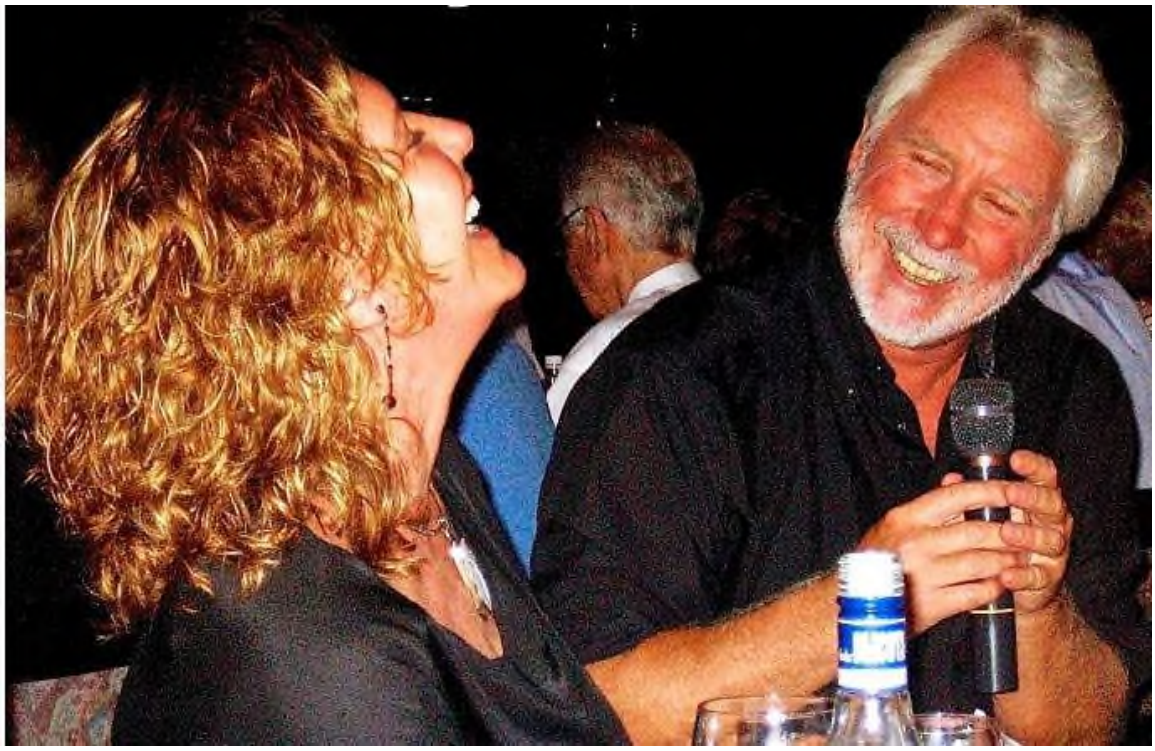


Photo: Alison Godfrey, Michael McKubre (photo courtesy: Dave Nagel).

ICCF-14

The 14th International Conference on Condensed Matter Nuclear Science (ICCF14) took place in Washington, D.C. between August 10 and 15, 2008, in the Hyatt Regency Hotel on Capitol Hill. In many ways, this conference was an historic event and a carefully strategized effort to influence "movers and shakers" in the political island of Washington D.C. Convened at Chairman Dave Nagel's chosen location, the conference was deliberately staged within easy strolling distance of any congressional representatives, delegates or bureaucrats who chose to engage with us. As far as I am aware none did. Just as Washington (or the District of Columbia) is divided from Virginia to the south by the Potomac River, so is the politics divided. North of the river where we were situated essentially all of the politics and power is civilian. This particular fiefdom had hitherto been un- or anti-interested in cold fusion and this tradition persisted through 2008.

South of the river the Pentagon dominates the landscape and the politics. This environment has traditionally been far more receptive to the message we were intending to communicate at ICCF14. A significant fraction of the SRI support had been generated by DARPA (the Defense Advanced Research Projects Agency, south of the river) which agency had maintained a solid and pragmatic interest first initiated by Robert Nowak (trained as an Electrochemist and who knew Fleischmann and Pons well) and maintained until recently when DoE impelled DARPA to leave the energy business (for a time). The other defense agency just beginning to exhibit serious interest in CMNS was DTRA (the Defense Threat Reduction Agency). To accommodate and capitalize on the generally more welcoming attitude of the "south of the river" DoD dominated politics, the conference General Chair (David Nagel) and Technical Chair (Michael Melich) had invited Vice-Admiral Dr. George P. (Pete) Nanos, Associate Director of Research and Development Enterprise at DTRA, to make the opening address to the conference. Photos of Nagel and Melich appear below.

Pete Nanos' opening address did not occur for reasons that are not completely clear. As Scott Chubb notes in his conference report for Infinite Energy : *"Apparently because of a scheduling conflict, an alternative speaker was engaged. Llewellyn King, journalist, former editor-in-chief and founder of The Energy Daily (the King Publishing Group's flagship newsletter), and now executive producer of the PBS television program, "White House Chronicle," gave the keynote address. The fact that such a well-known journalist would give the keynote address is consistent with the improved publicity associated with this ICCF conference. During the speech, Mr. King emphasized the past history of the energy situation. He recounted the problems of the initial oil shocks during the 1970s and the underlying ideas associated with using nuclear power and alternative fuel forms. He emphasized the importance of the role of government in altering the existing dynamic. He suggested that what was about to happen during ICCF14 is extremely important."*

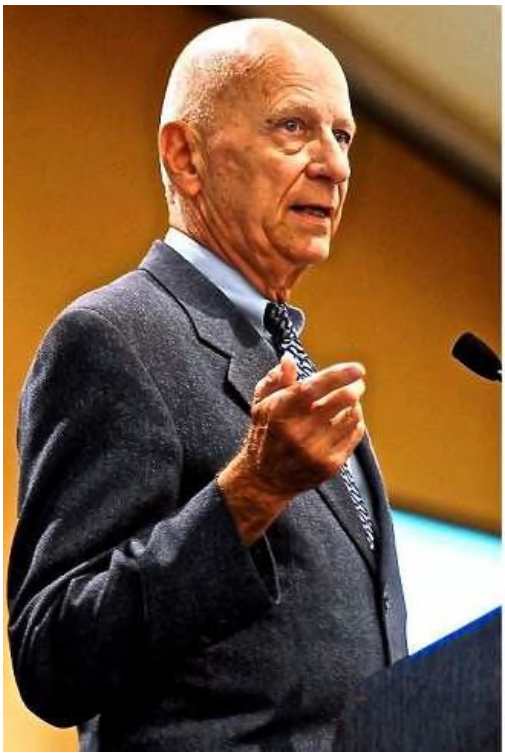


Photo: Dave Nagel;

Mike Melich (photos courtesy: Duy Tran).

The organizers Nagel and Melich took the unusual step of honoring living scientists with dedicated sessions. This was criticized prior to the event by *New Energy Times'* Steve Krivit with the phrase: "*How can the consequences of this honoring be anything but divisiveness?*" But it is hard to imagine two senior scientists in our community more worthy of honor than Yoshiaki Arata and Stanislaw Szpak. Arata (who we see below) is one of Japan's original hot fusion scientists and renowned "father" of electron beam welding. He has been described as Japan's "greatest living physicist" and he is the only physicist to have received Japan's highest civilian honor, the "Emperor's Medal." His ideas in CMNS include two of the most innovative of any so far: his double-structured cathode with which he reliably produced excess heat, helium-3 and helium-4 (the first two confirmed by replication at SRI); his method of producing finely dispersed nickel and/or palladium on a zirconia substrate in such a way as to prevent or mitigate sintering (apparently replicated by Mitch Swartz in his "nanor"). Arata's results of this second idea are discussed below.

Stan Szpak was one of the original workers in the CMNS field and although now advanced in age still is active in thinking and writing on the topic to the extent that he is, with his co-workers, our field's most prolific published author of peer reviewed "mainstream" journal articles. As Scott Chubb notes in his Infinite Energy report: *"Szpak has advanced science in its truest sense through his persistence and idealism. Not only has he been creative, he has followed through with conviction to make sure that what has happened ... has been recorded and presented openly and within the context of conventional science. Frank Gordon should also be commended for his foresight and creativity in recognizing the genius of Stan Szpak, and for encouraging and helping Pam [Boss] and Stan to perform their research."*


Photo: Yoshiaki Arata(photo courtesy: Duy Tran).

A total of 181 people were listed as registered participants although five of those people were unable to attend from the Russian delegation despite strenuous efforts on the part of the organizers. As expected (and as a reversal from ICCF13) 119 attended from the U.S., 17 from Japan, 12 from Italy, 8 from Russia, 7 from Israel, 5 from Germany, 3 from France, 2 from Canada and the United Kingdom, and 1 each from China, Finland, India, Malaysia, Taiwan and the Ukraine. The attendance from Germany was interesting, new and welcome. Besides a large number of scientists, many participants were investors or people actively scouting the energy arena. Below we see two of my Silicon Valley friends operating in the latter category: Matt Trevithick and Ed Beardsworth. According to the program, 61 oral presentations and 36 posters were scheduled for the conference.


Photo: Matt Trevithick and Ed Beardsworth(photo courtesy: Duy Tran).

The surprising “new kids on the block” at ICCF14 were a crew and producer from the CBS television program “60 Minutes” who filmed during the first two days. This caused considerable “buzz” despite their unannounced presence, and no little surprise and (in at least one case) an almost siren-like enticement. Sometime previously CBS had expressed a desire/willingness to feature the work of Energetics in a report on the topic of our conference. Before the conference I had been working with producers at “60 Minutes” and the Energetics’ folks (Alison Godfrey and Irv Dardik) for several months, and it would take more than 6 months more before the program “Cold Fusion Is Hot Again” aired to general (but not unanimous) critical acclaim on April 19, 2009. It was an interesting experience and the “60 Minutes” folks were the most careful and “fact provable” people I have ever worked with. One of the things we critically needed was an independent expert from a neutral or antagonistic position who would be willing to review the literature, visit the laboratories where Energetics work was being performed (Omer Israel, ENEA Frascati and SRI Menlo Park), and then make a public report on camera. The story needed balance. At ICCF14 CBS were just filming “background.”

Our task of finding an “honest physicist” was harder than imagined and several abortive attempts were made before we found Rob Duncan (who would rise to be a star in our field and to Chair ICCF18). Several “big name” individuals were willing to make an on-camera report based on what they already felt they “knew.” They were not, however, willing to review any literature or travel to see an experiment. Professor Duncan was a godsend; an experienced and highly capable experimentalist, former Gordon and Betty Moore Distinguished Scholar in the Division of Physics, Mathematics and Astronomy at the California Institute of Technology (Caltech), and a fellow (and life member) of the American Physical Society. More specifically Rob had several qualities that were desperately needed in such a review and role: personal hands-on experience

with calorimetry; an open mind, capable of change; a willingness (Rob would call it a scientific obligation) to speak out publicly if and when his mind was changed. This he did, and the experience changed him and our community permanently (I would argue for the good).

In his Infinite Energy review Scott Chubb acknowledged Professor Arata as having presented the "most significant results" at the conference and noted: *"In one series of experiments (Arata and Zhang), the reported heat occurred using a device in which there was no electrical (or other) form of input power; the associated measurements of excess heat, which were performed by monitoring changes in temperature and pressure of gases above particular nm-scale palladium (Pd) powders, persisted for such long periods of time and involved such simple forms of measurement that it is virtually impossible to understand how the resulting effect could have occurred, except from room temperature nuclear reactions."* Scott went on to comment*: "Prior to Arata's presentation, Talbot Chubb provided background material about Arata and an overview and interpretation of the work."* We have a picture of Arata above and below two very good shots, one of Scott at the microphone and of "Uncle" Talbot.

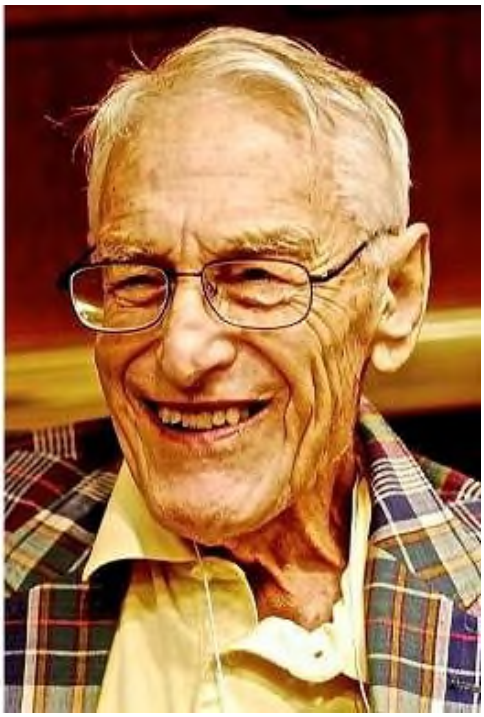


Photo: Scott Chubb; Talbot Chubb (photos courtesy: Duy Tran).

On Monday morning Mitch Swartz repeated his claim from ICCF9 that increased levels of excess heat can be obtained from Ni/normal water electrochemical systems by adding increasing amounts of heavy water. This is one of those facts that we keep forgetting and failing to fully reproduce. This is precisely the final thing that Edward Teller told me to do (and I did not). If correct, as Scott Chubb noted: *"This is important because it potentially clarifies a possible origin of the excess heat results in the Ni/normal water systems. As opposed to the commonly held, intuitive idea that unusual nuclear reactions are occurring in this kind of system (as a result of the assumption that protium in the normal water is entirely responsible for the*

reaction), it is possible that the Ni substrate could filter or partially filter out protium, or an alternative process could be at work, in such a way that even the small (1 part in 6000) portion of deuterium (and heavy water) that is present in normal water could be playing an important role in the associated reactions." With the current fashionability of Ni/normal hydrogen gas systems it may be time to seriously begin "Teller's task" to see if we can determine what (if anything) actually undergoes nuclear reaction in the experiments of Piantelli —Rossi— Parkhomov *et al*. Note Piantelli claims for his gas system at least that deuterons "poison" the nuclear reactivity of protons. Whatever the case we need to know.

Following up on the "60 Minutes" presence, Scott Chubb was also very impressed with the Energetics presentation and noted: *"On Monday, Shaul Lesin (Energetics) also gave a very important talk titled, Ultrasonically-Excited Electrolysis Experiments at Energetic Technologies. The talk was important because Lesin discussed experiments and experimental techniques that have demonstrated a highly successful (80% success rate) procedure for reproducing the excess heat effect and at magnitudes that are considerably larger than have been observed elsewhere. Key results that Lesin discussed involved modifying surfaces: 1) using short sequences of ultrasonically induced cavitation cycles (for cleaning the electrode surfaces), followed by low current density electrochemical loading, using Dardik's superwaves and 2) cleaning the electrode surfaces by etching them using glow discharge pulses that are constructed using superwaves, and then applying electrolytic currents that are also produced using superwave forms. Superwaves consist of highly non-linear (fractal) modulation."* The Energetics "extended family" were well represented at the conference and we see Tanya Zilov and Shaul Lesin from Omer, Israel below, and below that Fran Tanzella, Vittorio Violante and Arik El Boher from the U.S., Italy and Israel.

COLD FUSION IS HOT AGAIN

60 Minutes: Once Considered Junk Science, Cold Fusion Gets A Second Look By Researchers

2009
APR 17

FACEBOOK TWITTER REDDIT FLIPBOARD

Twenty years ago it appeared, for a moment, that all our energy problems could be solved. It was the announcement of cold fusion - nuclear energy like that which powers the sun - but at room temperature on a table top. It promised to be cheap, limitless and clean. Cold fusion would end our dependence on the Middle East and stop those greenhouse gases blamed for global warming. It would change everything.

But then, just as quickly as it was announced, it was discredited. So thoroughly, that cold fusion became a catch phrase for junk science. Well, a funny thing happened on the way to oblivion - for many scientists today, cold fusion is hot again.

"We can yield the power of nuclear physics on a tabletop. The potential is unlimited. That is the most powerful energy source known to man," researcher Michael McKubre told ***60 Minutes*** **correspondent Scott Pelley**.

Photo: Tanya Zilov and ShaulLesin(photo courtesy: Duy Tran).

Photo: Fran Tanzella, Vittorio Violante and Arik El Boher(photo courtesy: Duy Tran).

On behalf of the International Society for Condensed Matter Nuclear Science I was invited by Bill Collis to present the Giuliano Preparata Medal to my good friend and colleague Dr. Irving Dardik, of Energetics, LLC, in recognition of his outstanding contributions in developing procedures for creating excess heat through the Fleischmann Pons Heat Effect. Dr. Dardik's acceptance speech can be seen in the link to Scott Chubb's IE review of ICCF14. In it Irv focused attention on the task and the hoped for objectives with the words: *"The stakes are easily articulated. The survival of civilization is dependent upon finding a safe, sustainable and readily accessible solution to the energy crisis. It is our job to remain focused on our goals and not take on a victim's mentality, nor get caught up in the tempting web of infighting. This quiet revolution is yielding results that are more and more reproducible. We are on the verge of developing a technology that promises to rescue our future. And it is the people in this room who are going to save the world."* Below we have a very good picture of Irv Dardik and Alison Godfrey with a number of the Israeli Energetics team led by Shaul Lesin.

Many other old faces were present, and some new. In both categories we have a picture of Ed Storms with the Coolescence leadership, Matt McConnell and Rick Cantwell. Founded in 2005 to pursue LENR goals, Coolescence presented at the ISCMNS ("Asti") meeting in Catania organized by Bill Collis in October 2007, but I did not remember seeing them or hearing them present at previous ICCF's. Below that we see Antonio Spallone, Ludwik Kowalsi, Bill Collis himself, Frank Gordon in his signature T-shirt and newcomer Leona Neighbour.

Photo: Shaul Lesin, Irving Dardik, Alison Godfrey, Vitali Krakov, Tanya Zilov, Ehud Greenspan, Mark Tsirlin and Arik El Boher after the award of the Preparata Medal (photo courtesy: Duy Tran).

Photo: Rick Cantwell, Matt McConnell and Ed Storms (photo courtesy: Duy Tran).

Photo: Antonio Spallone, Ludwik Kowalsi, Bill Collis, Frank Gordon and Leona Neighbour (photo courtesy: Duy Tran).

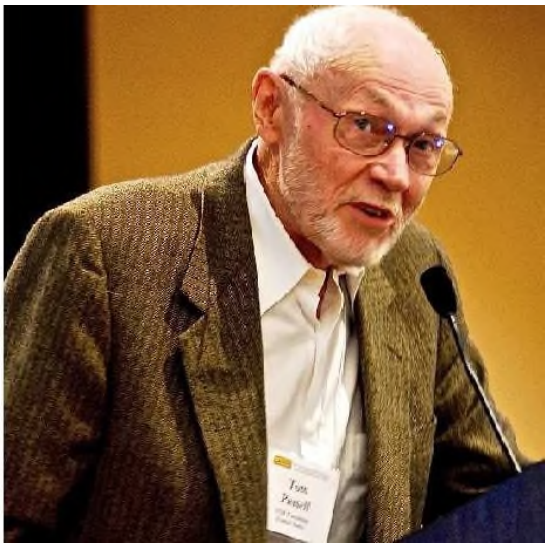
We also have an extremely fine shot of very dear friends Franco Scaramuzzi and his wife Teresa, and of Jean-Paul Biberian in customary good humor.

Photo: Franco and Teresa Scaramuzzi;

Jean-Paul Biberian (photos courtesy: Duy Tran).

We end in a cluster of four photographs: newcomer Robert Godes of Brillouin at his first of (we hope) many ICCF's; my good friend, first program manager and long-time cold fusioneer Tom Passell; the now departed and much missed John (Alf) Thompson who passed away far too early; and finally the team of Dave and Carol Nagel. Dave we all know, love and respect, and he put great effort into this conference with his technical partner, Mike Melich, to produce scientifically an extremely sound result. But watching Dave and Carol work together and share responsibilities and duties I was reminded of the phrase "behind every good man is a good woman." I think it is fair to guess that without Carol's strong and steady hand the conference experience would have been much less. For this I designate the team of Dave and Carol Nagel as my heroes of the conference

Photo: Robert Godes;



Tom Passell (photos courtesy: Duy Tran).

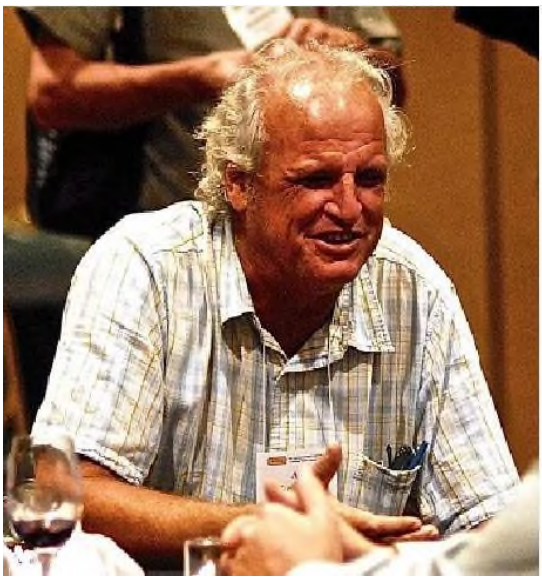


Photo: Alf Thompson; Carol and David Nagel (photos courtesy: Duy Tran).

The siting of the next conference was due to rotate back to Europe and the resolution of this matter by the IAC occasioned the most discussion, interest and drama of any before or since. Bill Collis had been given a “hunting license” by Yuri Bazhutov’s IAC in Sochi to pursue the organization of ICCF15. Bill has a demonstrated ability to organize good (and enjoyable) conferences and had formed a team with Larry Forsley to boost the technical side. He had arranged some funding and proposed a familiar location (Catania in Sicily); he had a well-prepared and strong plan for ICCF15. But in the year intervening between ICCF13 and ICCF14 a new candidate had emerged from a very strong agency, ENEA, and strong potential chairman, Vittorio Violante. Vittorio also approached the committee with a well-prepared and well thought out plan. Both men were members of the IAC and were thus able to make their cases directly.

The basic issues under discussion were: cost, accessibility, impact and science. Vittorio proposed to hold the conference in downtown Rome within easy walking distance of the seats of Italian power — using an argument parallel to Dave Nagel’s reason for siting ICCF14 in Washington, D.C. Catania was a long way away from such power but would certainly be less expensive for both the conference fee and accommodation (although perhaps not for air travel). Catania, on the sea in one of the most remarkable places on the planet, was certainly a great tourist destination — but so was Rome. I suspect the telling arguments were scientific — it would be very difficult to compete with the known scientific standard and credibility of ENEA (not to mention the technical prowess of the proposed Chairman). What none of us appreciated fully at the time was just how much influence ENEA has in Rome. After much discussion and deliberation a secret ballot was held that Vittorio narrowly won. And so we were off to Rome...

ICCF-15

Conferences in Italy rarely disappoint and ICCF15 most certainly did not. I would rate ICCF2 in Lake Como, also in Italy, as the most interesting conference I have ever attended for reasons discussed previously. But the most memorable of recent conferences was ICCF15, for reasons discussed below. The next conference, ICCF19, will also occur in Italy in less than a month at time of writing. I am sure it will also not disappoint and I look forward to it with eager anticipation. ICCF15 was the second conference organized by ENEA (the Italian National Agency for New Technologies, Energy and Environment). The previous one, ICCF8 at the turn of the century in Lerici, was chaired by one of the field's (and certainly ENEA's) most respected cold fusion scientists, my old friend Franco Scaramuzzi. That was a highly memorable conference for a number of reasons both good and sad, as noted. It would take a lot to compete or exceed. Fortunately my good friend Vittorio Violante and an excellent team from ENEA led by Maria Polidoro succeeded admirably with a wonderfully and beautifully crafted conference containing many memorable elements. Vittorio adopted a novel administrative arrangement with himself as chair, Shaul Lesin (CEO of Energetics Technologies, Israel) as co-Chair, and Martin Fleischmann (Professor of Electrochemistry at Southampton University, retired) as Honorary Chair. It was a nice touch. We did not know, at that time, how timely or how appropriate.

The conference location itself was magnificent. The lectures were held from October 5-9, 2009, at the *Angelicum, Pontificia Università San Tommaso d'Aquino* (the Papal University of St. Thomas Aquinas). Situated just behind Trajan's Markets and between the Roman Forums and the Quirinale Palace, Angelicum is located in a monastery built by Giacomo Della Porta at the end of the 16th century. The high altar of the monastery church *Santi Domenico e Sisto* is a work by Gian Lorenzo Bernini. Certainly as a community we had not been treated with such class and grace before. As Vittorio had promised the ICCF14 IAC, the sessions were held within easy walking distance of some of the most important Italian government offices (including the one in the Ministry of Economic Development from which Benito Mussolini once controlled Italy[29] that had I visited with Energetics the previous year). Refreshment breaks and the opening reception were held in the cloistered garden of the active convent, with nuns present. The ambience and gastronomy were everything one expects from Rome — spectacular!

I escorted Martin to the conference (see photo below) and the sessions opened in an interesting and memorable way with Franco Scaramuzzi and myself chairing. After welcoming comments by Vittorio Violante and Alison Godfrey, Martin Fleischmann was asked to address the audience (see photos below of Martin with notes before the address and while addressing the conference with Franco chairing). Considering Martin's state of health, the fact that he was able to do this at all was remarkable (see further detail below). I introduced Martin and sat down in the audience, unsure what to expect. Martin started speaking — and then stopped — a long pause, perhaps 10 seconds but it seemed much longer. As co-chairman and old friend I was not sure what to do but just when it seemed as if rescue was needed Martin resumed and delivered lucid, thoughtful and kindly comments to the audience that had assembled for just one reason: Martin Fleischmann. This was to be Martin's last public speech, and last attendance at an ICCF. Born in 1927 in

[29] Very interestingly, and of no possible significance, ICCF2 was held within easy walking distance of the place where Mussolini was executed by Italian partisans, near Lake Como at the end of World War 2.

Karlovy Vary, in the (now) Czech Republic, Martin died on August 3, 2012, after a long illness in his adopted home of Tisbury, England. The lasting honor that Martin was able to give his audience in that final lecture (in large part thanks to Vittorio Violante and ENEA), and that we were able to give him in the evening of that day (in large part due to Bill Collis, Akito Takahashi and the ISCMNS – and Alison Godfrey and Energetics – see below) is much of the reason why ICCF15 is so precious in my memory. Although Vittorio very well deserves this honor, and Maria Polidoro could share, I am certain that they will not object to my nominating Martin Fleischmann as the hero of ICCF15.

Photo: Vittorio Violante, Michael McKubre, Xing Zhong Li and Martin Fleischmann (photo courtesy: Dave Nagel).

Three introductory lectures were scheduled to follow Martin before the session itself. These were not introductions to cold fusion or CMNS, but rather a way for us to introduce and begin to integrate ourselves with “normal” European science. Professor Tomellini representing the Directorate General of Research for the European Union (EU) spoke generally of the place of Science in the world, and Professors Campanella (President of the Italian Chemical Society) and De Sanctis (Vice-President of the Italian Physical Society) spoke about their disciplines and welcomed us to Rome. It was a thoughtful and touching start by Vittorio and ENEA with two significant points: like it or not, to make any significant advance we would need to integrate with “mainstream” science and were here being welcomed to do so; ENEA has tremendous influence in Rome, Italy and the EU. As I was to discover later this influence also extends to the Vatican, and beyond.

Photo: Martin Fleischmann with notes and Alison Godfrey & Irv Dardik behind (photo courtesy: Mike McKubre).

Photo: Martin Fleischmann speaking and Franco Scaramuzzi (photo courtesy: Mike McKubre).

The technical sessions began with a session on the "Fleischmann & Pons Experiment" led off by Rob Duncan (then Vice Chancellor of Research at the University of Missouri and later chairman of ICCF18 in Columbia, Missouri). Rob, the face and voice of balance in the CBS "60 Minutes" documentary discussed above, having been swayed by the evidence he had reviewed and observed on behalf of CBS, chose then and chooses now to actively participate in CMNS. Rob and his lovely (and highly technically competent) wife Dr. Annette (Annie) Sobel were definitely the "new kids on the block" at ICCF14 (see photograph below at one of the evening functions). Rob's lecture was titled "An Outsider's View of the Significance of the Fleischmann-Pons Effect" and very much reinforced the points made by the three Italian speakers. Science is the Scientific Method. As Rob would say: *"This is the only tool we have and, fortunately, it is the only tool we need."* This was well received (although sometimes forgotten). The message and the messenger were powerful. The field needed new, young, strong, voices, especially those with good credentials and Rob's were impeccable. Prof. Duncan's closing comments were especially relevant to the audience and this community: *"Science is fundamentally empirical, so scientists must always be prepared for surprises that challenge accepted thought. But the Scientific Method, which strives to disprove the hypothesis through experiment, must be followed always, with no exception."*

Photo: Annette Sobel and Rob Duncan at Palazzo Brancaccio (photo courtesy: Dave Nagel).

I lectured next in a talk titled: *"Cold Fusion LENR: One Perspective on the State of the Science."* The Chairman of the conference and long-time colleague, Vittorio Violante, had tasked me to review the state of the science. As I note in the proceedings this would be a summary of *"at least 1000 man-years worth of work in 30 minutes, and here on a few pages. Of course [this task] is impossible, so what was and is presented here is a very brief and personal view of the state of the science, through time and space constraints necessarily avoiding consideration of many large and important research subtopics."* I focused on the SRI work (itself, at this point, more than 60 person-years of work) at a "gentle" level with the purpose of communicating as broadly as possible. The following talks in this first session, by Graham Hubler, David Kneis, Vittorio Violante, and Shaul Lesin, were all more technical. I, and many others, found this first morning strategy of "tapering into" the topic to be highly effective and Vittorio Violante and ENEA are to be highly commended for it.

And it got better. That evening was to be one of the most memorable of my life[30] but first we need to establish a little context. I remember clearly when I first noticed signs that my friend Martin Fleischmann was fading. I had taken Irv Dardik and Alison Godfrey to visit Martin at his home in Tisbury, England, in June, 2007. We were having lunch at an exquisite English country restaurant of Martin's choosing on the banks of a little river. The setting was idyllic. I noticed a lack of sharpness and Irv (trained as a medical doctor) queried Martin about his tremor; Martin acknowledged the early onset of Parkinson's. The disease proceeded swiftly. By early 2009 Martin could barely function and his friends became extremely concerned. Knowing that Irv and Alison had had considerable and demonstrated success in remediating this disease, Mike Melich and Marianne Macy arranged funding and support to bring Martin and Sheila to spend the summer before ICCF15 in New Jersey. In a mansion owned by Sidney Kimmel, on a hill overlooking Oldwick, New Jersey, Irv and Alison brought Martin back to life to the point that he was able to be present in Rome on Monday, October 5, 2009.

I spent much of my summer in Oldwick that year watching Irv and Alison, and their son Trevor Dardik (who we will meet again in this story at ICCF18 in another role), and Ryan Freilino, kindle a spark in the intellectual fire that had been Martin. In addition to Mike & Marianne many of Martin's "cold fusion" friends including Bob Nowak (my DARPA Program Manager, now retired — seen below in Irv & Alison's home) and Debra Rolison (NRL) spent time there that summer to provide Martin with cognitive stimulus. We have a good shot below of other members of Martin's "recovery team." Martin arrived on the Queen Mary on July 3rd (he could not fly) and I arrived on the 4th. I was instantly appalled at the deterioration.

[30] I would say "magical" but that would not comport with Rob's requirements for Scientific Method.

Photo: Robert Nowak in Oldwick (photo courtesy: Mike McKubre).

Photo: Some of the “Recovery Team”: Cecilia Oleas, Ryan Freilino, Irv Dardik, Martin Fleischmann, Alison Godfrey, Mike Melich, Charles Ressler and Joey Pero (photo courtesy: Mike McKubre).

I had watched Irv and Alison work their miracles before[31] but when I first saw Martin he could not finish a sentence or a thought; he could not walk or dress or feed himself unassisted. The prospect looked if not hopeless then, at best, bleak. But, with good care, the progress and rate of progress was stunning. Good friends of ours were married at the house on the 19th of September and Martin was able (and interested) to dress himself in a suit and tie and present himself fully attired for, and participate in the occasion. We were able to hold scientific conversations, sometimes in considerable depth, and I was able to hear my old friend's deep belly laugh again. My most enduring memory of the revived Martin is the vision of him jogging down the long corridor of Irv and Alison's home.

Photo: Irv Dardik, Charles Ressler, Alison Godfrey, and Martin Fleischmann (photo courtesy: Mike McKubre).

We have another picture below of that time in Oldwick at the kitchen table in Irv and Alison's home. Martin recovered sufficiently that Sheila was able to go home early. Martin flew back to Tisbury with Ryan Freilino in sufficient time to attend ICCF15 in Rome. I salute all those who participated in this rescue: Irving Dardik, Alison Godfrey, Trevor Dardik, Ryan Freilino, Marianne Macy, and Michael Melich. Without that gifted summer there was no possible way that

[31] Interestingly, or ironically, the method was a multi-resonant rhythmic exercise "SuperWave", the progenitor of the physical technique that had catapulted Energetics to the forefront of CMNS research, and it was precisely the regression of "impossible to cure" diseases that had caused Irv Dardik to be disbarred as a medical doctor in the State of New Jersey.

Martin could even have attended ICCF15, let alone speak cogently and unsupported to the conference that morning, or receive the award presented to him that evening[32].

Photo: Irv Dardik, Michael McKubre, Niamh Sullivan, Martin & Sheila Fleischmann (photo courtesy: Sue Ruscitto).

That evening of Monday, October 5, 2009, was brought to us by a powerful cast of characters: Vittorio Violante, Maria Polidoro and ENEA; Bill Collis, Akito Takahashi and the ISCMNS; the family of Minoru Toyoda; Alison Godfrey, Shaul Lesin, Sidney Kimmel and Energetics. The ISCMNS, principally Bill Collis and Akito Takahashi, had determined that a second medal was needed to augment the Preparata Medal to award individuals who had *"made outstanding contribution (not necessarily scientific) to the promotion and progress of CMNS community "*. There was some discussion and several names were mooted but there was little disagreement that Martin Fleischmann deserved the first. Akito Takahashi worked closely with the family and partners of Minoru Toyoda, to craft a medal in his name and image, and cast it in gold (there is a nice shot of Akito with the medal below). It is particularly fitting that Fleischmann was to receive a medal with this name. Martin always had the highest regard for Minoru Toyoda, and Toyoda had personally rescued Fleischmann and Pons from the U.S. Physics community and settled them in a beautiful laboratory with his name[33] in the south of France. This medal was to

[32] Regrettably without regular treatment, and returning to his old abode and set patterns, Martin's condition appreciably declined over the next year.

[33] IMRA-Europe — Institute Minoru Recherche Avancée.

be awarded to Martin that evening in one of Rome's most spectacular sites and buildings with the following announcement in the conference program:

Monday October 5, 2009	19:15	Conference Reception	Castel Sant'Angelo *(sponsored by "Energetics Technologies")*

Photo: Akito Takahashi and Minoru Toyoda Medal (photo courtesy: Dave Nagel).

Vittorio and the Energetics' folks were busy with the organization; my job was to bring Martin. It was a sparkling evening in one of my favorite places. One day past the full moon the taxi dropped us some distance away and Martin and I walked together towards the Angel and one of the most striking and symbolic structures in the planet: Castel Sant'Angelo. We were not moving quickly and Ryan Freilino and Martin's daughter Charlotte came to "rescue" us. We have an indistinct but evocative picture of Charlotte and Martin below. Very sadly Charlotte predeceased her father. We have another shot of the two of the together below before the ceremony to come.

Photo: Martin Fleischmann and daughter Charlotte (photo courtesy: Mike McKubre).

I had never before been inside Castel Sant'Angelo — it was nice to be welcomed as honored guests in a castle that had received Popes, Princes and Kings since its construction to house Emperor Hadrian's tomb in the 2nd Century A.D. Martin took the tiny elevator and I ambled up the helical ramp broad, tall and pitched gently enough for a coach and four horses — the traditional means of entry. At the summit is a panoramic terrace, watched over by a very large Angel about to fly. There the reception was held with fine food and a spectacular view over Rome and the Vatican. Following speeches Martin was presented with the Minoru Toyoda Medal carried in on a tasseled red cushion by Alison Godfrey (see pictures below). Below that we see Martin being congratulated by our chairman Vittorio Violante, sitting with Jean-Paul Biberian, and the assembled audience listening to comments by Charlotte. It is hard to imagine a more perfect night, wonderful that Martin was able to receive the medal while he was in a state to appreciate it, and marvelous that so many of us could be there to share.

Photo: Martin Fleischmann and daughter Charlotte (photo courtesy: Mike McKubre).

Photo: Alison Godfrey with Toyoda medal (photo courtesy: Mike McKubre).

Photo: Close-up of the Minoru Toyoda Gold Medal (photo courtesy: Mike McKubre).

Photo: Martin Fleischman and Vittorio Violante (photo courtesy: Mike McKubre).

Photo: Jean-Paul Biberian and Martin Fleischmann (photo courtesy: Dave Nagel).

Photo: Audience with many familiar faces listening to Charlotte Fleischmann at the Medal ceremony (photo courtesy: Mike McKubre).

Although impossible to match there was much more to come... It was a technically full program with 62 presentations and 41 posters scheduled. There was a fair amount of emphasis on Theory and "the future". Two round table discussions were held on Thursday, October 8. The first was on Theories and chaired by Drs. Dattoli (ENEA Frascati) and Hubler (NRL). In his review Dave Nagel (George Washington University) made a very useful start at systematizing the plethora of available theories with a helpful table that needs to be expanded. The second round table dealt with Future Perspectives and was led by Prof. Mario Bertolotti (U of Rome) and Graham Hubler. It was somewhat useful but as noted by Nagel: *"The discussion involved some specific suggestions about what needs to be done. It ranged from bemoaning the current lack of funding and attention, to upbeat assessments of how the field is progressing and its prospects."* Dave Nagel also expanded on the comments I made in the opening address about "What is needed to advance the field?"

Answering with his expected scientific acumen, Andrei Lipson (quoted by Nagel) offered a list of suggestions as relevant today as they were then: *"Lipson believes that careful measurements of energetic particles from LENR experiments provide the best way to convince the rest of the physics community of the ability to trigger nuclear reactions with chemical energies. He offered the following list of approaches: 1. Perform complete experiments with simultaneous detection of excess heat, atomic (D-D products and energetic alphas) and neutron emissions, as well as soft X-rays (E < or = 2.0 keV, not characteristic K X- rays from Pd); 2. Search for correlations between excess heat events and emissions of nuclear species and X-rays; 3. Employ special*

electrolytic cells and appropriate state-of- the-art calorimetric and nuclear detection equipment; 4. Use (nanostructured or nanolayered) highly D-loaded cathode samples (Pd-SWCNT-Pd, Pd-Re-Pd and PdO-Pd-PdO) with both enhanced deuterium desorption flux and D-D reaction yield, where SWCNT = single-walled carbon nanotubes." Although Andrei is no longer with us that still looks like good advice to me. We have a great shot below of three of the stalwarts of our field: Andrei Lipson, Tadahiko Mizuno and Xing Zhong Li somewhere on the streets of Rome.

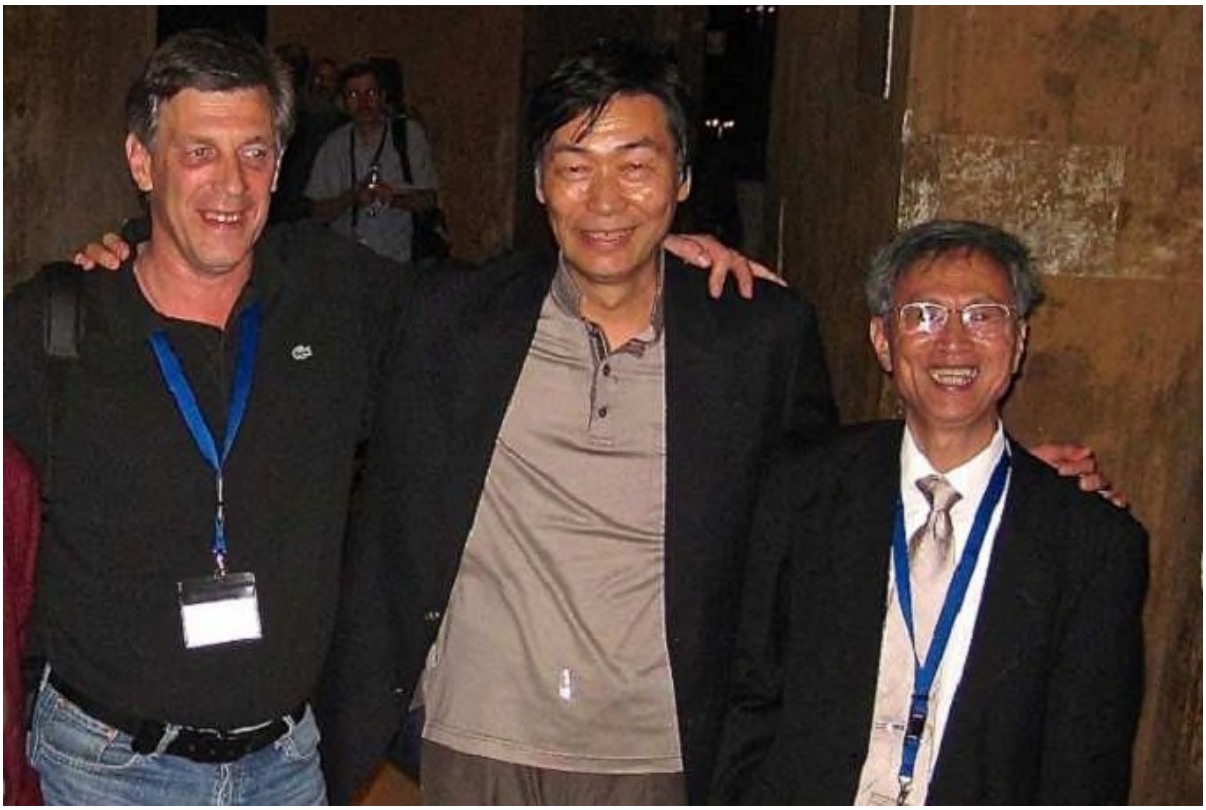


Photo: Andrei Lipson, Tadahiko Mizuno and Xing Zhong Li (photo courtesy: Dave Nagel).

On the Wednesday I ran into Annie Sobel as I was entering the Angelicum hall and she said she and Rob had tickets to attend the Papal audience at the Vatican that morning, but that Rob was not intending to go. I said I did not have a ticket and suggested on the spur of the moment that we might go together. The main group had left already and we caught up with them at the edge of the enormous square in front of St. Peter's Basilica. Our little group wended its way behind a guide through a corridor carved through what must have been hundreds of thousands of people waiting to see, and be blessed by, Pope Benedict XVI. I walked up front with Maria Polidoro as we penetrated deeper into the crowd until we were within 20 meters or so of St. Peter's itself. Maria handed me a ticket, a scroll and the conference program and said enigmatically: *"this is for him"*. She ushered me to the left of a "T" in the people tunnel, she and our group went to the right, and I walked on alone — somewhere. The where turned out to be a guard who looked at my ticket and asked me *"ENEA"*? I nodded and was ushered in to a single row of chairs now with my back up against the stairs of St. Peter's, just in front of the Swiss Guard. My view was behind the Papal chair and canopy, looking out over the enormous crowd on three sides of the platform half filling St. Peter's Square. Only then did I fully comprehend what might be happening.

The mood of an expectant papal audience is like that before a rock concert. Enormous energy: people calling out and announcing over megaphones where they were from (all over the world); groups singing; horns blowing. I was looking to the East directly towards the Tiber and Castel St'Angelo (hidden behind the buildings in the photo below). After some considerable time the Pope arrived in his Mercedes "PopeMobile" and was navigated "boustrophedically" (as Giuliano Preparata would have said) backwards and forwards through the crowd until eventually arriving at the place shown in the photo below. Pope Benedict demounted and seated himself in the large chair at a range and in clear sight that no (current or recent) President of the U.S. would dare. He spoke to the crowd, others spoke, recognizing particular groups and communicating his message of peace. A number of church dignitaries were honored and then the Pope stood and began a long procession to address individually the few of us seated in one row in an "L" around the podium. Fortunately I was near the last and was able to understand the process and compose some words for what, now obviously, would inevitably become "my turn". The process was slow, fascinating, and awe-inspiring. The recipients of the blessing were diverse: newlyweds, military, nuns, men in suits. All had gifts, some very elaborate, for his holiness. I felt a little under-dressed and under-equipped as I struggled equally to think of something succinct and appropriate to say, while watching each dramatic interchange from a distance decreasing down to 1 meter (see third photo below) where the plainclothes security politely but firmly instructed me to put my camera away.

Photo: St. Peter's Square (photo courtesy: Mike McKubre).

Photo: Pope Benedict approaching (photo courtesy: Mike McKubre).

Photo: Pope Benedict close-up (photo courtesy: Mike McKubre).

I am not a religious man — at least not in the sectarian sense. But the power and presence of Pope Benedict was clear. Not frightening, but calming, and I could see why he was elected Pope, and why 100,000 people or more had come to see him. Now it was my turn. I gave my gifts to his aide and he gave me a rosary that I gave to my mother. The Pope greeted me, I shook his hand and looked into his eyes as seen in the official photograph below. I explained the reason for my presence in more or less exactly the following words: *"My name is Michael McKubre from Stanford Research Institute in California. I am here representing the International Conference on Cold Fusion that is presently taking place in Rome. We could surely use your blessing."* He looked at me a little strangely. I expect he had not heard the request put that way very often. He said: *"I bless you, and I bless your community"*. His words may have been slightly different but that was the message. Call me crazy and I again disavow sectarian religiosity but I believe that, on the whole, things in our field have improved steadily if not monotonically from that time. I am certainly not going to refuse to accept, or believe, in a blessing of such eminence.

Photo: Pope Benedict and Michael McKubre (photo courtesy: Vatican Photo Services).

The conference banquet took place in Palazzo Brancaccio, considered to be one of the most beautiful venues in Rome. Built in 1880 and fully restored to its former glory this is the last Roman Patrician Palace. Located in the heart of Rome near Emperor Nero's “Domus Aurea” and the seven hills, between the Colosseum and the Basilica of Santa Maria Maggiore. It was a stunning Palace and garden. The assembled cold fusioneers were free to wander, glass in hand through the gardens dimly lit with yellow spheres. Foods of many kinds were spread about in little carts. We get some impression of the mood and ambience from the shot of Chino and me below, and the cheerful guests in the photo below that, and a great shot of Andrei Lipson with Tanya Zilov’s daughter Anna below at the end of the most splendid evening. I remember walking back with P.J. King (see below) through the streets of Rome basking in the afterglow. Rather than antiquity or gastronomy our conversation turned compulsively to cold fusion. P.J. was clearly influenced by Andrei’s suggestion to perform correlated studies specifically of heat and soft X-rays and he proceeded to do so.

Photo: Michael McKubre and Mahadeva (Chino) Srinivasan (photo courtesy: Dave Nagel).

Photo: Chino Srinivasan, Marianne Macy, Irv Dardik and Jenny Vinko (HERA[34]) (photo courtesy: Mike McKubre).

Photo: Anna Zilov and Andrei Lipson (photo courtesy: Mike McKubre).

[34] H.E.R.A. – Hydrogen Energy Research Agency.


Photo: PJ King and Michael Melich (photo courtesy: Mike McKubre).

The IAC had visited Palazzo Brancaccio on the previous evening for our deliberations. It was an interesting contrast to see the Palace cool, dark, sternly beautiful and almost empty on the Wednesday, and then full of life, light and laughter the next evening. We have a good shot of Iwamura and Takahashi arriving for the IAC meeting below. That IAC meeting lives in my memory as being sited in one of the most splendid rooms in which I have ever dined (see example in the last photo) — a further tribute to the vision of Vittorio and the influence of ENEA (we see Mike Melich addressing the room below). Perhaps because of the room, or the wine, the conversation became derailed from our mandated topic. I remember that Ed Storms had some matters that he wanted to raise but we never got to them.

But the issue of siting ICCF16 was very easily handled. In the previous year I had traveled around India with my good friend Mahadeva (Chino) Srinivasan (and Steve Krivit) talking and lecturing about CMNS. It was (and still is) Chino's strong desire to re-engage the Indian Science and Engineering community in the topic of cold fusion — CMNS. And where better? India has very strong communities of metallurgists and nuclear engineers — both critically needed for our field. Of all countries on the planet India can probably take greatest advantage of a limitless, universally accessible, non-polluting and potentially cheap primary energy source. Chino felt that by bringing the conference to India he could further advance this cause. The conference continental rotation returned to Asia and we had never been to India, the place where some of the most important early work was done. The committee readily agreed, Chino assumed the position as our chairman, and our tentative destination was established as Chennai, India, late 2010 or early 2011.

Photo: Iwamura and Takahashi arriving at Palazzo Brancaccio (photo courtesy: Mike McKubre).

Photo: Mike Melich addressing the IAC [missing Alison Godfrey[35]] (photo courtesy: Mike McKubre).

[35] On only three occasions so far have women been represented on the IAC. Debra Rolison (NRL) sat on the IAC at ICCF3 and proposed the notion and basic structure of the conference continental rotation steadily eastwards. Antonella de Ninno (ENEA) was listed as a member of the IAC for ICCF13 but did not attend the conference.

Photo: Palazzo Brancaccio (photo courtesy: Mike McKubre).

Alison Godfrey (Energetics) was a member of the ICCF15 IAC and participated in the conference (including as a sponsor) but did not attend the IAC meeting.

A Brief History and Introduction to the International Conference Series

Part Six - From ICCF16 to ICCF18

ICCF16

Some of the earliest positive results in the field of cold fusion (now Condensed Matter Nuclear Science — CMNS) were obtained at the Bhabha Atomic Research Center (BARC) located in Trombay, near Mumbai, India. I heard the work reported by two senior Scientists from BARC, Drs. Padmanabha Krishnagopala (P.K.) Iyengar and Mahadeva (Chino) Srinivasan. Their visit to SRI in early 1990, and the report they carried documenting dozens of experiments semi-independently performed at BARC in 1989, did a lot to convince my group at least that something new and nuclear was occurring in the solid state in ways entirely unexpected by the broader physics community. Iyengar joined BARC in 1954 (before it even was BARC) and took over as Director in 1984. With Srinivasan he saw the enormous possibility, potential and opportunity for India in the 1989 F&P announcement. Together they immediately set up and supervised a number of research projects at BARC to test the hypothesis that nuclear effects occur differently in the solid state than they do in free space. The answer appeared to be positive, hence the visit and the report[36].

It was therefore extremely appropriate and gratifying that we found ourselves in February, 2011, in India and under the command again of P.K. Iyengar[37] and my good friend Chino Srinivasan. We were welcomed to Chennai and ICCF16 with Iyengar's words: "*I extend a hearty welcome to all the participants of ICCF 16. This is the first time a meeting of the ICCF conference series is being held in India. It is fortuitous that the dates of the meeting coincide with the centenary of the discovery of the atomic nucleus and the birth of the discipline of "Nuclear" science. We are endeavouring to make it a scientifically stimulating and successful event with three satellite programs added. I look forward to meeting you all at Chennai in February, 2011*".

The 16th International Conference on Condensed matter Nuclear Science (ICCF16) took place in Chennai, India, from February 6 -11, 2011 under a byline reflecting Iyengar's words *"Celebrating the Centenary of the discovery of the Atomic Nucleus."* The event referred to my countryman Ernest Rutherford's findings in May, 1911, so seemed personally particularly appropriate. The conference took place in a modern hotel in downtown Chennai, not far from Chino's home. The three "satellite programs" mentioned above were ambitious and (although I attended only two) effective and enjoyable. Srinivasan worked very hard for this conference and he needed to solve some unexpected "hiccups". As Chino notes[38]; "*On returning to India (it was*

[36] BARC Studies in Cold Fusion Edited by P. K. Iyengar and M. Srinivasan available here.

[37] Iyengar passed away in December 2011, 10 months after ICCF16. He is definitely one of our fallen heroes. Had he not been promoted to chairman of the Atomic Energy Commission of India and secretary to the Department of Atomic Energy in 1990, his contributions and the "Indian presence" in our field could have been much more. As noted in the Indian newspaper *Daily News and Analysis*: *"Iyengar also pioneered cold fusion experiments in the 1980s to prove the hypothesis that nuclear fusion can occur at ordinary temperatures under certain scenarios. The experiments were discontinued after Iyengar's exit from the nuclear establishment by some conservative scientists."*

[38] M. Srinivasan, personal communication.

Oct 2009) after obtaining the approval of the IAC at ICCF15 in Rome, I proudly and happily announced to Dr. Iyengar that ICCF16 is to held in India in Feb 2011 and that he has to consent to be the Chairman of the organizing committee! The first question he asked me was whether I have obtained the various Govt. clearances needed for holding an International Conference in India? This was a bolt from the blue for I had no such knowledge. It was only then that learnt that I needed to get clearances from the Ministry of Home Affairs, Ministry of External Affairs, approval of the concerned "host" ministry and finally the security clearance from the local Tamil Nadu Govt.!"

To solve these "problems" required the help of a lot of friends including Dr.Bikash Sinha (seen below with Srinivasan at the conference opening) then president of the Indian Physics Association. The International Society for Condensed Matter Nuclear Science (ISCMNS) and the Indian Nuclear Society agreed to co-host and co-sponsor[39] the event. With that and P.K. Iyengar's extraordinarily high personal credibility in India, Chino was free to begin the work of organizing in earnest. He did not organize just the conference he organized the "three satellites": one before and two after the ICCF proper. The first of these was organized at "India's MIT", IIT Madras (IITM) where I had lectured three years before to an impressively attentive and receptive audience. I was glad to be back.

As noted by Marianne Macy for Infinite Energy (IE) *"The Indian Physics Association, the Science Club of Chennai and the Federation of Science Clubs of Tamil Nadu organized a day long "tutorial school" presentation,"Introduction to the Science of Low Energy Nuclear Reactions," on February 5, 2011 at the Indian Institute of Technology Madras (IITM). A group of Indian graduate students from IITM and many others from various colleges in the city and from afar filled the auditorium to hear the program, their interest perhaps piqued by articles in the The Times of India, including a short interview with Dr. Mahadeva Srinivasan which ran the day before the session".* It was a very good session; we can see the welcoming sign below and a photo of some of the speakers and organizers. Although disappointingly few of the IITM "professors" attended, the students, amongst the most capable in the world and India's future, were well represented on a Saturday and were exposed to our message.

[39] Coincidentally, perhaps, many of the persons who played a key role in 2009 are also presently included in the "LENR Specialists Group" which is meeting on April 8th 2015 at the National Institute of Advanced Studies (NIAS) in Bangalore to "Chart a Way Forward" in India!

Photo: Mahadeva (Chino) Srinivasan and Bikash Sinha at the conference opening (photo courtesy: Mike McKubre).

Re-reading another item that Marianne wrote about that session I am reminded of two things: (i) the first Rossi demonstration that occurred in January 2011, just before ICCF16, was a long time ago (from the date of writing, (March 2015), almost four years; (ii) as a community we tend to "over-hope". Quoting the Macy IE article: *"Nagel touched upon the Rossi demonstration, saying that he once would have made the statement 'If this goes commercial...' but now says 'When this goes commercial...' Nagel allowed that in the weeks since the demonstration, a lot of discussion has ensued around the world. He said, 'They showed power and energy gains over 10. Steam out—good for making electricity. Rossi has said he will have products on sale soon. Maybe this year you can buy a LENR-based steam boiler. We'll see.' Nagel stated that what needed to be developed was a reactor controller for the higher energies. He said, 'This could lead to a new nuclear energy industry'."* As Dave said: *"we'll see"*. I am not negative on this point and Rossi is to be credited positively with stimulating the present interest in the field. The anticipated attention at ICCF19 is a testament to "Rossi fever". But it is realistic to remind ourselves that reality has not happened yet.

Photo: Sign welcoming students and visitors to the pre-conference Tutorial School at IIT Madras (photo courtesy: Dave Nagel).


Photo: Some of the Tutorial School speakers and organizers (photo courtesy: Dave Nagel).

The location was luxurious — at least on the inside of the hotel. As a westerner the "entropy gradient" between the "haves" and "have nots" in India is jarring and the sights, sounds and smells of the world outside our doors certainly brought home the reason why we were there — or at least why we dream — universal, equal access to a non-polluting primary energy source. The conference was extremely well organized by Mr. C.V.K. Maithreya, Head, Conference Management Committee (seen below with friends and family).

Photo: Shaul Lesin, Michael McKubre, C.V.K. Maithreya, Dr. Sunita Maithreya and Upasika Maithreya (photo courtesy: Dave Nagel).

Dave Nagel provided the "Official" summary of the conference for Infinite Energy and for history. He made some interesting points the first of which was: *"This conference had a dual name, as did other recent conferences in this series. It was both the 16th International Conference on Cold Fusion (ICCF16) and the 16th International Conference on Condensed Matter Nuclear Science (CMNS). Most appropriately, it was co-sponsored by the International Society for Condensed Matter Nuclear Science, which is called the ISCMNS (iscmns.org). The terminology "condensed matter" is not familiar to many people. It is a term invented by the American Physical Society in 1947 to embrace both solid-state and liquid-state physics. It recognizes their many similarities, which are due to the atoms in both those phases of matter having similar inter-atomic separations. The "nuclear science" part of CMNS recognizes the fact that the field deals with the nuclear aspects of matter, specifically nuclear reactions. Hence, CMNS spans fundamental entities with sizes from nanometers down to femtometers, a challenging range of physical scales to treat theoretically."*

The main conference began with a "lamp lighting" ceremony and two talks by eminent local scientists. Bikash Sinha, had helped Srinivasan overcome local difficulties sufficiently to stage the conference as (then) President of the Indian Physics Association. He asserted forcefully that *"cold fusion is not dead"* and noted that *"hot fusion is a long way off"*, both messages falling on receptive ears. Mustansir Barma gave the Inaugural Address as Director of the Tata Institute of Fundamental Research (TIFR). The TIFR is the most prestigious basic physics research organization in India. Professor Barma began by stating that the development of this field is a scientific puzzle and that the key question remains: *"how can condensed matter influence nuclear reactions?"* Robert Duncan (then Vice Chancellor for Research at the University of Missouri) was scheduled to give a Keynote Address but could not attend the conference due to travel problems. Michael Melich read his remarks. Through Melich Duncan emphasized that the poor state of affairs regarding LENR is due to *"a widespread failure of the scientific method."* At the end of his dictated remarks, Duncan called for patent reforms to make it possible for inventors and investors to protect LENR intellectual property.

The conference proper started with introductory lectures by two of the field's (by this time) venerable "grey beards" and fellow "Wired rebels" (we have separate pictures of both with Jean-Paul Biberian below). I delivered a talk entitled "What is Needed in LENR/FPE Studies?" and Ed Storms offered "An Explanation of Low-energy Nuclear Reactions (Cold Fusion)". Thus primed we proceeded in an orderly way through the sub-topics of general interest: Gas Loading; Electrolysis; Theory; Glow Discharge Experiments; Nuclear Particle Measurements; Transmutation and Hotspots; and finally Materials. A total of 28 lectures were delivered to an registered audience of approximately 150, 50 of whom were from India[40]. It was very well organized reflecting our Chairman's "touch" with the CMNS scientific community. I found it odd that there were only three papers offered in the last session, Materials, two of which were presented by the Violante group from ENEA-Frascati in Italy Italy. Here we were in a country of superb Materials Scientists, covering the very topic whose solution had confounded and greatly delayed the progress in our field, the basic material, and only two groups had something important to say? Fortunately there was a Workshop on this topic to follow.

As noted and expected the presence of Indian Scientists was particularly strong and welcome. Below we have a great shot of Arunachalam Lakshmanan (Indira Gandhi Centre for Atomic Research) and Andrew Meulenberg (visiting Professor at the University of Science Malaysia in Penang). Below that we have some of the American contingent: first Fran Tanzella (SRI) and Ashraf Imam (NRL); and then Dawn Dominguez, Olga Dmitriyeva, David Kniess and David Kidwell (all from NRL except Olga who is with Coolescence). Finally in this set we have a picture of Norman Cook (Kansai University), Marianne Macy (reporting for Infinite Energy Magazine) and Michael Melich (US Naval Postgraduate School and co-Chair of ICCF14).

[40] In his IE Summary Dave Nagel notes a more encouraging number: *"In all, about 500 people attended the main conference and its associated meetings."*

Photo: Jean-Paul Biberian and Mike McKubre at the Banquet (photo courtesy: Dave Nagel).

Photo: Jean-Paul Biberian and Ed Storms at the Conference (photo courtesy: Dave Nagel).

Photo: Arunachalam Lakshmanan and Andrew Meulenberg (photo courtesy: Dave Nagel).

Photo: Fran Tanzella (SRI) and Ashraf Imam (photo courtesy: Dave Nagel).

Photo: Dawn Dominguez, Olga Dmitriyeva, David Kniess and David Kidwell (photo courtesy: Dave Nagel).

Photo: Norman Cook, Marianne Macy and Mike Melich (photo courtesy: Dave Nagel).

This paucity of papers on “Materials” was all the more surprising as Dave Nagel featured two of these three talks in his Scientific Overview of ICCF16 for Infinite Energy with the words: *“Vittorio Violante and his coworkers from ENEA-Frascati and SRI International have played a leading role in the study of Pd foil materials for electrochemical experiments for several years. In particular and importantly, they correlate material properties with the achievement of excess heat in electrochemical cells. At ICCF16, Violante showed that two observed material characteristics favor production of excess heat. The first is a <100> orientation of the surface grains on the foils. This is reasonable since the <100> face of Pd is more open than either the <110> or <111> faces. The second is a particular power spectral density of surface roughness obtained from Atomic Force Microscope measurements. A rationale for this observation remains to be developed. Emanuele Castagna from the same team gave a paper elaborating on the correlations between surface properties and the generation of excess heat. The group also ascribes importance to the nature and content of impurities and defects.”* These were and remain two of our most important observations. Without control over the crystal orientation and surface roughness (and impurity content) reproducibility of the electrochemical Flesischmann Pons heat effect (FPHE) will be remain low. Vittorio Violante and Emanuele Castagna can seen together below and we have another shot of Vittorio with some of the Energetics-ENEA-SRI “family”.

Photo: Vittorio Violante and Emanuele Castagna (photo courtesy: Dave Nagel).

Photo: Ehud Greenspan, Shaul Lesin, Vittorio Violante and Fran Tanzella (photo courtesy: Dave Nagel).

Although not present at this or any other ICCF (so far) Andrea Rossi was definitely the "new kid on the block" and the subject of much discussion. As noted by Dave Nagel *"The Focardi-Rossi demonstration greatly influenced the discussions at ICCF16. There were two presentations added to the Plenary Session of the conference about the demonstration. Francesco Celani from the Italian INFN (National Institute of Nuclear Physics), who was at the demonstration to measure gamma ray intensities, described his experiences. He noted that the public demonstration on January 14* [2011]*, with its energy gain greater than 10, never became self-sustaining. Celani stated that he was told that a run with the device on the day before had achieved gains exceeding 100 and might have been self-sustaining."*

Two post-conference specialist Workshops were held, one on the theme "Materials issues in LENR Devices" conducted during the weekend of 12th-13th February 2011 at the Chariot Beach Resort Hotel right on the Bay of Bengal. The second was a one-day course on "Biological Nuclear Transmutations: Historical Perspective and Applications" that I did not attend. The Chariot Beach Resort is a stunning location situated about 50 km from Chennai between the Indira Gandhi Centre for Atomic Research (IGCAR) at Kalpakkam, and Mahabalipuram which is a popular tourist resort located also on the sea. I had been to both during my "speaking tour" with Dr. Srinivasan three years earlier. I remembered the numerous masterful carvings (many of elephants — many full sized) at Mahabalipuram and the stunning, deserted beach, miles long at Kalpakkam where I swam for the first time ever in the Indian Ocean, with Chino. I was very keen to return — not just for the science. In addition to the charms of Chennai, siting the

workshop at the beach made the conference attractive for spouses and a number attended. Below we have good shots of Carol Nagel (co-heroine of ICCF14) with Chairman Chino, and Igor Goryachev (co-Chair of ICCF13) and his wife Olga enjoying the ambience.

Photo: Carol Nagel and Mahadeva (Chino) Srinivasan (photo courtesy: Dave Nagel).

Photo: Igor and Olga Goryachev (photo courtesy: Dave Nagel).

A "hidden agenda" of Srinivasan's (and, indirectly, mine) in the "speaking tour", the ICCF16 conference and the workshop agenda, was to harness the strength and excellence of India's Materials Science community to help solve our evident and persistent "materials problems". As stated by Srinivasan: *"The objective of the Workshop is to provide an opportunity to those researchers who are registered participants of ICCF16 and who have specialized in or are interested in the Materials Science aspects of CMNS/LENR devices to interact with their Materials Science peers from India in an informal and relaxed setting after the main ICCF16 conference. It will give an opportunity to the Indian Materials Science researchers, especially those who have a good understanding of hydrogen in metals in the context of nuclear technology, to gain an appreciation for the unique challenges posed by deuterated-hydrogenated metals in enabling anomalous nuclear reactions to take place in a metallic lattice, under certain special*

conditions which are not yet fully understood. Such a dialog and exchange is expected to be beneficial and rewarding to both the CMNS and MRSI members." The workshop was co-convened by the Indira Gandhi Centre for Atomic Research jointly with the Materials Research Society of India (MRSI), Dr. C. S. Sundar, Director, Materials Science group of IGCAR and Dr. Vittorio Violante (ENEA-Frascati). The process of the Workshop was designed to facilitate liaison between the Indian Materials specialists and the International CMNS community.

Workshops are easy to convene but notoriously difficult to execute. It is difficult to get people, particularly strangers, to work together and not simply "transmit their stuff" and talk past each other. The challenge at Chariot Beach was elevated above this expected awkward norm by the presence in the audience of an individual, some-time reporter, one-time friend of the field, who had become hostile and who many of us regarded with distrust. Some speakers attempted to engage their audience to participate constructively and interactively but this was not happening. Lectures were transmitted and I was very impressed particularly with the level of science and selected topics of the Indian scientists that Drs. Srinivasan and Sundar had assembled. New friendships were made, old friendships reinforced. And the Resort Hotel, the pool, the beach, the food and the surroundings were absolutely gorgeous as can be judged by the following photos.

Photo: Junko and Jed Rothwell, Chariot Beach (photo courtesy: Dave Nagel).

Photo: Michael McKubre and David Nagel, Chariot Beach Resort (photo courtesy: unknown).

During the previous week the IAC had dutifully met to steer a path forward for the ICCF series. This we failed to do in much the same situation as Akito Takahashi's IAC faced at ICCF12 in Yokohama. The rotation was due to turn back to the Americas and the obvious candidate was Rob Duncan. After his "60 Minutes" exposure, Rob was now a strong force in CMNS. He was (then) Vice Chancellor for Research at the University of Missouri, a powerful position at a strong technical school situated in the heart of the US. I had had some conversations with Rob and he was definitely interested (as future events confirm). But, due to weather related travel "issues" in the US Midwest, Rob was unable to attend ICCF16 or present at the IAC meeting (of which he was not a member — yet[41]). Obviously none of us could present the bid for Rob and I knew that he was not completely ready. But I still had hopes for ICCF17 at "Mizzou" and felt that an accident of weather should not disqualify their candidacy.

The IAC agreed to give me 3 months to organize a conclusion. In the meantime Prof. Sunwon Park from the Korean Advanced Institute of Science and Technology (KAIST) expressed a strong desire to host one of the next ICCF conferences. According to Steve Krivet (quoting Bill Collis albeit mis-reported although not on this detail): *"Park mentioned that he had financial support from the Korean government to help subside* [Sic] *a future ICCF conference."* The Koreans were serious. Five or six Korean nationals attended ICCF16 and it was very clear that

[41] The IAC is constituted of active previous ICCF Conference Chairmen and anyone designated by the present Chair to execute a particular purpose. The membership of this last group is not persistent.

South Korea was interested in entering and contributing to our field. Although this would mean two conferences in a row for Asia, South Korea was technology rich and energy poor — a good match for CMNS. And we had never had a conference there. In the end this was too good an opportunity to miss and Prof. Sunwon Park was granted the chairmanship by the IAC with the proviso that the conference would then turn back to the Americas.

That ICCF16 happened at all, and that it happened in India so successfully, can be attributed to one person only, my good friend Dr. Mahadeva (Chino) Srinivasan, who I designate as the hero of ICCF16. Without him it could not have happened — thank you Chino — I look forward to returning when India is again a world power in CMNS. I will end with Chino's words that convey some of the bureaucratic hurdles that he needed to overcome: *"Looking back it was a formidable task, but somehow we managed it. Then came the question of clearance of the 'nodal ministry'. Which Ministry is responsible for Cold Fusion? By then Dr. Srikumar Banerjee had become Chairman of the AEC [the Indian Atomic Energy Commission] and when I approached him he readily agreed, saying Cold Fusion is the responsibility of the Department of Atomic Energy. He said 'I will give you the clearance'."* Another triumph.

ICCF17

South Korea is an extremely modern country rapidly striving to be even more so. In keeping with this modernity Professor Sunwon Park and the local organizing committee instituted a number of innovations that created a new "tone" for our now aging conference series and community. The organizers however chose to revert to our old title and the 17th International Conference on Cold Fusion (ICCF17) took place in Daejeon, Republic of Korea, from August 12-17, 2012. Prof. Park (Professor of Chemical and Biomolecular Engineering at the Korean Advanced Institute of Science and Technology, KAIST) selected as his General Co-Chair Frank Gordon (recently retired from the US Navy SPAWAR Systems Center to become Senior VP, Global Energy Corporation). They made an effective team and with the addition of Ms. Lee (petite but precise) the conference ran smoothly without perceived hiccups. We have a good shot of Frank and Sunwon christening the opening of ICCF17, and another of Sunwon with the ever-efficient Ms. Lee. Thanks to the hard work of the organizers the conference had a particularly broad base of supporting organizations including: the Korean Institute of Chemical Engineers, the Korean Nuclear Society, the Korean Institute of Metals and Materials, the Korean Research Institute of Chemical Technology, KAIST Energy, Environment, Water and Sustainability Initiative, the Korean Tourism Organization, the Daejeon International Marketing Enterprise, the New Energy Foundation and ISCMNS

Photo: Frank Gordon and Sunwon Park opening the conference (photo courtesy: Dave Nagel).

Photo: Sunwon Park and Ms. Hyujeong Lee (photo courtesy: Dave Nagel).

The first place where errors might have occurred was in the transport logistics from the airport in Seoul to the conference hotel. Daejeon is located roughly 160 km (100 miles) south of Seoul, about a third of the length of the country. This involves a bus (or, as one of my colleagues discovered, an extremely expensive taxi ride). The instructions I received were precise and the journey over very modern highways was swift. Korea is a small country with a population in excess of 50 million. Every square meter of arable land is engaged in agriculture – much of it under greenhouses. I counted the bus stops after arriving in Daejeon, got off at the appointed one and was greeted by friendly young people who directed me to my Hotel. Prof. Park had called a meeting to discuss the upcoming conference and a few of us convened at a pre-meeting meeting in the Hotel restaurant as shown below.

Photo: M. Srinivasan, S. Park, Seung Bin Park, M. McKubre, J-P Biberian and D. Nagel – ICCF17 (photo courtesy: unknown).

The whole atmosphere of ICCF17 was extremely congenial. Many of us had never been to Korea before and were not quite sure what to expect. We need not have worried. Although the opportunities for "cultural missteps" were many the organization was smooth, professional, modern and highly technical. We were welcomed with the largest banner I have ever seen on the conference building, which as everything else in Korea seemed brand new. Professor Kim can be seen below with the "little sister" of the large banner at the Welcome Reception inside the conference center. Although we did not know it then, Prof. Kim was to be co-Chair of ICCF18 in less than a year.

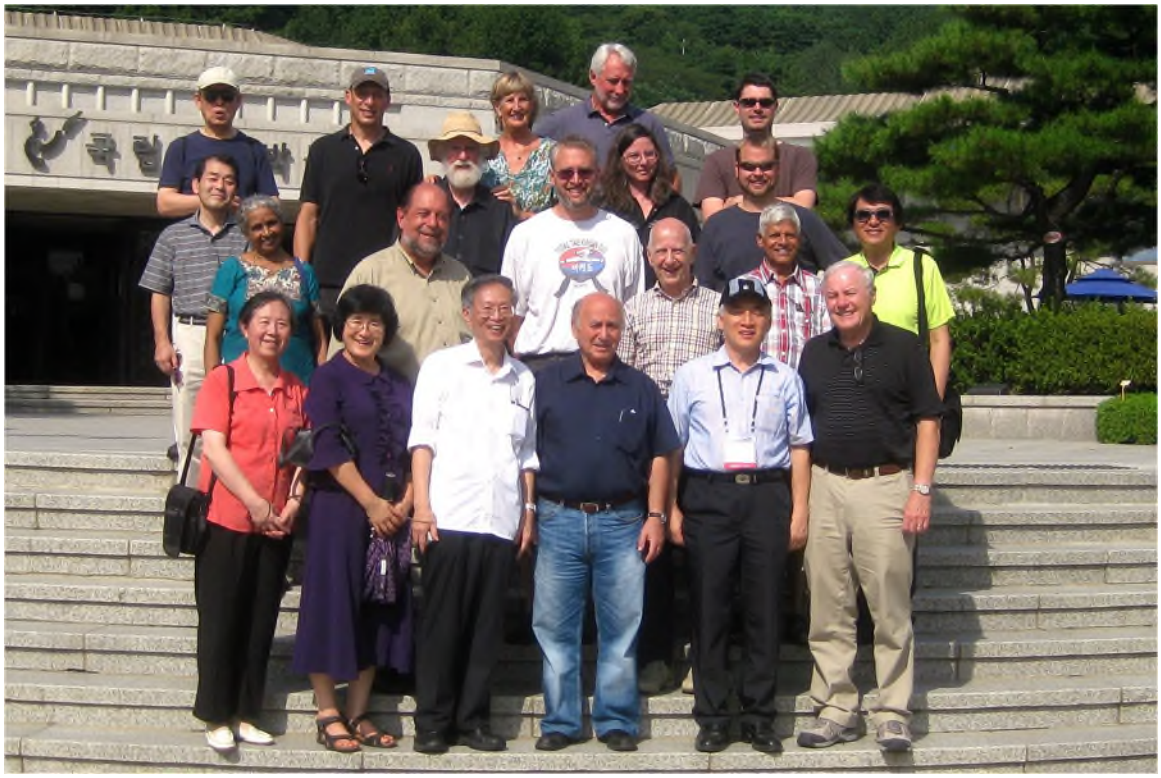
As with ICCF16, Sunwon and the organizers had organized a Workshop before the main conference, in this case on the Friday. It was very professionally done and I was extremely impressed with the facilities at KAIST (formerly the Korean Advanced Institute of Science and Technology) where it was held. There is good reason to be impressed. According to Wikipedia: *"KAIST had approximately 10,200 full-time students and 1,140 faculty researchers and had a total budget of US$765 million in 2013, of which US$459 million was from research contracts"*. In 2014 *"Times Higher Education ranked KAIST the third best university under the age of 50 years in the world."* The people of Korea are justly proud of this institution and their dedication to education, particularly technical, is an indication of how and why the South has advanced so far past the North since the enforced division in 1945.

Photo: Professor Y. E. Kim (Purdue) at the Welcome Reception" (photo courtesy: Dave Nagel).

Although still not an interactive Workshop format, and with relatively few of the 10,000 KAIST students present, the lecturers smoothly presented their practiced topics in a relaxed and informal atmosphere. One of the scheduled Workshop lecturers and conference stalwart Michael Melich (US Naval Postgraduate School) was unable to be in Korea due to very recent severe medical problems. He and many others were able to "attend" remotely due to one of the innovations introduced by Prof. Park and the local organizing committee: live streaming over Skype. A very interesting cultural program was also scheduled to occur before the conference on the Saturday — a group photo is shown below.

One unusual feature of ICCF17 was the "separation between church and state". The conferees were in several different hotels, all a reasonable distance from the Conference Center[42]. That meant that inter-conviviality was somewhat constrained. The means of transport to-and-from the conference were luxury coaches that picked us up each morning and deposited us back each evening. Below we have photos of Ryan Hunt (Hunt Utilities Group) about to board one of our big red busses, and of Prof. Li in usual good humor, already aboard, and Roger Stringham with Jean-Paul Biberian.

[42] This separation also existed at ICCF8 in Lerici, but without the semi-cohesive factor of busses.



Group photo from the Cultural Program – ICCF17

Photo: Ryan Hunt ready to board the bus (photo courtesy: Mike McKubre).

Photo: Prof. Xing Zhong Li on board (photo courtesy: Mike McKubre).

Photo: Roger Stringham and Jean-Paul Biberian (photo courtesy: Mike McKubre).

As a bittersweet reflection I have selected a photo taken only minutes before I learned that Martin had early stage Parkinson's, the disease that brought him down so fast, and directly or indirectly killed him. By extraordinary fate I had another task to perform that week this one happier. The ISCMNS had awarded John Bockris the Preparata medal to be presented later that week. Normally this medal is received in person but John's health was fading, also, and he was not able to make the trip. Bockris prepared a video to show, asked me to accept the medal on his behalf and say a few words. John was Martin's old teacher, both men my mentors, and together almost unarguably the ablest and most brilliant electrochemists in the English speaking world or perhaps beyond. It seemed odd, perhaps fitting, that I was able to speak on behalf of the two men I respected technically the most in the world, one in sorrow, the other in joy.

Photo:, Martin Fleischmann and Michael McKubre (photo courtesy: Alison Godfrey).

After Frank Gordon's plenary lecture entitled "Cold Fusion—From the Laboratory to the World." the program proceeded normally and formally. Rossi, although absent, had been the "buzz" of ICCF16. This time the "new kids on the block" were Defkalion Green Technologies (DGT). The first technical lecture of the conference was given by Menelaos Koulouris of DGT describing their technology (Menelaos can be seen below with Sunwon and Frank). With the wisdom of hindsight one can wonder whether it was wise to feature DFG in this way. Apparently, and in my view appropriately, Francesco Piantelli, the "father" of the Ni/natural-hydrogen gas phase experiments from which Rossi and DGT if not intellectually then at least inspirationally derive, was originally scheduled to speak first in this session. Piantelli was also unwell and unable to make the long journey to Korea. Adding the word "Commercial" in his "Scientific and Commercial Overview of ICCF17" written for Infinite Energy (IE), Dave Nagel notes: *"Three companies were slated to give early featured papers at ICCF17. The first was*

NichEnergy SRL of Milan, Italy. That is the company based on the research for two decades by Professor Francesco Piantelli of the University of Siena. It was disappointing that Professor Piantelli did not permit the presentation to be made, as scheduled, by Peter Mobberley of Advanced Energy Technologies in the UK." It is not clear why this presentation was not made.

Photo: Sunwon Park, Menelaos Koulouris and Frank Gordon (photo courtesy: Dave Nagel).

In the first (noted) innovation the Koreans made video connection to Defkalion's Chief Technology Officer, John Hadjichristos, who joined the discussion from Greece via Skype video. The discussion was essentially the same as some of us had seen at "NI Week[43]" a week before in Austin, Texas. It was still well received at ICCF17 although somewhat lacking technical detail (albeit no more than Rossi). As further noted by Dave Nagel for IE: *"The final featured commercial presentation was from Brillouin Energy Corporation in Berkeley, California. It was given by Francis Tanzella of Stanford Research International (SRI). The President and Chief Technology Officer of Brillouin, Robert E. Godes, responded to questions from ICCF17 participants over Skype audio from California. Brillouin and SRI signed a contract about the time of ICCF17 for SRI to do thorough tests on a prototype of the "Hot Tube Boiler," which is being developed by Brillouin. That is good news, since most of the tests of prototype LENR generators have not been sufficiently thorough to be confident of the claimed performance. Work by Brillouin to date has mainly involved electrochemical systems with special pulsing of the*

[43] NI Week is National Instruments annual outreach to its consumer base. The event has the feel of a rock concert (the Pope's was bigger). I had the good fortune to attend and present at NI Week in 2012 alongside my good friend Peter Hagelstein and other cold fusion folk. Dr. James Truchard, President, CEO, and Cofounder of National Instruments is a long time friend of cold fusion — or at least of the search for truth with an open mind. NI offered anyone their hardware free in 1989 to either prove or disprove the Fleischmann Pons conjecture. They remain interested behind the slogan "*we measure, we don't judge*".

cathodes to initiate, control and stop power production. Now, the company is also interested in developing gas loading approaches to commercial LENR generators

Due mostly to safety and liability concerns there have been relatively few live demonstrations at ICCF's. Reiko Notoya had a Ni light-water electrochemical cell on display at ICCF3. Jim Patterson and Dennis Cravens (CETI) demonstrated Patterson's flow-through multi-layer plastic bead reactor at ICCF5 and at ICCF10 Mitchell Swartz and Gayle Verner (Jet Energy Inc.) demonstrated their LENR PHUSOR^{TM} in a laboratory at MIT just down the road from the conference. At that same conference, Dennis Letts (LettsLab) controlled an experiment in his Texas laboratory over the internet from the podium during his presentation. As Dave Nagel notes in his Infinite Energy review: *"ICCF17 was distinguished by having a sophisticated demonstration operating in the meeting room throughout the conference. Francesco Celani from the Frascati National Laboratory took his experiment from Italy to the National Instruments meeting in Austin, Texas, the week before ICCF17, and operated it successfully there. Then, he moved it to Daejeon, and charged it at KAIST with seven atmospheres of hydrogen gas prior to the conference. During ICCF17, it was available for close inspection, and also had nearby a LabVIEW display on a monitor, which showed the recent and current operating conditions for the setup. The demonstration was powered by 48 watts and produced up to 18 watts of excess power during the conference."* Francesco can be seen below holding his device with Frank Gordon.

Phote: Francesco Celani, Celani Cell and Frank Gordon (photo courtesy: Dave Nagel).

Some of us had seen this demonstration at NI Week in Austin and the calorimetric method seemed fraught with ambiguities and uncertainties. Nevertheless the demonstration was very professionally done and prompted Dave Nagel to state that:*"it represents the high water mark*

for demonstrations at conferences in the ICCF series." Several "new kids" were present at ICCF17 loosely collected into the "Martin Fleischmann Memorial Project" (MFMP). This group is seeking to use the tools of open science to "crack the code" of Cold Fusion and have a modern website describing their purpose. This group, some not highly technical, were sufficiently impressed with the Celani demonstration to pursue a replication. They asked my advice, I expressed my uncertainty and reservations, and they proceeded. Now, after two and a half years, I am not sure what their conclusion is or even if the Celani replication effort continues. But it did expose a new method of collaborative and open scientific research that might well prove promising. The MFMP appears to be a loose affiliation somewhat lead by Bob Greenyer (Managing Director of GreenChild Imaging Solutions). One of these affiliates, Nicolas Chauvin[44] (LENR-cars) can be see below with me and John Dash, and Prof. Li and Roger Stringham behind. Below that we see another young scientist Mathieu Valat who appears to be affiliated with the MFMP and also with Jean-Paul Biberian of Aix Marseille Université in France. Mathieu is in interrupted conversation with Rick Cantwell of Coolescence (Boulder Colorado).

Photo: Nicolas Chauvin, Michael McKubre, John Dash (photo courtesy: Dave Nagel).

[44] Searching Wikipedia one finds: *"Nicolas Chauvin; a legendary, possibly apocryphal French soldier and patriot… His name is the eponym of chauvinism."* Hopefully "our Nicolas" or the "Martin Fleischmann Memorial Project" will become eponymous with CMNS success.

Photo: Mathieu Valat and Rick Cantwell (photo courtesy: Dave Nagel).

A second innovation introduced at ICCF17 was the introduction of "pre-Proceedings at your fingertip". Technical contributions prepared in advanced were distributed to conferees on flash drives. The deadline for the Final Paper submission was July 15, 2012, almost a month before the conference! Not all authors complied with this request and there are several arguments one can make pro and con the wisdom of this process. Against (and anticipating incomplete compliance) one might argue that there will be two proceedings, one partial, un-refereed, (effectively) un-citable, and therefore unprotected from potential plagiaristic abuse. Also the purpose of a conference is to inspire discussion, reconsideration and therefore improvement — none of which obviously can be included except by hindsight. Some institutions particularly military and hierarchical require formal signoff of submitted papers up to quite high levels. The process of writing and approval can take many months in which case the research results might be well out of date and superseded by better. Who wants to hear anything except the latest results? On the pro side, and a benefit I very much appreciated at the conference, lectures are very much more easily understood with supporting text to read along, especially those where there are language issues. On the whole it was good to have and I do recommend that future Chairpersons consider encouraging advanced copies of potential proceedings papers as an option for authors who want to clearly communicate their message.

A further innovation (and one that I suspect will not be attempted again any time soon) was the idea that an experimentalist should drive the theory session. The idea (I still believe sound) was that, following scientific method, the people most affected by theory are experimenters (and, presumably *vice-versa*). What are hands-on experimenters looking for to help them design better

experiments or test specific hypotheses? I was selected to organize a set of questions, given to the set of available theorists beforehand, that would allow theory non-specialists to understand and compare: the basic propositions of each theory (and therefore critical differences); the aspects of the problem being addressed; the major assumptions; the fundamental approach. This was attempted in a panel format. Although I tried, and the theorists tried, the outcome can best be described as a frustrating failure. Experimentalists (in this case I) need to ask more pertinent questions of their theory partners and insist on their answer, and theorists need to understand better what it is that will best help experiment progress. On the whole I feel that the predominant "blame" for our present seeming impasse must be laid at the feet of experimentalists. We simply have not performed sufficiently well-characterized and monitored experiments to allow theorists to know comprehensively what are the input conditions and what are the output channels, with an upper limit specified for all potential outputs.

The final innovation I will speak briefly about is the implementation of in internal committee to review the conference. As part of what presumably is a broader initiative to prepare the Republic of Korea to enter the Cold Fusion fray, the organizers had arranged for a panel of Scientists, Engineers and possibly Industrialists to sit in on the sessions and write a report of their finding with recommendations for future activity, or not. I am not aware of the outcome of this inside project but there does not appear to have been a pickup in activity at KAIST or in Korea. Hopefully they are working industriously and secretly behind closed doors, preparing to surprise us all. The Banquet on Thursday featured a speech by Rob Duncan (of some depth and technical detail), as noted above the award of the Preparata Medal to John Bockris that I accepted symbolically for him, and a very fine traditional Korean dance routine. Below we see Pam Boss and Peter Hagelstein in the audience.

Photo: Pam Boss and Peter Hagelstein seated at the Banquet (photo courtesy: Dave Nagel).

As a slightly disturbing non-technical non-occurrence there was no ISCMNS meeting at ICCF17, or any significant participation by the International Society. Although listed as a co-sponsor Dave Nagel notes in his IE review: *"In recent years, the International Society for Condensed Matter Nuclear Science (http://www.iscmns.org) had an evening membership meeting during each ICCF. That was not the case at this conference. It remains an open question whether that organization, or some other existing or new entity, will be the focus for the scientific field involving LENR and closely related disciplines."* This same situation persisted at ICCF18. As noted previously, the ISCMNS had contributed significantly from ICCF12 through ICCF16 and was quite instrumental in enabling the occurrence of the latter. We cannot afford to lose assets if they add value and this matter will be discussed at ICCF19.

The delayed resolution of the ICCF16 IAC was that ICCF17 would occur under Prof. Sunwon Park's chairmanship and that ICCF18 would occur in the US with Prof. Rob Duncan as the first candidate. In a splendid executive room at the conference center, Rob Duncan and his wife Annie Sobel, both of the University of Missouri at Columbia, provided a very well prepared and organized proposal to the assembled IAC members. The committee readily accepted their proposition and Sunwon Park stepped down as IAC Chair in favor of Rob Duncan. For his splendid steersmanship, great vision, technical innovation and a very smooth and enjoyable conference in a new land (to me and ICCF) I nominate Sunwon Park as hero of ICCF17. ICCF18 was scheduled to be held in Columbia, Missouri, the week of July 19, 2013. Below we have a photo of many members of the IAC (not including Rob and Annie) at a post-decision meal, and a shot of Rob Duncan, our next Chairman, with Frank Gordon, our outgoing co-Chair, below that.

Photo: Several members of the ICCF17 IAC – ICCF17 (photo courtesy: unknown).

Photo: Frank Gordon and Rob Duncan (photo courtesy: Dave Nagel).

ICCF18

The bipolar[45] titling tradition persisted and the 18th International Conference on Condensed Matter Nuclear Science took place on the beautiful campus of the University of Missouri in Columbia, from July 21-27, 2013. As noted by Dave Nagel in his Infinite Energy Review, "*The chairman was Robert V. Duncan, who is the Vice Chancellor for Research at the University. The Co-Chairman was Professor Yeong E. Kim from the Department of Physics at Purdue University. The Program Organizer was Dr. Annette Sobel, who is Director of the National Security Innovation Center at the University of Missouri. There were 215 participants, of which 14% were students. The attendees came from 21 countries, which tied for the most for any of the ICCF. The large fraction of students and number of countries represented both reflect the evolution of the field. The 85 oral presentations included two keynote presentations. Forty poster papers were also presented. The conference included five technical panels and a few exhibits. ICCF18 was distinguished by tours of five laboratories over three days for a total of 23 hours. Included was the Missouri University Research Reactor, a 10-megawatt facility called MURR.*" The conference took place under the banner: "Applying the Scientific Method to Understanding Anomalous Heat Effects: Opportunities and Challenges." Below we see Rob Duncan ending the proceedings and presenting to the audience the statistics of what was a highly successful meeting on several fronts.

We worked hard during the week and, with possibly one exception noted below, the talks were well received and a great deal was communicated, not just in the talks. As Marianne Macy notes is her Infinite Energy report ICCF18: SCIENTIFIC ADVANCEMENTS, INDUSTRIAL DEMONSTRATIONS, BIG TURNOUT, ENTHUSIASM; "*Participants on the whole reported some fatigue during and after the intensive week-long conference. Sessions began by 8:00 each morning and typically went into the evening. The conference featured 85 speakers, 40 posters and five technical panels. Five labs at the University of Missouri were toured (including both SKINR labs).*" This use of multiple panels and multiple lab tours was an innovation at ICCF18 that worked well but did contribute to the above noted "brain fatigue". The high level of students (14% as noted by Rob Duncan above) was extremely welcome and a strong argument for future placement of our conferences on university campuses, especially in places like Mizzou. The academic attitude in the heartland of the US is very different from the coasts. The Universities in the center are less aloof, more pragmatic, and the spirit of free inquiry is treasured. Mizzou, as the University of Missouri in Columbia is affectionately known, is particularly blessed in this regard. It was the first university in Thomas Jefferson's Louisiana Purchase and was designed in part upon Thomas Jefferson's original plans for the University of Virginia. The University prides its Jeffersonian tradition reflected in the State Motto "the Show Me State".

[45] Actually tri-polar as commented on previously by Dave Nagel in his review of ICCF16 for Infinite Energy. As readers of this History will recall, the first two were "Annual Conferences on Cold Fusion" (ACCF). From ICCF3 – ICCF13 the conferences were titled ICCF denoting the International Conference on Cold Fusion. The name Condensed Matter Nuclear Science (CMNS) was coined by the IAC at ICCF9 but not adopted formally as a conference title until ICCF14 (still preserving the ICCF acronym). ICCF17 reverted to "International Conference on Cold Fusion" but ICCF18 reversed the reversion back to "the 18th International Conference on Condensed Matter Nuclear Science".

Photo: Prof Rob Duncan (photo courtesy Dave Nagel).

When I first visited Mizzou I was struck by the willingness and enthusiasm of the Academics to engage in discussion and participate in Cold Fusion research, even by that name. Mizzou offered several other positive attributes as the conference site. Almost exactly at the geographic center of the Continental USA it was equidistant and (in principle equi-accessible) to the largest number of potential US attendees. Several people traveled from the Continental margins by bus to be present. Being a University, accommodation and food were easily available and reasonably priced.

ICCF18 was sufficiently important to merit two reviews by Infinite Energy Magazine (IE). The first to issue was Marianne Macy's, quoted above. Marianne described well the overall structure of the conference, the general feeling and the "big view". Dave Nagel's "Scientific and Commercial Overview of ICCF18" provided (in 24 pages!) a very thorough, scientific and almost blow-by-blow overview of talks that I will not attempt to emulate. Dave's IE review is a

very fine appetizer to the Proceedings — in some ways almost more valuable as some authors did not submit their papers to the proceedings as discussed briefly below. I will quote extensively from both IE reviews. Here we see some of our venerable group members at the conference including a very welcome visit from Charles Beaudette (who is discussed further below).

Photo: Rodney Johnson, Michael Melich, Charles Beaudette and David Nagel (photo courtesy: Mike McKubre)

Two "Keynote" lectures lead off ICCF18, each with unusual character. Dr. James Truchard, cofounded National Instruments in 1976 and presently operates as President and CEO. As Marianne Macy noted in her IE review Truchard: "*is a hard guy not to like, and indeed Forbes magazine counts him as one of 'America's Favorite Bosses"*. As he is affectionately known within the company "Dr. T" has a history of supporting cold fusion and his talk was sympathetic, supportive and well received for that reason. Dr. David Kidwell, US Naval Research Laboratory, gave the second "keynote", we see Truchard and Kidwell in discussion below. Kidwell was an unusual choice, gave an unusual lecture, and not universally well received. David used a subjective chart of happiness and sadness, presumably reflecting the state of mind of a hypothetical omniscient and emotionally well-balanced individual. If the avatar was Dave himself then this conceit failed. With this happy/sad "metric" he proceeded to extol and applaud his own work, and criticize and undermine the work of others, particularly Yasuhiro Iwamura at MHI, the work of my group at SRI, that of his senior colleague Debra Rolison in the Advanced Electrochemical Materials section at NRL (that she now heads) and the Martin Fleischmann Memorial Project. Rob Duncan was quoted by Marianne Macy as stating that David Kidwell is "*far more self-critical of his own work than he is of anyone else's and all of us know how critical he is of our work.*" Unfortunately not the latter, at least not in this lecture. In David's telling he

was the “white knight”, saving us all from our own “bad science”. Worse, his criticisms were incorrect or his conclusions at best grossly overstated[46]. I have attended every lecture at every ICCF and I have never seen one so obliviously divisive. The lesson of “do good science” is certainly appropriate to any audience but it needs to be delivered with love not hubris. With adequate time allocated for discussion and rebuttal in a spirit of give-and-take, this could have been an interesting and provocative start to the conference. This time was not available and the Kidwell lecture engendered a fair amount of discontent. As stated above, it was an odd choice for an odd lecture by an odd character, and an odd way to start our conference. Fortunately things were to get very much better.

Photo: David Kidwell and James Truchard (photo courtesy: Dave Nagel).

[46] Somewhat tellingly this paper was never written up for publication in the Proceedings suggesting that David Kidwell himself recognized the fallacy of his conclusions.

Respecting and recognizing his unique role in the LENR community Dr. Edmund Storms was presented with the "Distinguished Scientist Award" and brief speeches were given. We have a good shot below of Ed interacting with the audience during his talk. As noted by Marianne Macy: "Monday was the only day when the attendees came together for lunch. A luncheon at the beautiful Stotler Lounge in the Memorial Union featured a speech by Jed Rothwell titled, 'Lessons from Cold Fusion Archives and from History.' Rothwell is the co-founder and e-librarian of lenr-canr.org curating and hosting an impressive catalog of cold fusion papers. He indicated that the archive holds about 2,000 documents. He asked, *'What can we learn from all these papers? I have not read them all but I have read hundreds, and I think these are the most important lessons: Cold fusion is chaotic, and that is a good thing. The literature does prove the effect is real and it teaches how to replicate. I will point out specific papers that show how to replicate. This is a multidisciplinary subject. That means you better read the literature and consult with experts, or your experiment will fail. Finally, the worst error you can make is an unexamined assumption.'"* That still sounds like pretty good advice that still needs to be repeated and respected.

Photo: Ed Storms lecturing (photo courtesy: Dave Nagel).

This conference, ICCF18, was the last in the current series and was in many ways a turning point for Cold Fusion — LENR — CMNS. ICCF participants representing corporate entities have been common throughout the series of conferences. However the attendance by company personnel was remarkably high at ICCF18. As noted by Dave Nagel in his IE Review: "*Of the participants who were listed on the published roster of attendees, 42% had company affiliations*." The first major "exercise" of the conference was a remote demonstration by Defkalion Green Technologies that was coordinated by Prof. Mike Melich (U.S. Naval Postgraduate School and co-Chair of ICCF14) which occurred over the first few days of the conference. As Dave Nagel notes: "*Prior to the runs, the DGT Chief Technology Officer, John Hadjichristos, provided a remote tour of the laboratory. He described both the test set-up and the protocol to be employed.*" It was an interesting albeit incompletely convincing exercise. The remote reactor in Milan was initially operated in Argon gas as a calorimetric calibration, and then in Hydrogen. As summarized by Nagel: "*Melich reported that the maximum output power measured by the flow calorimeter was 5.2 kW, with an input power near 2 kW. That is, there was a power gain of about 2.6 at some unstated time during the run.*" Highly problematic was the extreme variability of the output power in the active hydrogen run suggesting that the mass flow rate of cooling water was equally variable. Clearly there was a problem with the flow or flow measurement, which most politely ignored, but which nevertheless severely undercut the value of what otherwise might have been a very powerful and modern demonstration. Demonstration doubts notwithstanding our co-Chair, Yeong Kim and John Hadjichristos jointly published a theory paper in the ICCF18 Proceedings. We see Prof. Kim with Dave Nagel below at the ICCF18 IAC dinner meeting.

Photo: Dave Nagel and Yeong Kim (photo courtesy: Mike McKubre).

Also on the theme of "change" three Workshops were held at ICCF18, two on entrepreneurial aspects and one on employment. The first was held the evening of July 22, entitled: "Entrepreneurial Efforts." This was organized and coordinated by Matt Trevithick, then Energy Partner at Venrock one of the original and still one of the most respected US Venture Capital firms. Inspired by an uncannily apposite cartoon of "Nikola Tesla Pitching Silicon Valley VCs", and with a $50 gift card to the University of Missouri gift store as incentive award for the winner, contestants were inspired to pitch the audience in "traditional" VC fashion. There were a small number of contestants. Robert Godes, founder of Brillouin Energy, started the pitch process with a slide describing his company's process of "controlled electron capture reaction." This was followed by the funding forefather of Coolescence, Matt McConnell, who started by describing his company as the "unluckiest cold fusion company in existence." As Marianne Macy noted: "*Just at that moment, their projected slides plunged into darkness, which got a laugh.*"

The next company up was JET Energy, with founder/head Mitchell Swartz, longtime LENR researcher and inventor. We have a good shot of Mitch below sitting at the conference banquet with newcomer Steve Katinsky who had formed an interesting partnership with Dave Nagel. Together they had created a concept for a new industrial association devoted to LENR, which they presented at ICCF18 . The next contender was Nicholas Chauvin who we first met at ICCF17. He is a young entrepreneur with plans to make LENR Cars – a very ambitious plan. The company has been based in Lausanne, Switzerland, near CERN, since March 2012. I do not remember the presentation well but remember being impressed that Daniel Borel, the co- founder of Logitech, was listed as key advisor, mentor and board member. Perhaps the plan might work? Max Fomitchev-Zamilov of Quantum Potential Corp. pitched a hot fusion solution utilizing vibrating gas bubbles in liquid. Operating from the Penn State Innovation Park they have raised $600,000 in what Max described as "a state-of-the-art research facility. "

Finally Tyler Van Houwelingen of the Martin Fleischmann Memorial Project (MFMP), joined later by Bob Greenyer, described their "Live Open Science" efforts that began at ICCF17. They claimed to have replicated Francesco Celani's nickel-hydrogen device (see below) and are also working with Tadahiko Mizuno. Their emphasis is on collaboration and open data. Both ideas are extremely welcome (and timely) and the enthusiasm of youth was infectious. So much so that on the following morning Matt Trevithick was able to announce that two thirds of the 126 session attendees voted MFMP first or second out of five projects, with 32% of the vote in their favor for first place. On this basis the prize was awarded to MFMP. It was all good fun but this exercise by my friend Matt Trevithick, expert in the ways of Silicon Valley, exposed the fact that as a community or as individuals we were not. And also that we could not follow instructions as none followed the guidelines laid down by Trevithick.

Photo: Mitch Swartz and Steve Katinsky seated at the Banquet (photo courtesy: Dave Nagel).

Five papers were presented at ICCF18 dealing with aspects of the gas loading experiment that Francesco Celani (Institute National Fisica Nucleare, INFN in Frascati, Italy) reported on and demonstrated at ICCF17. The first of the papers was by Celani and a group of a dozen collaborators from four laboratories in Italy and the UK. They reported further progress and developments in experiments with surface and bulk modified wires of constantan alloys. Ubaldo Mastromatteo (STM Microelectronics) and Celani measured the resistive and thermal characteristics of a constantan wire 200 μm diameter, and 25 centimeters long with nano-structured surface layers. A large change in resistance was seen with treated but not untreated wires. The cause of this resistance change was imputed to hydrogen atom loading although no calibration was reported. Nevertheless less power was required to reach a specific temperature with treated (presumably loaded) wires, for example, 1.2 W less at 350 C. This was taken as excess heat. X-ray analyses of wires that showed excess heat revealed the presence of elements unrelated to the original wire composition in areas that underwent surface morphological changes. Elements found were similar to those reported by other LENR researchers using different materials. As noted by Dave Nagel in his IE review:"*Mathieu Valat, Bob Greenyer and Ryan Hunt of the MFMP reported on their work to replicate Celani's results, as reported during ICCF17. Their primary cell was similar to that of Celani. Some differences in cell design and protocols were explored to improve the credibility of the experimental results. An identical dummy cell was used as a baseline. The wires were characterized before and after the experiments with scanning electron micrography and energy dispersive spectrometry. The group reported that they were confident of 6 W of excess power for 48 W input.*"

Another replication of the Celani experiment was performed by Cun-Kui Gong and Gui-Song Huang of Delta Energy Technologies in China. Caution was indicated in the last of the five papers on the Celani experiment. This was presented by Thomas Grimshaw from the University of Texas (Austin) – seen below with Andrew Meulenberg - and three colleagues from National Instruments. As noted by Dave Nagel: "*Their main thrust was to analyze the equipment, protocols and results obtained with this type of experiment in activities in six laboratories. They asserted that the effects observed by Celani may not be as robust as initially indicated in the 2012 demonstrations. The group called for recalibration of the Celani reactor each time it is set up for a run. They are also wary of interpreting changes in resistivity of a wire as certain indications of the degree of loading, as is commonly done for the Pd-D electrolytic system. Such detailed scrutiny of the Celani-type experiments is highly desirable, given the importance of the reported results.*"

Photo: Thomas Grimshaw and Andrew Meulenberg (photo courtesy: Dave Nagel).

The crown jewel of the MIzzou LENR program is the Sidney Kimmel Institute for Nuclear Renaissance (SKINR). SKINR was founded early in 2012 at the University of Missouri by my old friend Sidney Kimmel who, was and is a generous supporter of cancer research. In 2002 Sidney founded the company Energetics Technologies headquartered in New Jersey with its research laboratory in Israel. In 2010, as the second part of a two-pronged strategy, Kimmel moved Energetics Israel - lock, stock, barrel and management team (lead by Shaul Lesin) - to the Missouri University Life Science Business Incubator, a brand new and beautiful Research Park just off campus at Mizzou. He did this to be close to a major research University and within the compass of potential sources of US investment. Energetics were welcomed with open arms by the physics community at Mizzou and I was tasked by Sidney to convene a Science Advisory Board consisting mainly of Mizzou faculty. It is worth noting at this point that the Professors I approached for this task were open-minded and enthusiastic. This was not because of Sidney's money or Rob's university clout – they were genuinely interested unlike faculty at my neighboring institutions Stanford and Berkeley (and these are not alone). Kimmel also retained his good friend former Federal Senator and State Governor Bob Kerrey to assist in the task of raising matching funds to secure Energetics' continuity in the US.

For a variety of reasons we failed to accomplish this and, as a way of ensuring bounded continuity, Sidney Kimmel gifted the University of Missouri $5.5M to perform interdisciplinary research on topics related to LENR. Recently retired from NRL Graham Hubler was retained in early 2013 to head what then became SKINR to manage the research and continue the search for matching funding so that the Institute bearing Sidney Kimmel's name did not collapse at the end of the committed funding. We see Graham below at the door of the SKINR institute on campus. Below that we see Arik El-Boher, senior and very capable engineer, one of the many who made the transition from Energetics Israel, to Energetics Missouri, and one of the few to SKINR. Arik is the man mostly responsible for one of the most important CMNS experiments ever reported (at ICCF10 in 2003). Captured again during the SKINR lab visit was Charles Beaudette, author of "Excess Heat: Why Cold Fusion Research Prevailed" a "cold fusion warrior whose weapon is the keyboard rather than the instrument rack .

Photo: Graham Hubler at SKINR (photo courtesy: Dave Nagel)

Photo: Arik El-Boher at SKINR (photo courtesy: Dave Nagel).

Photo: Charles Beaudette at SKINR (photo courtesy: Dave Nagel).

Following on from their novel and very successful "Double Structured" palladium studies in the mid 1990's Professors Arata and Zhang later pioneered the use of an extremely ingenious method to oxidize one phase only of a two-phase alloy containing a minority component of Pd (or other hydrogen catalyst element). In this way nanometric islands of the active element are stranded, isolated within the newly formed solid, open, oxide structure. This helps avoid particle agglomeration by sintering during experimental runs. Research using gas loading of nano-particles continues and was reported at ICCF18 in four papers from three laboratories. As noted by Dave Nagel in IE: "*Two papers were from the collaboration between Technova Inc. and Kobe University. Their experiments are done by loading and deloading of deuterium and hydrogen into and out of nano-composite materials in separate but similar chambers, one for H and the other for D... The first paper was presented by Akira Kitamura. It had five collaborators. Anomalous exo- and endo-thermic effects due to loading and unloading of nickel nano-composite materials were observed at temperatures as high as 573 K. Those results were characterized as 'interesting, even astonishing.' Bursts of heat were measured at a level of 600 eV per atom of H.*"

The conference banquet was held on Thursday in a dining hall on campus within easy amble of the "dorms" where most of us were staying. This was possibly just as well as the wine was splendid and the company sublime. Pam Boss very deservedly was awarded the Preparata Medal as having contributed most to the science of CMNS in the previous year. One of our most venerable members Dr. John Dash was presented with the Best Poster Award for "Power Output, Microstructure and Microchemical Analysis of Highly Porous Palladium Obtained by Spinodal Decomposition." Somebody had the good idea to capture on photo the 12 of us who had attended the first ICCF in Salt Lake City, all the way back in 1990, and were still attending. This very precious record is reproduced below.

Signaling recognition of the electronic age ICCF18 broke with the tradition of a "Hardcopy Published Proceedings" by publishing the Proceedings electronically as a special Volume in the Journal of Condensed matter Nuclear Science, JCMNS. This matter was discussed at the ICCF18 IAC meeting and opinions diverged. Traditionalists (me included) waxed poetic on the touch and feel and superior random access capabilities of a stack of books at your fingertips, with places to annotate in the margins. The counter-arguments; mass, volume, portability and cost — quite rationally won out. Jean-Paul Biberian (seen below with Peter Hagelstein), serving double-duty on the IAC as Editor-in-Chief of JCMNS and Chairman of ICCF11, very graciously agreed to edit and organize the review process, and a new precedent (if not tradition[47]) was born. In the Preface to the ICCF18 Proceeding Volume of JCMNS Rob Duncan wrote: "*My thanks to everyone who attended ICCF18, which was held at the University of Missouri. We had a total of 215 registered participants, of whom 125 submitted original work that was presented within the scientific program. This was the first time in many years that ICCF has been held on the campus of a major research university, and we were delighted to have the opportunity to host this important conference.*"

[47] The ICCF18 IAC decision relates only to the ICCF18 Proceedings. Each subsequent Chairperson is still free to evaluate and decide as they choose best.

Photo: A dozen attendees of ICCF1 (ACCF in Salt Lake City March 1990): Tom Claytor (Los Alamos); Mike McKubre (SRI); Yeoong Kim (Purdue); Mike Melich (US Naval Postgraduate School); Xing Zhong Li (Tsinghua University); Tom Passell (EPRI-retired); Peter Hagelstein (MIT); Graham Hubler (NRL and SKINR); Dave Nagel (NRL and George Washington University); Unknown (to me); Mahadeva (Chino) Srinivasan (BARC); Fran Tanzella (SRI). Ed Storms also attended both ICCF1 and ICCF18 but may not have been present at the banquet.

Photo: Peter Hagelstein and Jean Paul-Biberian (ICCF10 and ICCF11) seated at the IAC dinner meeting (photo courtesy: Dave Nagel).

The IAC meeting itself proceeded straightforwardly except for one detail. The continental rotation was to turn back to Europe/Africa for ICCF19. I had been in contact with Prof Antonio La Gatta who was very enthusiastic about chairing the conference in the Veneto Region of Italy. With its capital Venice this is a very rich, industrial and technical region in the north of Italy, home to one of the world's oldest Universities, the University of Padua. Tony La Gatta was (and is) a Professor at the University, the CEO of a medium sized technology company, TSEM, and President of the Veneto Region Consortium for Industrial Technology. Altogether a very attractive combination and something new for the ICCF series. With assistance from Vittorio Violante (Chairman of ICCF15 and IAC member) Tony had prepared a formal proposal and proposition for the IAC. Tony unfortunately was prevented from attending ICCF18 by a serious family medical issue and he asked his business partner Trevor Dardik to present the proposal to the IAC[48]. Below we see Trevor Dardik at the IAC dinner meeting, The IAC discussed general matters and Bill Collis joined us by Skype. The tradition and unwritten rule of the IAC is that only those physically present can exercise a vote but no vote was needed.

Photo: Trevor Dardik at the IAC dinner meeting (photo courtesy: Mike McKubre).

[48] We have met Trevor Dardik before in this History as the son of Irv Dardik and Alison Godfrey, and one of the people responsible for returning Martin Fleischmann to some semblance of physical and intellectual health before ICCF15 in 2009 in Rome.

I (below) accepted our Chairman, Rob Duncan's, delegation on the topic of site selection and the committee listened to and discussed the La Gatta proposal presented by Dardik. There were procedural and organizational questions but without objection the IAC agreed to transfer its Chairmanship to Prof. Tony La Gatta *in absentia*. The original plan was to hold ICCF19 in Venice in February 2015. This was already a long delay from ICCF18 and there was IAC discussion of this point. This timing and siting was reconsidered during a site visit by Trevor Dardik and myself in February 2014. In our judgment Venice was too inaccessible and isolated, too expensive, too cold, and too wet as it was under water in February 2014. Tony, Trevor, Alison Godfrey and I visited the Mayor of Padua to seek and receive his permission to use the splendid 12th Century Palazzo di Raggione in April 2015, where and when ICCF19 will be held.

Photo: Mike McKubre (ICCF4) at the IAC meeting (photo courtesy: Dave Nagel).

As a final note ICCF18 was run smoothly and professionally. The siting at a Research University near the middle of a land mass relatively densely populated with CMNS researchers made access relatively convenient and relatively inexpensive. Credit for the organization should be broadly shared but two people were primarily responsible for siting and implementation: Rob Duncan and Annie Sobel (in either order as they operate very much as a team). For that reason and for their unflagging support of CMNS in the broader community I nominate Rob Duncan and Annie Sobel as the second husband-and-wife pair to the team of conference heroes. We see them seated together below.

Photo: Annie Sobel and Rob Duncan, Heroes of ICCF19 (photo courtesy: Mike McKubre).

Since this is the last in this series of histories, conferences and heroes I take the opportunity to list and thank them all. Without these heroes the individual conferences would have been far less productive and enjoyable, and the series would almost certainly have failed. As it is all and more of us are looking forward to meeting up in the Palazzo di Raggione in Padua in April 2015 for ICCF19. The heroes list below is interesting and slightly alarming. We have covered 18 conferences in 18 different cities. 11 countries in 23 years. 21 heroes in all, two twice, appropriately and unsurprisingly Martin Fleischmann and Giuliano Preparata. But only 14 of our heroes survive. The community has lost a third of them and it is only going to get worse. It is time to redouble our efforts and move with good speed and direction towards the object that Fleischmann and Pons pointed us towards.

Table of Conference Heroes

	#	Hero	Co-Hero	City	Country
ICCF	1	Fritz Will		Salt Lake	USA
ICCF	2	*Giuliano Preparata*		Como	Italy
ICCF	3	Hideo Ikegami	*Minoru Toyoda*	Nagoya	Japan
ICCF	4	Tom Passell		Maui	USA
ICCF	5	*Martin Fleischmann*	Stanley Pons	Monte Carlo	Monaco
ICCF	6	*Makoto Okamoto*	*Naoto Asami*	Toya	Japan
ICCF	7	*Les Case*		Vancouver	Canada
ICCF	8	*Giuliano Preparata*		Lerici	Italy
ICCF	9	Xing Zhong Li		Beijing	China
ICCF	10	Peter Hagelstein		Cambridge	USA
ICCF	11	Jean-Paul Biberian		Marseilles	France
ICCF	12	Akito Takahashi		Yokohama	Japan
ICCF	13	*Yuri Bazhutov*		Sochi	Russia
ICCF	14	David Nagel	Carol Nagel	Washington	USA
ICCF	15	*Martin Fleischmann*		Rome	Italy
ICCF	16	Mahadeva Srinivasan		Chennai	India
ICCF	17	Sunwon Park		Daejeon	Korea
ICCF	18	Robert Duncan	Annette Sobel	Columbia	USA