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Google Scholar: <https://scholar.google.com/citations?user=OEabjp8AAAAJ&hl=en>
Mathematics Genealogy Project:
<https://www.genealogy.math.ndsu.nodak.edu/id.php?id=143462&fChrono=1>

Education

Ph.D, (2000) School of Aeronautics and Astronautics with a specialization in Computational Engineering (CS&E), Purdue University, West Lafayette, IN, U.S.A.

B.Sc. / M.Sc., (1995) Nuclear Engineering, Instituto Balseiro, Bariloche, Argentina. (6 years program with thesis)

Work Experience and Academic Appointments:

8/20-present **Jeffrey M. and Linda T. Engelhardt Professor**, Lyles School of Civil Engineering, Purdue University, W. Lafayette, IN, USA.

8/17-8/20 **Full Professor**, Lyles School of Civil Engineering, Purdue University, W. Lafayette, IN, USA.

July, 2023

- 8/15-8/20 **University Faculty Scholar**, Purdue University, W. Lafayette, IN, USA.
- 8/14-2017 **Associate Professor (w/early tenure)**, Lyles School of Civil Engineering, Purdue University, W. Lafayette, IN, USA.
- 8/09-7/14 **Assistant Professor**, School of Civil Engineering, Purdue University, W. Lafayette, IN, USA.
- 8/09-7/11 **Assistant Professor**, School of Mechanical Engineering (*By Courtesy*), Purdue University, W. Lafayette, IN, USA.
- 8/08-7/09 **Adjunct Assistant Professor**, School of Mechanical Engineering, Purdue University, W. Lafayette, IN, USA.
- 8/08-7/09 **GM Engineer-in-residence at Purdue**, General Motors (1 year at the School of Mechanical Engineering, Purdue University)
- 6/08-7/09 **Staff Researcher**, General Motors Research and Development Center, Warren, MI, USA.
- 3/07-12/07 **Materials Engineer**, Materials and Corrosion Engineering, General Motors Corporation, Warren, MI, USA.
- 1/01-5/08 **Senior Researcher**, General Motors Research and Development Center, Warren, MI, USA.
- 8/01- 7/02 **Visiting Professor** at the Department of Aeronautics, School of Engineering, Universidad Nacional de la Plata, La Plata, Argentina
- 8/96-12/00 **Research Assistant** in the School of Aeronautics and Astronautics, Purdue University, W. Lafayette, IN, USA.
- 1/96-7/96 **Visiting Scholar** in the School of Aeronautics and Astronautics, Purdue University, W. Lafayette, IN, USA.

Summary of Impact:

Pablo Zavattieri's research interests lie at the interface between Solid Mechanics and Materials Engineering, focusing on developing novel materials that exhibit paradigm-shifting properties for various applications that can impact the general field of infrastructure and lightweight structural materials. His contributions to the solid mechanics area have been focused on the structure-function relationship of advanced materials at multiple length scales, combining state-of-the-art computational techniques and experiments to characterize the properties, and enabling the design of novel materials. His most substantial contribution has been in the area of micromechanical models for material's mechanical behavior, which has provided a robust framework for combined computational/experimental investigations of polycrystalline materials. He is credited with the development of new fracture models for thin-walled structures and their implementation in commercial finite element codes. He pioneered the use of 3D printing technology for the fabrication of scaled-up biomimetic composites and, through theoretical/computational models and experiments, unveiled the primary toughening mechanisms found in some of the most impact-resistant natural materials. His most recent work has focused on architected metamaterials, smart and programmable materials

Awards and Honors:

1. **NSF Faculty Early Career Development (CAREER) award**, *National Science Foundation, 2013.*
2. **Roy E. & Myrna G. Wansik Research Award**. *Lyles School of Civil Engineering, Purdue University, 2013. This annual award was created to recognize an outstanding researcher in the School of Civil Engineering.*
3. **IM:PACT fellow** (*Instruction Matters: Purdue Academic Course Transformation*), *Purdue University, 2013.*
4. **Frontier of Engineering Alumnus (USFOE)**, *National Academy of Engineering (NAE), 2014. Attendee of the NAE Frontier of Engineering Symposium in 2014*
5. **Kavli Frontier of Science Fellow**, *National Academy of Science (NAS), 2015. Attendee of the NAS Kavli Indonesian-American Symposium in 2015.*
6. **University Faculty Scholar**, *Purdue University, 2015. University Faculty Scholars are select associate and full professors who have been in that rank for no more than five years and are on an accelerated path toward academic distinction. In the College of Engineering, they are nominated by committees from their academic areas, and reviewed and recommended by a subcommittee of the College's named and distinguished professors. The dean makes the selection and requests approval by the provost. University Faculty Scholars receive additional funding to support their research.*
7. **Seeds for Success ACORN Award**, *Purdue University, 2015. The Office of the Vice President for Research gives this award in recognition of the accomplishments of single investigators and teams of investigators for their efforts in obtaining a \$1 million dollar or more research grant. Prof. Zavattieri received the bronze acorn in recognition of his contribution in acquiring two million dollar awards.*
8. **2016 HIVE 100 Innovator**, *Builder Magazine (Hanley Wood editorial). In recognition of the pioneering, disrupting and transforming work on nanocellulose-reinforced cements. Together with Robert Moon (USFS), J. Youngblood and J. Weiss.*
9. **Name Professorship, Zavattieri was the Jerry M. and Lynda T. Engelhardt Professor in Civil Engineering in 2020**
10. **Appointee**, *Defense Materials, Manufacturing and its Infrastructure (DMMI) Standing Committee of the National Academies of Sciences, Engineering, and Medicine. 2021*
11. **Appointed SIMULIA 2021 Champion**. *The SIMULIA Champions Program pays tribute to our most active and influential simulation experts and brings them together to advance the future of simulation.*
12. **Fellow of the American Society of Mechanical Engineers (ASME) , 2022.** *A Fellow, one who has attained a membership grade of distinction, at the time of advancement shall be a corporate member of the Society, shall have been responsible for significant engineering achievements, and shall have no less than 10 years of active practice and 10 years of corporate membership in ASME.*

Other awards:

Paper awards, front pages and recognitions:

1. Award to the **Engineering Fracture Mechanics** Journal Most Cited Articles in the 2005 to 2009 period. For the paper entitled “*Mixed-mode cohesive-zone models for fracture of an adhesively bonded polymer-matrix composite*”.
2. Second Most Cited **Journal of the Mechanics and Physics of Solids** Article between 2007 and 2012. For the paper entitled “*On the mechanics of mother-of-pearl: A key feature in the material hierarchical structure*”
3. Most downloaded and most cited Computer-Aided Design journal article between 2015-2018. For the paper Gao et al. “*The status, challenges, and future of additive manufacturing in engineering*”.
4. Cover page of the journal **Cellulose** (impact factor: 3.917), Nov. 2013
https://engineering.purdue.edu/~zavattie/research-projects/Cellulose_Cover.jpg
<https://link.springer.com/journal/10570/20/6/page/1>
5. Cover page of the journal **Advance Functional Materials** (impact factor: 15.621), Oct. 2014. <https://onlinelibrary.wiley.com/doi/10.1002/adfm.201470255>
6. Cover page of the journal **Advanced Materials** (impact factor: 30.85), 2016. <https://onlinelibrary.wiley.com/doi/10.1002/adma.201670219>
7. Frontpiece page of the journal **Advanced Materials** (impact factor: 30.85), 2018 <https://onlinelibrary.wiley.com/doi/10.1002/adma.201870326>
8. Cover page of the journal **Advanced Functional Materials** (impact factor: 18.81), 2019 <https://onlinelibrary.wiley.com/doi/10.1002/adfm.201970232>
9. Inside cover page of the **Advance Functional Materials** (impact factor: 18.81), 2021, <https://doi.org/10.1002/adfm.202170368>
10. Front cover page of **Materials Advances** (Royal Society of Chemistry), 2022, <https://doi.org/10.1039/D1MA01031J>

Fellowships:

1. Full fellowship to study at Balseiro Institute. Granted by the National Atomic Energy Commission, Argentina, 1991-1995. *The Balseiro Institute is a very prestigious university located in the south of Argentina in which only 30 students are accepted each year after a very selective exam. Each student receives a full fellowship and they are required to previously complete the first two years in engineering or physics program at any university. After 4 years at the institute -6 years in total- the degree of engineer or physicist is recognized as a Masters degree in other international institutions.*

July, 2023

2. Fellowship to pursue graduate studies at Balseiro Institute. Granted by the National Atomic Energy Commission, Argentina, Aug-Dec, 1995.
3. Full Research fellowship granted by the National Scientific and Technical Research Council (CONICET) to pursue doctorate studies, Argentina, 1996. Granted but declined by PDZ to pursue studies in the U.S..

Students: Prof. Zavattieri graduated 20 PhD and 4 MS students. Seven of his PHD students have transitioned into academic positions (with three currently in top US programs). He is currently supervising 9 PhD students; many of them recipients of external, University and School awards (including the best PhD dissertation, SURF Award of Excellence awards, etc.). He has a strong record of mentoring undergraduate students. He has mentored and advised about 30 undergraduate students in Capstone, Honors and individual study courses, about 30 Summer projects, in which most of them are SURF. Zavattieri's top undergraduate students participating in these summer projects have been recipient of various awards. In some cases, the students participated in external publications.

List of graduated PhD students:

<https://www.genealogy.math.ndsu.nodak.edu/id.php?id=143462&fChrono=1>

Original Research Work

Google Scholar: h-index: 51 (Citations 13,000) <https://goo.gl/WTismF>

Dissertations:

- Master Thesis: "*Finite element mesh optimization in three dimensions*" presented at Instituto Balseiro, S. C. de Bariloche, Argentina, in June 1995. Advisor: Gustavo Buscaglia, Enzo Dari.
- Ph.D. Thesis: "*Computational Modeling for Bridging Size Scales in the Failure of Solids*", presented at the School of Aeronautics and Astronautics, Purdue University, U.S.A. in December 2000. Advisor: Horacio Espinosa

Journal Publications:

- [1] P.D. Zavattieri, E. A. Dari and G. C. Buscaglia, "*Optimization strategies in unstructured mesh generation*", **International Journal for Numerical Methods in Engineering**, 39, pp. 2055-2071, 1996.
- [2] P.D. Zavattieri, G. C. Buscaglia and E. A. Dari, "*Finite element mesh optimization in three dimensions*", **Latin American Applied Research**, 26 pp. 233-236, 1996.

- [3] H. D. Espinosa, P. D. Zavattieri and G. L. Emore, "*Adaptive FEM Computation of geometric and material nonlinearities with application to brittle failure*", special issue of **Mechanics of Materials** edited by H.D. Espinosa and R.J. Clifton, 29, pp. 275-305, 1998.
- [4] H. D. Espinosa, S. Dwivedi, P. D. Zavattieri and G. Yuan, "*Numerical investigations of penetration in multilayered material/structure systems*", **International Journal of Solids and Structures**, 35(22), pp. 2975-3001, 1998.
- [5] H. D. Espinosa, P. D. Zavattieri and S. Dwivedi, "*A finite deformation continuum/discrete model for the description of fragmentation and damage in brittle materials*", **Journal of the Mechanics and Physics of Solids**, 46(10), pp. 1909-1942, 1998.
- [6] H.D. Espinosa, H-C. Lu, P.D. Zavattieri, and S. Dwivedi, "*A 3-D finite deformation anisotropic visco-plasticity model for fiber composites*", **Journal of Composite Materials**, 35(5), pp. 369-409, 2001.
- [7] P.D. Zavattieri, P.V. Raghuram and H.D. Espinosa, "*A computational model of ceramic microstructures subjected to multi-axial dynamic loading*", **Journal of the Mechanics and Physics of Solids**, 49(1), pp. 27-68, 2001.
- [8] P.D. Zavattieri and H.D. Espinosa, "*Grain level analysis of crack initiation and propagation in brittle materials*", **Acta Materialia**, 49, pp. 4291-4311, 2001.
- [9] P.D. Zavattieri and H.D. Espinosa, "*An examination of the competition between bulk behavior and interfacial behavior of ceramics subjected to dynamic pressure-shear loading*", **Journal of the Mechanics and Physics of Solids**, 51(4), pp. 607-635, 2002.
- [10] H.D. Espinosa and P.D. Zavattieri, "*A grain level model for the study of failure initiation and evolution in polycrystalline brittle materials. Part I: Theory and numerical implementation*", **Mechanics of Materials**, 35(3-6), pp. 333-364, 2003.
- [11] H.D. Espinosa and P.D. Zavattieri, "*A grain level model for the study of failure initiation and evolution in polycrystalline brittle materials. Part II: Numerical examples*", **Mechanics of Materials**, 35(3-6), pp. 365-394, 2003.
- [12] S. Li, M.D. Thouless, A.M. Waas, J. Schroeder, P.D. Zavattieri, "*Use of Mode-I cohesive-zone models to describe the fracture of an adhesively-bonded polymer-matrix composite*", **Composites Science and Technology**, 65(2), pp. 281-293, 2005.
- [13] S. Li, M.D. Thouless, A.M. Waas, J. Schroeder, P.D. Zavattieri, "*Use of a cohesive-zone model to analyze the fracture of a fiber-reinforced polymer-matrix composite*", **Composites Science and Technology**, 65(3-4), pp. 537-549, 2005.
- [14] S. Li, M.D. Thouless, A.M. Waas, J. Schroeder, P.D. Zavattieri, "*Competing failure mechanisms in mixed-mode fracture of an adhesively-bonded polymer-matrix composite*", **International Journal of Adhesion and Adhesives**, 26(8), pp. 609-616, 2006.

- [15] S. Li, M.D. Thouless, A.M. Waas, J. Schroeder, P.D. Zavattieri, *Mixed-mode cohesive-zone models for fracture of an adhesively bonded polymer–matrix composite*, **Engineering Fracture Mechanics**, 73(1), pp. 64-78, 2006.
- [16] P. Zavattieri, “*Modeling of crack propagation in thin-walled structures with a cohesive model for shell elements*”, special issue on Computational Mechanics of **Journal of Applied mechanics**, 73(6), pp. 948-958, 2006.
- [17] F. Barthelat, H. Tang, P.D. Zavattieri, C-M. Li and H.D. Espinosa, “*On the mechanics of mother-of-pearl: A key feature in the material hierarchical structure*”, **Journal of the Mechanics and Physics of Solids**, 55(2), pp. 306-337, 2007.
- [18] M.A. Sutton, J. Yan, X. Deng, C.-S. Cheng, P. Zavattieri, “*Three-dimensional digital image correlation to quantify deformation and crack-opening displacement in ductile aluminum under mixed-mode I/III loading*”, **Journal of Optical Engineering**, 46(5), 051003, 2007.
- [19] P.D. Zavattieri, L.H. Hector Jr., A.F. Bower, “*Determination of the mode-I effective fracture toughness of a sinusoidal interface between two elastic solids*”, **International Journal of Fracture**, 145(3), pp. 167-180, 2007.
- [20] P. Zavattieri, L. Hector, Jr. and A.F. Bower “*Determination of the Effective Mode I Toughness of a Sinusoidal Interface between two Elastic Solids*,” **International Journal of Fracture**, 146, (1) 123-124, 2007.
- [21] P.D. Zavattieri, L.H. Hector Jr., A.F. Bower, “*Cohesive zone simulations of crack growth along a rough interface between two elastic plastic solids*”, **Engineering Fracture Mechanics**, 75(15), pp. 4309-4332, 2008.
- [22] H. Tao, W. Tong, L. Hector, P. Zavattieri, “*Uniaxial tensile and simple shear behavior of resistance spot welds in dual-phase steel*”, **Journal of Materials Engineering and Performance** 17 (4) pp. 517-534. (2007), doi: 10.1007/s11665-007-9170-8, 2007.
- [23] C. Sun, M.D. Thouless, A.M. Waas, J.A. Schroeder, P.D. Zavattieri “*Ductile-brittle transition in the fracture of plastically-deforming adhesively-bonded structures. Part I: Experimental studies*”, **International Journal of Solids and Structures**, 45 (10), pp. 3059-3073, 2008.
- [24] C. Sun, M.D. Thouless, A.M. Waas, J.A. Schroeder, P.D. Zavattieri “*Ductile-brittle transition in the fracture of plastically-deforming adhesively-bonded structures. Part II: Numerical studies*” **International Journal of Solids and Structures**, 45 (17), pp. 4725-4738, 2008.
- [25] C. Sun, M.D. Thouless, A.M. Waas, J.A. Schroeder, P.D. Zavattieri, “*Rate Effects for Mode-II Fracture of Plastically Deforming, Adhesively-Bonded Structures*”, **International Journal of Fracture**, 156(2), pp. 111-128, 2008.
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- [33] H.Espinosa, A. Juster, F. Latourte, D. Gregoire, O.Loh, P. Zavattieri.,”*Lessons in Abalone shell toughness applied to synthetic materials*”, **Nature Communications**, 2, 173, doi:10.1038/ncomms1172, 2011.
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- [35] F. C. Antico, P D Zavattieri, L. G. Hector, Jr ., A Mance., W R Rodgers and D A Okonski, *Adhesion of nickel-titanium shape memory alloy wires to thermoplastic materials: Theory and experiments*, **Smart Materials and Structures**, 21, 035022, 2012.
- [36] J.C. Weaver, G.W. Milliron, A. Miserez, K.Evans-Lutterodt, S. Herrera, I. Gallana, WJ Mershon, B. Swanson, P.Zavattieri, E.DiMasi, D.Kisailus, “*The Stomatopod Dactyl Club: A Formidable Damage-Tolerant Biological Hammer*”, **Science**, 336 (no. 6086), pp. 1275-1280, 2012.
- [37] F. Cordisco, P.D. Zavattieri, L.H. Hector Jr., A.F. Bower, “*Toughness of a patterned interface between two elastically dissimilar solids*”, **Engineering Fracture Mechanics**, 96, pp. 192-208, 2012.
- [38] F. Dri, L.G. Hector Jr. R. Moon, P.D. Zavattieri, “*Anisotropy of the Properties of Crystalline Cellulose I β from First Principles Density Functional Theory with Van der Waals Interactions*”, **Cellulose**, 20(6), pp. 2703-2718, 2013. [including artwork in Cover page]

- [39] X. Chen, X. Deng, M. A. Sutton, P. Zavattieri, "An Inverse Analysis of Cohesive Zone Model Parameter Values for Ductile Crack Growth Simulations", **International Journal of Mechanical Sciences**, 79, pp. 206-215, 2014.
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- [41] L.K. Grunenfelder, E. Escobar de Obaldia, Q. Wang, D. Li, B. Weden, C. Salinas, R. Wuhner, P. Zavattieri* and D. Kisailus, "Stress and Damage Mitigation from Oriented Nanostructures within the Radular Teeth of *Cryptochiton stelleri*", **Advanced Functional Materials**, 24(39), pp. 6085-6240, 2014 [Cover Page]
- [42] X. Chen, X. Deng, M. Sutton, P. Zavattieri, "Simulation of mixed-mode I/III stable tearing crack growth events using the cohesive zone model approach", **International Journal of Fracture**, 189(1), pp. 59-75, 2014.
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- [44] F. Dri, S Shang, L.G. Hector Jr, P. Saxe, Z-K Liu, R. Moon and P.D. Zavattieri, "Anisotropy and temperature dependence of structural, thermodynamic, and elastic properties of crystalline cellulose I β : a first-principles investigation", **Modelling and Simulation in Materials Science and Engineering**, 22 085012, 2014.
- [45] Y. Cao, P. Zavattieri, J. Youngblood, R. Moon, J. Weiss, "The influence of cellulose nanocrystal additions on the performance of cement paste", **Cement and Concrete Composites**, 56, pp. 73-83, 2014.
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- [52] F.A. Cordisco, P.D. Zavattieri, L.G. Hector, B.E. Carlson, "Mode I Fracture Along Adhesively Bonded Sinusoidal Interfaces", **International Journal of Solids and Structures**, 83, pp. 45-64, 2016.
- [53] Y. Suzuki, G. Cardone, D. Restrepo, P. D. Zavattieri, T. S. Baker, F.A. Tezcan, "Designed Self-Assembly of Coherently Dynamic, Auxetic Two-Dimensional Protein Crystals", **Nature**, 533 (7603), 369–373, 2016.
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- [55] D. Restrepo, N.D. Mankame and P.D. Zavattieri , "Programmable materials based on periodic cellular solids. Part I: Experiments", **International Journal of Solids and Structures**, 100-101, pp. 485–504, 2016.
- [56] D. Restrepo, N.D. Mankame and P.D. Zavattieri, "Programmable materials based on periodic cellular solids. Part II: Numerical analysis", **International Journal of Solids and Structures**, 100-101, pp. 505–522, 2016.
- [57] E. Escobar de Obaldia, S. Herrera, L.K. Grunenfelder, D. Kisailus, P.D. Zavattieri, "On the mechanics of naturally-occurring rod-like microstructures", **Journal of the Mechanics and Physics of Solids**, 96, pp. 511-534, 2016.
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Cover pages and others:



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More than 30 internal research reports have been published internally in General Motors Research and Development.

Special issues:

Guest Editor, International Journal of Experimental and Computational Biomechanics (IJEBCB), “*Polymer and Composite Materials from Renewable Resources and Bio-refinery: from chemistry to applications.*”, vol. 3 (3), 2015.

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Guest Editor, *Extreme Mechanics Letter*, in Honor for Prof. Horacio Espinosa’s William Prager Medal, 2019-2020.

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Invited keynotes and plenary talks at Conferences, Workshops and Symposia:

1. P. D. Zavattieri, “*Modeling of crack propagation in thin-walled structures*”, ENIEF 2004, held in S. C. de Bariloche, Nov. 8-11, 2004. (Invited Key Talk)
2. “Lessons learned from biomineralized marine organisms applied to the design of biomimetic materials”, the Advances in Cement-based Materials: Characterization, Processing, Modeling and Sensing Meeting, July 11-13, 2010, Purdue University, West Lafayette, IN. (Invited Talk)
3. “Inelastic deformation, hardening and competing failure mechanisms in biomineralized materials”, the International Plasticity Conference, Puerto-Vallarta Mexico, January 3-8, 2011. (Invited Talk)
4. “Biomimetic materials design: from biomineralized marine organisms to tough composite materials”, VIII Colombian Congress on Numerical Method, Medellin, Colombia, Aug. 10-12, 2011. (**Plenary**)
5. “Multiscale modeling of the hierarchical structure of cellulose nanocrystals”, 48th Annual Technical meeting of the Society of Engineering Science (SES 2011), Northwestern University on Oct. 12-14, 2011. (Keynote Speaker)
6. “Multiscale computational modeling for bridging size scales in the failure of cementitious-based materials: Recent progress, current challenges, gaps and opportunities”, NSF US-Poland workshop on Multiscale Computational Modeling of Cementitious Materials (MCMoCM 2012) Cracow, Poland, October 18-19, 2012 (**Plenary**)
7. “Multiscale mechanics of natural fibers”, NSF Pan American Advanced Studies Institute (PASI) on Polymer and Composite Materials from Renewable Resources

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8. "Mechanical Investigation of Biomineralized and Biologically-Inspired Materials: Lessons learned from Nature", I International Seminar on Biomaterials, Biomechanics and Regenerative Medicine, RutaN, Medellin, Colombia, May 16, 2014. (**Plenary**)
 9. "Numerical Investigation of Naturally-Occurring High Performance Materials", XXI Congress on Numerical Methods and their Applications (ENIEF 2014), San Carlos de Bariloche, Argentina, 23th-26th September 2014. (**Plenary**)
 10. "Combined 3D Printing and Multi-scale Modeling for the Development of Biomimetic Materials", Multiscale/3D Printing Cement Workshop, Vanderbilt University, July 16-17, 2015. (**Plenary**)
 11. "Combined 3D Printing and Multi-scale Modeling for the Development of High Performance Biomimetic Materials", I Seminar of Nanosurfaces: Advanced Processing and Characterization – II International Seminar on Biomaterials, Biomechanics and Regenerative Medicine, RutaN, Medellin, Colombia, Sept. 16-18, 2015. (**Plenary**)
 12. Mechanical investigation of growing twisting cracks in naturally-occurring Bouligand structures, Symposium SM9: Structure and Properties of Biological Materials and Bioinspired Designs 2016 MRS Spring Meeting and Exhibit, Phoenix, Arizona March 28-1, 2016. (Keynote talk)
 13. P. Zavattieri, 1st International Meeting on the Advanced Applications of Natural Biomaterials, Universidad de Antioquia, sede Rio Negro, Colombia, Sept. 27-30, 2016 (**Plenary**)
 14. D. Restrepo, Y. Zhang, Nilesh D. Mankame and Pablo D. Zavattieri, "Phase transforming cellular materials: Design, fabrication and characterization", Invited Talk in the Symposium "Architected Metamaterials" Society of Engineering Science, 53rd Annual Technical Meeting, University of Maryland (UMD) during 2-5 October 2016. (Invited Keynote Talk)
 15. N. Suksangpanya, N. Guarin-Zapata, D. Kisailus, P. Zavattieri "Lessons Learned from the Mighty Dactyl Club of the Mantis Shrimp", Invited Talk at the Biological Materials Science (BMS) Symposium at 2017 TMS Annual Meeting & Exhibition in San Diego, CA (February 26 - March 2), 2017 (Keynote talk)
 16. D. Restrepo. Y. Zhang, N. Mankame, P. Zavattieri, "Bioinspired Phase Transforming Cellular Materials", (Advanced Biomaterials session), 3rd Pan American Materials Congress San Diego, CA (February 26 - March 2), 2017.
 17. P. Zavattieri, "Bioinspired Architected Materials: Understanding the inner architecture of high-performance natural materials", Hyber Symposium, Helsinki, Finland, 18-19 May 2017. (**Plenary**)
 18. P. Zavattieri, *Biological Material Science and Engineering: The Role of Architecture*, XVIII International congress of Materials and Metallurgy, SAM-CONAMET 2018, San Carlos de Bariloche, Argentina, Oct. 1-5, 2018 (**Plenary**).
 19. Reza Moini, Jan Olek, Jeff Youngblood, Pablo Zavattieri, "Cement-based 3D printed bioinspired architecture materials: Challenges and opportunities", TRB Annual Meeting, Washington DC. January 13-17, 2019. (keynote invited talk)

20. N. Suksangpanya, I. Gallana, M. Shishebor, N. Yaraghi, D. Kisailus², Pablo Zavattieri, “*Clever mechanisms and impact resistance strategies found in the architecture of some naturally occurring materials*”, **43th Int. Conference and Exposition on Advanced Ceramics and Composites**, Daytona Beach, FL, Jan., 2019.(Invited talk)
21. P. Zavattieri “*Clever mechanisms and impact resistance strategies found in the architecture of some naturally occurring materials*”, Engineering Mechanics Institute Conference (EMI 2019), Caltech, CA, June 18-21, 2019. (Invited Talk)
22. M. Moini, J. Olek, J. Youngblood, P. D. Zavattieri, *Additive Manufacturing and Mechanical Performance of Architected Cement-based Materials*, American Association of State Highway and Transportation (Committee on Materials and Pavements), ASHTO/COMP, Baltimore, Aug. 17, 2019. (**Plenary**)
23. P. Zavattieri, “*Uncovering new mechanisms in biological and engineering architected materials*”, “56th Annual Technical Meeting of the Society of Engineering Science (SES2019), October 13 - 15, 2019, Washington University. (Invited Talk)
24. Y. Zhang, K. Hector, M. Velay, D. Restrepo, N. D. Mankame, P. D. Zavattieri, “*Stress- and Temperature-Induced Phase Transformation in Architected Materials*”, **MRS Fall 2019** (Keynote Talk)
25. M.S. Hosseini, J. Rivera, D. Restrepo, D. Kisailus, P.D. Zavattieri, “*Role of the inner architecture of a naturally-occurring interlocking interface found in the diabolical ironclad beetle*”, **TMS 2020, San Diego**. (Invited talk)
26. P. Zavattieri, “*Uncovering new mechanisms in biological and biomimetic architected materials*” **8th International Conference on Mechanics of Biomaterials and Tissues (ICMOBT)**, which will take place from 15-19 December 2019 in Waikoloa, Hawaii, USA. (**Plenary**)
27. M. Shishebor, M. Hosseini, J. Rivera, N. Yaraghi, N. Suksangpanya, D. Kisailus, P. Zavattieri, “*Bioinspired Architected materials: When geometry enables novel mechanisms and better performance*”, **44th Int. Conference and Exposition on Advanced Ceramics and Composites**, Daytona Beach, FL, Jan. 26-31, 2020. (Invited talk)
28. P. Zavattieri, “*Materiales microestructurados inspirados en la naturaleza*” **VI Congreso internacional de Ingeniería Civil con prospectiva en su formación profesional, ética e investigativa**, Bogota, Colombia, Dec. 15-16, 2020 (**Plenary – Virtual**)
29. P. Zavattieri, “*Architected Material Analogs for Shape Memory Alloys*“, **EMI committee on Architected Materials**, April 19, 2021. (**Plenary**)
30. P. Zavattieri “*Materiales microestructurados inspirados en la naturaleza*”, **2º Congreso Internacional de Ingeniería con Impacto Social CIISOL 2021** (Conferencista magistral/**Plenary Talk**).
31. P. Zavattieri, “*Harnessing the emerging properties of architected materials: bioinspiration and beyond*”, **NSF Workshop on Architected Metamaterials for Civil Infrastructure**, University of Massachusetts Amhers, May 23-25, 2022. (**Plenary Talk**)
32. Y. Zhang, K. Hector, P.S. Daskika, M. Velay, D. Restrepo, N. D. Mankame, Pablo D. Zavattieri, “*Architected Material Analogs for Shape Memory Alloys*”,

- Engineering Mechanics institute (EMI) Conference**, 2022, Baltimore, MD, May 31, June5, 2022 (Keynote)
33. P. Zavattieri, “Harnessing the emergent behavior of architected materials: bioinspiration and beyond ”10th International Workshop on Interfaces, Design for Performance, Santiago de Compostela, Spain Sept. 4-7, 2022. (**Plenary**)
 34. P. Zavattieri, “counterintuitive mechanisms and clever architectures to enable new material behavior”, **Gordon Research Conference on Multifunctional Materials and Structures**, Imparting Intelligence in and Through Self-Learning Materials and Structures, Ventura Beach, CA, September 25 - 30, 2022 (Invited **Plenary Talk**)
 35. P. Zavattieri “Harnessing the Emergent Behavior of Architected Materials: Bioinspiration and Beyond”, **Drucker Medal Symposium, ASME-IMECE**, Nov. 2022 (invited talk)
 36. Kristian Hector, Phani Saketh Dasika, Adwait Trikanad, Nilesh Mankame, Wei Huang Jesus Rivera; D. Kisailus, David Restrepo, Pablo D. Zavattieri, “Mechanics of bioinspired hierarchical tape-springs “, **TMS 2023, 152nd Annual Meeting and Exhibition**, San Diego, CA, March 19-23, 2023. (Invited talk)

Invited seminars:

1. "*Multiscale Modeling: A Hierarchical Approach to Investigate Dynamic Failure of Advanced Materials*", Computational Science & Engineering Seminar Series, **Purdue University**. Oct. 20, 1999.
2. “*Computational Modeling for Bridging Size Scales in the Failure of Solids*”, Material & Processes Lab, **GM Research and Development**. May, 2001.
3. “*Applications of Cohesive Models: From Atoms to Autos*”, School of Mechanical Engineering, **Purdue University**. Sept. 29, 2003.
4. “*Understanding Failure of Advanced Materials and Their Interfaces: A Key Enabler for Designing Future Vehicles*”, School of Materials Engineering, **Purdue University**. Dec. 1, 2006.
5. “*Recent Progress and Current Challenges in Cohesive Zone Models Applied to the Failure of Automotive Structures*”, Department of Mechanical Engineering, **University of South Carolina**. Aug. 8th, 2007.
6. “*Bridging Size Scales in the Modeling of Deformation and Failure of Advanced Materials*”, School of Civil Engineering, **Purdue University**, April, 2009.
7. “*Lessons learned from biomineralized marine organisms applied to the design of biomimetic materials*”, Solid Mechanics @ Purdue Seminar series, **Purdue University**, July, 2010
8. “*Diseño de materiales estructurales de alta resistencia inspirados en organismos marinos*”, **Universidad del Valle**, Cali, Colombia, March 27, 2012.
9. “*Synergetic role of ultrastructure geometry and size scale in biomineralized and biomimetic materials*”, Bio-Interest Group (BIG) Seminars at Mechanical Science and Engineering (MechSE) Department, **University of Illinois at Urbana-Champaign (UIUC)**, April 9, 2012.

10. “*Multiscale computational modeling for bridging size scales in the failure of cementitious-based materials: Recent progress, current challenges, gaps and opportunities*”, As a Topic Leader at the **NSF US-Poland workshop on Multiscale Computational Modeling of Cementitious Materials (MCMoCM 2012)** Cracow, Poland, October 18-19, 2012
11. “*Mechanical investigation of naturally-occurring high performance materials*”, **Stanford University**, March 14, 2013.
12. “*Multiscale mechanics of natural fibers*”, **NSF Pan American Advanced Studies Institute (PASI)** on Polymer and Composite Materials from Renewable Resources and Biorefinery: from Chemistry to Applications, Costa Rica, August 2013,
13. *Mechanical Investigation of Biomineralized and Biologically-Inspired Materials: Lessons learned from Nature, I International Seminar on Biomaterials, Biomechanics and Regenerative Medicine*, RutaN, Medellin, Colombia, May 16, 2014.
14. *Mechanical Investigation of Biomineralized and Biologically-Inspired Materials: Lessons learned from Nature*, **EAFIT University**, Medellin, Colombia, May 19, 2014.
15. *Mechanical Investigation of Naturally-Occurring High Performance Materials: Lessons learned from Nature*, **Whistler Center for Carbohydrate Research, Purdue University**, May 30, 2014.
16. "Naturally-Occurring High Performance Materials: Lessons learned from Nature", **Biomimicry Group, Arizona State University**, March 26, 2015 (via teleconference)
17. Bio-Inspired Materials: Lessons Learned from Nature, Seminar series for **SURF Program, Purdue University**, June 18 2015. [Available on line-<https://nanohub.org/resources/22777>]
18. "Investigación de la Mecánica de Materiales Compuestos Naturales y Biomiméticos de Alto Rendimiento", **Universidad Nacional de La Plata**, La Plata, Argentina, June 26, 2015.
19. “Combined 3D Printing and Multi-scale Modeling for the Development of High Performance Biomimetic Materials”, **American Concrete Institute (ACI) Headquarter**, Farnington Hills, Oct. 9, 2015.
20. “Nanocellulose-based Composites and Bio-inspired Materials”, **Smart Materials Workshop, Kent State University**, Kent, OH, April 13th, 2016.
21. “Designing Architected Materials” Seminar series for **SURF Program, Purdue University**, June 14 2016.
22. “Understanding the inner architecture of high-performance natural materials: a few interesting problems in mechanics”, **Jacobs School of Engineering, University of California San Diego**, San Diego, CA., Oct. 17, 2016.
23. “Engineering 2.0: Millions of years of trial and error making high-performance materials”, Featured Speaker, **Science on Tap Lafayette**, Oct. 27, 2016.

24. "Architected materials inspired by Nature: a few interesting problems in mechanics", **William E. Boeing Department of Aeronautics & Astronautics, University of Washington**, Seattle, WA, Nov. 2, 2016.
25. "Engineering vs. Natural Materials", **Grupo de Biotecnología Universidad de Antioquia**, Medellin Colombia (Via teleconference), Nov. 8, 2016.
26. "Architected materials inspired by Nature: a few interesting problems in mechanics", **School of Engineering, Brown University**, Providence, RI, Nov. 21, 2016.
27. P. Zavattieri, "*Impresión 3D aplicada al diseño de materiales con micro-arquitectura*", **YPF-Technology (YTec)**, Dec. 22, 2016.
28. "High performance naturally occurring materials: The role of architecture", Invited MSE Seminar, School of Materials Engineering, **Purdue University**, March 24, 2017.
29. "Questioning in Research: A practical Guide to Have Cooperative and Constructive Argumentative Dialogue", Invited Talk, **Network for Computational Nanotechnology/SURF program**, June 14, 2017 [Available on line: <https://nanohub.org/resources/26764>]
30. "*Cement-based 3D printed bioinspired architected materials*", **Department of Civil, Construction, and Environmental Engineering, North Carolina State University**, Feb. 22, 2019.
31. "*Uncovering new mechanisms in biological and engineering architected materials*", **Department of Mechanical Engineering, John Hopkins University**, April 4, 2019.
32. *Uncovering new mechanisms in biological and biomimetic architected materials*, **ExxonMobil Research Center (EMRE)**, New Jersey, NJ, July 2, 2019
33. "*Architected Materials in Nature*", Departamento de Ingeniería Mecánica de la **Universidad de Antioquia**, Colombia, Sept. 2019
34. *Clever architectures, interfaces and competing mechanisms in biological materials*, Civil and Environmental Engineering, and Michigan Institute for Computational Discovery and Engineering (MICDE), **University of Michigan**, Nov. 6, 2019.
35. *Enabling unusual mechanical behavior through material architecture and bio-inspiration*, Mechanical Engineering Department, **Virginia Tech, ME Distinguished Speaker seminar**, Blacksburg, VA (*last in-person seminar before COVID*) March 5, 2020
36. *Enabling unusual mechanical behavior through material architecture and bio-inspiration*, **General Motors Research and Development & HRL Laboratories**, (*virtual seminar*), Aug. 27, 2020.
37. *Material architecture and bio-inspiration as a strategy to enable new mechanical behavior*, **University of Colorado, Boulder**, *Virtual Seminar*, Dec. 7, 2020.
38. P. Zavattieri, "*The Diabolical Ironclad Beetle: Material architecture and bio-inspiration as a strategy to enable new mechanical behavior*", **SAMPE Orange County Chapter**, (*virtual seminar*), May 24th, 2021.

39. *Material architecture and bio-inspiration as a strategy to enable new mechanical behavior*, **University of Houston, ME Distinguished Seminar Speaker Series**, (*first in-person seminar after COVID*), Houston, TX, Oct. 7, 2021.
40. P. Zavattieri, “*Material architecture and bio-inspiration as a strategy to enable new mechanical behavior*”, **University of California, Irvine** (virtual seminar) May 11th, 2022.
41. P. Zavattieri, “*Harnessing the emergent behavior of architected materials: bioinspiration and beyond*”, **University of California, San Diego** (virtual seminar), June 4th, 2022.
42. P. Zavattieri, “*Harnessing the emergent behavior of architected materials: bioinspiration and beyond*”, **University of California, Irvine**, (in-person seminar), Nov. 18th, 2022.

Intellectual property (IP):

U.S. and international patents awarded.

1. 7,448,678, *Active material actuated headrest assemblies*. Inventors: A. Browne, A. Chernoff, R. Glaser, N. Johnson, J. Khoury, U. Ukpai, P. Zavattieri. Assignee: GM Global Technology Operations, Inc. Issue Date: November 11, 2008.
2. 7,594,697, *Active material actuated headrest assemblies*. Inventors: A. Browne, A. Chernoff, R. Glaser, N. Johnson, J. Khoury, U. Ukpai, P. Zavattieri. Assignee: GM Global Technology Operations, Inc. Issue Date: September 29, 2009.
3. 20080023871, *Methods of forming polymeric articles having continuous support structures*. Inventors: D. Okonski, P. Zavattieri, Assignee: GM Global Technology Operations LLC. January 31, 2008
4. 7,758,121, *Active material based conformable and reconfigurable seats*. Inventors: A. Browne, N. Johnson, P. Zavattieri, U. Ukpai, J. Ulicny, J. Cafeo, R. Glaser, G. Jones; J. Khoury, C. Perelli, W. Rodgers, X. Gao, Assignee: GM Global Technology Operations, Inc. Issue Date: July 20, 2010.
5. 20100092238, *Active material elements having reinforced structural connectors*. Inventors: P. Zavattieri, X. Gao, W. Carter, E. Sherman, A. Browne, N. Johnson, P. Alexander, N. Mankame, W. Rodgers, R. Stevenson, J. Shoemaker, Assignee: GM Global Technology Operations LLC. April 15, 2010
6. 7,993,537, *Method for improving adhesion between a shape memory alloy and a polymer*. Inventors: L. Hector, Jr.A. Mance, W. Rodgers; P. Zavattieri, D. Okonski; E. Sherman, W. Barvosa-Carter. Assignee: GM Global Technology Operations LLC. Issue Date: August 9, 2011.
7. 8,190,331, *Systems for detecting animate objects in a vehicle compartment*. Inventors: A. Browne, N. Johnson; J. Khoury, A. Martin, P. Zavattieri, W. Barvosa-Carter, Assignee: GM Global Technology Operations LLC. Issue Date: May 29, 2012.
8. 8,388,773, *Apparatus for and method of conditioning shape memory alloy wire*. Inventors: J. Luntz, J. Shaw, D. Brei, C. Churchill, P. Anupam, N. Mankame, A. Browne, N. Johnson, P. Alexander, X. Gao, P. Zavattieri. Assignee: GM Technology Operations LLC. Issue Date: March 5, 2013.

9. 8,627,600, ***Pinch protection mechanism utilizing active material actuation***, X. Gao, C. Kollar, N. Johnson, A. Browne, P. Zavattieri; N. Mankame; P. Alexander. Assignee: GM Global Technology Operations LLC. Issue Date: January 14, 2014.
10. 8,773,835, ***Active material actuation utilizing magnetic overload protection***, N. Johnson, A. Browne, X. Gao, N. Mankame, P. Alexander, P. Zavattieri. Assignee: GM Global Technology Operations LLC. Issue Date: July 8, 2014.
11. 8,870,144 ***Active material adaptive object holders***, P. Zavattieri, M. Kramarcyk, A.L. Browne, J.Y. Khoury, N.L. Johnson, C. Namuduri, S.N. Karuppaswamy, N.D. Mankame, R.A. Glaser, P.W. Alexander, Assignee: GM Global Technology Operations LLC. Issue Date: October 28, 2014.
12. 9,255,619, ***Bi-stable and multi-stable devices***, P. Zavattieri, N. Mankame, Assignee: GM Global Technology Operations LLC. Issue Date: February 9, 2016
13. US 20160075601 A1, ***Cellulose Nanocrystal additives and improved cementitious systems***, J. Youngblood, P. Zavattieri, R. Moon, Y. Cao, Assignee: Purdue Research Foundation, Dec. 1, 2016
14. 11,400,885, ***Compact, lightweight and reusable local energy absorbers***, N. Mankame, P. Zavattieri, D. Restrepo, G. Jarrold, K. Hector, Assignee: GM Global Technology Operations LL, 2022.
15. 20220120043 A1, ***Phase transforming cellular matrix (PXCM) based tile design for a lightweight runway mat***, P. Zavattieri, S. Hartford, K. Hector Assignee: Purdue Research Foundation, April. 2022.

Published patent applications (source www.uspto.gov)

1. 20070246979, Active material actuated headrest assemblies. Inventors: A. Browne, A. Chernoff, R. Glaser, N. Johnson, J. Khoury, U. Ukpai, P. Zavattieri, Assignee: GM Global Technology Operations LLC. October 25, 2007
2. 20070246285, Active material based conformable and reconfigurable seats. Inventors: A. Browne, N. Johnson, P. Zavattieri, U. Ukpai, J. Ulicny, J. Cafeo, R. Glaser, G. Jones; J. Khoury, C. Perelli, W. Rodgers, X. Gao, Assignee: GM Global Technology Operations LLC. October 25, 2007
3. 20080023871, Methods of forming polymeric articles having continuous support structures. Inventors: D. Okonski, P. Zavattieri, Assignee: GM Global Technology Operations LLC. January 31, 2008
4. 20080103660, Systems for Detecting Animate Objects in a Vehicle Compartment. Inventors: A. Browne, N. Johnson; J. Khoury, A. Martin, P. Zavattieri, W. Barvosa-Carter, Assignee: GM Global Technology Operations LLC. May 1, 2008
5. 20080202637, Method for improving adhesion between a shape memory alloy and a polymer. Inventors: L. Hector, Jr. A. Rodgers; A. Mance, P. Zavattieri, D. Okonski; E. Sherman, W. Barvosa-Carter. Assignee: GM Global Technology Operations LLC. August 28, 2008
6. 20080222853, Shape memory alloy reinforced hoses and clamps. Inventors: P. Zavattieri, A. Gunther, Assignee: GM Global Technology Operations LLC. September 18, 2008
7. 20080272259, Active material adaptive object holders. Inventors: P. Zavattieri, M. Kramarcyk, A. Browne, J. Khoury, N. Johnson, C. Namuduri, S. Karuppaswamy, N. Mankame, R. Glaser, P. Alexander, Assignee: GM Global Technology Operations LLC. November 6, 2008

8. 20090008973, Active material actuated headrest assemblies. Inventors: A. Browne, A. Chernoff, R. Glaser, N. Johnson, J. Khoury, U. Ukpai, P. Zavattieri. Assignee: GM Global Technology Operations LLC, January 8, 2009
9. 20090223604, Apparatus for and method of conditioning shape memory alloy wires. Inventors: J. Luntz, J. Shaw, D. Brei, C. Churchill, P. Anupam, N. Mankame, A. Browne, N. Johnson, P. Alexander, X. Gao, P. Zavattieri, Assignee: GM Global Technology Operations LLC. September 10, 2009
10. 20100109322, Shape Memory Alloy Reinforced Hoses and Clamps. Inventors: P. Zavattieri, A. Gunther, N. Johnson, A. Browne, Assignee: GM Global Technology Operations LLC. May 6, 2010
11. 20100092238, Active material elements having reinforced structural connectors. Inventors: P. Zavattieri, X. Gao, W. Carter, E. Sherman, A. Browne, N. Johnson, P. Alexander, N. Mankame, W. Rodgers, R. Stevenson, J. Shoemaker, Assignee: GM Global Technology Operations LLC. April 15, 2010
12. 20110115114, Methods of forming polymeric articles having continuous support structures. Inventors: D. Okonski, P. Zavattieri, Assignee: GM Global Technology Operations LLC. May 19, 2011
13. 120110258931, Pinch Protection mechanism Utilizing Active Material Actuation. Inventors: X. Gao, C. Kollar, N. Johnson, A. Browne, P. Zavattieri, N. Mankame, P. Alexander, Assignee: GM Global Technology Operations LLC. October 27, 2011
14. 20130082427, Bi-Stable and Multi-Stable Devices. Inventors: P. Zavattieri, N. Mankame, Assignee: GM Global Technology Operations LLC. April 4, 2013
15. 20130242451, Active material actuation utilizing magnetic overload protection, Inventors: N. Johnson, A. Browne, X. Gao, N. Mankame, P. Alexander, P. Zavattieri, Assignee: GM Global Technology Operations LLC, September 19, 2013
16. 20160075601, Cellulose Nanocrystal additives and improved cementitious systems, J. Youngblood, P. Zavattieri, R. Moon, Y. Cao, Assignee: Purdue Research Foundation, March 17, 2016
17. 20160347661, Cellulose Nanocrystal additives and improved cementitious systems, J. Youngblood, P. Zavattieri, R. Moon, Y. Cao, Assignee: Purdue Research Foundation, Dec. 1, 2016
18. 20200307502 Compact, Lightweight And Reusable Local Energy Absorbers, N. Mankame; P. Zavattieri, D. Restrepo, J. Gordon, K. Hector.

List of NanoHUB tools published:

1. Chidubem Nuela Enebechi, Gavin Carter, Yunlan Zhang, Kristiaan William Hector, Pablo Daniel Zavattieri, Phase Transforming Cellular Material Simulator,
2. Joshua Leonardo, Mehdi Shishebor, Pablo Daniel Zavattieri, Mechanics of Crystalline Nano Cellulose Nanofilm, doi:10.4231/D3TT4FW0D, Link: <https://nanohub.org/resources/cnc>
3. Kuo Tian, Mehdi Shishebor, P. Zavattieri "Coarse Graining of Crystalline Cellulose), doi:10.4231/D3930NW4D , Link: <https://nanohub.org/resources/24763>
4. S Lee; C. Gomez, P. Zavattieri; A. Strachan (2011), "Bio Composite Simulator," DOI: 10254/nanohub-r12273.1. link: <http://nanohub.org/resources/nacresimulator>

5. Mateo Gómez Zuluaga; Robert J. Moon; Fernando Luis Dri; Pablo Daniel Zavattieri (2013), "Crystalline Cellulose - Atomistic Toolkit," DOI: 10.4231/D35T3G03B, Link: <https://nanohub.org/resources/ccamt>
6. Mateo Gómez Zuluaga; Fernando Luis Dri; Pablo Daniel Zavattieri; Robert J. Moon (2013), "Anisotropy Calculator - 3D Visualization Toolkit," DOI: 10.4231/D3K06X13R, Link: <https://nanohub.org/resources/matrix2surface>
7. F. Cordisco, Sk A S M Monirul Islam, D. Lemus, P. Zavattieri, "*NanoScale Adhesion Model Tool (Continuum)*", under development NanoHUB.
8. E. Ochoa, F. Dri, P. Zavattieri "*Nanoscale Adhesion Tool (Molecular Dynamics)*", NanoHUB (to be released in Summer 2013)

Teaching:

Prof. Pablo Zavattieri graduated 14 PhD and 3 MS students, and he is currently supervising 6 PhD. many of them recipients of University and CE awards (including the best dissertation and several SURF Awards of Excellence). He has a strong record of mentoring undergraduate students (taking advantages of programs such as SURF, Honors, and individual studies). He teaches both undergraduate and graduate courses including Advanced Solid Mechanics, Computational Mechanics, Numerical methods and Nonlinear Fracture Mechanics in the School of Civil Engineering. Zavattieri teaches CE231 "Materials Engineering I" regularly. He is an IM:PACT fellow and his CE231 evaluation has been increasing since he participated in the program. He has been improving the student learning experience in CE231 since then by adding elements of active learning in the classroom.

CE231 "*Engineering Materials I*", **Purdue University**, West Lafayette, IN. (Taught in Fall 2009, Fall 2010, Fall 2011, Fall 2012, Spring 2013, Fall 2013, Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018).

CE335 "*Civil Engineering Materials*", **Purdue University**, West Lafayette, IN. (Taught in Spring 2020, Spring 2022). New CE 2020 curriculum.

CE597 "*Advanced Topics in Classical and Computational Solid Mechanics*", **Purdue University**, West Lafayette, IN. (Taught in Spring 09, Spring 12, Fall 2014, Spring 2019, Spring 2021, Spring 2023).

Web site: <http://engineering.purdue.edu/~zavattie/CE597>

CE597 "*Nonlinear Fracture Mechanics*", **Purdue University**, West Lafayette, IN. (Taught in Spring 11, Spring 13, Fall 2015, Fall 2017, Fall 2019, Fall 2021), Web site: <http://engineering.purdue.edu/~zavattie/Fracture/> .

CE597 "*Numerical Methods in Civil Engineering*", **Purdue University**, West Lafayette, IN. (Taught in , Fall 2016, Fall 2018, Fall 2020, Fall 2022), Web site: <https://engineering.purdue.edu/~zavattie/NumericalMethods/> .

ME323 “*Mechanics of Materials*”, School of Mechanical Engineering, **Purdue University**, West Lafayette, IN. (Taught in Spring 2009)

ME581 “*Numerical Methods in Mechanical Engineering*”, School of Mechanical Engineering, **Purdue University**, West Lafayette, IN. (Taught in Fall 08).

“*The Finite Element Method: Theory and Implementation*” (Course designed by Zavattieri and taught at the graduate level), Department of Aeronautical Engineering, **Universidad Nacional de la Plata**, La Plata, Argentina. (Taught in 2001)

Graduated PhD Students Graduate:

Name	School	Year
<u>Dri, Fernando</u>	Purdue University	2013
<u>Cao, Yizheng</u>	Purdue University	2014
<u>Cordisco, Fernando</u>	Purdue University	2014
<u>Escobar de obaldia, Enrique</u>	Purdue University	2015
<u>Restrepo, David</u>	Purdue University	2015
<u>Suksangpanya, Nobphadon</u>	Purdue University	2016
<u>Gallana, Isaias</u>	Universidad Nacional de La Plata	2017
<u>Antico, Federico</u>	Purdue University	2018
<u>Shishehbor, Mehdi</u>	Purdue University	2018
<u>Hosseini, Maryam</u>	Purdue University	2019
<u>Zhang, Yunlan</u>	Purdue University	2019
<u>Moini, Mohamadreza</u>	Purdue University	2020
<u>Shagerdi Esmaeeli, Hadi</u>	Purdue University	2020
<u>Wang, Di</u>	Purdue University	2020
<u>Guarin-Zapata, Nicolas</u>	Purdue University	2021
<u>Adwait Trikanad</u>	Purdue University	2021
<u>Kristiaan Hector</u>	Purdue University	2022
<u>Alvaro Garnica</u>	Purdue University	2022
<u>Liliana Bustamante</u>	Universidad de Antioquia	2023
<u>Fabian Rodriguez</u>	Purdue University	2023

PhD students who have transitioned to academic positions: 7

1. David Restrepo (PhD 2015), Assistant Professor, **University of Texas, San Antonio, USA**.
2. Nobphadon Suksangpanya (PhD 016): Assistant Professor, **Suranaree University of Technology**. Thailand.
3. Isaias Gallana (PhD. 2017), **National University of La Plata**, Argentina.

4. Federico Antico (PhD 2018), Assistant Professor, Civil Engineering, *Adolfo Ibáñez University*, Chile.
5. Reza Moini, (PhD 2020) Assistant Professor, Department of Civil and Env. Engineering, *Princeton University*, USA.
6. Nicolas Guarín-Zapata (PhD 2021) Assistant Professor, Civil Engineering Department, *EAFIT University*, Colombia.
7. Yunlan Zhang (PhD 2019) Assistant Professor, Civil, Architectural and Environmental Engineering, *University of Texas at Austin*, USA.

Graduated MS Students: Hadi Shagerdi Esmaeeli, Vanessa Restrepo, Chanhue Jeong, Fabian Rodriguez, John (Jack) Connolly

Post-docs supervised: David Restrepo, Bryan Magee, Mirian Velay-Liznacós, Mehdi Shishehbor, Maryam Sadat Hosseini, Hadi Shagerdi esmaeeli, Peter A. Kolis

Undergraduate Student Mentorship:

Zavattieri has a strong record of mentoring undergraduate students. He has mentored and advised about 30 undergraduate students in Capstone, Honors and individual study courses, about 30 Summer projects, in which most of them are SURF. In fact, Some of his SURF projects have been geared towards educational/outreach activities such as the development of *nanoHUB* tools. Zavattieri's top undergraduate students participating in these summer projects have been recipient of various awards and most of their work resulted in an external publication. Zavattieri has 20 years of mentoring experience. Even before he joined Purdue, he worked closely with research groups at academic institutions and worked directly with their graduate and undergraduate students. Prof. Zavattieri continuously cultivates a climate of mentoring by bringing undergraduate students under those programs directly into his research group by encouraging graduate students to team up with them. He directly nurtures this environment by carefully designing projects that are aligned to the learning objectives and research needs. The following list details all the Undergraduate Students and individual projects.

Zavattieri has a strong commitments and involvement with the Society of Hispanic Professional Engineers (SHPE) where he led activities specially designed to the mentoring of undergraduate and graduate students, and young faculty from 2012 to 2018. His annual SHPE Engineering Science Symposium allows him to interact directly with hundred undergraduate and graduate students from top US institutions.

Service and Professional Activities

Zavattieri has been very active in the Solid Mechanics and Materials Community. He has been a reviewer of over 40 journals, served in several NSF panels and reviewed proposals for international research foundations. Prof. Zavattieri is an active member of the ASME,

MRS, SES, SHPE and SEM. He is the current chair of the Biological Systems and Materials Technical Division of the Society of Experimental Mechanics (SEM). Prof. Zavattieri has also been involved in the Society of Hispanic Professional Engineers (SHPE) since 2011. He has been a key player in the academic program of the national conference and was appointed as the chair of the SHPE Engineering Science Symposium, a unique undergraduate and graduate mentoring experience. He was the chair of the 2016 SHPE (Society of Hispanic Professional Engineers) Engineering Science Symposium. He was also the main organizer, proponent and conference secretary of the prestigious 51st Society of Engineering Science (SES) Annual Technical meeting that took place in Purdue University on Oct. 1-3, 2014. He currently serves in the editorial board of two international journals, and edited 5 conference proceedings. He also served as guest editor of a special issue for an international journal.

Memberships in academic, professional and scholarly societies.

1. 2001-2005 Member of the Automotive Composites Consortium (ACC), **United State Council for Automotive Research (USCAR)**. Sub-committee: Crash Analysis of Adhesive Bonded Composite Structures (CAABS).
2. 2001-2009 Member of the General Motors/Brown University Collaborative Research Laboratory on Computational Materials Research.
http://www.engin.brown.edu/facilities/GM_CRL/
3. 2003-2004 appointed member of the Committee of Technical and Educational Programs (CTEP) of the General Motors Research and Development Center.
4. 2003-Present: Member of the American Society of Mechanical Engineers (ASME).
5. 2009-2010, 2013-Present: Member of the Materials Research Society (MRS).
6. 2010-Present: Active member of the Society of Experimental Mechanics (SEM). Active Role: *Biological Systems and Materials* Technical Division of the Society of Experimental Mechanics (SEM) *Secretary* 2012-2014, *Co-Chair* 2014-2016, *Chair* 2017.
7. 2010-Present: Active Member of the Society of Hispanic Professional Engineers (SHPE).
Active Role: Chair of the 2012, 2013, 2014, 2015 SHPE Undergraduate and Graduate Student Scientific Paper Presentations.
8. 2011-Present: Member of the Society of Engineering Sciences (SES), ASCE, Engineering Mechanics Institute (EMI), American Society of Mechanical Engineering (ASME), TMS.

Major committee assignments in the Department, School, and/or University.

College of Engineering level

1. Member of the College of Engineering **Strategic Planning Team 8b: “Global Engagement”** (Aug.-Nov. 2009). *Attended weekly meetings and worked with other members to write the final report that was presented to the Dean in November 2009.*
2. Serving as a faculty mentor for *Beering Scholars* (2010).
3. Member of the **Colombia Purdue Institute of Advanced Scientific Research (CPIASR)** special committee on “*Engineering against Natural Hazards*” to visit 8 top Colombian universities the week of March 12th-16th, 2012. This trip took place during the Spring Break 2012 (March 18-23th), and the group visited 9 universities in the cities of Medellin, Cali and Bogota.
4. 2013-2017: Faculty member of the Dean’s Engineering Advisory Council, College of Engineering. Participated in all semi-annual Advisory Council meetings
5. *Member of the Engineering Named Professorships Committee (ENPC), Aug. 2022-Present*

School level

1. CE Honors Committee (2010-)
2. Materials Area Faculty Search Committee
3. Served as a member of the Curtis Professorship committee in Aug. 2010.
4. CE Graduate Committee Meetings, Sept. 2015-present.
5. Member of the CE Head Review Committee, 2022
6. Member of the CE Strategic plan and SWOT Analysis Committee, 2022-2023

Advisor Student-driven organizations:

- Faculty Advisor: ***Biomimicry Club*** 2022-present
- Faculty Advisor: ***ARGURU Club*** 2022-present
- Faculty Advisor: ***Chi Epsilon*** (Purdue University Chapter) – 2023-present
- Purdue Engineering Office of Graduate Education and the Engineering Academic Career Club (EACC), Summer Mentoring Circles (Summer 2023).

Administrative duties at Purdue.

Dec. 2009-Present, **Materials Engineering Area Coordinator**, School of Civil Engineering. As such Prof. Zavattieri is responsible for the teaching assignments and

TAs in the Area of Materials and to serve as a communication link between the School administration and the Area faculty.

Service to government or professional organization.

2021 Member of the National Academy of Science, Engineering and Medicine (NASEM) Defense Materials, Manufacturing and its Infrastructure (DMMI) Standing Committee, <https://www.nationalacademies.org/our-work/defense-materials-manufacturing-and-its-infrastructure-standing-committee#sectionProjectScope>

Reviewer/Panels for Research proposals

1. Served as a reviewer for the Scientific and Technological Research Fund, (*Agencia Nacional de Promoción Científica del FONCyT*), Argentina 2006.
2. Served as a reviewer for the Superior Council of the National Fund for Scientific & Technological Development (FONDECYT), Chile, 2008.
3. Served as a reviewer for the IB50K Contest for Business Plans Based on Technology 08/09, organized by the Balseiro Institute, the National Atomic Energy Commission, Universidad Nacional de Cuyo, Argentina, 2009. (2 proposals reviewed)
4. Served as a **NSF panelist/reviewer and Ad-Hoc reviewer** since 2010, at least once a year (participated in 2 NSF CAREER panels). CMMI, various programs.
5. **NIST:** Participated of the *Workshop on Quantitative Tools for Conditional Assessment of Aging Infrastructure* at NIST, May 4-5, 2010.
(http://www.nist.gov/mml/materials_reliability/workshop-on-quantitative-tools-for-condition-assessment-of-aging-infrastructure.cfm)
6. Served as a **reviewer** Icelandic Research Fund (IRF), October 2012.

Editorial Boards for international Journals:

1. Associate Editor, *International Journal of Experimental and Computational Biomechanics* since 2013
2. Member of the Editorial Board of the *ASTM Journal of Advances in Civil Engineering Materials* (ACEM) since 2013
3. Member of the Advisory Board of Matter (Cell Press), since 2019.

Other Editorial Activities/Book Proceedings:

1. 1997-2000 Technical assistant of Prof. Horacio Espinosa (Purdue Univ.) for the design and edition of the magazine “Mechanics” and maintenance of the American Academy of Mechanics Web Page (www.AAMech.org).
2. Associate Editor and member of the editorial board in “Mecánica Computacional” Volume XXIII. Number 4. Computational Mechanics of Solids and Structures in

- Industry, Edts. Gustavo C. Buscaglia, Enzo A. Dari, Oscar M. Zamonsky.
<http://www.cimec.org.ar/ojs/index.php/mc/issue/view/43>
3. Associate Editor and member of the editorial board (with R. Lebensohn) in “Mecánica Computacional” Volume XXIII. Number 3. Multiscale Modeling of Solids, , Edts. Gustavo C. Buscaglia, Enzo A. Dari, Oscar M. Zamonsky.
<http://www.cimec.org.ar/ojs/index.php/mc/issue/view/42>
 4. Editor of the 2009 Spring MRS Proceedings “Structure-function relationships in biomaterials/biominerals and bio-mimetic systems”, Eds. D. Kisailus, L. Estroff, H. Gupta, W. Landis, P. Zavattieri, Volume 1187, 2009. Cambridge University Press, ISBN: 1605111600 / 1-60511-160-
 5. “*Mechanics of Biological Systems and Materials*”, Volume 5, 2012 Conference Proceedings of the Society for Experimental Mechanics (SEM) Series: Preface, B.C. Prorok, F. Barthelat, C.S. Korach, K.J. Grande-Allen, E. Kipke, G. Lykofatitits, P. Zavattieri. Springer, ISSN: 21915644 ISBN: 978-146144426-8
 6. “*Mechanics of Biological Systems and Materials*”, F. Barthelat, C.S. Korach, P.D. Zavattieri, Volume 6, 2013, Conference Proceedings of the Society for Experimental Mechanics (SEM), in preparation.
 7. “*Mechanics of Biological Systems and Materials*”, F. Barthelat, C.S. Korach, P.D. Zavattieri, Volume 7: Proceedings of the 2014 Annual Conference on Experimental and Applied Mechanics (Conference Proceedings ... Society for Experimental Mechanics Series)
 8. Bajaj, P. Zavattieri, M. Koslowski, & T. Siegmund (Eds.). Proceedings of the Society of Engineering Science 51st Annual Technical Meeting, October 1-3, 2014 , West Lafayette: Purdue University Libraries Scholarly Publishing Services, 2014.
<http://docs.lib.purdue.edu/ses2014/>
 9. “*Mechanics of Biological Systems and Materials*”, Volume 6: Proceedings of the 2015 Annual Conference on Experimental and Applied Mechanics (Conference ... Society for Experimental Mechanics Series)

Reviewer for International Journals

Advanced Materials, ASTM Journal of Advances in Civil Engineering Materials, Applied Physics Letter, Chemical Society Reviews, Computational Mechanics, Computer Methods in Applied Mechanics and Engineering, Engineering Fracture Mechanics, Experimental Mechanics, Experimental Techniques, Fatigue and Fracture of Engineering Materials and Structures, Finite Elements in Analysis and Design, Journal of Applied Mechanics, Journal of Applied Physics, Journal of Composite Materials, Journal of Computational and Applied Mathematics, Journal of Geotechnical and Geoenvironmental Engineering, Journal of Material Research, Journal of Materials Engineering and Performance, Journal of Manufacturing Science and Engineering, Journal of Tribology, Int. J. Experimental and Computational Biomechanics, International Journal of Fracture, International Journal of Hydrogen Energy, International Journal of Mechanics and Materials in Design, International Journal for Multiscale Computational Engineering, International Journal of

Numerical Methods in Engineering, International Journal of Plasticity, International Journal of Solids and Structures, Materials and Structures, Metallurgical and Materials Transactions A, Modelling and Simulation in Materials Science and Engineering, Plasma Processes and Polymers, Philosophical Magazine & Philosophical Magazine Letters, Surface Engineering, Smart Materials and Structures, Extreme Mechanics Letters.

Referee for the following conference proceedings books:

1. IMECE'01, (ASME International Mechanical Engineering Congress).
2. IMECE'04, (ASME International Mechanical Engineering Congress).
3. IMECE'10, (ASME International Mechanical Engineering Congress).
4. Mecánica Computacional, Vol. XXIII (Proceedings of the Argentinean Congress on Computational Mechanics ENIEF2004),
5. Mecánica Computacional, Vol. XXIV (Proceedings of the Argentinean Congress on Computational Mechanics MECOM 2005),
6. Mecánica Computacional, Vol. XXIV (Proceedings of the Argentinean Congress on Computational Mechanics MECOM-CILAMSE 2010),
7. MRS (Material Research Society) – Spring 09 Proceedings.
8. 17th APS (American Physical Society)- Shock Compression in Condense Matter (SCCM), 2011.

Symposium Organizer:

1. “*Research on computational mechanics of solids and structures in the industry*“, for the, **XIV Congress on Numerical Methods and their Applications ENIEF 2004**, S. C. de Bariloche, Argentina, Nov. 8-11, 2004
2. “*Multiscale modeling of the mechanical behavior of solids: from atomistic simulations to engineering applications*“ for the **XIV Congress on Numerical Methods and their Applications ENIEF 2004**, S. C. de Bariloche, Argentina, Nov. 8-11, 2004.
3. “*Advances and Applications of Meshfree and Extended Finite Element Methods*” for the **9th US National Congress on Computational Mechanics (USNCCM)** held in San Francisco, CA, USA July 2007.
4. **First Argentinean Congress on Aeronautical Engineering**, Member of the Scientific Committee (Area of Mechanics, Materials and Structures), La Plata, Dec. 3-5, 2008.
5. “*Structure-function relationships in biomaterials/biominerals and bio-mimetic systems*” for the **2009 Spring MRS Meeting**, San Francisco, USA, April 2009.
6. “*Modeling of materials for coupled problems*”, IX Argentinean Congress on Computational Mechanics, **XXXI Iberian-Latin-American Congress on Computational Methods in Engineering, II South American Congress on Computational Mechanics**, Buenos Aires, Argentina 15-18 November 2010.
7. “Symposium 3.4: *Mechanics of Materials across Multiple Length Scales*” , **48th Annual Technical Meeting of Society of Engineering Sciences (SES)**, Evanston, IL, Oct. 12-14, 2011.

8. "Multiscale modeling and simulation of complex materials and systems", for the **12th Pan American Congress of Applied Mechanics (PACAM XII)**, held in Port of Spain, Trinidad, Jan 2-6, 2012.
9. *2nd International symposium on the mechanics of biological systems and materials*, as part of the **SEM XII International Congress and Exposition on Experimental and Applied Mechanics**, June 2012.
10. "*Computational Modeling of Damage and Fracture in Solids*", **49th Annual Technical Meeting of Society of Engineering Sciences (SES)**, Georgia Tech, Atlanta GA, Oct. 10-12, 2012.
11. *3rd International symposium on the mechanics of biological systems and materials*, as part of the **SEM XIII International Congress and Exposition on Experimental and Applied Mechanics**, June 2013.
12. "*Material Design and Biomimetic Material Concepts*", **50^h Annual Technical Meeting of Society of Engineering Sciences (SES)**, Brown University, Providence, RI, , July 28-31, 2013.
13. "Computational and Experimental Investigations of Bio-Inorganic Interfaces" in the Biological and Biomimetic Materials track for the **2014 Society of Engineering Science (SES) 51st Annual Technical Meeting**.
14. "Bridging Scales in Heterogeneous Materials", **MRS Fall Meeting**, 2014.
15. "Bridging size scales in hierarchical materials: Multiscale modeling and experiments", First PanAmerican Congress on Computational Mechanics, **PANACM 2015**, April 27-29, 2015, Buenos Aires, Argentina.
16. Scientific Advisory Board member and symposium organizers for the 14th International Conference on Fracture (**ICF14**), to be held in Rhodes, Greece, June 18-23, 2017.

Conference Organizer:

Prof. Zavattieri was the main organizer and Secretary of the 51st Society of Engineering Science (SES) Annual Technical

SES at Purdue 2014: Member of the Executive Committee and main proposers of the **51st Society of Engineering Science (SES) Annual Technical** meeting to take place in Purdue University on Oct. 1-3, 2014. Prof. Zavattieri prepared the proposal and presented it personally at the SES Board of Directors in Georgia Tech on Oct. 10th, 2012. Status: proposal accepted by the SES. Pablo Zavattieri was also Track organizers (for Biological and Biomimetic Materials and the Mechanics of Solids Tracks), and Symposium organizer.

Co-organizer of the **SES 2021 (Mechanics Matter)**. the **Society of Engineering Science (SES) Annual Conference (Virtual Month of October)**. <https://socengsci.org/ses-virtual-month/>

July, 2023

Service to government or professional organization:

- **2003-2008 Member of the Composite Technical Committee of the USCAR** (United State Council for Automotive Research LLC). Representing General Motors.
- **2021 Member of the National Academy of Science, Engineering and Medicine (NASEM) Defense Materials, Manufacturing and its Infrastructure (DMMI) Standing Committee,** <https://www.nationalacademies.org/our-work/defense-materials-manufacturing-and-its-infrastructure-standing-committee#sectionProjectScope>