

BIOGRAPHICAL SKETCH

NAME Hoi-Ying N. Holman	POSITION TITLE Staff Scientist/Chemist		
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
University of California, Berkeley	Ph.D.	1986	Environ. Chem./Chem. Eng.
University of California Toxic Substances Research & Training Program	Postdoc	1988	Environmental Toxins

RESEARCH AND/OR PROFESSIONAL EXPERIENCE

- 2010-present Director, Berkeley Synchrotron Infrared Structural Biology Program, LBNL
- 2008-present Head, Chemical Ecology Group, Ecology Department, Earth Science Division
- 1995-present Principal Investigator; Staff Scientist/Chemist, LBNL. Utilize an interdisciplinary approach to develop real-time bioanalytical and imaging techniques, microfluidic and nanfluidic systems for measuring at a molecular level the functions and structures of a living cells and tissues at a micron-size spatial resolution.
- 1996-1997 University of California Biotechnology Program Review Committee. Reviewed proposed research/teaching program which would benefit the development of biotechnology in California.
- 1990-1994 Staff Scientist/Chemist: Head of Environmental Measurement Lab; Group Leader of Analytical Organic Chemistry.
- 1989-1990 Scientist, LBNL. Established LBNL's Environmental Measurement Lab.

Awards

1998 Lawrence Berkeley National Laboratory Outstanding Scientific Performance Award

2005 Lawrence Berkeley National Laboratory Technology Transfer Award

Patents and Patent Pending

- Holman, H.-Y.N. and R. Miles. Virtual Window and Thin-Liquid-Film Apparatus for Continuous Fluorescence and Infrared Spectroscopy Imaging of Living Cells and Tissues, IB-2201, **2009**.
- Holman, H.-Y.N. Spectroscopic evaluation of atherosclerotic plaques, IB-1867P, **2010**.
- Holman, H.-Y.N. Gastrointestinal mimetic device, U.S. Patent No. 6,040,188, **2000**.

SELECTED PUBLICATIONS

- Holman, H.-Y.N. Synchrotron infrared spectromicroscopy for studying chemistry of microbial activity in geologic materials, in *Synchrotron-Based Techniques in Soils and Sediments*, (Editors: B. Singh and M. Gräfe), Developments in Soil Science, Vol. 34, 103-130, Elsevier, **2010**.
- Holman, H.-Y.N. and F. G. Blankenbery. Mid-Infrared Reflectivity of Mouse Atheromas: A Case Study, in *Biomedical Applications of Synchrotron Infrared Microspectroscopy: A Practical Approach*(RSC Analytical Spectroscopy Series), Royal Society of Chemistry, in press, **2010**.
- Asatiani, N., Abuladze, M., Kartvelishvili, T., Kulikova, N., Asanishvili, L., Holman, H.-Y.N., and N. Sapojnikova. Response of antioxidant defense system to chromium(CI)-induced cytotoxicity in human diploid cells, *Biometals*, 23:161-172, **2010**.
- Choi, S., Park, I., Hao, Z., Holman, H.-Y.N., Pisano, A., and T. Zohdi. Ultra-Fast Self-Assembly of Micro-Scale Particles by Open-Channel Flow. *Langmuir*, published online. **2009**.
- Holman, H.-Y.N., Miles, R., Hao, Z., Wozel, E., Anderson, L.M., and H. Yang. Real-time Chemical Imaging of Bacterial Activity in Biofilms Using Open-Channel Microfluidics and Synchrotron FTIR Spectromicroscopy. *Analytical Chemistry*, 81(20), 8564-8570, **2009**.

6. Holman, H.-Y.N., Wozei, E., Lin, Z., Comolli, L.R., Ball, D.A., Borglin, S., Field M.W., Hazen, T.C. and K.H. Downing. Real-time molecular monitoring of chemical environment in obligated anaerobes during oxygen adaptive response. *PNAS USA*, 106(31), 12599-12640, **2009**.
7. Tsibakhashvili, N., Kalabegishvili, T., Rchenlishvili A. V., Murusidze, I., Rchenlishvili O.A., Kerkenjia, S., Holman, H.-Y. N. Decomposition of Cr(V)-diols to Cr(III) complexes *A. oxydans. Microbial Ecology*, 57:360-366, **2009**.
8. Holman, H.-Y.N. Bjornstad, C., Rosenberg, C., Martin, M.C., McKinney, W.R., Blakely E.A., and F.G. Blankenberg, Mid-infrared reflectivity of Experimental Atheromas. *J. of Biomedical Optics*, 13, **2008**.
9. Tsibakhashvili, N., Kalabegishvili, T., Mosulishvili, L., Kirkesali, E., Kerkenjia, S., Murusidze, I., Holman, H.-Y. N., Frontasyeva, M.V., and S.F. Gundorina. Biotechnology of Cr(VI) transformation into Cr(III) complexes. *J. of Radioanalytical and Nuclear Chemistry*, 278(3), **2008**.
10. Yang, C., Cheng, Y., Ma, X., Zhu, Y., Holman, H.-Y.N., Zhang, L., and C. Wang. Surface mediated chromate-resistant mechanism of *Enterobacter cloacae* bacteria investigated by atomic force microscopy. *Langmuir*, 23(8), 4480-4485, **2007**.
11. Holman, H.-Y. N., and M.C. Martin. Synchrotron radiation infrared spectromicroscopy: a non-invasive molecular probe for biogeochemical processes. *Advances in Agronomy*, 90: 79-127, **2006**.
12. R. Codd, P. Lay, N. Tsibakhashvili, T. Kalabegishvili, I. Murusidze, H.-Y. N. Holman. Chromium(V) complexes generated in *Arthrobacter oxydans* by simulation analysis of EPR spectra. *J. Inorg. Biochem.* 100, 1827-1833, **2006**.
13. Lin, Z., Zhu, Y., Kalabegishvili T.L., Tsibakhashvili, N.Y., and H.-Y. N. Holman. Effect of chromate action on morphology of basalt-inhabiting bacteria. *Materials Science and Engineering C*. 26:610-612, **2006**.
14. Woods, K.N., Lee, S.A., Holman, H.-Y. N., and J. Wiedemann. "The effect of solvent dynamics on the low frequency collective motions of DNA in solution and unoriented films", *J. Chemical Physics*, 124:224706-1 – 224706-8, **2006**.
15. Mukhopadhyay A., He Z., Alm E.J., Arkin A.P., Baidoo E.E., Borglin S.C., Chen W., Hazen T.C., He Q., Holman H.-Y. N., Huang K., Huang R., Joyner D.C., Katz N., Keller M., Oeller P., Redding A., Sun J., Wall J., Wei J., Yen H.-C., Zhou J., and J. D. Keasling. Salt stress in *Desulfovibrio vulgaris* Hildenborough: An integrated genomics approach. *J. of Bacteriology*, 188(11): 4068-4018, **2006**.
16. Tsibakhashvili N.Y., Frontasyeva M.V., Kirkesali E.I., Aksenova N.G., Kalabegishvili, T.L., Murusidze I.G., Mosulishvili, L.M., H.-Y. N. Holman. Epithelial Neutron Activation Analysis of Cr(VI)-Reducer Basalt-Inhabiting Bacteria. *Analytical Chemistry*, 78(18), 6285-6290, **2006**.
17. Wozei E., Hermanowicz S. W., and H.-Y. N. Holman. Developing a biosensor for estrogens in water samples: Study of the real-time response of live cells of the estrogen-sensitive yeast strain RMY/ER-ERE using fluorescence microscopy. *Biosensors & Bioelectronics*. 21(8): 1654-1658, **2006**.
18. Monaselidze J., Abuladze M., Asatiani N., Kiziria E., Barbakadze S., Majagaladze G., Iobadze M., Tabatadze L., Holman H.-Y. N., and N. Sapojnikova. Characterization of chromium-induced apoptosis in cultured mammalian cells: A differential scanning calorimetry study. *Thermochimica Acta*. 441:8-15, **2006**.
19. Stroo H.F., Nakles D.V., Kreitinger J. P., Lohehr R.C., Hawthorn, S.B., Luthy, R.G., Holman H.-Y. N., and A. Lapierre. Improving Risk Assessments for Manufactured Gas Plant Soils by Measuring PAH Availability. *Integrated Environmental Assessment and Management*. 1(3): 259–266, **2005**.
20. Asatiani N.V., Abuladze MK., Kartvelishvili T.M., Bakradze N.G., Sapojnikova N.A., Tsibakhashvili N.Y., Tabatadze L.V., Lejava L.V. Asanishvili L.L., Holman H.Y. Effect of Chromium(VI) action on *Arthrobacter oxydans*. [Article] *Current Microbiology*. 49(5):321-326, **2004**.
21. Tsibakhashvili N.Y., Mosulishvili L.M., Kalabegishvili T.L., Kirkesali E.I., Frontasyeva M.V., Pomyakushina E.V., Pavlov S.S., Holman H.-Y.N. ENAA studies of chromium uptake by *Arthrobacter oxydans*. *Journal of Radioanalytical & Nuclear Chemistry*. 259(3):527-531, **2004**.

22. Asatiani N., Sapojnikova N., Abuladze M., Kartvelishvili T.L., Kulikov, N., Kiziria E., Namchevadz, E., and H.-Y. N. Holman. "Effects of Cr(VI) long-term and low-dose action on mammalian antioxidant enzymes: An *in vitro* study". *J. Inorganic Biochemistry*, 98, 490-496, **2004**.
23. Kartvelishvili T, Abuladze M, Asatiani N, Akhvlediani J, Kiziria E, Asanishvili L, Lejava L, Holman H.-Y.N., Sapojnikova N. Estimation of the cellular antioxidant response to chromium action using ESR method. *ScientificWorldJournal*. Sep 2;4:785-794, **2004**.
24. Kartvelishvili T, Abuladze M, Asatiani N, Akhvlediani J, Asanishvili L, Holman H.-Y.N., Sapojnikova N. Antioxidant capacity of cultured mammalian cells estimated by ESR method. *ScientificWorldJournal*. Jun 29;4:490-499, **2004**.
25. Tsibakhashvili, N.Y., Mosulishvili, N.A., Kalabegishvili, T.L., Kirkesali, T.I., Frontasyeva, M.V., Pomyakushina, E.V., Pavlov, S.S., and H.-Y. N. Holman. "Epithermal neutron activation analysis (ENAA) studies of chromium uptake by *Arthrobacter oxydans*". *Journal of Radioanalytical and Nuclear Chemistry*, 259 (1/2), **2004**.
26. Holman, H.-Y. N., Martin, M.C. and W.R. McKinney. "Tracking chemical changes in a live cell: Biomedical Applications of SR-FTIR Spectromicroscopy", in *Special issue: First International Conference on Biomedical Spectroscopy: From Molecules to men*", *Spectroscopy - An International Journal*, 17(2-3), 139-160. **2003**.
27. Holman, H.-Y. N., Martin, M.C. and W. R. McKinney "Synchrotron-Based FTIR Spectromicroscopy: Cytotoxicity Considerations" *J. Biological Physics* 29, 275-286, **2003**.
28. Kalabegishvili, T.L, Tsibakhashvili, N.Y. and H.-Y. N. Holman. "Electron spin resonance study of chromium(V) formation and decomposition by basalt-inhabiting bacteria". *Environmental Science & Technology*, 37, 4678-4684, **2003**.
29. Bakradze, N., Sokhadze, V., Abuladze, M., Asatiani, N., Sapojnikova, N., Kartvelishvili, T.L., Tsibakhashvili, N.Y., Namchevazde, E., Tabatadze, L., Lejava, L., and H.-Y.N. Holman. "A Calorimetric Characterization of Cr(VI)-reducing *Arthrobacter oxydans* at different phases of the cell growth cycle". *TheScientificWorldJournal*, 3, 432-442, **2003**.
30. Holman, H.-Y. N., Bjornstad, K.A., McNamara, M.P., Martin, M.C., McKinney, W.R., and E.A. Blakely. "Synchrotron Infrared Spectromicroscopy as a Novel Bioanalytical Microprobe for Individual Living Cells: Cytotoxicity Considerations". Selected as an important article of Frontier Research and published by *Virtual Journal of Biological Physics Research* at <http://www.vjbio.org>. 8(1), **2002**.
31. Holman, H.-Y. N., Bjornstad, K.A., McNamara, M.P., Martin, M.C., McKinney, W.R., and E.A. Blakely. "Synchrotron Infrared Spectromicroscopy as a Novel Bioanalytical Microprobe for Individual Living Cells: Cytotoxicity Considerations". *J. of Biomedical Optics*, 7(3), 417-424, **2002**.
32. Holman, H.-Y. N., Nieman, K., Sorensen, D.L., Miller, C.D., Martin, M.C.; Borch, T., McKinney, W.R., and R.C. Sims. "Catalysis of PAH Biodegradation by Humic Acid Shown in Synchrotron Infrared Studies". *Environmental Science & Technology*, 36(6): 1276-1280, **2002**.
33. Holman, H.-Y. N., Bjornstad, K.A., McNamara, M.P., Martin, M.C., McKinney, W.R., and E.A. Blakely. "Synchrotron Infrared Spectromicroscopy as a Novel Bioanalytical Microprobe for Individual Living Cells: Cytotoxicity Considerations". *J. of Biomedical Optics*, 7(3), 417-424, **2002**.
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39. Holman, H.-Y. N., Martin, M.C., Blakely, E.A., Bjornstad, K., and W.R. McKinney. "Infrared spectroscopic characteristics of cell cycle and cell death probed by synchrotron-based FTIR spectromicroscopy," *Biopolymers: Biospectroscopy*, 57[6], 329-335, **2000**.
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42. Holman, H.-Y. N., Perry, D.L., Martin, M.C., Geraldine Lambie, W.R. McKinney, and J.C. Hunter-Cevera. "Real-time Characterization of Biogeochemical Reduction of Cr(VI) on Basalt Surfaces by SR-FTIR Imaging," *Geomicrobiology J.*, 16(4), 307-323. **1999**.
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45. Holman, H.-Y. N., Perry, D.L., and J.C. Hunter-Cevera. Surface-enhanced infrared absorption-reflectance (SEIRA) microspectroscopy – a chemical/biological probe for bacteria localization in geologic materials. *J. Microbiol. Methods*, 34/1, 59-71, **1998**.
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48. Holman, H.-Y. N., and Y.W. Tsang. Effects of soil moisture on biodegradation of petroleum hydrocarbons. In: *In situ aeration: air sparging, bioventing and related remediation processes*, Battelle Press, Richland. 323-332, **1995**.
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