Reginald M. Penner, Ph.D.

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Contents

Page

A General Information **2**
- A.1 Personal . . . 2
- A.2 Academic History . . . 2
- A.3 Professional Appointments . . . 2
- A.4 Awards . . . 2
- A.5 Professional Affiliations . . . 3
- A.6 Research Interests . . . 3

B Scholarly Activity **4**
- B.1 Publications . . . 4
  - B.1.1 At the University of California, Irvine . . . 4
  - B.1.2 At the California Institute of Technology . . . 16
  - B.1.3 At Texas A&M University . . . 17
- B.2 Patents . . . 17
- B.3 Invited Presentations & Seminars . . . 18
  - B.3.1 At scientific meetings. . . . 18
  - B.3.2 At universities, Institutes, and Companies . . . 26

C Teaching **31**

D Service **32**
- D.1 Professional Service . . . 32
- D.2 Editorial Responsibilities . . . 33
- D.3 Scientific Advisory Boards . . . 34
- D.4 University and Departmental Service . . . 34

E Extramural Funding **35**

F Students Supervised **39**
- F.1 Graduate Students . . . 39
- F.2 Postdoctoral Scholars . . . 43

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A. General Information

A.1. Personal

1. Date of birth: February 5, 1960.
2. Citizenships: USA and Canada.
3. Personal Address: 1607 Mariners Drive
   Newport Beach, CA 92660-4417
4. Business Address: Department of Chemistry
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   URL: http://chem.ps.uci.edu/~rmpenner/PennerGroup.html

A.2. Academic History

1. Gustavus Adolphus College, Saint Peter, Minnesota, 1978-1983
   B.A. Chemistry, Biology, 1983.
2. Texas A&M University, 1983-1987.
   Ph.D. Chemistry, 1987, Thesis Advisor: Charles R. Martin.
3. Stanford University, 1987-1988. California Institute of Technology, 1988-1990.
   Postdoctoral Advisor: Nathan S. Lewis.

A.3. Professional Appointments

1. Distinguished Professor, Emeritus, University of California, Irvine, 2024-present.
2. Assoc. Dean for Research & Innovation, University of California, Irvine, 2020-2024.
3. Distinguished Professor, University of California, Irvine, 2018-2024.
4. Chancellor's Professor, University of California, Irvine, 2011-2018.
5. Chairman, Department of Chemistry, University of California, Irvine, 2013-2016.
6. Director, UCI School of Physical Sciences Center for Solar Energy, 2008-2014.
7. Director, Institute for Surface and Interface Science (ISIS), 2005-2008.
8. Professor, University of California, Irvine, 1998-2011.
9. Associate Professor, University of California, Irvine, 1995-1998.
10. Assistant Professor, University of California, Irvine, 1990-1995.
11. Postdoctoral Fellow, California Institute of Technology, 1988-1990.
12. Postdoctoral Fellow, Stanford University, 1987-1988.
13. Research/Teaching Assistant, Texas A&M University, 1983-1987.

A.4. Awards

2018 *Distinguished Alumni Citation in Chemistry*, Gustavus Adolphus College Alumni Assoc.
2018 Appointed Distinguished Professor, University of California, Irvine.
2016 *Charles N. Reilley Award* presented by the Society for Electroanalytical Chemistry (SEAC).
2016 *ACS Division of Analytical Chemistry Award in Electrochemistry.*
2011 Appointed Chancellor's Professor, University of California, Irvine.
2007 Elected Fellow, American Association for the Advancement of Science (AAAS).
2009 *Faraday Medal*, Royal Society of Chemistry of the UK, Electrochemistry Group.
2004 *National Science Foundation Award for Special Creativity.*
2000 *Hellmuth Fischer Medal*, 8th International Fischer Symposium, Karlsrühe Germany.
sponsored by DECHEMA.

1995 *Camille Dreyfus Teacher-Scholar.*
1995 UCI School of Physical Sciences Award for Outstanding Contributions to Undergraduate Education.
1995 *Alfred P. Sloan Foundation Fellow.*
1993 Arnold and Mabel Beckman Foundation, *Beckman Young Investigator Award*.
1993 Office of Naval Research, *ONR Young Investigator Award.*
1992 National Science Foundation, *NSF Young Investigator Award*.
1991 Procter & Gamble, *University Exploratory Research Program Award*.
1985 *Dow Fellow*, Texas A&M University.
1986 *Distinguished Graduate Student Research Award*, Texas A&M University.

A.5. Professional Affiliations

1. American Chemical Society, 1983.
2. Electrochemical Society, 1986.
3. Materials Research Society, 1997.

A.6. Research Interests

My research focuses on the development of new synthetic methods for preparing nanomaterials that have unique and useful properties for chemical sensing, photonics, energy storage, and bio- and gas sensing. The emphasis is on electronic materials including metals, metal oxides, semiconductors, thermoelectric materials, and electronically conductive polymers. I am, first and foremost, an electrochemist and electrodeposition is the starting point for all the synthetic methods we develop. This means that nanostructure "synthesis" begins on a conductive electrode surface (composed of graphite or silicon) from precursors (metal ions, organic monomers, etc.) present in a contacting liquid phase. Additional processing steps that do not involve electrochemistry are also sometimes employed to obtain compounds of interest. I have termed this "Electrochemical/Chemical" synthesis. The rigorous structural characterization of the nanomaterials we prepare consumes a large fraction of our day-to-day research effort and routinely involves six methods (TEM, SAED, SEM, EDX, XPS, and powder XRD).

Many projects in the group proceed sequentially through three phases: Phase 1: synthesis and structural characterization of a nanomaterial, Phase 2: measurement of one or more "functional" fundamental, properties that may be optical, electronic, thermal, magnetic, etc., and, Phase 3: evaluation of performance in a prototype device that exploits the properties probed in Phase 2. While breakthroughs can happen in Phases 1 and 2, I believe that the most important discoveries in chemical sensing and in other applications will involve proceeding all the way to Phase 3. The reason is that the behavior of a particular nanomaterial in a particular application or device can not be predicted based on its structure, morphology, and chemical composition. Consequently, I target nanomaterials that are likely to exhibit useful behavior, and stay alert for surprises. I am interested in how the composition and structure of a nanomaterial produces the properties that make it useful, and I am willing to devote time and effort to the elucidation of this structure-property relationship. My central premise is that nanomaterials with unique attributes, and over which we have direct synthetic control, will lead to breakthroughs in chemical sensing, biosensing, energy storage, nanophotonics, and other applications.

The six objectives of our research program are the following:

1. Identify and understand the processes that lead to size dispersion in the electrochemical growth of nanostructures such as nanoparticles and nanowires.
2. Devise electrochemical methods for circumventing these processes; methods that enable the electrodeposition of "size monodisperse" nanometer-scale structures.
3. Synthesize nanostructures composed of compounds possessing desirable and technologically useful electronic properties. The family of methods we are developing for this purpose are called "Electrochemical/Chemical Methods". Materials of current interest include semiconductors (e.g., MoS_2, CdS), thermoelectrics (Bi_2Te_3), and electronically conductive polymers (e.g. polythiophene).

4. Discover new strategies for enforcing a two-dimensional organization on the electrodeposition of nanostructures on flat electrode surfaces.
5. Measure and understand the size-dependant physical and chemical properties of nanostructures including the conductivity, electro- and photoluminescence, thermoelectricity, magnetoresistance, and chemical reactivity.
6. Exploit the unique properties of these nanostructures in chemical sensors and other types of devices in new and interesting ways.

B. Scholarly Activity

B.1. Publications

Google Scholar H-Index = **81 (December 12, 2024), total citations > 24,000.**
Links to online versions of papers available at: http://www.chem.uci.edu/~rmpenner/pubs.html.

B.1.1. At the University of California, Irvine

196. Peresi Majura Bulemo, Dong-Ha Kim, Hamin Shin, Hee-Jin Cho, Won-Tae Koo, Seon-Jin Choi, Chungseong Park, Jaewan Ahn, Reginald M. Penner, and Il-Doo Kim*, Selectivity in Chemiresistive Gas Sensors: Strategies and Challenges, Chemical Reviews (2024) submitted.
DOI: n.a.

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Energy Materials, (2021) 46542-6552.
DOI: 10.1021/acsaem.1c00580

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DOI: 10.1021/acs.analchem.0c04476

187. Erica S. Forzani, Huixin He, Josh Hihath, Stuart Lindsay, Reginald M. Penner,* Shaopeng Wang, and Bingqian Xu, Moving Electrons Purposefully through Single Molecules and Nanostructures: A Tribute to the Science of Prof. Nongjian Tao (1963 - 2020), ACS Nano (2020) 14, 12291 - 12312.
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DOI: 10.1021/acssensors.8b00714

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170. Mya Le Thai, Shaopeng Qiao, Rajen K. Dutta, Gaurav Jha, Alana Ogata, Girija Thesma Chandran, and Reginald M. Penner*, "Collateral Advantages of a Gel Electrolyte for MnO_2 Nanowire Capacitors:

Higher Voltage; Reduced Volume", ACS Energy Letters 2 (2017) 1162.
DOI:10.1021/acsenergylett.7b00172.

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DOI: 10.1021/acs.jpcc.7b00258.

168. Beatriz Pelaz, Christoph Alexiou, Ramon A. Alvarez Puebla, Frauke Alves, Anne M. Andrews, et al., "Diverse Applications of Nanomedicine," ACS Nano 11 (2017) 2313.
DOI: 10.1021/acs.analchem.6b04840.

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166. Alana Ogata, Joshua Edgar, Sudipta Majumdar, Shae Petterson, Jeffrey Briggs, Ming Tan, Stephan T. Kudlacek, Christine Schneider, Gregory A. Weiss* and Reginald M. Penner*, "A Virus-Enabled Biosensor For Human Serum Albumin," Analytical Chemistry 89 (2017) 1373.
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DOI: 10.1021/acsnano.6b02404

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149. Kritika Mohan, Keith C. Donavan, Jessica A. Arter, Reginald M. Penner*, and Gregory A. Weiss*, "Sub-nanomolar Detection of Prostate Specific Membrane Antigen in Synthetic Urine by Synergistic, Dual Ligand Phage", J. Am. Chem. Soc. 135 (2013) 7761.

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14. N.S. Lewis, M.J. Heben, A. Kumar, S.R. Lunt, G.E. McMannis, G.M. Miskelly, R.M. Penner, M.J. Sailor, P.G. Santangelo, G. Shreve, B.J. Tufts, M. Youngquist, C.A. Barnes, R.W. Kavanagh, S.E. Kellog, R.B. Vogelaar, T.R. Wang, R. Kondrat, and R. New, "Searches For Low Temperature Nuclear Fusion of Deuterium in Palladium", Nature 340 (1989) 525.

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12. R.M. Penner, M.J. Heben, and N.S. Lewis*, "Preparation and Electrochemical Characterization of Conical and Hemispherical Ultramicroelectrodes", Anal. Chem. 61 (1989) 1630.

11. M.J. Heben, M.M. Dovek, N.S. Lewis, R.M.Penner, and C.F. Quate*, "Preparation of STM Tips for *In-Situ* Characterization of Electrode Surfaces", J. Micros. 152 (1988) 651.

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B.1.3. At Texas A&M University

9. R.M. Penner, L.S. Van Dyke, and C.R. Martin*, "Electrochemical Evaluation of Charge Transfer Rates in Electronically Conductive Polymers", Sol. State Ionics 32 (1989) 553.

8. R.M. Penner and C.R. Martin*, "Electrochemical Investigations of Electronically Conductive Polymers. II. Evaluation of Charge Transport Rates of Polypyrrole Using an AC Impedance Method", J. Phys. Chem. 93 (1989) 984.

7. R.M. Penner, L.V. Van Dyke, and C.R. Martin*, "Electrochemical Investigations of Electronically Conductive Polymers. I. Evaluation of Charge Transport Rates In Polypyrrole Films Using a Current-Pulse Electrochemical Experiment", J. Phys. Chem. 92 (1988) 5274.

6. R.M. Penner and C.R. Martin*, "Preparation and Electrochemical Characterization of Ultramicroelectrodes Ensembles", Anal. Chem. 59 (1987) 2625.

5. C.R. Martin* and R.M. Penner, "New Ultramicroelectrode Arrays", in Ultramicroelectrodes, M. Fleischmann, S. Pons, D. Rolison, and P. Schmidt, Eds., Data Tech Systems Inc., Morganton NC, 1987.

4. R.M. Penner and C.R. Martin*, "Controlling the Morphology of Electronically Conductive Polymers", J. Electrochem. Soc. 133 (1987) 2206.

3. M.W. Espenscheid, A.R. Ghatak-Roy, R.B. Moore, R.M. Penner, M.N. Szentirmay, and C.R. Martin*, "Sensors From Polymer-Modified Electrodes", J. Chem. Soc., Faraday Trans. I 82 (1986) 1051.

2. R.M. Penner and C.R. Martin, "Electronically Conductive Composite Polymer Membranes," J. Electrochem. Soc. 133 (1986) 310.

1. R.M. Penner and C.R. Martin*, "Ion Transporting Composite Membranes. I. Nafion Impregnated Goretex," J. Electrochem. Soc. 132 (1985) 514.

B.2. Patents

13. "Impedance Transduced Virus Bioresistor." Reginald M. Penner, Alana F. Ogata, Apurva Bhasin, Gregory Weiss, Phillip Tam, Jeffrey Scott Briggs (filed March 29, 2018).
United States Provisional Application Number 62/650,059.
Assignee: The Regents of the University of California (Oakland, CA).

12. "Systems and Methods for Electrodepositing Manganese Oxide with Improved Rate Capabilities for Electrical Energy Storage." Chandran, G., and Penner, R.M. (filed March 23, 2018).
United States Patent US10818917. Publication date: Oct. 27, 2020.
Assignee: The Regents of the University of California (Oakland, CA).

11. "Nanowire Based Hydrogen Sensors"
Won-Tae Koo, Il-Doo Kim, Penner, R.M. (filed September 12, 2017).
United States Provisional Patent US16791159, Publication date: August 13, 2020
Assignee: The Regents of the University of California (Oakland, CA).

10. "Hydrogen Gas Sensors Based Upon Carbon Nanotube Ropes."
Li, X., Penner, R.M. (filed Jan. 23, 2018).
United States Patent US11231381, Publication date: Jan. 25, 2022.
Assignee: The Regents of the University of California (Oakland, CA).

9. "Enhanced Cycle Lifetime with Gel Electrolyte for MnO_2 Nanowire Capacitors." Thai, M.L., Penner, R.M. (filed Nov. 23, 2017).

United States Application Number US16426407, Publication date: May 14, 2014.
Assignee: The Regents of the University of California (Oakland, CA).

8. "Phage wrapping." Weiss, G.A., Mohan, K., Kindra, L., Penner, R.M. (filed Feb. 25, 2015).
United States Patent US11,16,8306. Publication date: Nov. 9, 2021.
Assignee: The Regents of the University of California (Oakland, CA).

7. "Electrically conductive polymer nanowires with incorporated viruses", G.A. Weiss, R.M. Penner, J.A. Arter, D.K. Taggart, K.C. Donavan, United States Patent Nos. 8,525,237 B1 granted Sept 3, 2013, and 9,062,353 granted Aug. 23, 2017. Assignee: The Regents of the University of California (Oakland, CA).

6. "Hydrogen gas detection using single palladium nanowires", F. Yang, R.M. Penner, United States Patent US8499612, filed April 23, 2010, granted Aug. 6, 2013, Assignee: The Regents of the University of California (Oakland, CA).

5. "Method and apparatus for target detection using electrode-bound viruses", G.A. Weiss, R.M. Penner, P.Y. Tam, L-M. Yang, T. Brigham, United States Patents No. 8,513,001 and US9316608 B2, filed March 9, 2007 and July 12, 2013, granted Aug. 20, 2013 and April 19, 2016, respectively. Assignee: The Regents of the University of California (Oakland, CA).

4. "Hydrogen gas sensor", R.M. Penner, E. Walter, F. Favier, United States Patent US7628959 and US7186381 B2 filed March 6, 2007 and Dec 8, 2009, respectively, Assignee: The Regents of the University of California (Oakland, CA).

3. "Lithographically patterned nanowire electrodeposition", R.M. Penner, E.J. Menke, M.A. Thompson, C. Xiang, United States Patent US8142984 filed August 21, 2007, granted March 27, 2012, Assignee: The Regents of the University of California (Oakland, CA).

2. "Methods for Fabricating Metal Nanowires", M.P. Zach, F. Favier, R.M. Penner, United States Patent US6843902 US7220346, and 8070930, filed Oct. 12, 2001, June 3, 2004, and April 20, 2007, respectively, granted January 18, 2005, May 22, 2007, Dec. 6, 20011, respectively, Assignee: The Regents of the University of California (Oakland, CA).

1. "Ultramicroelectrode Ensembles", C.R. Martin and R.M. Penner, United States Patent US5174883, Filed Sept. 2, 1988, Granted December 29, 1992, Assignee: The Dow Chemical Company (Midland, MI).

B.3. Invited Presentations & Seminars

B.3.1. At scientific meetings.

176. Gordon Research Conference on Electrochemistry, Ventura, CA, September 11, 2022.

175. NanoKorea 2022, Symposium on "Hybrid Nanomaterials for Next Generation Convergence Science and Technology", Kintex, Korea, July 6, 2022 (Remote).

174. PacifiChem 2021, Symposium on Electrochemical Energy Storage, December 20, 2021 (Remote).

173. PacifiChem 2021, Symposium on Extreme Biosensing, December 18, 2021 (Remote).

172. KAIST Emerging Materials 2021, Nov. 17, 2021 (Remote).

171. The Korean BioChip Meeting, Global Networking Session, Nov. 17, 2021 (Remote).

170. 239th Meeting of The Electrochemical Society, Chicago, IL, May 30, 2021 (Remote).

169. IEEE NEMS 2020, San Diego, September 27, 2020. (Remote)

168. Fall 236th Electrochemical Society Meeting, Symposium on Current Trends in Electrodeposition, Atlanta, GA, October 16, 2019.

167. Keynote Lecture, Symposium on 2D Materials: Innovative Materials and Devices for Energy and Fuel, 258th American Chemical Society Meeting, San Diego, CA, August 24, 2019.

166. UCI Chief Executive Roundtable, Aspen, CO, April 27, 2019.

165. Extreme Biosensing 2018, Lihue, HI, December 11, 2018.

164. Extreme Biosensing 2018, KAIST, Korea, September 6, 2018.

163. 2018 UC Mesoscale Materials Summer School, UC Irvine, August 10, 2018

162. Keynote Lecture, International Society of Electrochemistry (ISE), 24th Topical Meeting: Electrochemical Assembly at the Meso, Nano and Molecular Scale, Meridan, Mexico, April 7, 2018.

161. Energy Materials Research Symposium, of the Keck Energy Materials Research Program (KEMP), September 15, 2017.

160. Potter's Lodge Meeting #7. Blue Mountain Lake, New York. September 7, 2017.

159. XII ECHEMS international meeting, Milano Marittima, Italy, July 7, 2017.

158. 231st Meeting of The Electrochemical Society, New Orleans, LA, May 30, 2017.

157. UC Irvine - Tel Aviv University, Conference on Functional and Nano-Materials 2025, UC Irvine, August 16, 2016.

156. 252th ACS National Meeting, Division of Analytical Chemistry Awards Symposium, Philadelphia, PA, August 23, 2016.

155. 230th Meeting of The Electrochemical Society,, San Diego, June 29, 2016.

154. PittCon 2016, SEAC Biosensing Symposium, Atlanta, March 10, 2016.

153. PittCon 2016, C.N. Reilly Award Symposium, Atlanta, March 7, 2016.

152. NanoBioTech 2015, Kona, Hawaii, December 11, 2015.

151. Potter's Lodge Meeting #6. Blue Mountain Lake, New York. September 9, 2015.

150. 250th ACS National Meeting, Nanoscience Symposium of the Inorganic Division, Boston, August 18, 2015.

149. 2nd International Conference and 4th International Macro-Nano Symposium on the Challenges and Perspectives of Functional Nanostructures, Ilmenau, Germany, July 30, 2015.

148. 13th International Fischer Symposium, Lübeck, Germany, June 7, 2015.

147. 227th Meeting of the Electrochemical Society, Chicago, May 24, 2015.

146. 4th Zing Conference on Electrochemistry, Carvoeiro, Portugal, April 19, 2015.

145. ACS Nano Editors Symposium, UCLA, August 8, 2014.

144. Gordon Research Conference on Electrodeposition, University of New England, Biddeford, ME, July 31, 2014.

143. Telluride workshop on Battery Materials, Telluride Sciences Research Center (TSRC), Telluride, CO, July 14, 2014.

142. 247th ACS National Meeting, Symposium on Energy from ACS Nano Associate Editors, Dallas, March 17, 2014.

141. SPIE Optics and Photonics, Symposium on "Nanoepitaxy: Materials and Devices V", San Diego, August 25, 2013.

140. Plenary Lecture, 13th Topical Meeting of the International Society of Electrochemistry (ISE) on Advances in Electrochemical Materials and Manufacturing, Pretoria, South Africa, April 10, 2013.

139. 68th Southwest Regional Meeting of the ACS. Baton Rouge, LA November 4, 2012.

138. UKC 2012 - U.S.- Korea Joint Conference 2012, Anaheim, CA, August 12, 2012.

137. XXIII Congresso Nazionale della Divisione di Chimica Analytica, The Island of Elba, Italy, Sept. 20, 2012.

136. Science for our Nation's Energy Future: Energy Frontier Research Center Summit & Forum, Washington D.C. May 26, 2011.

135. Symposium on: "Nanotechnology for Infectious Disease", PittCon 2011, Atlanta, GA, March 16, 2011.

134. Third Annual Workshop on Electrochemistry, University of Texas, Austin, February 19, 2011.

133. Surface Canada, Simon Fraser University, Burnaby, B.C. Canada, May 14, 2011.

132. Symposium on: "Bioelectronics, Biointerfaces, and Biomedical Applications", 219th Electrochemical Society National Meeting, Montreal, Canada, May 2, 2011.

131. Symposium on: "Electrodeposition for Energy Applications", 219th Electrochemical Society National Meeting, Montreal, Canada, May 2, 2011.

130. American Chemical Society, Orange County Section, Costa Mesa, CA, January 20, 2011.

129. Symposium on: "Applications of Nanomaterials in Chemical Sensing and Energy Conversion" FACSS 2010, Raleigh, NC, Oct. 19, 2010.

128. Symposium on: "Molecular Structure of the Solid-Liquid Interface and Its Relationship to Electrodeposition", 218th Electrochemical Society National Meeting, Las Vegas, NV, Oct. 14, 2010.

127. Plenary Lecture, XXII Congress of the Italian Division of Analytical Chemistry, Como, Italy, Sept. 14, 2010.

126. Gordon Research Conference on Electrodeposition, New London, NH, Aug. 1, 2010.

125. Gordon Research Conference on Bioanalytical Sensors, New London, NH, June 22, 2010.

124. Symposium on "Multifunction at the Nanoscale through Nanowires" Materials Research Society, Boston, November 30, 2009.

123. Electrochem09, Faraday Award Lecture, Manchester, England, September 16, 2009.

122. International Society of Electrochemistry, 2009, Keynote Lecture, Symposium on "Electrodeposition for Nanoelectronic Applications", Beijing, China, August 16, 2009.

121. E-MRS 2009, Symposium on "Bio & Chem sensors and transducers: from materials to systems". Strasbourg, France, June 8, 2009.

120. Surface Analysis 2009, Santa Cruz, CA, April 22, 2009.

119. PittCon 2009, Chicago, IL, March 8, 2009.

118. International Colloquium on Environmentally Preferred Advanced Power Generation (ICEPAG) 2009, Newport Beach, CA, Feb.11, 2009.

117. Gordon Research Conference on Chemical Reactions at Surfaces, Ventura, CA, Feb. 3, 2009.

116. Extreme Biosensing 2008, Makena, Maui, Dec. 11, 2008.

115. Symposium on: "Electrochemistry Enabled Nano S&T" Chemical Society of Canada Spring 2008, Edmonton, Alberta, Canada, May 24, 2008.

114. Symposium on: "Electrochemistry Enabled Nano S&T" ACS Spring 2008, New Orleans, LA April 6, 2008.

113. Symposium on: "Nanowire Sensors and Diagnostics" LabAutomation 2008, Palm Springs, CA January 28, 2008.

112. Symposium on: "Nanowires: From Synthesis to Application", Center for Integrated Nanotechnologies (CINT) Users Workshop 2008, Albuquerque, New Mexico January 9, 2008.

111. Keynote Lecture, 3rd Annual Minnesota Nanotechnology Conference, Saint Paul, Minnnesota, November 14, 2007.

110. Keynote Lecture, Doktorandenkolloquium des Sfb 448, Linstow, Germany, October 12, 2007.

109. Symposium on "Chemical and Electrochemical Synthesis of Advanced Materials and Nanostructures on Solid Surfaces: Growth Mechanisms, Characterizations and Applications (CESAM)", European Materials Research Society (E-MRS), Warsaw, Poland, September 17-20, 2007.

108. Potter's Lodge Meeting #5. Blue Mountain Lake, New York. September 5-9 2007.

107. European Workshop on Electron Interactions in Ultra 1D Nanostructures, Nice France, May 15-18, 2007.

106. UCI Chief Executive Roundtable, La Jolla, CA, May 4, 2007.

105. Symposium on "Nanoconductors and Chemical Sensing", PittCon 2007, Chicago, IL, February 26, 2007.

104. Symposium on "Detection of Terrorist Weapons: Biological Weapons", PittCon 2007, Chicago, IL, February 28, 2007.

103. Symposium on "Electrochemical Surface Science: Recent Advances in the Study of The Electrode-Electrolyte Interface", 201th International Meeting of the Electrochemical Society, Cancun, Mexico Oct. 30, 2006.

102. Symposium on "Dielectrics and the Dielectric-Electrolyte Interface in Biological and Biomedical Applications", 201th International Meeting of the Electrochemical Society, Cancun, Mexico Oct. 30, 2006.

101. Gordon Research Conference on Electrodeposition, New London, New Hampshire, August 2, 2006.

100. Keynote lecture. Center of Excellence on Sustainable Energy System, University of Kyoto, Japan, August, 30, 2006.

99. American Association of Crystal Growth (AACG) Meeting: 20th Conference on Crystal Growth and Epitaxy, Fallen Leaf Lake, CA, June 6, 2006.

98. Session on "NanoMaterials for Revolutionary Innovations of Broad Impact", 2006 NanoMaterials for Defense Applications Symposium, Virginia Beach, VA, May 4, 2006.

97. Plenary Lecture, Incontro de Specttroscopia Analytica (ISA 2006), Giovinazzo, Italy, April 11, 2006.

96. Symposium on "Nanowires", Joint Meeting of the European Physics Society and the German Physics Society, Dresden, Germany, March 29, 2006.

95. Symposium on "Surface and Interfaces in Electronic Materials", 2006 APS March Meeting, Baltimore, MD, March 16, 2006.

94. Symposium on "Low-Dimensional Materials in Chemical Analysis", ACS Western Regional Meeting, Anaheim, CA, January 23, 2006.

93. Symposium on "Nanoparticles and Nanostructures in Sensors and Catalysis", Fall 2005 Materials Research Society National Meeting, Nov. 29, 2005.

92. SCS 2005 (Fall Meeting of the Swiss Chemical Society), Lausanne, Switzerland, Oct. 13, 2005.

91. ElectroChem 2005, Plenary lecture, Newcastle Upon Tyne, England, Sept. 5, 2005.

90. Gordon Research Conference on Chemical Sensors and Interfacial Design, Oxford, England, August 30, 2005.

89. SPIE Optics and Photonics 2005, San Diego, CA, August 4, 2005.

88. Gordon Research Conference on Analytical Chemistry, Roscoff, France, June 15, 2005.

87. Symposium on: "Charge Transer at Interfaces", 229th ACS National Meeting, San Diego, CA, March 15, 2005.

86. Gordon Research Conference on Electrochemistry, Ventura, CA, February 25, 2005.

85. Dedication of the Nanoscience Center, University of Jyväskyla, Jyväskyla , Finland, Oct. 16, 2004.

84. Los Angeles Area Nanowire Network (LANN), UCLA, Los Angeles, July 23, 2004.

83. Symposium on: "Inorganic Nanomaterials Syntheses", 227th ACS National Meeting, Anaheim, CA, March 30, 2004.

82. Materials and Modeling for Information Technology, Louisiana State University, Baton Rouge, LA, February 20, 2004.

81. NanoBioTech 2004, Kona, Hawaii, January 18, 2004.

80. Symposium M "Nontraditional Approaches to Patterning", Fall 2003 Materials Research Society National Meeting, Boston, Dec. 2, 2003.

79. Symposium on "Soft Solution Processing", 8th IUMRS Conference on Advanced Materials. Oct. 12, 2004, Yokohama, Japan.

78. Symposium on "New Electroanalytical and Surface Methods" 38th ACS Western Regional Meeting, Long Beach, CA, Oct. 18, 2003.

77. Symposium on "Nanomaterials and Applications" 38th ACS Western Regional Meeting, Long Beach, CA, Oct. 17, 2003.

76. Potter's Lodge Meeting #3, Blue Mountain Lake, New York, Sept. 5, 2003.

75. Fischer Symposium on Electrodeposition, TU Münich, Germany, July 21, 2003.

74. Symposium Q "Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage, and Sensing", Spring 2003 Materials Research Society National Meeting, San Francisco, April 29, 2003.

73. Symposium on: "Electrochemistry with and of Nanostructured Materials", PittCon 2003, Orlando, Florida, March 12, 2003.

72. First University of California Symposium on Surface Science and its Applications, University of California, Riverside, February 14, 2003.

71. Symposium on "Three-Dimensional Nanoengineered Assemblies", Fall 2002 Materials Research Society National Meeting, Boston, Dec. 2, 2002.

70. Symposium on "Electrochemistry at Nanoscale Dimensions", 202nd Electrochemical Society National Meeting, Salt Lake City, Oct. 20, 2002.

69. Symposium on: "Ordered Molecular Assemblies of Nanoparticles", 224th ACS National Meeting, Boston, August 22, 2002.

68. Gordon Conference on Electrodeposition, New London, NH, Aug. 15, 2002.

67. Conference on: "Physical Chemistry of Interfaces and Nanomaterials", 47th Annual SPIE Meeting, Seattle, July 7, 2002.

66. Symposium on: "Advances in Hydrogen Energy", 224th ACS National Meeting, Boston, August 23, 2002.

65. Keynote Lecture, 53rd Annual Meeting of the International Society of Electrochemistry, Düsseldorf, Germany September 20, 2002.

64. Symposium on Chemical and Biological Sensors, 2002 Materials Research Society Spring Meeting, San Fransisco, CA, April 6, 2002.

63. Symposium on: "Design and Characteriation of Nanostructured Materials" 222th ACS National Meeting, Chicago, August 26, 2001.

62. Gordon Conference on Analytical Chemistry, New London, CT, June 23, 2001.

61. Symposium on Surface Chemistry in Honor of Hajo Freund, UCI, June 14, 2001.

60. Symposium on: "Nanoelectrochemistry", 221st ACS national Meeting, San Diego, May 1, 2001.

59. Symposium on: "Nanoparticle Synthesis, Properties and Applications", Spring 2000 MRS Meeting, San Francisco, April 18, 2001.

58. Symposium on: "Surface Processes", 199th National Meeting of the Electrochemical Society, Washington, D.C., March 28, 2001.

57. Symposium on: "Electrodeposition of Nanoscale and Nanophase Materials II", 199th National Meeting of the Electrochemical Society, Washington, D.C., March 26, 2001.

56. Symposium on: "Nanoscale Electroanalytical Chemistry", PittCon 2000, New Orleans, March 5, 2001.

55. 8th International Fischer Symposium, Karlsruhe, Germany, June 19, 2000.

54. Symposium on Nanoscale Electrochemistry, ACS National Meeting, San Fransisco, March 26, 2000.

53. Symposium on Nanomaterials in Electroanalytical Chemistry, PittCon 2000, New Orleans, March 13, 2000.

52. AVS 46th International Symposium, Seattle, Oct. 26, 1999.

51. 1999 Joint International Meeting of The Electrochemical Society, Honolulu, October 21, 1999.

50. 1999 Joint International Meeting of The Electrochemical Society, Honolulu, October 19, 1999.

49. NSF Division of Materials Chemistry, Workshop on Solid State Chemistry, University of Southern California, Los Angeles, June 14, 1999.

48. Symposium on The Electrochemical Synthesis of Nanomaterials, Fall 1998 ACS Meeting, Anaheim, March 23, 1999.

47. Gordon Conference on Electrochemistry, Doubletree Hotel, Ventura, CA., January 18, 1999.

46. DARPA Workshop: 'The μ-Electrochemical Foundry", Arlington, VA., December 9, 1998.

45. Symposium on Microcrystalline and Nanocrystalline Semiconductors, Fall 1998 MRS Meeting, November 30, 1998.

44. Symposium on Nanoscale and Patterned Assemblies, ACS National Meeting, Las Vegas, Sept. 7, 1997.

43. Plenary Lecturer, International Society of Electrochemistry/Electrochemical Society (ISE/ECS) International Meeting, Paris, France, Sept. 3, 1997.

42. Plenary Lecturer, Fischer Symposium on Electrodeposition, University of Karlsruhe, Karlsruhe, Germany, June 15, 1997.

41. Plenary Lecturer, NSF Division of Materials Chemistry, Workshop on Solid State Chemistry University of Southern California, Los Angeles, June 11, 1997.

40. Symposium on NSOM and Optical SPM in Chemistry, QELS '97, Baltimore, MD., May 18, 1997.

39. Symposium on the "Chemistry of Photoluminescent and Electroluminescent Polymers and Semiconductors", ACS National Meeting, San Fransisco, CA., April 13, 1997.

38. Symposium on Electrochemistry at Truly Nanoscopic Electrodes, PittCon '97, Atlanta, GE., March 19, 1997.

37. Symposium on the Characterization & Modification of Surfaces, ACS Midwest Regional Meeting, Souix Falls, S.D., Nov. 8, 1996.

36. Plenary Lecturer, Swiss National Science Foundation Workshop on Nanosciences, Hasliberg, Switzerland, Oct. 16, 1996.

35. Potter's Lodge Meeting #1, Blue Mountain Lake, New York, Sept. 7, 1996.

34. ECS National Meeting, Spring 1996, Los Angeles, May 9, 1996.

33. ECS National Meeting, Spring 1996, Los Angeles, May 7, 1996.

32. ECS National Meeting, Fall 1995, Chicago, October 12, 1995.

31. ECS National Meeting, Fall 1995, Chicago, October 11, 1995.

30. ACS National Meeting, Fall 1995, Chicago, August 24, 1995.

29. ACS National Meeting, Fall 1995, Chicago, August 21, 1995.

28. ACS National Meeting, Spring 1995, Anaheim, April 6, 1995.

27. PittCon '95, New Orleans, March 9, 1995.
26. Southern California Microscopy Society, Irvine, February 16, 1995.
25. Read Conference (on Electrodeposition), University Park, PA, June, 1994.
24. ECS National Meeting, Spring 1994, San Francisco, CA, May, 1994.
23. Microscopy Society of America, San Bernadino, CA April 8, 1994.
22. Symposium on "Photochemical & Electrochemical Surface Science: Advances in Interfacial Chemistry, Physics and Biology with Scanning Probe Microscopes", ACS National Meeting, Spring 1994, San Diego, CA, March 1994.
21. Gordon Conference on Electrodeposition, Ventura, CA, January 20, 1994.
20. NATO Advanced Study Institute, "NanoScale Probes of the Solid-Liquid Interface", Nice, France, July 19, 1993.
19. Scanning Microscopy International Meeting, Los Angeles, May 13, 1993.
18. ACS National Meeting, Spring 1993, Denver, April 1, 1993.
17. SWAP '93, Riverside, January 23, 1993.
16. SPIE '93, Los Angeles, January 19, 1993.
15. Fall ACS National Meeting, Washington D.C., August 22, 1992.
14. 1992 Rocky Mountain Conference, Denver, August 3, 1992.
13. 52nd Annual Conference on Physical Electronics, University of California, Irvine, June 23, 1992.
12. Beckman Laser Institute, University of California, Irvine, May 28, 1992.
11. Procter & Gamble, Miami Valley Laboratories, Cincinnati, April 16, 1992.
10. Spring ACS National Meeting, Spring 1992, San Francisco, April 6, 1992.
9. SPIE '92, Los Angeles, January 22, 1992.
8. American Vacuum Society, 38th National Symposium, Seattle, November 11, 1991.
7. FACSS/Pacific Conference 27th Western Regional ACS Meeting, Anaheim, October 6, 1991.
6. 1991 Rocky Mountain Conference, Denver, July 29, 1991.
5. ACS National Meeting, Spring 1991, Atlanta, April 16, 1991.
4. Procter & Gamble, Miami Valley Laboratories, Cincinnati, March 24, 1991.
3. 1991 Pittsburgh Conference, Chicago, March 5, 1991.
2. Chemistry at Surfaces , University of California, Irvine, October 22, 1990.
1. STM '90, Baltimore, July 26, 1990.

B.3.2. At universities, Institutes, and Companies

149. The University of Texas, Department of Chemistry, Austin, TX, April 7, 2022.
148. Wayne State University, September 15, 2020. (Remote)
147. The University of North Carolina, Chapel Hill, September 16, 2019.
146. The University of Texas, Department of Materials Science and Engineering, Austin, TX, September 9, 2019.
145. The Ohio State University, February, 27, 2019.
144. UC Irvine Department of Urology, January 16, 2019.
143. Gustavus Adolphus College, Department of Chemistry, St. Peter, MN, October 5, 2018.
142. Sungkyunkwan University (SKKU), Suwon-si, Gyeonggi-do, Korea, September 7, 2018.
141. Korean Advanced Institute for Science and Technology (KAIST), Daejeon, Korea, September 5, 2018.
140. University of California, Irvine, 2018 UC Mesoscale Materials Summer School, August 9, 2018.
139. Chalmers University, Department of Physics, Gothenburg, Sweden, May 24, 2018.
138. University of Pittsburgh, Chemical & Petroleum Engineering, March 16, 2018.
137. University of California, Irvine, Summer Undergraduate Research Conference, Irvine, July 21, 2017.
136. University of Venice, Italy, June 12, 2017.
135. University of Bari, Italy, June 5, 2017.
134. UCSD, Nanoengineering Dept., 10 Year Anniversary Celebration, June 2, 2017.
133. Oregon State University, Corvallis, OR, November 4, 2016.
132. Washington University St. Louis, MO, September 15, 2016.
131. University of Florida, Gainesville, FL, September 7, 2016.
130. KAIST International MSE Workshop, KAIST, Daejeon, Korea, August 2, 2016.
129. NanoGUNE, San Sebastian, Spain, June 23, 2016.
128. NanoGUNE, San Sebastian, Spain, June 20, 2016.
127. Temple University, Philadelphia, May 10, 2016.
126. UCLA, Los Angeles, January 25, 2016.
125. Waseda University, Tokyo, Japan, October 19, 2015.
124. Horiba Ltd., Kyoto, Japan, October 17, 2015.
123. Notre Dame University, South Bend, IN, August 27, 2015.
122. Colorado School of Mines, Golden, CO, January 16, 2015.
121. Case Western Reserve University, October 30, 2014.
120. University of Minnesota, October 9, 2014.

119. AMSEC Distinguished Lecture, Western Washington University, April 25, 2014.
118. The University of Houston, Department of Electrical Engineering, March 27, 2014.
117. The University of Wyoming, April 26, 2013.
116. The Hach Lecture, Colorado State University, April 24, 2013.
115. UC Irvine Department of Chemical Engineering and Materials Science, April 19, 2013.
114. California State University, Fullerton, CA March 21, 2013.
113. The University of North Carolina, Chapel Hill, NC, Oct. 9, 2012.
112. Duke University, Durham, NC, Oct. 8, 2012.
111. Department of Electronics, University of Barcelona, July 15 and 17, 2012.
110. The Phi Lambda Epsilon Lecture, Kansas State University, Manhattan KS, April 26, 2012.
109. Saddleback College, Lake Forest, CA March 23, 2012.
108. UC Riverside, Department of Chemical Engineering, Riverside, CA, Nov. 16, 2011.
107. Georgetown University, Washington, DC, Oct. 27, 2011.
106. Tufts University, Medford, MA, Sept. 28, 2010.
105. University of Bari, Bari, Italy, Sept. 6, 2010.
104. School of Natural Sciences, University of California, Merced, June 17, 2010.
103. Webinar for Nanostructures for Electrical Energy Storage", University of Maryland, June 15, 2010.
102. Department of NanoEngineering, University of California, San Diego, January 20, 2010.
101. University of California, Santa Cruz, January 13, 2010.
100. Southern Illinois University, Carbondale, September 9, 2009.
99. Georgia Institute of Technology, Atlanta, GA, August 31, 2009.
98. University of Sharjah, United Arab Emirates, Plenary Lecture for the Workshop on Hydrogen Sensing, March 22, 2009.
97. University of California, Los Angeles, February 2, 2009.
96. San Diego State University, San Diego, September 19, 2008.
95. Georgia Institute of Technology, Atlanta, GA, September 11, 2008.
94. Naval Research Labs, Washington D.C., May 15, 2008.
93. University of Illinois, Champaign-Urbana, IL, January 18, 2008.
92. University of Texas, Austin, TX, March 22, 2007.
91. University of Pittsburgh, Department of Electrical Engineering, March 8, 2007.
90. Louisiana State University, Baton Rouge, LA, November 10, 2006.
89. University of Michigan, Ann Arbor, MI, October 6, 2006.

88. University of the Pacific, Stockton, CA, May 9, 2006.
87. Department of Analytical Chemistry, University of Bari, Italy, April 7, 2006.
86. University of California, Riverside, Chemical & Environmental Engineering, Sept. 30, 2005.
85. California State University, Long Beach, Sept. 21, 2005.
84. CNRS Montpellier, France, June 10, 2005.
83. Orange County chapter of the Institute of Environmental Sciences and Technology (IEST), Anaheim, CA, April 6, 2005.
82. Rutgers University, Newark, NJ, April 5, 2005.
81. Osher Life Long Learning Institute, UCI, March 9, 2005.
80. Discover the Physical Sciences, UCI, Beckman Center, January 25, 2005.
79. Arizona State University, Tempe, AZ, Oct. 1, 2004.
78. University of Maryland, College Park, MD, Sept. 3, 2004.
77. Argonne National Laboratories, Materials Science Division Colloquium, July 22, 2004.
76. Max Planck Institute for Metals, Stüttgart, Germany, April 25, 2004.
75. University of Louisville, Louisville, KY March 26, 2004.
74. Purdue University, West Lafayette, IN, February 10, 2004.
73. Northwestern University, Evanston, IL January 29, 2004.
72. Harvard University, Cambridge, MA, May 15, 2003.
71. University of Oregon, Eugene, OR, April 14, 2003.
70. University of California, Santa Barbara, April 8, 2003.
69. University of Puerto Rico Rio Piedras, San Juan, Puerto Rico, March 26, 2003.
68. Georgia Institute of Technology, Atlanta, Georgia, February 20, 2003.
67. Department of Physics, California State University, Northridge, Oct. 30, 2002.
66. University of Heidelberg, Germany, Sept. 23, 2002.
65. University of Chicago, May 20, 2002.
64. The University of Alberta, Edmonton, Alberta, Canada, April. 12, 2002.
63. University of California, Santa Cruz, CA, Feb. 6, 2002,
62. Nanomix Inc., Emeryville, CA, Jan. 9, 2002,
61. National Fuel Cell Research Center, UC Irvine, CA, Jan. 24, 2001.
60. Nanomix, Inc., Emeryville, CA, Jan. 9, 2001.
59. Washington State University, Pullman, WA, Dec. 17, 2001.
58. Colorado State University, Fort Collins, CO, Dec. 10, 2001.

57. University of Wisconsin, Madison, Dec. 6, 2, 2001.
56. Caltech, Pasadena, Dec. 3, 2, 2001.
55. Texas A&M University, College Station, TX, Nov. 13, 2001.
54. Lawrence Berkeley Laboratory, October 11, 2001.
53. Nanogen Inc. San Diego, May 11, 2001.
52. Gustavus Adolphus College, St. Peter, MN., May 4, 2001.
51. UC Davis, April 10, 2001.
50. Univ. Washington, Seattle, WA, Nov. 7, 2000.
49. UCLA, Los Angeles, CA, Oct. 2, 2000.
48. North Carolina State University, Raleigh, NC, Sept. 22, 2000.
47. University of Arizona, Tucson, April 20, 2000.
46. UCSB, Jan. 19, 2000.
45. Department of Materials Science, University of Southern California, L.A., Nov. 12, 1999.
44. Department of Physics, UCI, Nov. 8, 1999.
43. Iowa State University, Ames, IA,, Oct. 8, 1999.
42. Max-Planck Institute For Microstructure Physics, Halle, Germany, May 6, 1999.
41. The Fritz-Haber Institute, Berlin, Germany, May 4, 1999.
40. University of California, Berkeley, April 20, 1999.
39. Department of Chemical Engineering, Johns Hopkins University, Baltimore, Feb. 5, 1999.
38. Washington University, St. Louis, Feb. 5, 1998.
37. The University of Illinois, Urbana-Champaign, IL, Nov. 21, 1997.
36. University of Southern California, Nov. 14, 1997.
35. University of California, San Diego, Oct. 14, 1997.
34. CalTech, Pasadena, CA, Oct. 13.
33. California State University, NorthRidge, Oct. 1, 1997.
32. California State University, Pomona, Sept. 23, 1997.
31. St. John's College, and the College of Saint Catherine's, Collegeville, MN, May 15, 1997.
30. University of North Carolina, Chapel Hill, NC, April 7, 1997.
29. Duke University, Durham, April 4, 1997.
28. University of Missouri, Rolla, March 17, 1997.
27. Washington University, St. Louis, Feb. 5, 1997.
26. Institute of Surface and Interface Science (ISIS) Seminar, UCI, Irvine, Dec. 3, 1996.

25. University of Wisconsin, Madison, Nov. 7, 1996.
24. The University of Bern, Bern, Switzerland, Oct. 21, 1996.
23. Cal State Long Beach, Sept. 18, 1996.
22. University of Pennsylvannia, March 5, 1996.
21. University of Utah, March 1,1996.
20. Texaco Research and Development, Fishkill, NY, Nov. 15, 1995.
19. UCLA, Los Angeles, Nov. 17, 1995.
18. Northwestern University, Evanston, IL, August 18, 1995.
17. Georgia Tech. University, Atlanta, April 27, 1995.
16. The University of Georgia, Athens, GE, April 26, 1995.
15. Auburn University, Auburn, AL, April 25, 1995.
14. Harvey Mudd College, Claremont, CA, May 3, 1994.
13. Carleton College, Northfield, MN, February 8, 1994.
12. Saint Olaf College, Northfield, MN, February 8, 1994.
11. Gustavus Adolphus College, St. Peter, MN, February 8, 1994.
10. College of St. Thomas, St. Paul, MN, February 8, 1994.
9. KFA, Jülich, Germany, July 9, 1993.
8. Fritz-Haber Institute, Berlin, Germany, July 7, 1993.
7. University Ulm, Germany, July 5, 1993.
6. University of California, Irvine, May 25, 1993.
5. Dept. of Electrical Engineering, University of California, Irvine, April 28, 1993.
4. University of Southern California, Los Angeles, April 13, 1993.
3. University of Colorado, Boulder, CO, April 6, 1993.
2. Colorado State University, Fort Collins, CO, April 5, 1993.
1. Texas A&M University, College Station, TX, December 14, 1992.

C. Teaching

Course Title	Category	Enrollment	Website URL
Majors Analytical Chemistry Lab	introductory	40-20 Spring 2024 Fall 2023 Spring 2022 Fall 2020 Spring 2020 Spring 2019 Spring 2018	* https://canvas.eee.uci.edu/courses/62311 * https://canvas.eee.uci.edu/courses/56492 * https://canvas.eee.uci.edu/courses/53260 * https://ucirvine.instructure.com/courses/29647 * https://ucirvine.instructure.com/courses/24196 **https://ucirvine.instructure.com/courses/16165 **https://ucirvine.instructure.com/courses/9100
General Chemistry	introductory	200-450	https://canvas.eee.uci.edu/courses/11109 *https://ucirvine.instructure.com/courses/18786 *https://canvas.eee.uci.edu/courses/9100 *https://canvas.eee.uci.edu/courses/5910 *http://eee.uci.edu/00s/40080 http://eee.uci.edu/98s/40010 http://eee.uci.edu/97s/40050
Honors General Chemistry	introductory	27-65	*https://eee.uci.edu/08f/4028 *https://eee.uci.edu/07f/4030 *http://eee.uci.edu/06f/40200 http://eee.uci.edu/05w/40220 http://eee.uci.edu/04w/40230 http://eee.uci.edu/03w/40175
Analytical Chemistry	upper division	60-120	*https://eee.uci.edu/12f/40720 *https://eee.uci.edu/11f/40720 *https://eee.uci.edu/10f/40720 *https://eee.uci.edu/09f/40720 http://eee.uci.edu/04f/40370 http://eee.uci.edu/03f/40370 http://eee.uci.edu/02f/40370 http://eee.uci.edu/01f/40370 http://eee.uci.edu/98f/40370
Physical Chemistry	upper division	50-160	**https://eee.uci.edu/12s/40910 *https://eee.uci.edu/11s/40910 *https://eee.uci.edu/10s/40900 *https://eee.uci.edu/09s/40900 *http://eee.uci.edu/08w/40906 *http://eee.uci.edu/07w/40858 http://eee.uci.edu/98w/40365 http://eee.uci.edu/97w/40365 http://eee.uci.edu/96f/40315
Materials Chemistry	upper division	8-25	none.
Electrochemistry	graduate	8-25 31	*https://eee.uci.edu/13w/41500 *https://eee.uci.edu/11w/41500 *https://eee.uci.edu/09w/41530
Chemical Kinetics	graduate	8-25	none

*Includes a comprehensive set of lecture notes in PDF format.
**Includes a comprehensive set of lecture notes in PDF format, and youTube videos of each lecture.

D. Service

D.1. Professional Service

- Member, of an American Chemical Society (ACS) National Award Selection Committee, 2020 - 2022.
- Reviewer, Samsung Technology Foundation Award, 2020 - 2024.
- External Examiner, for the Ph.D. dissertation of Mr. Ferry Nugroho, Department of Physics, Chalmers University, Gothenburg, Sweden, CA, May 23, 2018.
- Invited participant, DOE Workshop on Basic Research Needs (BRN) for Next Generation Electrical Energy Storage, March 27-29, 2017, Gaithersburg, MD.
- Advisory Board member, Next Generation Electrochemistry (NGenE), University of Illinois at Chicago, August 2016 - present.
- External Reviewer - Department of Materials Science and Engineering, KAIST, Daejeon, Korea, August 3, 2016.
- Thrust Leader - Nanostructures for Electrical Energy Storage II (NEES II) "Thrust 3: The Science of Degradation and Failure", A DOE Energy Frontier Research Center funded by the Department of Energy, July 2014 - present.
- Thrust Leader - Nanostructures for Electrical Energy Storage (NEES), "Thrust 2: Electron Transfer", A DOE Energy Frontier Research Center funded by the Department of Energy, July 2011 - June 2014.
- External Operations Review Committee, Department of Energy, Environmental Molecular Sciences Laboratory (EMSL), Pacific Northwest National Laboratory, Sept. 22-24, 2014.
- External Review Committee, Department of Energy, Center for Nanoscale Materials (CNM), Argonne National Laboratory, August 13-15, 2013.
- Workshop Organizer (with Dr. Lori Greene) "Challenges in the Development of Solar Energy: Joint Iranian/US Workshop" sponsored by the U.S. State Department and the U.S. National Academy of Sciences, University of California, Irvine, Nov. 10-12, 2010.
- Committee Member, for the advancement-to-candidacy examination for Mr. Justin Hujdic, School of Natural Sciences, University of California, Merced, June 17, 2010.
- External Examiner, for the Ph.D. dissertation of Mr. Eoin Sheridan, Department of Chemistry, Dublin City University, Dublin, Ireland, CA, January 12, 2009.
- Member, Review Committee, "Director's Review" of Lawrence Berkeley National Laboratories Materials Science Division, Napa, CA, August 13-15, 2007.
- Discussion Leader, Gordon Conference on Chemical Sensors and Interfacial Design, Salve Regina Collage, Newport, RI, July 29, Aug 3, 2007.
- Symposium Organizer & Session Chair, Symposium on "Low-Dimensional Materials in Chemical Analysis" 40th ACS Western Regional Meeting (WRM 2006), Anaheim, CA, January 23, 2006.
- Symposium Organizer & Session Chair (with N. Myung and N.J. Tao), Symposium on "Electrodeposition of Nanoengineered Materials" 208th ECS National Meeting, Los Angeles, CA, October 16, 2005.

- Chair, "Director's Review" of Lawrence Berkeley National Laboratories Materials Science Division, Napa, CA, August 25-26, 2004.
- Symposium Organizer & Session Chair, Symposium on "Chemical Sensing Using Low Dimensional Materials" 227th ACS National Meeting, Anaheim, CA, March 31 and April 1, 2004.
- Symposium Organizer (with Prof. Peter Searson and Dr. Charles Barbour) & Session Chair, "Symposium on Mechanisms in Electrochemical Deposition and Corrosion", Spring 2003 MRS Meeting, San Francisco, April 24, 25, 2003.
- Symposium Organizer (with Prof. Jay Switzer) & Session Chair, Symposium on Electrochemistry at Nanoscale Dimensions, Spring 2003 MRS Meeting, Salt Lake City, Oct. 21, 2002.
- Session Chair, Symposium on The Electrodeposition of Nanoscale and Nanophase Materials, Spring 2001 ECS Meeting, Washington, D.C., March 25, 2001.
- Session Chair, Gordon Conference on Electrochemistry, Ventura, CA., February 20, 2001.
- Symposium Organizer & Session Chair, Symposium on The Electrochemical Synthesis of Nanomaterials,Spring 1999 ACS Meeting, Anaheim, CA, March 21, 1999.
- Session Chair, Symposium on Physical Electrochemistry, ECS National Meeting, San Diego, CA, May 3, 1998.
- Session Chair, Symposium on Colloid and Surface Chemistry of Advanced Materials: Chemistry of Photoluminescent and Electroluminescent Polymers and Semiconductors, ACS National Meeting, San Francisco, April 14, 1997.
- Organizer & Session Chair (with Dr. Chris Vitus, BNL) Symposium on Scanning Probe Microscopy For Electrode Characterization and Nanometer-Scale Modification, Fall ECS National Meeting, Oct. 8 - 13, 1995.
- Organizer & Session Chair (with Prof. Charles Martin) Symposium on Electrochemistry in Materials Research, Fall ACS National Meeting, Aug. 27 - Sept. 1, 1995.
- Session Chair, Symposium on "Molecular Processes At Solid Surfaces", Spring ACS National Meeting, Denver, March 30, 1993.
- Session Chair, "Symposium on Electrochemistry", 1992 Rocky Mountain Conference, Denver, August 6, 1992.
- Session Chair, Symposium on "Novel Structural, Mechanical, and Electrical Aspects of Chemical Interfaces", ACS National Meeting, Spring 1992, San Francisco, April 6, 1992.
- Session Chair, Symposium on "Ultrafast", Molecular Reaction Dynamics in Condensed Matter Newport Beach, April 2, 1992.
- Session Chair, Symposium on "Characterizing the Structure of Large Molecules", Spring ACS National Meeting, Atlanta, April 16, 1991.
- Session Chair, "Symposium on Electrochemistry", 1991 Rocky Mountain Conference, Denver, July 29, 1991.

D.2. Editorial Responsibilities

2005 - present	Member, Editorial Advisory Board: *Nano Letters.*
2012 - 2022	Associate Editor: *ACS Nano*.
2009 - 2012	Board of Reviewing Editors (BoRE), *Science Magazine*.
2005 - 2007	Member, Editorial Advisory Board: *Analytical Chemistry*.

D.3. Scientific Advisory Boards

2008 - 2016	QuantumSphere Nano Inc. (http://www.qsinano.com/).
2014 - present	PhageTech Inc. (http://www.phagetech.com/).
2016 - present	Next Generation Electrochemistry (NGenE), University of Illinois, Chicago (https://energyinitiative.uic.edu/energy/ngene).

D.4. University and Departmental Service

- Member, Search committee for Director of the Physical Sciences Computing Services Group, Spring Quarter, 2022.
- Member, Search committee for UCI Associate Vice Chancellor, Environmental and Facilities Services, Spring Quarter, 2022.
- Chair, School of Physical Sciences, Committee on COVID, Winter Quarter 2020 - present.
- Chair, Irvine Materials Research Institute (IMRI), 5-Year Review Committee, Winter Quarter, 2022.
- Associate Dean for Research and Innovation, School of Physical Sciences, July 2020 - present.
- Member, Graduate Student Recruiting Committee, Sept. 2017 - 2020.
- Member, Irvine Materials Research Institute (IMRI) Advisory Committee, Sept. 2014 - present.
- Founder (with Prof. Matthew Law), Irvine Materials Research Institute (IMRI), 2014.
- Chair, Department of Chemistry, July 1, 2013 - June 30, 2016.
- Chair, Distinguished Faculty in TEM Search Committee, 2013 - 2014.
- Member, Hellman Fellowship Proposal advisory committee, June 2013.
- Chair, Materials Chemistry Faculty Search Committee, Department of Chemistry, Fall, 2012.
- Chair, Campus-wide Search Committee for TEM/Materials, Spring/Summer 2013.
- Member, Electron Microscopy Oversight Committee, Sept. 2010 - Sept. 2014.
- Member, UCI Research Advisory Committee (RAC), March 2007 - 2010.
- Director, School of Physical Sciences Center for Solar Energy, March 1, 2007 - 2014.
- Member, UCI Office of Technology Alliances Review Committee, July 2007 - July 2008.
- Director, Institute for Surface and Interface Science (ISIS), October 1, 2005 - Sept. 1, 2008.
- Vice-Chairman for Facilities, Space, and Safety, Department of Chemistry, July 1, 2001 - July 1, 2005.
- Roundtable Discussion leader: 8th Annual UCI Undergraduate Research Symposium, May 12, 2001.
- Research Presentation: UCI Honor's Day, March 10, 2001.

E. Extramural Funding

Agency	Dates	Total Amount[1]	Agency #
Petroleum Research Fund Type G	1/1/91; 12/31/93	$18,000.00	23637-G4
Procter & Gamble University Exploratory Research Program	7/1/91; 6/30/94	$149,997.00	PG-14986
Arnold and Mabel Beckman Foundation Beckman Young Investigator Award	7/1/92 6/30/95	$175,000.00	BF-18238
Office of Naval Research ONR Young Investigator Award	4/1/93 3/31/96	$225,000.00	400X119YIP
NSF-DMR NSF Young Investigator Award	8/15/92 7/31/97	$312,500	DMR 9257000
Alfred P. Sloan Foundation A.P. Sloan Fellowship	9/14/95 9/15/97	$30,000	BR-3410
Office of Naval Research Electrochemical Sciences Division	4/1/96 9/31/98	$250,000	N00014-93-1-0757
Camille & Henry Dreyfus Foundation Camille Dreyfus Teacher/Scholar Award	7/1/95 6/30/00	$60,000	TC-95-052
NSF Division of Materials Research	3/1/99 2/28/02	$271,235	DMR 9876479
Office of Naval Research Materials Engineering Division (with E. Lavernia, F. Mohammed, S. Nutt)	6/1/01 5/31/03	$178,810	N00014-01-088
UC BioStar/Nanomix Inc.	5/1/02 4/30/03	$35,000	biostar 01-10169
DOE SBIR (with John Olsen, Boundless Corp)	2/1/04 4/30/04	$31,500	DE-FG02-03ER83614
NSF Chemistry	8/1/01 7/31/04	$396,790.00	CHE-0111557
UCI Committee on Research (with Professor Derek Dunn-Rankin)	07/01/03 06/30/04	$10,500.00	n.a.

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*Includes direct and indirect costs unless otherwise indicated.

Agency	Dates	Total Amount[1]	Agency #
NSF Chemistry "Two-Year Extension for Special Creativity"	8/1/04 7/31/06	$300,000.00	CHE-0111557
NSF Division of Materials Research	6/1/04 5/31/07	$285,167	DMR-040547
ACS PRF Type AC	5/1/04 8/31/06	$80,000	40714-AC5
NSF International	2/15/03 8/31/07	$18,339	INT-0233371
NSF NIRT (with Profs. Phil Collins, Nancy Allbritton, and Greg Weiss)	8/31/08 9/1/04	$1,649,998.00 total	DMR-0404057
NSF Chemical Instrumentation (CRIF)	2/15/2006 1/31/2009	$276,380	CHE-0541812
UC Cancer Research Coordinating Committee (UC CRCC)	7/1/07 6/30/08	$41,500	CRCC-41532
ACS PRF Type AC	9/1/07 8/31/09	$90,000	46815-AC 10
NSF Chemistry	2/15/07; 2/14/10	$456,765.00	CHE-0641169
NSF Division of Materials Research	6/1/07 5/31/10	$352,410	DMR-0654055
Hyundai Heavy Industries	3/22/10 3/21/11	$40,000.00	HHI-48693
California Community Foundation	3/1/07 2/28/11	$900,000 (direct costs)	n.a.
University of California, MRPI Lead institution: UCLA	12/31/11 1/1/10	$88,000.00	UCLA-49391
NSF Chemistry	3/1/10 2/27/13	$456,765.00	CHE-0956524

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*Includes direct and indirect costs unless otherwise indicated.

Agency	Dates	Total Amount[1]	Agency #
Department of Energy, EFRC "Nanoelectrodes for Electrical Energy Storage (NEES)" Lead institution: Univ. Maryland	7/31/14 7/31/14	$630,000.00	DESC0001160
Department of Energy, EFRC "Nanoelectrodes for Electrical Energy Storage (NEESII)" Lead institution: Univ. Maryland	8/1/14 7/31/18	$520,000.00	DESC0001160
NSF Division of Materials Research	9/01/12 8/31/15	$414,998.00	DMR-1206867
NSF Division of Chemistry	7/15/13 7/14/16	$465,000.00	CHE-1306928
NSF Chemistry MRI grant For an XPS/SAM spectrometer (co-PIs: J.C. Hemminger, M. Law, R. Ragan, D. Mumm)	9/01/13	$700,000.00	CHE-1338173
Hitachi Chemical Co. America Ltd.	11/01/16	$44,745.00	H-203783
NIH (NCI) (1R33CA206955-01) (PI: Gregory Weiss)	7/01/16 6/30/19	$75,000.00	1R33CA206955-01
NSF Chemical, Bioengineering, Environmental and Transport Systems (CBET)	7/01/18 6/30/21	$330,000.00	CBET-1803314
SKKU, Korea	1/01/20 12/31/21	$35,000.00	n.a.
School of Physical Sciences Research Committee	4/21/20 4/20/21	$909.00	n.a.
UCOP Emergency COVID-19 Research Seed Funding w/Greg Weiss	04/15/20 10/14/20	$25,000.00/6 mos	R00RG2519
Clinical Research Acceleration and Facilitation Team (CRAFT) - COVID w/Greg Weiss and Philip Felgner	6/01/20 5/31/21	$60,000.00	n.a.

*Includes direct and indirect costs unless otherwise indicated.

Agency	Dates	Total Amount[1]	Agency #
NSF Division of Chemical, Bioengineering, Environmental and Transport Systems w/Andrej Luptak	1/11/22 1/10/25.	$360,000.00	CBET-2149631
NSF Division of Chemistry,	8/01/22 7/31/25.	$450,000.00	CHE-2201042

*Includes direct and indirect costs unless otherwise indicated.

F. Students Supervised

F.1. Graduate Students

Name	Dates	Thesis Title	UCI pubs	Current Position
Wenjie Li, Ph.D	6/15/92 - 5/31/96	"Nanometer-Scale Electrochemical Synthesis of Materials Using a Scanning Tunneling Microscope"	6	Quality Director, Bioglan Labs, Lake Forest CA
Gregor Hsiao, Ph.D.	1/1/92 - 5/31/97	"Synthesis and Characterization of Metal and Semiconductor Structures"	5	Engineer Mettler-Toledo Inc.
Matt Anderson, M.S.	1/1/94 - 12/31/97	"Electrochemical/Chemical Synthesis of Luminescent Cadmium Sulfide Nanocrystals on the Atomically Smooth Graphite Basal Plane"	3	Orion Research Boston MA
Jim Zoval, Ph.D.	10/1/93 - 5/31/98	"Electrochemical Deposition of Silver and Platinum Nanocrystallites on the Atomically Smooth Graphite Basal Plane: Characterization, Particle Size Control, and Chemical Applications"	4	Prof of Chemistry Saddleback College Mission Viejo CA
Rebecca Stiger, Ph.D	10/1/93 - 9/1/98	"Electrochemical Synthesis of Silver Nanocrystals on Single Crystal Surfaces"	5	Chemist PPG Industries Pittsburgh PA
Hongtao Liu, Ph.D	1/1/97 - 6/1/01	"Electrodeposition of Dimensionally Uniform Metal Particles on Electrode Surfaces"	5	Engineer KLA-Tencor Milpitas CA
Kwok Ng, Ph.D	1/1/98 - 5/1/02	"Electrochemical Synthesis of Metal and Semiconductor Nanostructures"	5	Engineer KLA Milpitas CA
Mike Zach, Ph.D	1/1/98 - 6/1/02	"Controlling Size Dispersity, Morphology and Spatial Orientation of Nanostructures by Electrodeposition and Chemical Vapor Deposition on Highly Oriented Pyrolytic Graphite"	11	Scientist Oak Ridge National Lab

Name	Dates	Thesis Title	UCI pubs	Current Position
Erich Walter, Ph.D	1/1/00 - 8/13/04	"Sensors from Electrodeposited Nanowires"	16	Scientist, NIST Applied Physics Laboratory Johns Hopkins Univ.
Stacey Rogers	1/1/01 -6/1/2004	M.S. Chemistry	0	Tustin Unified School District
Ben Murray, Ph.D	1/1/01 - 5/1/05	"Chemical Sensing with Electrodeposited Nanowires"	6	Engineer, KLA Hillsboro, OR
Qiguang Li Ph.D	10/1/01 - 3/1/06	"Semiconductor Nanowire Ensembles by Electrochemical /Chemical Synthesis"	9	Engineer, KLA Milpitas CA
Erik Menke, Ph.D	1/1/01 - 5/1/06	"Advances in Nanowire Preparation via Electrochemical Step Edge Decoration"	5	Assoc. Professor Dept of Chemistry UC Merced
Gisela Kaltenpoth, Ph.D	6/1/01 - 12/31/01	Visiting Ph.D. student from the Univ. Heidelburg, Germany	2	Daimer-Chrysler Inc., South Africa
Cobey Cross	10/1/01- - 12/31/06	M.S. Chemistry	1	Thermo-Fisher Scientific Palo Alto CA
Megan Bourg Ph.D	10/1/01- - 12/31/07	"Nanowire-Based Thermocouple Ensembles"	2	Naval Research Laboratory Washington D.C.
Li-Mei Yang Ph.D	1/1/03- - 12/31/07	"Bioaffinity Sensing Using Covalently Bound Virus Layers"	5	N.A.
Chengxiang Xiang Ph.D	9/1/04- - 9/1/09	"Lithographically Patterned Nanowire Electrodeposition"	10	Project Co-Leader Joint Center for Artificial Photosynthesis Caltech
David Taggart Ph.D	2/1/06- - 3/1/11	"Using Lithographically Patterned Nanowire Electrodeposition To Fabricate Devices For The Purpose of Studying Thermoelectrics, Biosensing and Other Phenomena"	12	Scientist, General Monitors, Lake Forest CA.

Name	Dates	Thesis Title	UCI pubs	Current Position
Sheng-Chin Kung Ph.D	2/1/06- - 5/1/11	"Photoconductors Based Upon Lithographically Patterned Nano-crystalline Cadmium Selenide Nanowires"	13	Engineer, Applied Materials, Santa Clara CA.
Fan Yang Ph.D	2/1/06- - 10/31/11	"Hydrogen Sensors Based Upon Single Metal Nanowires"	13	Postdoctoral Scholar, Prof. Nate Lewis, Caltech.
Jung Yun Kim Ph.D	5/1/08- - 3/30/2013	"Grain Growth of Gold Nanowires Through Laser Zone Annealing and Rapid Thermal Annealing"	6	Materials Engineer, Apple Inc. Cupertino CA.
Keith Donovan Ph.D	12/31/07- - 8/15/12	"Virus-PEDOT Biocomposite Films and Nanostructures for Use in Electrochemical Impedance Spectroscopy-Based Biological Sensing"	11	Prof. of Chemistry Irvine Valley College, Irvine CA
Wenbo Yan Ph.D	3/01/09- - 12/31/12	"High Performance Li^+ Anode Materials from Lithographically Patterned Nanowire Arrays"	4	Data Scientist, Amazon Inc. Seattle WA
Wendong Xing Ph.D	3/01/09 - 12/31/12	"Fabrication of Chemical Sensors, Optical Detectors, and Optical Sources From Metal Nanogap Structures"	10	Engineer, Apple Inc. Cupertino CA
Eminet Gebremichael	12/01/09- - 8/31/11	M.S. Chemistry,	0	Scientist, Shasha Crystals San Francisco CA
Talin Ayvazian Ph.D	9/01/10- - 8/01/13	"Polycrystalline Nanowire Photonics"	6	Scientist, Aerospace Corp, El Segundo CA
Lindsay Kindra	9/01/13 - 8/1/14	M.S. Chemistry	1	Community College of Baltimore County Baltimore MD
Xiaowei Li Ph.D	9/01/11 - 12/31/16	"Rapid and Ultrasensitive Hydrogen Sensing: From Single Nanowires to to Carbon Nanotubes"	8	Glidewell Laboratories Newport Beach CA

Name	Dates	Thesis Title	UCI pubs	Current Position
Mya Li Thai Ph.D	9/01/12 - 12/31/16	"Ultra-Long Manganese Oxide Nanowires for Efficient Energy Storage Systems"	8	Enervate Inc. Irvine, CA
Crystin Eggers Ph.D	9/01/12- - 3/31/17	"Design and Methodology for Optimization of Polymer Sensing for Three Target Analytes"	1	Coastline College Fountain Valley, CA
Rajan Dutta Ph.D	9/01/11- - 3/31/17	"Lithographically Patterned Nanowires in Sensors and Transducers"	9	Intel Hillsboro, OR
Shaopeng Qiao Ph.D	9/01/13- 7/30/18	"Electrodeposition of Electroluminescent CdSe Nanowire Devices"	11	N.A.
Qiang Xu	9/01/14- - present	visiting student	2	Department of Physics Xiamen University, Xiamen, China
Alana Ogata Ph.D	9/01/15- 10/1/19	"Development of Label-free, Non-faradaic Electronic Biosensors Using Polymer Biocomposites for Rapid Detection of Proteins"	12	Univ. of Toronto Toronto, CA
Gaurav Jha Ph.D	2/01/16- - 12/31/19	"Energy Storage in Niobium(V) Oxide Nanostructures: Fabrication, Conductivity and Degradation "	8	Intel Hillsboro, OR
Annee Wildgoose	2/01/17- 1/1/20	M.S. Pharm. Sci.	0	Univ. of North Texas Ph.D. Program in Chemistry
Vivian Chen	2/01/16- 8/31/20	M.S. Chemistry	3	KLA Corp Hillsboro, OR
Apurva Bhasin Ph.D	2/01/17- 8/31/20	"Development and optimization of the Virus-Bioresistor: A Potential Point-of-care Diagnostic Platform"	4	Graphwear Inc. San Jose, CA

Name	Dates	Thesis Title	UCI pubs	Current Position
Joshua Ziegler Ph.D	12/01/17 - 5/31/22	"Understanding degradation in in Low-Dimensional Transition Metal Chalcogenide Electrodes"	5	Intel Corp Hillsborough, OR
Ilektra Andoni Ph.D	12/01/18 - 7/1/22-	"Exploring Niobium Oxide Nanostructures for Lithium-Ion Energy Storage "	4	Western Digital Inc. San Jose, CA
Eric Choi	12/01/18- 1/30/24-	Exploring Sub-micron, Electrodeposition-Enabled Liquid a Gas-Phase Sensors	4	Applied Materials Portland, OR
Nick Drago	12/01/19- - 12/01/23	TBD	6	PPG Industries
Nick Humphrey	12/01/18- - 6/01/23	TBD	3	Sandia Natl Labs
Heriberto Flores-Zuleta	12/01/20- - present	TBD	2	UCI Chemistry

F.2. Postdoctoral Scholars

- Prof. Jorma Virtanen, 1991 - 1994, Professor of Nanoscience, University of Jyväskylä.
- Dr. Ralph Nyffenegger 1993 - 1995, Director of Engineering, KLA Corp Milpitas, CA.
- Dr. Georg Erley, 1993 - 1994, Engineer, Fraunhofer IPMS, Dresden, Germany.
- Dr. Sasha Gorer, 1994 - 1997, Chemist, InterMolecular, Inc., Santa Clara, CA.
- Dr. Yongan Yang, 2007 - 2010, Assistant Professor, Department of Chemistry, TianJin University, China.
- Dr. Girija Chandran, 2015 - 2017, Xerion Advanced Battery Corp, Dayton, Ohio.