Neal R. Armstrong

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Director Emeritus, Institute for Energy Solutions (IES) https://energy.arizona.edu/

FIELDS OF SPECIALIZATION:

Interface Science of Materials for Energy Conversion, Light Emission and Sensing; Surface Photoemission Spectroscopies (UPS, XPS), Scanning Probe Microscopies, Electrochemistry, New Approaches to Development and Characterization of Energy Conversion Materials

ACADEMIC AND PROFESSIONAL APPOINTMENTS

2013 -2023	Regents Professor – University of Arizona – August 2013 –Sept. 2021 – Emeritus status (2021 – present) https://www.cbc.arizona.edu/faculty/neal-r-armstrong
2023 -	Affiliate Professor, Department of Chemistry, University of Washington
2015-2021	Director Arizona Institute for Energy Solutions (https://energy.arizona.edu) currently Director Emeritus
2014-2020	Associate Vice President for Research – University of Arizona
2009- 2014	Director for the Department of Energy, Office of Science, Energy Frontier Center for Interface Science: Solar Electric Materials (CISSEM)
2002-07	Associate Director for the NSF Science and Technology Center Materials and Devices for Information Technology Research (MDITR)
1994 - 2000	Pacific Northwest Laboratories Affiliate Staff Scientist
1994 -	Professor Optical Sciences, University of Arizona
1997-1999	Director, General Chemistry Laboratories
1989-1994	Head, Department of Chemistry, University of Arizona
1987-	Professor, Department of Chemistry, University of Arizona
1982-87	Associate Professor, University of Arizona
1978-82	Assistant Professor, University of Arizona
1975-78	Assistant Professor, Michigan State University

EDUCATION

1970	B.S., Chemistry, University of New Mexico
1971-74	Associated Western Universities/Atomic Energy Commission Graduate Fellow at Sandia Laboratories, Albuquerque, New Mexico, in the Division of Solid State Physics Research
1974	Ph.D., Analytical Chemistry, University of New Mexico
1974-75	Ohio State University Postdoctoral Fellow

HONORS AND AWARDS

2013	Regents Professor in Chemistry/Biochemistry/Optical Sciences
2011	University of Arizona at the Leading-Edge Award – Innovation Day 2011
2011	Elizabeth and Keith Hege Galileo Circle Fellow – College of Science, University of Arizona
2002	Alexander von Humboldt Senior Research Prize – Institut für Angewandte Photophysik der Technischen Universität Dresden (IAPP)/Max Planck Institute für Polymerforschung – Mainz (MPIP)
2000	National Science Foundation - Special Award for Creativity
1996	Career Teaching Award, College of Science, University of Arizona
1996	National Science Foundation - Chemistry Special Award for Creativity
1992	Alexander von Humboldt Fellowship - Max Planck Institut für Polymerforschung
1985	Alexander von Humboldt Fellowship - Institut für Physicalische Chemie, Universität München

SCHOLARSHIP – RESEARCH INTERESTS

Over the last four decades my research activities have been primarily focused on enhancing our understanding of interfaces in materials and device platforms that are emerging (or have now emerged) as new technologies for solar energy conversion (solar cells), light emission (organic light emitting diodes), and chemical sensing platforms. We have played key roles in the development of new measurement science approaches to understanding the interfaces formed between these materials and metal, metal oxide and semiconductor electrical contacts, with primary emphasis on surface photoemission spectroscopies, electrochemistry and structural probes including X-ray diffraction, scanning probe microscopies and electron microscopies. As shown below the products of this scholarship have been 300+ peer-reviewed manuscripts and multiple patents and the training of 49 Ph.D., ca. 25 M.S. and more than 100 undergraduate students, postdocs and visiting scientists. None of this would have been possible without significant collaborations and leadership from a group of like-minded scholars and educators from the University of Arizona, and scholars from research institutes around the world, including their students, postdocs and research scientists. Our program has been most impactful in the context of those collaborations. As can be seen below we have recently expanded or reinstituted those interactions in a sustainable manner, also establishing new research activities in both the U.S. and Europe. Products of that scholarship are detailed below in the sections containing publications, patents, current and pending support, etc.

CONSULTING ACTIVITIES (since ca. 1980)

My consulting and scientific oversight and review activities, primarily in the areas of materials and interface characterization of optoelectronic, energy conversion and energy storage materials, have included both private companies and government laboratories, including: Burr-Brown, Sierracin-Sylmar, Motorola, Xerox, Kodak, IBM, 3M, Pacific Northwest Laboratories (PNNL), National Renewable Energy Laboratories (NREL), Brookhaven National Laboratories (BNL), Helmholtz-Zentrum Berlin.

Currentt and Pending Support and Recent Tech Transfer Activities

Current:

- Title: Understanding and Enhancing Stability of Perovskite/Contact Interfaces Across Length Scales
  Summary: *This effort focuses on: 1) removal of surface defects at contact/perovskite active layer (PAL) interfaces using robust interface modification schemes; and 2) elucidation of complex degradation chemistries of rapidly evolving, high performing mixed cation halide perovskite active layers in PV platforms. – Ratcliff is lead/Armstrong participates either remotely of in person*
  Source: Office of Naval Research
  Period of Performance: 5/1/2018 – 5/17/2023
  Total Award Amount: $861,000

- Title: EMPOWER STEM: Electronic Materials to Power a Naval STEM Workforce
  Summary: *This proposed effort is focused on establishing a unique training program at UA directed initially toward graduate students, and then at undergraduates to enable them to pursue career paths that lead to Department of Navy research laboratories, with active mentoring from DoN research scientists, partnering with UA faculty. – Ratcliff, Printz, Ogden are the lead PIs, Armstrong plays mostly a consulting off-site/in-person role at this point.*
  Source: Office of Naval Research
  Contract/Grant #: N/A
  Annual Direct Costs: Year 1: $249,608
  Period of Performance: 02/01/21-01/31/24
  Total Award Amount: $748,824

- Title: “Advance Perovskite Solar Cell Development and Stability Using In-Line Electrochemical Methodologies”
  Summary: *Overall Objectives: Develop and demonstrate a disposable, non-destructive electrochemical sensor prototype for: i) characterization of reactive defects in metal halide perovskite solar cell layers during in-line manufacturing (i.e., roll-to-roll) and ii) assessing quality, stability, and durability of device layers under stressors (i.e., humidity, light, and temperature).*
  Source of Support: US DOE
  Project/Proposal Support Start Date (if available): 10/1/2022
  Project/Proposal Support End Date (if available): 09/30/2023
  Total Award Amount (including Indirect Costs): $300,000
  Person-months per year committed 2023 0.18

- Title: Center for Soft Photoelectrochemical Systems (SPECS)
  Summary: *This DOE Energy Frontier Research Center (EFRC) proposed effort is focused on the basic science underpinning the development of new materials, and their interfaces with electrolytes, for electrochemical and photoelectrochemical energy conversion and storage. Ratcliff (UA) Director and lead-PI, with Miller (NREL), Stinglein (Georgia Tech), Lian (Emory), Marder (CU)…. et al. (Armstrong = Senior Advisor (UA)).*
  Source: Department of Energy, EFRC
  Award Amount: $11M – August 2022-27.

Recent patent disclosures and patent assignments:

1. “Curriculum materials for the education of graduate level measurement science,” with Farrell, Heien, Saavedra, Armstrong, Oudry – Univ. of Arizona (UA19-115) – disclosure filed.
2. Organic Photovoltaic Devices Comprising Solution-Processed Substituted Metal Phthalocyanine and Exhibitng Near-IR Photo-Sensitivity, Dominic V. McGrath, Mayank Mayukh, Diogenes Placencia, Neal R. Armstrong US 9,505,770 B2
3. Conjugated Side-Strapped Phthalocyanines and Methods for Producing and Using the Same - US 9.425,413 B2
4. "Solar Window With Spectral And Photovoltaic Properties For Agricultural And Biofuel Applications,” Lacomb, Peyghambarian, Ogden, Armstrong – UA16-085 - filed
5. “Compositions and Methods for Reducing Defects in Perovskite-Oxide Interface, Shallcross, Saavedra, Armstrong - UAZ -005700PV – filed
6. “Engineered Sorbents and Process for Selective Removal of Perfluorinated Organics Species from Water,” Karanikola et al.
7. “Device and Methods for Characterization of Semiconductor Films,” De Keersmaecker, et al. UAZ-008600PV – filed March 2022

PAST STUDENTS

MS/Ph.D. (Ph.D. in bold; ** = joint students)

Mr. Vance Rogers Shepard, Duracell International Inc.
Mr. Curt Sayers, Semilab Inc.
Associate Prof .Clovis Linkous, Youngstown State University
Dr. Tom Mezza, Univ. Oil Prod., LLC
Dr. Robert Cieslinski, The Dow Chemical Company
Dr. Gary Deborski, Impact Analytical
Dr. David Hawn, The Dow Chemical Company
Dan Deibel, Adjunct Prof., Rochester Institute of Technology
Ken Chan – deceased (Cal St. Fresno Univ.)
Mr. Paul Lee (University of Arizona)
Dr. Ken Nebesny (University of Arizona)
Dr. Kevin Zavadil, SNL Sandia National Laboratories
Mr. Brad Thacker, LexisNexis
Dr. Tom Klofta, Proctor & Gamble Co.
Dr. Brian Maschhoff, Exelearn Systems, LLC
Dr. Peter Rieke, Pacific Northwest Laboratories
Dr. Michael Burrell, Bechtel Marine Propulsion Corp.
Mr. Tabitha Sims, Spectral Instruments, Inc
Dr. Joel Pankow, National Renewable Energy Laboratories
Dr. James Danziger, Proctor and Gamble Co.
Dr. Greg Collins, U.S. Naval Research Laboratory
Dr. Cory Hammond, Lexmark International, Inc.
Associate Prof. Elizabeth Atkinson, Linfield College **
Dr. Thomas Schuerlein, Evans Analytical Group Inc.
Dr. Lin Yang, Golden Sigma (Investment Management) **
Dr. Michelle Anderson, U.S. Naval Research Laboratory
Dr. Andrew Back, Physical Electronics Inc.
Dr. Paul Smolenyak, Yavapai College
Dr. Darren Dunphy, Sandia National Laboratories **
Dr. Jeff Anderson, Proctor and Gamble Co.
Dr. Peter Skrdla, Merck & Co., Inc. **
Dr. Rebecca (Peterson) Zangmeister, NIST
Dr. John Bradshaw, Artel Inc. **
Dr. Michael Hofmann, Technische Universität Dresden (Germany)
Dr. Carrie Donley, The University of North Carolina at Chapel Hill
Dr. Britt A. Minch, The Lubrizol Corp. **
Dr. Ware Flora, ConAgra Foods, Inc.
Dr. Wei Xia, China Business Executives Academy (China)
Dr. Beatrice Muriithi, Waters Corp.
Dr. Chet Carter, Micron Technologies
Dr. Chenhao Ge, DuPont Apollo Limited (China) **
Dr. Saneeha Marrikar, Huntsman Corp.
Dr. Michael Brumbach, Sandia National Laboratories
Dr. Sergio Paniagua-Barrantes, Intel Co.
Dr. Brooke Beam (University of Arizona) **
Prof. Dana M. Alloway, Concord University
Dr. Niranjani Kumaran, Intel Co.
Dr. Clayton Shallcross (General Atomics)
Dr. P. Alexander Veneman, University of Texas at Austin
Dr. Adam Simmonds (University of Arizona)
Dr. Amy Graham (University of Arizona)
Dr. Diogenes Placencia, U.S. Naval Research Laboratory
Dr. Mariola Macech, Intel Co.
Dr. Judith Jenkins (Eastern Kentucky Univ.)
Dr. Brian Zacher, (University of Arizona)
Dr. Jeremy Gantz, Nike, Portland, OR
Dr. Gordon McDonald (NIST, Boulder, CO)
Dr. Kai-Lin Ou (Lamb Research, Portland, OR)
Dr. Michael Liao (Evans Associates, CA)
Dr. Mario Malfavon, Univ. Calif. San Diego
Ms. Xin Wu
Ms/ Kara Saunders
Dr. James Stanfill, Nanoscience, Phoenix, AZ

Undergraduates

Kathleen Gibson (University Physicians)
Jim White (IBM), Roy Kaller (Gain Technologies)
Tom Patterson (pediatrician, Idaho), Deborah Kaller (Intel), John Fordemwalt (Hewlett-Packard)
Debborah Diehl, Michelle Douskey
Scott Waite (Proctor and Gamble), Cameron Oden, Shawn Kraut, Carole Mars (consultant)
Ron Buchanon (Motorola), Aaron Belsher (Micron)
Brian Nablo (NIST), Christina Hood (Penn State Univ.), Cathie Williamson, Jacob Woodruff
Matt Lawler, Ryan Hernandez (U.S. Navy)
Natalie Thompson, Cindy Taylor, Stephanie Tolbert, Kim Noble, Efram Zacusa, Avery Lindemann,
Brenda Molina, Brittany Lynn
Dan Huebner, Derek Manglesdorf, David Manglesdorf, Sona Avetian McMenamin, Leo Hamerlynk

Postdocs/Visiting Faculty

Dr. William Butner, National Renewable Energy Laboratories (NREL)
Dr. Rosella Brina, consultant
Prof. Lai-Kwan Chau, National Chung-Cheng University (Taiwan)
Dr. Craig England, (Digital Electronics Corp.)

Prof. Claude Arbour, l'Université du Québec à Trois-Rivières (Canada)
Prof. Jean-Pol Dodelet, l'Université du Quebec/INRS (Canada)
Dr. Valorie Valencia, Stellar Research Enterprises, Inc.
Dr. Albert Schmidt, Baumer Optronic GmbH
Prof. James Mills, Fort Lewis College
Prof. Hisao Yanagi, Kobe University (Japan)
Prof. Dr. Derck Schlettwein, Universität Giessen (Germany)
Prof. Rudiger Schlaf, University of South Florida
Prof. Marcus Lawerence, Concordia University (Canada)
Prof. Dr. Torsten Fritz, Universität Jena (Germany)
Dr. Liying Wang, BASF SE
Dr. Thomas Schulmeyer, SPECS Surface Nano Analysis, Inc.
Prof. Dana M. Alloway, Concord University
Assistant Professor Erin Ratcliff (University of Arizona – Materials Sci./Engr.)
Assistant Prof. Andrea Munro, Pacific Lutheran University
Assistant Prof. Weining Wang, Seton Hall University
Dr. Xerxes Steirer
Prof. Weining Wang (Seton Hall Univ.)
Dr. Olga Griffith (Univ. Michigan)
Dr. Xerxes Steirer (National Renewable Energy Laboratories)
Dr. Clayton Shallcross (General Atomics)

PUBLICATIONS https://orcid.org/0000-0003-1456-9612?lang=en

308. "How low can you go? - Defect quantification at the 10^{15} cm^{-3} level in mixed-cation perovskites using differential pulse voltammetry," Michel De Keersmaecker, Neal R. Armstrong, Erin L. Ratcliff, ACS Energy Lett., **2022**, **7**, 4017-4027307; https://doi.org/10.1021/acsenergylett.2c02033
307. "Waveguide-Based Spectroelectrochemical Characterization of Band Edge Energies in Submonolayers of CdSe Quantum Dots Tethered to Indium-Tin Oxide Electrodes," Weijun Sun, Chisom Olikagu, Kyle J. Carothers, Dhruba Pattadar, Jeffrey Pyun, S. Scott Saavedra, Neal R. Armstrong, Journal of Physical Chemistry C, **2022**, 126, 48, 20183–20195 https://doi.org/10.1021/acs.jpcc.2c05692
306. "Rationalizing Energy Level Alignment by Characterizing Lewis Acid/Base and Ionic Interactions at Printable Semiconductor/Ionic Liquid Interfaces," Linze Du Hill, Michel De Keersmaecker, Adam E. Colbert, Joshua W. Hill, Diogenes Placencia, Janice E. Boercker, Neal R. Armstrong, and Erin L. Ratcliff, Materials Horizons, **2022**, 9, 471-481 DOI: 10.1039/D1MH01306H).
305. "Near-Surface Composition, Structure and Energetics of TiO_2 Thin Films: Characterization of Stress-Induced Defect States in Oxides Prepared via Chemical Vapor Deposition versus Solution Deposition from Sol-Gel Precursors," R. Clayton Shallcross and Neal R. Armstrong, invited paper - J. Phys. Chem. C 2021, 125, 43, 24011–24024 -- DOI:10.1021/acs.jpcc.1c05477).
304. "Defect quantification in metal halide perovskites: The solid-state electrochemical alternative," Michel De Keersmaecker, Neal R. Armstrong, and Erin L. Ratcliff, Energy and Environmental Science, **2021**,14, 4840-4846 -- https://doi.org/10.1039/D1EE01525G
303. "Influence of Processing Environment on Surface Composition and Electronic Structure of Size-Quantized CdSe Quantum Dots," R. Clayton Shallcross, Amy L. Graham, Metin Karayilan, Nicholas G. Pavlopoulous, Jordan Meise, Jeffrey Pyun and Neal R. Armstrong, Journal of Physical Chemistry C 124, (**2020**) 21305-21308 - DOI: 10.1021/acs.jpcc.0c05622
302. "Reducing Surface Recombination Velocity of Methylammonium-Free Mixed-Cation Mixed-Halide Perovskites via Surface Passivation," Sarthak Jariwala, Sven Burke, Sean Dunfield, Clayton Shallcross, Margherita Taddei, Jian Wang, Giles E. Eperon, Neal R. Armstrong, Joseph J. Berry, David S. Ginger, Chemistry of Materials, **202**1, 33, 13, 5035–5044 -- doi.org/10.1021/acs.chemmater.1c00848

301. "Overcoming redox reactions at perovskite/nickel oxide interfaces to boost voltages in perovskite solar cells," Caleb C. Boyd, R. Clayton Shallcross, Taylor Moot, Ross Kerner, Luca Bertoluzzi, Arthur Onno, Shalinee Kavadiya, Cullen Chosy, Eli J Wolf, Jérémie Werner, James A Raiford, Camila de Paula, Axel F Palmstrom, Zhengshan J Yu, Joseph J Berry, Stacey F Bent, Zachary C Holman, Joseph M Luther, Erin L. Ratcliff, Neal R Armstrong, Michael McGehee, Joule, 4 (**2020**), 1-4 DOI:10.1016/j.joule.2020.06.004

300. "Zinc Phthalocyanine-Phosphonic Acid Monolayers on ITO: Influence of Molecular Orientation, Aggregation, and Tunneling Distance on Charge Transfer Kinetics, Luis E. Oquendo, Ramanan Ehamparam, Neal R. Armstrong, S. Scott Saavedra, Dominic V. McGrath, J. Phys. Chem. C. 123, 6970-6980 (**2019**) DOI:10.1021/acs.jpcc.8b10301

299. "Impact of TiO_2 surface defects on the interfacial composition and energetics of evaporated perovskite active layers" R. Clayton Shallcross, Selina Olthof, Klaus Meerholz, Neal R. Armstrong, ACS Applied Materials and Interfaces **2019**, 11, 35, 32500–32508; DOI: 10.1021/acsami.9b09935

298. "Challenges and Opportunities at the Nexus of Energy, Water and Food," N.R. Armstrong, R. Clayton Shallcross, Kimberly Ogden, Shane Snyder, Andrea Achilli, Erin L. Armstrong, MRS Energy and Sustainability (www.mrs.org/energy-sustainability-journal) 5, (**2018**) DOI:10.1557/mre.2018.2

297. "Critical interface states controlling rectification of ultrathin NiO-ZnO p-n heterojunctions," K. Xerxes Steirer, Kai Lin Ou, Paul Lee, Neal R. Armstrong, and Erin L. Ratcliff, ACS Applied Materials and Interfaces, 9, 31111–31118 (**2017**) DOI: 10.1021/acsami.7b08899

296. "Axially Bound Ruthenium Phthalocyanine Monolayers on Indium Tin Oxide: Structure, Energetics and Charge Transfer Properties," Ramanan Ehamparam, Luis E. Oquendo, Michael W. Liao, Ambjorn K. Brynnel, Kai-Lin Ou, Neal R. Armstrong, Dominic V. McGrath, and S. Scott Saavedra, ACS Applied Materials & Interfaces, 9, 29213-29223 (**2017**) DOI: 10.1021/acsami.7b07394

295. "Determining Band-edge Energies and Morphology-Dependent Stability of Formamidinium Lead Perovskite Films Using Spectroelectrochemistry and Photoelectron Spectroscopy," R. Clayton Shallcross, Yilong Zheng, S. Scott Saavedra, N.R. Armstrong, J. Amer. Chem. Soc. 139 4866-4878 (**2017**) **DOI:** 10.1021/jacs.7b00516.

294. "Introduction: Electronic Materials," Erin Ratcliff, R. Clayton Shallcross, N.R. Armstrong, Chemical Reviews, 116, 12621-12622 (**2016**) DOI: 10.1021/acs.chemrev.6b00646

293. "Surface modification of indium-tin oxide with functionalized perylene diimides: Characterization of orientation, electron-ˇ-transfer kinetics and electronic structure," Yilong Zheng, Anthony J. Giordano, R. Clayton Shallcross, Sean R. Fleming, Stephen Barlow, Neal R. Armstrong, Seth R. Marder, S. Scott Saavedra, J. Phys. Chem. C. 120, 20040–20048 (**2016**) DOI: 10.1021/acs.jpcc.6b06812

292. "Characterization of ZnO Interlayers for Organic Solar Cells: Correlation of Electrochemical Properties with Thin Film Morphology and Device Performance," Kai-Lin Ou, Ramanan Ehamparam, Gordon MacDonald, Tobias Stubhan, Xin Wu, R. Clayton Shallcross, Robin Richards, Christoph J. Brabec, S. Scott Saavedra, and Neal R. Armstrong, ACS Applied Materials & Interfaces, 8, 19787-19798 (**2016**) DOI: 10.1021/acsami.6b02792

291. "Phosphonic acids for interfacial engineering of transparent conductive oxides," Sergio A. Paniagua, Anthony J. Giordano, O'Neil L. Smith, Stephen Barlow, Hong Li, Neal R. Armstrong, Jeanne E. Pemberton, Jean-Luc Brédas, David Ginger, and Seth R. Marder, Chemical Reviews, 116, 7117–7158, (**2016**) DOI: 10.1021/acs.chemrev.6b00061.

290. "Overcoming Electrode Induced Losses in Organic Solar Cells by Tailoring a Quasi-Ohmic Contact to Fullerenes via Solution-Processed Alkali Hydroxide Layers," Hong Zhang, R. Clayton Shallcross, Ning Li, Tobias Stubhan, Yi Hou, Wei Chen, Tayebeh Ameri, Mathieu Turbiez, Neal R. Armstrong, Christoph J. Brabec, Advanced Energy Materials, 6, 1502195, (**2016**), DOI: 10.1002/aenm.201502195

289. "Solution Processed Titanyl Phthalocyanines as Donors in Solar Cells: Photoresponse to 1000 nm," Mayank Mayukh, Mariola R. Macech, Diogenes Placencia, Yu Cao, Neal R. Armstrong, and Dominic V. McGrath, ACS Applied Materials and Interfaces, 9, 8786-8800 (**2015**), DOI: 10.1021/acsami.5b05900.

288. "Investigation of ultra-thin titania films as hole-blocking contacts for organic photovoltaics," Hyungchul Kim, Kai-Lin Ou, Xin Wu, Paul F. Ndione, Joseph Berry,Yannick Lambert,d Thierry Melin, Neal R. Armstrong and Samuel Graham, J. Mater. Chem. A, 3, 17332-17343, (**2015**), DOI: 10.1039/c5ta04687d

287. "Characterization of Band Edge Energetics and Rates of Charge Injection Processes in Heterostructured Nanorods: Photoemission Spectroscopy and Waveguide Spectroelectrochemistry of Au-Tipped CdSe Nanorod Monolayers," Ramanan Ehamparam, Nicholas Pavlopoulos, Michael W. Liao, Lawrence J. Hill, Neal R. Armstrong, Jeffrey Pyun, S. Scott Saavedra, ACS Nano, 9, 8786–8800, (**2015**); DOI: 10.1021/acsnano.5b01720

286. "Influence of Molecular Orientation on Charge-Transfer Processes at Phthalocyanine/Metal-Oxide Interfaces and Relationship to Organic Photovoltaic Performance," Hsiao-Chu Lin, Gordon A. MacDonald, Yanrong Shi, Nate W. Polaske, Dominic V. McGrath, Seth R. Marder, Neal R. Armstrong, Erin L. Ratcliff, S. Scott Saavedra, J. Phys. Chem. C, 119, 10304-10313 (**2015**) DOI: 10.1021/acs.jpcc.5b02971

285. "Quantifying the Extent of Contact Doping at the Interface between High Work Function Electrical Contacts and Poly(3-hexylthiophene) (P3HT), R. Clayton Shallcross, Tobias Stubhan, Erin L. Ratcliff, Antoine Kahn, Christoph J. Brabec, Neal R. Armstrong, J. Phys. Chem. Lett. 6, 1303-09 (**2015**) DOI: 10.1021/acs.jpclett.5b00444

284. "Nickel oxide interlayer films from nickel formate-ethylenediamine precursor: Influence of annealing on thin film properties and photovoltaic device performance," K. X. Steirer, R. E. Richards, A. K. Sigdel, A. Garcia, P. F. Ndione, S. Hammond, D. Baker, E. L. Ratcliff, C. Curtis, T. Furtak, D. S. Ginley, D. C. Olson, N. R. Armstrong, J. J. Berry, J. Materials Chemistry A, 3, 10949–10958, (**2015**), DOI: 10.1039/c5ta01379h.

283. "Pentafluorophenoxy Boron Subphthalocyanine (F_5BsubPc) as a Multifunctional Material for Organic Photovoltaics," Graham E. Morse, Jeremy L. Gantz, K. Xerxes Steirer, Neal R. Armstrong, and Timothy P. Bender, ACS Applied Mater. Int., *6*, 1515-1524 (**2014**), DOI: 10.1021/am404179z

282. "Structure-Processing-Property Correlations in Solution-Processed, Small-Molecule, Organic Solar Cells," Benjamin H. Wunsch, Mariacristina Rumi, Naga Rajesh Tummala, Chad Risko, Dun-Yen Kang, Xerxes Steirer, Jeremy Gantz, Marcel M. Said, Neal Armstrong, Jean-Luc Brédas, David Bucknall, and Seth Marder, Journal of Materials Chemistry C , *1*, 5250 - 5260 (**2013**), DOI: 10.1039/C3TC30774C.

281. "Organic Solar Cells – At The Interface," Brian Zacher, Jeremy L. Gantz, Robin E. Richards, Neal R. Armstrong, Invited Commentary for the Journal of Physical Chemistry Letters, *4*, 1949–1952, (**2013**), DOI: 10.1021/jz4009932.

280. "Energy level alignment and morphology of Ag and Au nanoparticle recombination contacts in tandem planar heterojunction solar cells," K. Xerxes Steirer, Gordon A. MacDonald, Selina Olthof, Jeremy Gantz, Erin L. Ratcliff, Antoine Kahn, Neal R. Armstrong, J. Phys. Chem. C., Invited (Ron Naaman Festschrift), **2013** DOI:10.1021/jp402672j

279. "Titanium Dioxide Electron-Selective Interlayers Created by Chemical Vapor Deposition for Inverted Configuration Organic Solar Cells," Kai-Lin Ou, Delvin Tadytin, K. Xerxes Steirer, Diogenes Placencia, Mike Nguyen, Paul Lee, and Neal R. Armstrong, J. Mater. Chem. A, **1,** 6794 – 6803 (**2013**), DOI: 10.1039/C3TA10894E**.**

278. "Influence of Electrode Surface Composition and Energetics on Small-Molecule Organic Solar Cell Performance: Polar Versus Non-Polar Donors on ITO Contacts," Jeremy Gantz, Diogenes Placencia, Anthony Giordano, Seth R. Marder, Neal R. Armstrong, J. Phys. Chem. C., 117 1205–1216 (2013). DOI: 10.1021/jp307546v.

276. "Electrical Property Heterogeneity at Transparent Conductive Oxide/Organic Semiconductor Interfaces: Mapping Contact Ohmicity Using Conducting-Tip Atomic Force Microscopy," Gordon MacDonald, P. Alex Veneman, Diogenes Placencia, Neal R. Armstrong, ACS Nano *6*, 9623–9636, (**2012**). DOI: 10.1021/nn303043y.

275. "Built-in Potential in Conjugated Polymer Diodes with Changing Anode Work Function: Interfacial States and Deviation from the Schottky-Mott Limit," Bradley MacLeod; Noah Horwitz; Erin Ratcliff; Judith Jenkins; Neal R. Armstrong; Anthony Giordano; Peter Hotchkiss; Seth Marder; Charles Campbell; David Ginger, J. Phys. Chem. Lett., *3*, 1202–1207, (**2012**) DOI: 10.1021/jz300283h

274. "Electron Transfer Processes in Monolayer-Tethered Zinc Phthalocyanines: Characterization by Waveguide Spectroelectrochemistry, Voltammetry, and Potential-Modulated Attenuated Total Reflectance (PM-ATR)," Hsiao-Chu Lin, Nathan W. Polaske, Luis E. Oquendo, Matthew Gliboff, Kristina M. Knesting, Dennis Nordlund, David S. Ginger, Erin L. Ratcliff, Brooke M. Beam, Neal R. Armstrong, Dominic V. McGrath, S. Scott Saavedra, J. Phys. Chem. Lett. *3*, 1154–1158, (**2012**) DOI: 10.1021/jz3002426

273. "Energy level alignment in PCDTBT:$PC_{70}BM$ solar cells: solution processed NiO_x for improved hole collection and efficiency," Erin L. Ratcliff, Jens Meyer, K. Xerxes Steirer, Neal R. Armstrong, Dana Olson, and Antoine Kahn, Organic Electronics, *13*, 744-749, (**2012**). DOI: 10.1016/j.orgel.2012.01.022

272. "Surface-Initiated Synthesis of Poly(3-methylthiophene) from Indium Tin Oxide and its Electrochemical Properties," Natalia Doubina, Judith L. Jenkins, Sergio A. Paniagua, Katherine A. Mazzio, Gordon A. MacDonald, Alex K.-Y. Jen, Neal R. Armstrong, Seth R. Marder, Christine K. Luscombe, Langmuir, *28*, 1900–1908, (**2012)**. DOI: 10.1021/la204117u

271. "Phosphonic Acid Functionalized Asymmetric Phthalocyanines: Synthesis, Modification of Indium Tin Oxide (ITO), and Charge Transfer," Nathan W. Polaske, Hsiao-Chu Lin, Anna Tang, Mayunk Mayukh, Luis Oquendo, John T. Green, Erin L. Ratcliff, Neal R. Armstrong, S. Scott Saavedra, and Dominic V. McGrath, Langmuir, *27*, 14900–14909, (**2011**). DOI: 10.1021/la203126c

270. "Characterization of surface composition and energetics of solution processed NiO_x selective interlayer materials for use in polymer bulk heterojunction organic photovoltaics," Erin L. Ratcliff,[†]* Jens Meyer,[‡] K. Xerxes Steirer, [§] Andres Garcia, [§] Joseph J. Berry, [§] David S. Ginley, [§] Dana C. Olson, [§] Antoine Kahn,[‡] Neal R. Armstrong, Chemistry of Materials, 23, 4988-5000 (**2011**).

269. "Modeling Nanometer-Scale Heterogeneity in the Electrical Properties of Contacts in Organic Solar Cells," Brian Zacher, Neal R. Armstrong, J. Phys. Chem. C. *115*, 25496–25507, (**2011**). DOI: 10.1021/jp207471f

268. "Highly Photoactive Titanyl Phthalocyanine Polymorphs as Textured Donor Layers in Organic Solar Cells," Diogenes Placencia, Weining Wang, Jeremy Gantz, Judith Jenkins, Neal R. Armstrong, J. Phys. Chem. C. 115, 18873-18884 (**2011**).

267. "The Modification of Indium Tin Oxide with Phosphonic Acids: Mechanism of Binding, Tuning of Surface Properties, and Potential for use in Organic Electronic Applications," Peter Hotchkiss, Simon Jones, Sergio Paniagua, Bernard Kippelen, Neal R. Armstrong, Asha Sharma, Seth Marder, Accounts of Chemical Research, *45*, 337–346 (**2012**). DOI: 10.1021/ar200119g

266. "Poly(aniline) nanowires in sol-gel coated ITO: A pH-responsive substrate for planar supported lipid bilayers," Chenhao Ge, Kristina S. Orosz, Neal R. Armstrong, and S. Scott Saavedra, ACS Applied Materials and Interfaces, 3, 2677-2685 (**2011**)

265. "Selective Interlayers and Contacts in Organic Photovoltaic Cells," Erin L. Ratcliff, Brian Zacher, and Neal R. Armstrong, J. Phys. Chem. Letters – Perspective – **Invited**, J. Phys. Chem. Lett. 2, 1337–1350 (**2011**).

264. "Enhanced efficiency in plastic solar cells via energy matched solution processed NiOx Interlayers," K. Xerxes Steirer, Paul F. Ndione, N. Edwin Widjonarko, Matthew T. Lloyd, Jens Meyer, Erin Ratcliff, Antoine Kahn, Neal R. Armstrong, Calvin J. Curtis, David S. Ginley, Joseph J. Berry, and Dana C. Olson, Advanced Energy Materials, **2011**, 1, 813-820 (**2011**).

263. "Characterization of Phosphonic Acid Binding to Zinc Oxide," Peter J. Hotchkiss, Michał Malicki, Anthony J. Giordano, Neal R. Armstrong and Seth R. Marder, J. Mater. Chem., 21, 3107-3112 (**2011**).
262. "Surface composition, work function and electrochemical characteristics of gallium-doped zinc oxide (GZO) semi-transparent electrodes," Erin L. Ratcliff, Ajaya K. Sigdel, Mariola R. Macech, Kenneth Nebesny, Paul A. Lee, David S. Ginley, Neal R. Armstrong, Joseph J. Berry, Thin Solid Films, 520, 5652-5663 (**2012**). DOI: 10.1016/j.tsf.2012.04.038
261. "Colloidal Polymerization of Polymer-Coated Ferromagnetic Cobalt Nanoparticles into Pt-Co_3O_4 Nanowires," Pei Yuin Keng, Mathew M. Bull, In-Bo Shim, Kenneth G. Nebesny, Neal R Armstrong, and Jeffrey Pyun, Chemistry of Materials, 23, 1120–1129 (**2011**)
260. "Planar and textured heterojunction organic photovoltaics based on chloroindium phthalocyanine (ClInPc) versus titanyl phthalocyanine (TiOPc) donor layers," Weining Wang, Diogenes Placencia, Neal R. Armstrong, Organic Electronics, 12, 383–393, (**2011**)
259. "Potential-modulated attenuated total reflectance (PMATR) characterization of charge injection processes in monolayer-tethered CdSe nanocrystals, Zeynep Ozkan Araci, Clayton R. Shallcross, Neal R. Armstrong and S. Scott Saavedra, JPC Letters, 1, 1900–1905, (**2010**)
258. "Photoemission spectroscopy of tethered CdSe nanocrystals: Shifts in ionization potential and local vacuum level as a function of nanocrystal capping ligand," Andrea Munro, Brian Zacher, Amy Graham, Neal R. Armstrong, ACS Applied Materials and Interfaces, 2, 863-869, (**2010**).
257. "Waveguide-Based Chemical and Spectroelectrochemical Sensor Platforms," Brooke M. Beam, Adam Simmonds, P. Alex Veneman, Erin Ratcliff, Sergio B. Mendes, S. Scott Saavedra, Neal R. Armstrong, ECS Transactions, 19, 109-117 (**2009**).
256. "A Planar, Chip-Based, Dual-Beam Refractometer Using an Integrated Organic Light Emitting Diode (OLED) Light Source and Organic Photovoltaic (OPV) Detectors," Erin L. Ratcliff, P. Alex Veneman, Adam Simmonds, Brian Zacher, Daniel Huebner, S. Scott Saavedra, Neal R. Armstrong, Analytical Chemistry, 82, 2734-2742, (**2010**)
255. "Work function control of hole-selective polymer/ITO anode contacts: an electrochemical doping study." Erin L. Ratcliff, Paul A. Lee, and Neal R. Armstrong, J. Mater. Chem. (invited for themed issue on Interface Engineering of Organic and Molecular Electronics, 20, 2672-2679 (2010).
254. "Synthesis and Colloidal Polymerization of Ferromagnetic Au- Co Nanoparticles into Au-Co_3O_4 Nanowires, Bo Yun Kim, In-Bo Shim, Zeynap Ozkan, S. Scott Saavedra, Oliver L.A. Monti, Neal R Armstrong, Rabindra Sahoo, Divesh N. Srivastava, and Jeffrey Pyun, J. Amer. Chem. Soc., 132, 3234-35, (**2010**)
253. "Efficient CdSe Nanocrystal Diffraction Gratings Prepared by Microcontact Molding," R. Clayton Shallcross, Gulraj S. Chawla, F. Saneeha Marikkar, Stephanie Tolbert, Jeffrey Pyun, Neal R. Armstrong, ACS Nano, 3, 3629-3637 (**2009**).
252. "Photoelectrochemical Processes in Polymer-Tethered CdSe Nanocrystals, R. Clayton Shallcross, Gemma D. D'Ambruoso, Jeffrey Pyun, Neal R. Armstrong, J. Amer. Chem. Soc., 132, 2622-2632, (**2010**).
251. "Ferrocene Functional Polymer Brushes on Indium Tin Oxide via Surface-Initiated Atom Transfer Radical Polymerization," Kim, Bo Yun, Ratcliff, Erin L., Armstrong, Neal R., Kowalewski, Tomasz, Pyun, Jeffrey, Langmuir, 26, 2083-2092 (**2009**).
250. "Tuning the Effective Work Function of Gold and Silver Using ω-Functionalized Alkanethiols: Varying Surface Composition through Dilution and Choice of Terminal Groups," Dana M. Alloway, Amy L. Graham, Xi Yang, Anoma Mudalige, Ramon Colorado, Jr., Vicki H. Wysocki , Jeanne E. Pemberton, T. Randall Lee, Ronald J. Wysocki, Neal R. Armstrong, Journal of Physical Chemistry C, 113, 20328-20334 (**2009**).
249. "Evaluation of Transparent Carbon Nanotube Networks of Homogeneous Electronic Type," Roderick K. Jackson, Andrea Munro, Kenneth Nebesny, Neal Armstrong, Samuel Graham, Nano Letters, 4, 1377–1384 (**2010**).

248. "Colloidal Polymerization of Polymer Coated Ferromagnetic Nanoparticles into Cobalt Oxide Nanowires," Pei Yuin Keng, Bo Yun Kim, Inbo Shim, Rabindra Sahoo, P. Alex Veneman, Neal R. Armstrong, Heemin Yoo, Jeanne E. Pemberton, Mathew M. Bull, Jared J. Griebel, Erin L. Ratcliff, Kenneth G. Nebesny, Jeffrey Pyun, ACS Nano, 3, 3143-3157 (**2009**).

247. "Oxide Contacts in Organic Photovoltaics: Characterization and Control of Near-SurfaceComposition in Indium-Tin Oxide (ITO) Electrodes," Neal R. Armstrong, P. Alex Veneman, Diogenes Placencia, Erin Ratcliff, Michael Brumbach, Accounts Chemical Research (**Invited**), 42, 1748-1757 (**2009**).

246. "Modification of the Surface Properties of Indium Tin Oxide with Benzylphosphonic Acids: A Joint Experimental and Theoretical Study" by Peter J. Hotchkiss, Hong Li, Pavel B. Paramonov, Sergio A. Paniagua, Simon C. Jones, Neal R. Armstrong, Jean-Luc Brédas, Seth R. Marder Advanced Materials, 21, 4496-4502 (**2009**).

245. "Organic/Organic' Heterojunctions: Organic Light Emitting Diodes and Organic Photovoltaic Devices," Neal R. Armstrong, Weining Wang, Dana M. Alloway, Diogenes Placencia, Erin Ratcliff, Michael Brumbach, **Invited Review**, Macromol. Rapid Commun. **2009**, 30, 717–731.

244. "Site-isolated, Intermolecularly Photocrosslinkable and Patternable Dendritic Quinacridones," Gemma D. D'Ambruoso, Eric E. Ross, Neal R. Armstrong and Dominic V. McGrath, Chem. Comm. 22, 3222-3224 (**2009**).

243. "Organic Photovoltaic Cells Based On Solvent-Annealed, Textured Titanyl Phthalocyanine/C_{60} Heterojunctions, Diogenes Placencia, Weining Wang, R. Clayton Shallcross, Kenneth W. Nebesny, Michael Brumbach, Neal R. Armstrong, Advanced Functional Materials, 19, 1913-1921 (**2009**).242. "An Electroactive Fiber Optic Chip for Spectroelectrochemical Characterization of Ultra-Thin Redox Active Films, Brooke M. Beam, Neal R. Armstrong, Sergio B. Mendes, Analyst, 134, 454–459 (**2009**).

241. "Organic Heterojunctions of Layered Perylene and Phthalocyanine Dyes: Characterization with UV Photoelectron Spectroscopy and Luminescence Quenching," Dana Alloway, Neal R. Armstrong, Appl. Phys. A., 95, 209-218 (**2009**).

240. "Broadband Spectroelectrochemical Interrogation of Molecular Thin Films by Single-Mode Electro-Active Integrated Optical Waveguides, Sergio B. Mendes, S. Scott Saavedra, Neal R. Armstrong, in "Optical Guided-Wave Chemical and Biosensors," Zourob, M. and Lakhtakia, A. eds; Springer-Verlag book series on "Chemical Sensors and Biosensors," Springer Series on Chemical Sensors and Biosensors, **2010**, pp. 101-129.

239. "Theoretical characterization of the indium tin oxide surface and of its binding sites for adsorption of phosphonic acid monolayers," Pavel B. Paramonov, Sergio A. Paniagua, Peter J. Hotchkiss, Simon C. Jones, Neal R. Armstrong, Seth R. Marder, and Jean-Luc Brédas, Chemistry of Materials, 20, 5131-5133 (**2008**).

238. "Electrodeposited, "Textured" poly(3-hexyl-thiophene) (e-P3HT) Films for Photovoltaic Applications," Erin L. Ratcliff, Judith L. Jenkins, Ken Nebesny and Neal R. Armstrong, Chemistry of Materials 20, 5796-5806 (**2008**).

237. "Hydrogen Bonded Phthalocyanine Aggregates," Niranjani Kumaran, Britt A. Minch, Neil Jacobsen, David F. O'Brien, Neal R. Armstrong, Chemistry of Materials, 22, 2491–2501 (**2010**).

236. "Phosphonic Acid Modification of Indium-Tin Oxide Electrodes: Combined XPS/UPS/Contact Angle Studies," Sergio A. Paniagua, Peter J. Hotchkiss, Simon C. Jones, Seth R. Marder,Anoma Mudalige, F. Fathima Saneeha Marrikar, Jeanne E. Pemberton, Neal R. Armstrong, J. Phys. Chem. C. (invited paper, Larry Dalton Festschrift) J. Phys. Chem. C 112, 7809–7817 (**2008**).

235. "Titanyl Phthalocyanine/C_{60} Heterojunctions: Band-Edge Offsets and Photovoltaic Device Performance," Michael Brumbach, Diogenes Placencia, Neal R. Armstrong, J. Phys. Chem. C. 112, 3142-3151 (**2008**).

234. "Surface Composition, Electrical and Electrochemical Properties of Freshly Deposited and Acid-Etched Indium-Tin Oxide Electrodes," Michael Brumbach, P. Alex Veneman, F. Saneeha Marrikar, Thomas Schulmeyer, Adam Simmonds, Wei Xia, Paul Lee, Neal R. Armstrong, Langmuir, 23, 11089-11099, (**2007**).

233. "Characterization of the Angular Orientation Distribution of Discotic Molecules in Thin Film Assemblies: Combinations of Polarized Transmission and Reflection- Absorption Infrared Spectroscopies," Niranjani Kumaran, Carrie Donley, Sergio B. Mendes, Neal R. Armstrong, Journal of Physical Chemistry A, 112, 4971-4977 (**2008**).

232. "Conducting Polymer Diffraction Gratings on Gold Surfaces Created by Micro-Contact Printing and Electropolymerization at Sub-Micron Length Scales," F. Saneeha Marikkar, Chet Carter, Kathy Kieltyka, Joey Robertson, Cathie Williamson, Adam Simmonds, Rebecca Zangmeister, Torsten Fritz, Neal R. Armstrong, Langmuir, 23, 10395-10402, (**2007**).

231. "Poly-(3, 4-ethylenedioxythiophene)-Semiconductor Nanoparticle Composite Thin Films Tethered to Indium Tin Oxide Substrates via Electropolymerization," R. Clayton Shallcross, Gemma D. D'Ambruoso, Bryan D. Korth, H.K. Hall Jr., Zhiping Zheng, Jeffrey Pyun, Neal R. Armstrong J. Amer. Chem. Soc., 129, 11310-11311, (**2007**).

230. "Surface Modification of $BaTiO_3$ Thin Films: Adjustment of the Effective Surface Work Function," T. Schulmeyer, S.A. Paniagua, P.A. Veneman, S. C. Jones, P. J. Hotchkiss, A. Mudalige, J. E. Pemberton, S. R. Marder, N. R. Armstrong, Journal of Materials Chemistry, 17, 4563-4570, (**2007**).

229. "Optical Spectroscopies on a Planar Fiber Optic Chip," Brooke M. Beam, R. Clayton Shallcross, Jinuk Jang, Neal R. Armstrong, and Sergio B. Mendes, Applied Spectroscopy, 61, 582-595, (**2007**).

228. "Discotic Mesophase Materials: Their Use in Organic Field-Effect Transistors and Organic Photovoltaics," Neal R. Armstrong, Wei Xia, Britt Minch, Adam Simmonds, Chet Carter, Carrie L. Donley, Rebecca A.P. Zangmeister, Anthony Drager, Samir K. Cherian, Lynn LaRussa, Bernard Kippelen, Seunghyup Yoo, Benoit Domercq, David L. Mathine, David F. O'Brien, in "Electron Transfer in Nanomaterials," G. Rumbles, T. Lian, K. Murakoshi, eds. ECS Publications – PV 2004-22, 376-384 (**2006**).

227. "pH-Sensing Properties of Poly(Aniline) Ultrathin Films Self-Assembled on Indium-Tin Oxide," Chenhao Ge, Neal R. Armstrong, S. Scott Saavedra, Analytical Chemistry, 79, 1401-1410, (**2007**).

226. "Small Molecule Chemisorption on Indium-Tin Oxide Surfaces: Enhancing Probe Molecule Electron Transfer Rates and the Performance of Organic Light Emitting Diodes," Chet Carter, Michael Brumbach, Carrie Donley, Richard D. Hreha, Seth R. Marder, Benoit Domercq, SeungHyup Yoo, Bernard Kippelen, Neal R. Armstrong, J. Phys. Chem. B., 110, 25191-25202 (**2006**).

225. "Modification of Indium-Tin Oxide Electrodes with Thiophene Copolymer Thin Films: Optimizing Electron Transfer to Solution Probe Molecules," F. Saneeha Marrikar, Michael Brumbach, Dennis H. Evans, Ariel Lebrón-Paler, Jeanne E. Pemberton, Ronald J. Wysocki, Neal R. Armstrong, Langmuir, 23, 1530-1542 (**2007**).

224. "Dendritic Arrays of the $[Re_6(\mu_3\text{-}Se)_8]^{2+}$ Core-Containing Clusters: Exploratory Synthesis and Electrochemical Studies," Bryan K. Roland, Ware H. Flora, Hugh D. Selby, Neal R. Armstrong, and Zhiping Zheng, J. Amer. Chem. Soc., 128, 6620-6625 (**2006**).

223. "Electrochemically Tunable Surface-Plasmon-Enhanced Diffraction Gratings and Their Bio-sensing Applications," Shengjun Tian, Neal R. Armstrong, and Wolfgang Knoll, Langmuir, 21, 4656-4660 (**2005**).

222. "Potential-Modulated, Attenuated Total Reflectance Spectroscopy of Poly(3,4 Ethylenedioxy-thiophene) (PEDOT) and Poly(3,4-Ethylenedioxythiophene Methanol) (PEDTM) Copolymer Films on Indium-Tin Oxide," Walter J. Doherty III, Ronald J. Wysocki Jr., Neal R. Armstrong, and S. Scott Saavedra, J. Phys. Chem. B. *110,* 4900-4907 (**2006**).

221. "Electrochemical Copolymerization and Spectroelectrochemical Characterization of 3,4-Ethylene-dioxythiophene (EDOT) and 3,4-Ethylenedioxythiophene Methanol (EDTM) Copolymers on Indium-Tin Oxide," Walter Doherty, Ronald Wysocki, Neal R. Armstrong, S. Scott Saavedra, Macromolecules, *39*, 4418-4424 (**2006**).

220. "Tetrameric arrays of the [Re6(μ3-Se)8]2+ clusters supported by a porphyrin core: synthesis, characterization, and electrochemical studies," Bryan K. Roland,Ware H. Flora, Neal R. Armstrong, Zhiping Zheng, Comptes Rendus Chimie 8, 1798–1807 (**2005**).

219. "Covalently Bound Hole-Injecting Nanostructures. Systematics of Molecular Architecture, Thickness, Saturation, and Electron-Blocking Characteristics on Organic Light-Emitting Diode Luminance, Turn-on Voltage, and Quantum Efficiency," Qinglan Huang, Guennadi A. Evmenenko, Pulak Dutta, Paul Lee, Neal R. Armstrong, and Tobin J. Marks, J. Amer. Chem. Soc. 127, 10227-10242 (**2005**).

218. "Molecular Ordering in Monolayers of Perylenebisimide Dyes by Visible Regime Attenuated Total Reflectance (ATR) Spectroscopy," Walter J. Doherty III, Adam G. Simmonds, Sergio B. Mendes, Neal R. Armstrong, S. Scott Saavedra, Applied Spectroscopy, 59, 1248-1256 (**2005**).

217. "Modeling of organic photovoltaic cells with large fill factor and high efficiency," S. Yoo, B. Domercq, S. R. Marder, N. R. Armstrong, and B. Kippelen, *Organic Photovoltaics V*, Proc. SPIE Int. Soc. Opt. Eng. 5520, 110 (**2004**).

216. "Characterization of Proton Transport Across a Waveguide-Supported Lipid Bilayer, Todd W. McBee, Liying Wang, Chenhao Ge, Brooke Beam, Ana L. Moore, Devens Gust, Thomas A. Moore, Neal R. Armstrong, and S. Scott Saavedra1, J. Amer. Chem. Soc., 128, 2184-2185 (**2006).**

215. "Conducting Polymer Growth in Porous Sol-Gel Thin Films: Formation of Nanoelectrode Array and Mediated Electron Transfer to Sequestered Macromolecules," Walter J. Doherty III, Neal R. Armstrong, S. Scott Saavedra, Chemistry of Materials, 17, 3652-3660 (**2005**).

214. "High-Performance Hole Transport Layers for Polymer Light-Emitting Diodes. Implementation of Organosiloxane Crosslinking Chemistry in Polymeric Electroluminescent Devices," He Yan, Paul Lee, Amy Graham, Neal R. Armstrong, Guennadi A. Evmenenko, Pulak Dutta, and Tobin J. Marks, J. Amer. Chem. Soc. 127, 3172-3183 (**2005**).

213. "Modification of Transparent Conducting Oxide (TCO) Electrodes Through Silanization and Chemisorption of Small Molecules," Michael Brumbach, Neal R. Armstrong, Encyclopedia of Electrochemistry. Volume 10 - Modified Electrodes, M. Fujihira, I. Rubenstein, J. Rusling, (Volume 10 eds.), A.J. Bard, M. Stratmann, eds. Wiley-VCH, 15-29 (**2007**).

212. "Octakis(2-benzyloxyethylsulfanyl) Copper (II) Phthalocyanine: A New Liquid Crystalline Discotic Material with Benzyl-Terminated, Thioether-linked-Side Chains," Britt A. Minch, Wei Xia, Carrie L. Donley, Ryan M. Hernandez, Chet Carter, Michael D. Carducci, Alice Dawson, David F. O'Brien, Neal R. Armstrong, Chemistry of Materials, 17, 1618-1627 (**2005**).

211. "Dendritic Incorporation of Quinacridone: Solubility, Aggregation, Electrochemistry, and Solid State Luminescence," Adrian Ortiz, Ware H. Flora, Gemma D. D'Ambruoso, Neal R. Armstrong, and Dominic V. McGrath, Chem. Comm. **2005**, 444–446.

210. "Determination of Molecular Anisotropy in Thin-Films of Discotic Assemblies Using Attenuated Total Reflectance UV-Visible Spectroscopy," Ware Flora, Sergio Mendes, Walter Doherty III, S. Scott Saavedra, Neal R. Armstrong, Langmuir, 21, 360-368 (**2005**).

209. "LB Films of Rod-Like Phthalocyanine Aggregates: Specular X-Ray Reflectivity Studies of the Effect of Interface Modification on Coherence and Microstructure," Wei Xia, Britt Minch, Mike Carducci, N.R. Armstrong, Langmuir, 20, 7998-8005 (**2004**).

208. "Effects of Field Effect Mobility and Contact Barriers on Liquid Crystalline Phthalocyanine Organic Transistors," Samir Cherian, Carrie Donley, David Mathine, Wei Xia, Lynn LaRussa, Neal R. Armstrong, Journal of Applied Physics, 96, 5635-5643, (**2004**)

207. "Liquid-crystal approaches to organic photovoltaics," Bernard Kippelen, Seunghyup Yoo, Joshua A. Haddock, Benoit Domercq, Stephen Barlow, Britt Minch, Wei Xia, Seth.R. Marder, and Neal R. Armstrong, in "Organic Photovoltaics," S. Sariciftci and S. Sun Editors, Marcel Dekker, New York (**2004**), pp 271-298.

206. "An Inorganic-Organic Hybrid Composite Featuring Metal Chalcogenide Clusters," B.K. Roland, W.H. Flora, M.D. Carducci, N.R. Armstrong, Z. Zheng, J. Cluster Sci., 14, 449-458, (**2003**).

205. "Patterned Deposition of Tobacco Mosaic Virus on Mica Surfaces," S. Jones-Willy, W. Xia, S.S. Saavedra, N.R. Armstrong, in "Biological and Bio-Inspired Materials Assembly," T. Deming, A.E. Barron, H.-A. Klok, eds., "Architecture and Applications of Biomaterials and Biomolecular Materials," (Volume #EXS-1), Materials Research Society Publications, **2004**.

204. "Organic photovoltaic cells containing discotic liquid crystalline phthalocyanines," S. Yoo, B. Domercq, C.L. Donley, C. Carter, W. Xia, B.A. Minch, D.F. O'Brien, N.R. Armstrong, B. Kippelen, International Symposium Organic Materials and Nanotechnology, -- SPIE volume 5215 -- Organic Photovoltaics IV, pp. 71-78 (**2004**).

203. "Anisotropies in the Electrical Properties of Rod-Like Aggregates of Liquid Crystalline Phthalocyanines: D.C. Conductivities and Field-Effect Mobilities," C.L. Donley, R.A.P. Zangmeister, W. Xia, B. Minch, A.S. Drager, S.K. Cherian, L. LaRussa, B. Kippelen, B. Domercq, D.L. Mathine, D.F. O'Brien, N.R. Armstrong, Journal of Materials Research, 19, 2087-2099 (**2004**).

202. "Voltammetric and Waveguide Spectroelectrochemical Characterization of Ultrathin Poly(Aniline)/Poly(Acrylic Acid) Films Self-Assembled on Indium-Tin Oxide," Chenhao Ge, Sergio B. Mendes, Neal R. Armstrong, S.Scott Saavedra, Talanta, 65, 1126-1131 (**2005**).

201. "Interface Modification of ITO Thin Films: Organic Photovoltaic Cells," N.R. Armstrong, C. Carter, C. Donley, A. Simmonds, P.A. Lee, M. Brumbach, B. Kippelen, B. Domercq, S. Yoo, Thin Solid Films, 445, 342-352 (**2003**).

200. "Interface Dipoles Arising from Self-Assembled Monolayers on Gold: UV-Photoemission Studies of Alkanethiols and Partially Fluorinated Alkanethiols," D. Alloway, M. Hofmann, D.L. Smith, N.E. Gruhn, A.L. Graham, R. Colorado, Jr., V.H. Wysocki, T. R. Lee, P.A. Lee, N.R. Armstrong, J. Phys. Chem. B. 107, 11690-11699 (**2003**)**.**

199. "Thin Films of Polymerized Rod-Like Phthalocyanine Aggregates," C.L. Donley, W. Xia, B. Minch, R.A.P. Zangmeister, A.S. Drager, K.W. Nebesny, D.F. O'Brien, N.R. Armstrong, Langmuir, 19, 6512-6522 (**2003**).

198. "Interfacial Trap States in Junctions of Molecular Semiconductors," D. Schlettwein, T. Oekermann, N. Jaeger, N.R. Armstrong, D. Wöhrle, Chemical Physics, 285, 103-112 (**2002**).

197. "Broadband Coupling Into a Single-Mode, Electroactive Integrated Optical Waveguide for Spectroelectrochemical Analysis of Surface-Confined Redox Couples," J.T. Bradshaw, S.B. Mendes, N.R. Armstrong, S.S. Saavedra, Analytical Chemistry, 75, 1080-1088, (**2003**).

196. "Guest Emission Processes in Doped Organic Light-Emitting Diodes: Use of Phthalocyanine and Naphthalocyanine Near-IR Dopants," W.H. Flora, H.K. Hall, N.R. Armstrong, J. Phys. Chem. B.,107, 1142-1150, (**2003**).

195. "Starch-iodine films respond to water vapor," P.J. Skrdla, N.R. Armstrong, S.S. Saavedra, Analytica Chimica Acta, 455, 49-52, (**2002**).

194. "Progress in High Work Function TCS OLED Anode Alternatives and OLED Nanopixelation," T.J. Marks, J.G.C. Veinot, J. Cui, H. Yan, A. Wang, N.L. Edelman, J. Ni, Q. Huang, P. Lee, N.R. Armstrong, Synthetic Metals, 127, 29-35 (**2002**).

192. "A Broadband Spectroelectrochemical ATR Instrument for Molecular Adlayer Studies," W.J. Doherty, C.L. Donley, N.R. Armstrong, S.S. Saavedra, Applied Spectroscopy, 56, 920-927, (**2002**).

191. "Characterization of Indium-Tin Oxide Interfaces Using X-ray Photoelectron Spectroscopy and Redox Processes of a Chemisorbed Probe Molecule: Effect of Surface Pretreatment Conditions," C.L. Donley, D.R. Dunphy, D. Paine, C. Carter, K.W. Nebesny, P.A. Lee, D. Alloway, N.R. Armstrong, Langmuir, 18, 450-457, (**2002**).

190. "Selective Deposition of Rod-like Phthalocyanine Aggregates on Au Surfaces Patterned with a Combination of Microcontact Printing and Electropolymerization," R.A.P. Zangmeister, D.F. O'Brien, N.R. Armstrong, Advanced Functional Materials, 12, 179-186, (**2002**).

189. "Transfer of rod-like aggregate phthalocyanines to hydrophobized gold and silicon surfaces: Effect of phenyl-terminated surface modifiers on thin film transfer efficiency and molecular orientation, Zangmeister, R. A. P., Smolenyak, P. E., Drager, A. S., O'Brien, D. F. & Armstrong, N. R. Langmuir 17, 7071-7078 (**2001**)**.**

188. "Indium-Tin Oxide/Organic Interfaces, C.L. Donley, D.R. Dunphy, W.J. Doherty, R.A.P. Zangmeister, A.S. Drager, D.F. O'Brien, S.S. Saavedra, N.R. Armstrong, in "Molecules as Components in Electronic Devices," M. Lieberman, ed., ACS Symposium Series #844, 133-153 (**2003**).

187. "Planar Integrated Optical Waveguide Sensor for Isopropyl Alcohol in Aqueous Media," P.J. Skrdla, S.B. Mendes, N.R. Armstrong, S.S. Saavedra, Journal of Sol-Gel Science and Technology, 24, 167-173, (**2002**).

186. "Interface electronic structure of organic semiconductors with controlled doping," J. Blochwitz, T. Fritz, M. Pfeiffer, K. Leo, D.M. Alloway, P.A. Lee, N.R. Armstrong, Organic Electronics, 2, 97-104, (**2001**).

185. "Indium-Tin Oxide Alternatives -- High Work Function Transparent Conducting Oxides as Anodes for Organic Light-Emitting Diodes," J. Cui, A. Wang, N.L. Edelman, P.A. Lee, N.R. Armstrong, T.J. Marks, Advanced Materials, 13, 1476-1480, (**2001**).

184. "Organic Molecular Beam Epitaxy (OMBE): Creation of Ordered Organic Thin Films and Organic/Organic' Heterojunctions," D. Schlettwein, D. Alloway, A. Back, K.W. Nebesny, P.A. Lee, N.R. Armstrong, **invited chapter** in the Encyclopedia of Surface and Colloid Science, A. Hubbard, ed., Marcel Dekker, Inc., available online at **www.dekker.com** -- pp. 3842-3857, (**2002**), published in print in the second edition -- Encyclopedia of Surface and Colloid Science, Second Edition; Taylor & Francis: New York, (**2006**); 6, pp. 4349 - 4363.

183. "One-Dimensional Polymers of Octasubstituted Phthalocyanines,"A.S. Drager, R.A.P. Zangmeister, A. Somoygi, N.R. Armstrong, D.F. O'Brien, J. Amer. Chem. Soc., 123, 3595-96, (**2001**).

182. "Nanometer-Level Dielectric Self-Assembly Process for Anode Passivation, Charge Injection Balance, and Luminous Efficiency Enhancement in Organic Light-Emitting Diodes," Joshua E. Malinsky, Homer Chou, Ghassan E. Jabbour, Sean E. Shaheen, Jeffrey D. Anderson, Paul Lee, Andrew G. Richter, Tobin J. Marks, Neal R. Armstrong, Bernard Kippelen, Pulak Dutta, Nasser Peyghambarian, Chemistry of Materials, 14, 3054-3065, (**2002**).

181. "Electronic Energy Levels in Individual Molecules, Thin Films, and Organic Heterojunctions of Substituted Phthalocyanines," D. Schlettwein, K. Hesse, N.E. Gruhn, P.A. Lee, K.W. Nebesny, N.R. Armstrong, J. Phys. Chem. B. 105, 4791-4800, (**2001**).

180. "Joint Experimental and Theoretical Characterization of The Electronic Structure of 4,4'-Bis(*N*-m-tolyl-*N*-phenylamino)biphenyl (TPD) and Substituted Derivatives," J. Cornil, N.E. Gruhn, D.A. dos Santos, M. Malagoli, P.A. Lee, S. Barlow, S.R. Marder, N.R. Armstrong, and J.L. Brédas, J. Phys. Chem. A. 105, 5206-5211, (**2001**).

179. "Light Emitting Electrochemical Processes," N.R. Armstrong, R.M. Wightman, E.M. Gross, **invited review**; Annu. Rev. Phys. Chem. 52, 391-422, (**2001**)

178. "Indium-Tin Oxide Thin Films For Characterization of Electrochemical Processes in Molecular Assemblies: Surface Characterization and Surface Modification," C. L. Donley, D.R. Dunphy, R.A. Peterson, K.W. Nebesny, N.R. Armstrong, **invited chapter** in "Conducting Polymers and Molecular Assemblies: Applications for Organic Molecular and Polymer-Based Electronic Devices," W. Salaneck and A. Kahn, eds., Marcel Dekker, (**2002**), 269-292.

177. "Oxadiazole Metal Complex for Organic Light-Emitting Diodes," J. F. Wang, G. E. Jabbour, E. A. Mash, J. Anderson, Y. Zhang, P. A. Lee, N. R. Armstrong, N. Peyghambarian, B. Kippelen, Advanced Materials, 11, 1266-1269, (**1999**).

176. "Single Reactor Route to Polar Superlattices. Layer-by-Layer Self-Assembly of Large Response Molecular Electro-Optic Materials by a Protection-Deprotection Strategy," Milko E. van der Boom, Andrew G. Richter, Joshua E. Malinsky, P.A. Lee, Neal R. Armstrong, Pulak Dutta, Tobin J. Marks, Chemistry of Materials, 13, 15-17, (**2001**).

175. "Ordered Thin Films of Perylenetetracarboxylicdianhydride-bisimide and bis-(N-alkyl)-Quinacridone Dyes," Andrew Back, Dana Alloway, Derck Schlettwein, Brook Schilling, J.-F. Wang, Mike Carducci, Neal R. Armstrong, Invited paper in "Morphology and Dynamics of Crystal Surfaces in Complex Molecular Systems," J.J. DeYoreo, W. Casey, A.J. Malkin, E. Vlieg, M.D. Ward, eds. Mat. Res. Soc. Symp. 620, M3.2.1-M3.2.12., (**2000**).

174. "Electrogenerated Chemiluminescence from Derivatives of Aluminum Quinolate and Quinacridones: Cross Reactions With Triarylamines Lead to Singlet Emission Through Triplet-Triplet Annihilation Pathways," E.M. Gross, J.D. Anderson, A.F. Slaterbeck, S. Thayumanavan, S. Barlow, Y. Zhang, S.R. Marder, H.K. Hall, M. Flore Nabor, J.-F. Wang, E.A. Mash, N.R. Armstrong, R.M. Wightman, J. Amer. Chem. Soc. 122, 4972-4979, (**2000**).

173. "High *Tg* Hole Transport Polymers for the Fabrication of Bright and Efficient Organic Light-Emitting Devices with an Air-Stable Cathode," G.E. Jabbour, S.E. Shaheen, M.M. Morrell, J.D. Anderson, P.A. Lee, S. Thayumanavan, S. Barlow, E. Bellmann, R.H. Grubbs, B. Kippelen, S. Marder, N.R. Armstrong, N. Peyghambarian, IEEE Journal of Quantum Electronics, 36, 12-17, (**2000**).

172. "Phthalocyanines and Porphyrins as Materials," **invited review** in the Journal of Porphyrins and Phthalocyanines, N.R. Armstrong, 4, 414-417, (**2000**).

171. "Preparation of Polyetherol-Appended Sulfur Porphyrazines and Investigations of Peripheral Metal Ion Binding in Polar Solvents," Lori A. Ehrlich, Peter J. Skrdla, Wade K. Jarrell, John W. Sibert, Neal R. Armstrong, S. Scott Saavedra, Anthony G. M. Barrett and Brian M. Hoffman, Inorganic Chemistry, 39, 3963-3969 (**2000**).

170. "New Planar Waveguide Attenuated Total Reflectance Techniques for Organic Thin Film Spectroscopy and Chemical Sensing," D.R. Dunphy, Sergio B. Mendes, L. Li, J.J. Burke, J.E. Lee, N.R. Armstrong, S. Scott Saavedra, SPIE, 3602, 140-148, (**1999**).

169. "Aluminum Composite Cathodes: A New Method for the Fabrication of Efficient and Bright Organic Light Emitting Devices," G.E. Jabbour, S.E. Shaheen, M.M. Morrell, B. Kippelen, and N. Peyghambarian, Optics and Photonics News, 10, 25, (**1999**).

168. "Photoconductive properties of PVK-based photorefractive polymer composites doped with fluorinated styrene chromophores," Eric Hendrickx, Yadong Zhang, Kyle B. Ferrio, Jon A. Herlocker, Jeff Anderson, Bernard Kippelen, and Nasser Peyghambarian, Journal of Materials Chemistry, Special Issue on Photonic Materials, 9, 2251-2258, (**1999**).

157. "Highly Ordered Thin Films of Octasubstituted Phthalocyanines," P. Smolenyak, R. Peterson, K. Nebesny, M. Törker, D.F. O'Brien, N.R. Armstrong, J. Amer. Chem. Soc. 121, 8628-8636, (**1999**).

166. "Energy and Charge Transfer in Organic Light-Emitting Diodes: A Soluble Quinacridone Study," S.E. Shaheen, Y. Kawabe, J.-F. Wang, J.D. Anderson, E.A. Mash, P.A. Lee, B. Kippelen, N. Peyghambarian, J. Appl. Phys., 85, 7939-7945, (**1999**).

165. "Organic Light-Emitting Diode with 20 Lumens /Watt Efficiency Using a Triphenyldiamine Side-Group Polymer as the Hole Transport Layer," S.E. Shaheen, G.E. Jabbour, B. Kippelen, N. Peyghambarian, J.D. Anderson, E. Bellman, S.R. Marder, and R.H. Grubbs, Applied Physics Letters, 74, 3212-3214, (**1999**).

164. "Valence Electronic Structure of π-Conjugated Materials: Simulation of the Ultraviolet Photoelectron Spectra with Semiempirical Hartree-Fock Approaches," J. Cornil, S. Vanderdnonckt, R. Lazzaroni, D.A. dos Santos, G. Thys., J.J. Geise, L.-M. Yu, P. Barta, W.R. Salaneck, N.E. Gruhn, D. Lichtenberger, P.A. Lee, J.L. Brédas, Chemistry of Materials, 11, 2436-2443, (**1999**).

163. "Organic light emitting devices containing a highly soluble isoindole or polyisoindole,"S. Gauvin, F. Santerre, J.-P. Dodelet, Y. Ding, A.R. Hill, A.S. Hay, J. Anderson, T.C. Gorjanc, M. D'Iorio, Thin Solid Films, 353, 218-222, (**1999**).

162. "Structure of 3,4,9,10-perylene-tetracarboxylic-dianhydride grown on reconstructed and unreconstructed Au(100)," T. Schmitz-Hübsch, T. Fritz, R. Staub, A. Back, K. Leo, Surface Science, 437, 163, (**1999**).

161. "Observation of Strong Band Bending in Perylenetetracarboxylicdianhydride (PTCDA) Thin Films Grown on SnS_2," R. Schlaf, P.G. Schroeder, M.W. Nelson, B.A. Parkinson, P.A. Lee and K.W. Nebesny, Journ. Appl. Phys., 86, 1499-1509, (**1999**).

160. "Photorefractive Polymer Composites with Short Response Times," B. Kippelen, E. Hendrickx, K. B. Ferrio, J. Herlocker, Y. Zhang, S. R. Marder, S. Mery, J. Anderson, N. Peyghambarian, J. Imaging Science and Technology, Feature Article in a memorial issue to Paul Borsenberger, 43, 405-412, (**1999**).

159. "Covalently Interlinked Organic LED Transport Layers vis Spin-Coating/Siloxane Condensation," W. Li, Q. Wang, J. Cui, H. Chou, S.E. Shaheen, G.E. Jabbour, J.D. Anderson, P.A. Lee, B. Kippelen, N. Peyghambarian, N.R. Armstrong and T. J. Marks, Advanced Materials, 11, 730, (**1999**).

158. "Formation and spectroelectrochemical characterization of multilayer and submonolayer

thin films of 2,3,9,10,16,17,23,24-octa(2-benzyloxyethoxy) phthalocyaninato copper ($CuPc(OC_2OBz)_8$)," P.E. Smolenyak, R.E. Peterson, D.R. Dunphy, S. Mendes, K.W. Nebesny, D.F. O'Brien, S.S. Saavedra, Porphyrins and Phthalocyanines, 3, 620-633, (**1999**).

157. "Self-Assembly Processes for Organic LED Electrode Passivation and Charge Injection Balance," J.E. Malinsky, G.E. Jabbour, S.E. Shaheen, J.D. Anderson, A.G. Richter, T.J. Marks, B. Kippelen, P. Dutta, N. Peyghambarian, Advanced Materials, 11, 227 (**1999**).
156. "Absence of Final State Screening Shifts in Photoemission Spectroscopy Frontier Orbital Alignment Measurements of Organic Semiconductor Interfaces," R. Schlaf, B.A. Parkinson, P.A. Lee, K.W. Nebesny, Surface Science Letters, 420, L122 (**1999**)
155. "Molecular Self-Assembly Routes to Electroluminescent Multilayer Structures," W. Li, J.E. Malinsky, H. Chou, W. Ma, L. Geng, T.J. Marks, G.E. Jabbour, S.E. Shaheen, B. Kippelen, N. Peyghambarian, P. Dutta, A.G. Richter, P.A. Lee, J.D. Anderson, Polymer Preprints, 39, 1083 (**1998**).
154. "Investigation of the Electronic Structure of LiF Coated Al and Pt Electrodes by Photoemission Spectroscopy," R. Schlaf, B.A. Parkinson, P.A. Lee, K.W. Nebesny, G. Jabbour, B. Kippelen, N. Peyghambarian, Journal of Applied Physics, 84, 6729 (**1998**).
153. "Sol-gel Based, Planar Waveguide Sensor for Water Vapor," P. Skrdla, S.S. Saavedra, S.B. Mendes, N. Peyghambarian, Anal. Chem., 71, 1332 (**1999**).
152. "Electrochemical models for the radical annihilation reactions in organic light-emitting diodes,"J. Anderson, P.A. Lee, E. McDonald, R.M. Wightman, H.K. Hall, T. Hopkins, A. Padias, S. Thayumanavan, S. Barlow, S. Marder, in "Organic Light Emitting Devices II," Z. Kafafi, ed. SPIE 3476-29, 178, (**1998**).
151. "Aluminum Based Cathode Structure for Enhanced Electron Injection in Electroluminescent Organic Devices," G.E. Jabbour, B. Kippelen, N. Peyghambarian, Applied Physics Letters, 73, 1185 (**1998**).
150. "Bright Blue Organic Light-Emitting Diode with Improved Color Purity Using a LiF/Al Cathode,"S.E. Shaheen, G.E. Jabbour, M.M. Morrell, Y. Kawabe, B. Kippelen, N. Peyghambarian, M.-F. Nabor, R. Schlaf, E.A. Mash, J. Appl. Phys., 84, 2324, (**1998**).
149. "Determination of Frontier Orbital Alignment and Band Bending at an Organic Semiconductor Heterointerface by Combined X-ray and Ultraviolet Photoemission Measurements," R. Schlaf, B.A. Parkinson, P.A. Lee, K.W. Nebesny, Appl. Phys. Lett. 73, 1026 (**1998**).
148. "Spectroelectrochemistry of Monolayer and Sub-Monolayer Films using an Electroactive Integrated Optical Waveguide," D. Dunphy, S. Mendes, and S.S. Saavedra, an **Invited Chapter** in "Interfacial Electrochemistry," A. Wieckowski, ed., Marcel Dekker, Chapter 29, pp 513-526, (**1999**).
147. "Electrochemistry and Electrogenerated Chemiluminescence Processes of the Components of Aluminum Quinolate/Triarylamine, and Related Organic Light Emitting Diodes," J.D. Anderson, E.M. McDonald, P.A. Lee, M.L. Anderson, E.L. Ritchie, H.K. Hall, T. Hopkins, A. Padias, S. Thayumanavan, S. Barlow, S. Marder, G.E. Jabbour, S. Shaheen, B. Kippelen, N. Peyghambarian, R.M. Wightman, J. Amer. Chem. Soc., 120, 9646 (**1998**).
146. "Electrochemical Processes of the Polyphthalocyaninatosiloxanes and Related Cofacially Aggregated Phthalocyanine Assemblies," D. Dunphy, P. Smolenyak, H. Rengel, S. Mendes, S.S. Saavedra, D.F. O'Brien, G. Wegner, Polym.. Prepr., 39, 723 (**1998**).
145. "Influence of Surface Reactions and Ionization Gradients on Junction Properties of $F_{16}ZnPc$," S. Hiller, D. Schlettwein, D. Wörhle, J. Materials Chem., 8, 945, (**1998**).
144. Evidence for exciton-exciton binding in a molecular aggregate," A. Chakrabarti, A. Schmidt, V. Valencia, B. Fluegel, S. Mazumdar, N. Armstrong, N. Peyghambarian., Phys. Rev. B., 57, R4206, (**1998**).
143. "Biexcitons in mixed-stack charge-transfer solids, conjugated polymers, and molecular aggregates," S. Mazumdar, M. Chandross, Y. Shimoi, A. Chakrabarti, N. Peyghambarian, Proceedings of ``Optical Probes of Conjugated Polymers," SPIE, 3145, 69 (1997).
142. Ultrathin Films of Perylenedianhydride and Perylenebis(dicarboximide) Dyes on (001) Alkali Halide Surfaces, D. Schlettwein, A. Back, B. Schilling, T. Fritz, Chemistry of Materials, 10, 601, (1998).

141. "Reduction of Indicator Leaching From Doped Sol-Gels by Attachment of Macromolecular Carriers," P. Skrdla, H. Skrdla, and S.S. Saavedra, Applied Spectroscopy, 53, 785-791, (1999).
140. "Chemical and Biochemical Sensors Based on Sol-Gel Derived, Laminate Planar Waveguide Structures," L. Yang, M. Huskey, and S. Saavedra, Polym.. Prepr.., 76, 453 (1997).
139. "Exciplex Electroluminescence from Organic Bilayer Devices Composed of Triphenyldiamine and Quinoxaline Derivatives," J.F. Wang, Y. Kawabe, S.E. Shaheen, M.M. Morrell, G.E. Jabbour, P.A. Lee, J. Anderson, B. Kippelen, E.A. Mash, and N. Peyghambarian, Advanced Materials, 10, 230 (**1998**).
138. "The Electroactive Integrated Optical Waveguide (EA-IOW): Ultrasensitive Spectroelectrochemistry of Submonolayer Adsorbates," D. Dunphy, S.S. Saavedra, S. Mendes, Analytical Chemistry, 69, 3086, (**1997**).
137. "HOMO/LUMO Alignment at PTCDA/ZnPc and PTCDA/ClInPc Heterointerfaces Determined by Combined UPS and XPS Measurements," R. Schlaf, B.A. Parkinson, P.A. Lee, and K.W. Nebesny, J. Phys. Chem., 103, 2984 (**1999**).
136. "Experimental Determination of Quantum Dipoles at Semiconductor Heterojunctions Prepared by van der Waals Epitaxy (vdWe): Linear Correction Term for the Electron Affinity Rule (EAR)," R. Schlaf, B.A. Parkinson, O. Lang, C. Pettenkofer, and W. Jaegermann, J. Vac. Sci. Technol., 15, 1365 (**1997**).
135. "Photoelectrochemical Effects and (Photo)Conductivity of "N-Type" Phthalocyanines," E. Karmann, J.-P. Meyer, D. Schlettwein, N.I. Jaeger, M. Anderson, and A. Schmidt, Mol. Cryst. Liq. Cryst., 283, 283 (**1996**).
134. "Electroactive Integrated Optic Waveguides (EA-IOWs): Spectroelectrochemistry in Ultrathin Film Materials," D. Dunphy, S. Mendes, L. Li, J. Burke, and S.S. Saavedra, in "New Trends in Electroanalytical Chemistry," J. Leddy, M. Wightman, Electrochemical Society Publications, 96-9, 174 (**1996**).
133. "Dye-sensitizing Effect of TiOPc Thin Films on n-TiO_2 (001) Surface," H. Yanagi, S.-Y. Chen, P.A. Lee, K.W. Nebesny, and A. Fujishima, J. Phys. Chem. 100, 5447 (**1996**).
132. "van der Waals Epitaxy of the Layered Semiconductors $SnSe_2$ and SnS_2: Morphology and Growth Modes," R. Schlaf, B.A. Parkinson, C. Pettenkofer, W. Jaegermann, Surface Science, 385, 1, (**1997**).
131. "Sol-Gel Based, Planar Waveguide Sensor for Gaseous Iodine," Lin Yang and Scott Saavedra, Analytical Chemistry, 68, 1834 (**1996**).
130. "Spectroscopic and Electrochemical Characterization of LB films of (2,3,9,10,16,17,23,24-Octa(2-benzyloxyethoxy)phthalocyaninato)copper (CuPcOC2OBz) and its Demetallated Analogue (H2PcOC2OBz)," P. Smolenyak, S.-Y. Chen, E. Osburn, L.-K. Chau, and D.F. O'Brien, Langmuir, 13, 6568, (**1997)**.
129. "Novel Amphiphilic Phthalocyanines: Formation of Langmuir-Blodgett and Cast Thin Films," E. Osburn, L.-K. Chau, S.-Y. Chen, N. Collins, and D.F. O'Brien, Langmuir, 12, 4784 (**1996**).
128. "Substituted Aluminum and Zinc Quinolates with Blue-Shifted Absorbance/Luminescence Bands:Synthesis and Spectroscopic, Photoluminescence and Electroluminescence Characterization," T.A. Hopkins, M.L. Anderson, A. Schmidt, A.B. Padias, H.K. Hall, Jr., K. Meerholz,‡, S. Shaheen, B. Kippelen, N. Peyghambarian, Chemistry of Materials, 8, 344 (**1996**).
127. "Supramolecular Fibers via Self-Assembly of an Octasubstituted Copper Phthalocyanine," E.J. Osburn, A. Schmidt, L-K. Chau, S.-Y. Chen, P. Smolyenak, , N.R. Armstrong, D.F. O'Brien, Advanced Materials, 8, 926 **(1996)**.
126. "Epitaxial Phthalocyanine Ultrathin Films Grown by Organic Molecular Beam Epitaxy (OMBE)," A. Schmidt, L.-K. Chau, A. Back, invited chapter in "Phthalocyanines," C. Leznoff, A.P.B. Lever, eds., VCH Publications, Volume 4, **1996**, pp. 307- 341
125. "Epitaxial Growth of the Ionic Polymer Fluoroaluminum-Phthalocyanine on the Basal Plane of Single Crystal Tin Disulfide," A. Schmidt, R. Schlaf, D. Louder, L.-K. Chau, S.-Y. Chen, T. Fritz, M. F. Lawrence, B. A. Parkinson, Chemistry of Materials, 7, 2127 (**1995**).
124. "Photoelectron and Optical Spectroscopic Investigations of the Electronic Structure of Oligo(p-phenylene-vinylene)s in the Solid State," A. Schmidt, M.L. Anderson, D. Dunphy, Th. Wehrmeister, K. Müllen, N.R. Armstrong, Advanced Materials, 7, 722 (**1995**).

123. Spectra of Third-Order Optical Susceptibilities of Epitaxial Chloro-indium-phthalocyanines," H. Tajalli, J.P. Jiang, A. Schmidt, J.T. Murray, M. Chandross, S. Mazumdar, N. Peyghambarian, Appl. Phys. Lett. 67, 1639 (**1995**).
122. "Electronic States of Vapor Deposited Electron and Hole Transport Agents and Luminescent Materials for Light-Emitting Diodes," A. Schmidt, M.L. Anderson, J. Appl. Phys. 78, 5619 (**1995**).
121. "Large Molecule Epitaxy on Single Crystal Metals, Insulators and Single Crystal and MBE-Grown Layered Semiconductors," T. Schuerlein, A. Schmidt, P.A. Lee, and K. W. Nebesny, Jap. Journ. Appl. Phys. 34, 3837 (**1995**).
120. "Growth of Layered Semiconductors by Molecular Beam Epitaxy: Formation and Characterization of GaSe, $MoSe_2$ and Phthalocyanine Ultrathin Films on Sulfur-Passivated GaP(111)," C. Hammond, A. Back, M. Lawrence, K. Nebesny, P. Lee and R. Schlaf, J. Vac. Sci. Technol. A, 13, 1761 (**1995**).
119. "MBE Growth of Thin Films of SnS_2 and $SnSe_2$ on Cleaved Mica and the Basal Planes of Single Crystal Layered Semiconductors: RHEED, LEED, Photoemission and STM.AFM Characterization," R. Schlaf, D. Louder, O. Lang, C. Pettenkofer, W. Jaegermann, K.W. Nebesny, P.A. Lee and B.A. Parkinson, J. Vac. Sci. Technol., A, 13, 1768 (**1995**).
118. "Ordered Ultrathin Films of Perylene-tetracarboxylic-dianhydride and dimethyl-perylene-bis(dicarboximide) on Cu(100): Characterization of Structure and Surface Stoichiometry by LEED, TDMS and XPS," A. Schmidt, T.J. Schuerlein, and G.E. Collins, J. Phys. Chem., 99, 11770 (**1995**).
117. "Photoelectrochemical Investigations on Naphthalocyanine Derivatives in Thin Films," H. Yanagi, Y. Kanbayashi, D. Schlettwein and D. Wöhrle, J. Phys. Chem., 98, 4760 (**1994**).
116. "Periodic Multilayers of Perylene-3,4:9,10 tetracrboxylic-dianhydride and chloroindium-phthalocyanine: Limitations to Long Term Stability," A. Schmidt, L.-K. Chau and V.S. Valencia, Chem. Mater., 7, 657 (**1995**).
115. "Electronic Structure of Oligorylenes in Thin Solid Films," A. Schmidt, C. Göltner and K. Muellen, J. Phys. Chem., 98, 11780 (**1994**).
114. "Correlation of Frontier Orbital Positions and Conduction Type of Molecular Semiconductors as Derived from UPS in Combination with Electrical and Photoelectrochemical Experiments," D. Schlettwein, J. Phys. Chem., 98, 11771 (**1994**).
113. "Epitaxial Thin Films of Large Organic Molecules: Characterization of Phthalocyanine and Coronene Overlayers on the Layered Semiconductors, MoS_2 and SnS_2," C.D. England, G.E. Collins, T.J. Schuerlein, Langmuir, 10, 2748 (**1994**).
112. "Polarization-Dependent Femtosecond Dynamics of MBE-Grown Phthalocyanine Organic Thin Films," Sandalphon, V.S. Williams, K. Meissner, and N. Peyghambarian, Ultrafast Phenomena VIII, J.-L. Martin, A. Migus, G.A. Mourou, A.H. Zewail, eds. Springer Series in Chemical Physics, 55, 379 (**1993**), and "Ultrafast Excited-State Dynamics in a Fluro-Aluminum Phthalocyanine Thin Film," Mat. Res. Soc. Symp. Proc., 227, 39 (**1992**).
111. "Formation and Characterization of Epitaxial Phthalocyanine and Perylene Monolayers and Bilayers on Cu(100): LEED and TDMS Studies," T.J. Schuerlein, J. Vac. Sci. Technol. A 12(4), 1992 (**1994**).
110. "Organic Molecular Beam Epitaxy," Handbook of Surface Imaging and Visualization, A. T. Hubbard, editor, CRC Press, (**1995**) pp. 575-580.
109. "Fabrication and Characterization of Low Loss, Sol-Gel Planar Waveguides," L. Yang, S.S. Saavedra, and J. Hayes, Anal. Chem., 66, 1254 (**1994**).
108. "Dye Sensitization with Octa-substituted Liquid Crystalline Phthalocyanines," L.-K. Chau, E.J. Osburn, D.F. O'Brien and B.A. Parkinson, Langmuir, 10, 353 (**1994**).
107. "Factors Which Control the "N-Type" or "P-Type" Photoelectrical Behavior of Molecular Semiconductor Thin Films," D. Schlettwein, P.A. Lee, and K.W. Nebesny, Mol. Cryst. Liq. Cryst., 252-253, 161 (**1994**).
106. "RHEED and Optical Characterization of Ordered Multilayers of Phthalocyanine/C_{60} and Pthalocyanine/Perylene-Tetracarboxylicdianhydride (PTCDA)," M.L. Anderson, G.E. Collins,

V.S. Williams, C.D. England, L.-K. Chau, T.J. Schuerlein, P.A. Lee, and K.W. Nebesny, Surface Science, 307-309, 551 (**1994**).

105. "Organic/Inorganic Molecular Beam Epitaxy (O/I-MBE): Formation and Characterization of Ordered Phthalocyanine Thin Films -- Photoelectrochemical Processes," L.-K. Chau, S.-Y. Chen, G.E. Collins, C.D. England, V.S. Williams, M.L. Anderson, T.J. Schuerlein, P.A. Lee, K.W. Nebesny, B.A. Parkinson and C. Arbour, Molecular Crystals and Liquid Crystals, 252, 67 (**1994**).
104. "Organic/Inorganic-Molecular Beam Epitaxy (O/I-MBE): Ordered Monolayers of Phthalocyanines, Napthalocyanines, Perylenes and Coronene on Cu(100), SnS_2(0001), and MoS_2(0001)," C.D. England, G.E. Collins, T.J. Schuerlein, and M.L. Anderson, in "Interfacial Design and Chemical Sensing," American Chemical Society Symposium Series 561, **1994**, p. 202.
103. "Electrochemical Characterization of the Oxidation of LB-Films of Poly-phthalocyaninatosiloxane (PcPS)," A. Ferencz, N.R. Armstrong, G. Wegner, Macromolecules, 27, 1517 (**1994**).
102. "Photoconductivity/Dark Conductivity Studies of Chlorogallium Phthalocyanine Thin Films on Interdigitated Microcircuit Arrays," J.W. Pankow, C. Arbour, J.P. Dodelet, and G.E. Collins, Journal of Physical Chemistry, 97, 8485 (**1993**).
101. "Thin Film Sensors: The Role of Defects and Impurity Sites in Controlling Sensor Response and Selectivity," G.E. Collins, J.W. Pankow, C. Odeon, R. Brina, C. Arbour and J.-P. Dodelet, Journal of Vacuum Science and Technology, J. Vac. Sci. Technol. A11, 1383 (**1993**).
100. "Organic/Inorganic-Molecular Beam Epitaxy (O/I MBE): Photoelectrochemical and Optical Properties of Epitaxially Deposited, Single Component, and Multiple Component Organic Superlattices," L.-K. Chau, G.E. Collins, S.Y. Chen, K.W. Nebesny, V.S. Williams, P.A. Lee, C. Arbour, J. Danziger, E. Osburn, D.F. O'Brien, and B.A. Parkinson, International Symposium on Optical Materials Technology for Energy Efficiency and Solar Energy Conversion-XI SPIE 1729, (**1992**).
99. "Epitaxial Phthalocyanine Thin Films and Phthalocyanine/C_{60} Multilayers," G.E. Collins, V.S. Williams, L.-K. Chau, K.W. Nebesny, C. England, P.A. Lee, T. Lowe, and Q. Fernando. Synthetic Metals, 54, 351 (**1993**).
98. "Oxidation Processes in Magneto-Optic and Related Materials," Paul A. Lee, James L. Danziger, and Craig D. England, SPIE Proceedings, Optical Data Storage, 1663, 387 (**1992**).
97. "Visible Absorption and Photocurrent Spectra of Epitaxially Deposited Phthalocyanine Thin Films: Interpretation of Exciton Coupling Effects," Lai-Kwan Chau, Craig D. England, and Siying Chen, J. Phys. Chem., 97, 2699 (**1993**).
96. "Phthalocyanine Aggregates on Metal Dichalcogenide Surfaces: Dye Sensitization on SnS_2 Semiconductor Electrodes by Ordered and Disordered InPc-Cl Thin Films," C. Arbour, L.-K. Chau, G.E. Collins, K.W. Nebesny, P.A. Lee, C.D. England, and B.A. Parkinson, J. Phys. Chem., 97, 2690 (**1993**).
95. "Femtosecond Excited-State Dynamics in Fluoro- and Chloro-Aluminum Phthalocyanine Thin Films," V.S. Williams, S. Mazumdar, Z.Z. Ho, and N. Peyghambarian, J. Phys. Chem. 96, 4500 (**1992**).
94. "Dye Aggregates and Organic Superlattices Formed by Organic/Inorganic Molecular Beam Epitaxy (O/I-MBE)," K.W. Nebesny, G.E. Collins, L.-K. Chau, P.A. Lee, C. England, D. Diehl, M. Douskey, and B.A. Parkinson, "Science and Technology of Thin Films for the 21st Century," R.P.H. Chang, Ed., Thin Solid Films, 216, 90 (**1992**).
93. "O/I-MBE -- Formation of Highly Ordered Phthalocyanine/Semiconductor Junctions by Molecular Beam Epitaxy: Photoelectrochemical Characterization," Ken W. Nebesny, Greg E. Collins, Paul A. Lee, Lai-Kwan Chau, Claude Arbour, and Bruce Parkinson, in Photopolymer Device Physics and Applications, SPIE, 1559, 18 (**1991**).
92. "TCNQ Thin Films on Cu, Au, Pt and SnS_2: Characterization by X□ray Photoelectron Spectroscopy," Tom Patterson and Joel Pankow, Langmuir, 7, 3160 (**1991**).
91. "Organic/Inorganic - Molecular Beam Epitaxy (O/I-MBE): Formation of an Ordered Phthalocyanine/SnS_2 Heterojunction," K.W. Nebesny, G.E. Collins, P.A. Lee, L.-K. Chau, J. Danziger, and E. Osburn, Chemistry of Materials, 3, 829 (**1991**).

90. “Ultrafast Polarization-Dependent Spectral Hole Burning in a Nearly Amorphous Fluoro-Aluminum Phthalocyanine Thin Film," V.S. Williams, J.P. Sokoloff, Z.Z. Ho, C. Arbour, and N. Peyghambarian, Chem. Phys. Lett. 193, 317 (**1992**).
89. “Orientation and Structure of Monolayer --> --> Multilayer Phthalocyanine Thin Films on Layered Semiconductor (MoS_2 and SnS_2) Surfaces," G.E. Collins, K.W. Nebesny, C.D. England, L.-K. Chau, P.A. Lee, and B.A. Parkinson, J. Vac. Sci. Technol A., 10(4), 2902, (**1992**).
88. “Heterojunctions Formed from Phthalocyanine and Perylene Thin Films: Photoelectrochemical Characterization,” J. Danziger, J.-P. Dodelet, P. Lee, and K.W. Nebesny, Chemistry of Materials, 3, 821 (**1991**).
87. “Electrochemical and Photoelectrochemical Processes on Thin Films of Perylene Tetracarboxylic Dianhydride (PTCDA),” J. Danziger and J.-P. Dodelet, Chemistry of Materials, 3, 812 (**1991**).
86. “Challenges to Quantitation in AES and XPS: Systems of Electrochemical Interest,” K.W. Nebesny, P.A. Lee, K.F. Stork, B.L. Maschhoff, J.W. Pankow, and T.S. Patterson, J. Electrochem. Soc., 91-7, 58 (**1991**).
85. "Oxide Formation on Rare Earth/Transition Metal and Bimetallic Transition Metal Thin Films: Modeling the Effect of Fourth Element Modifiers on O_2 and H_2O Surface Chemistries," Paul A. Lee, J. Magnetism & Magnetic Materials, 93, 159 (**1991**).
84. "Oxide Formation on Fe and Ti Thin Films and on Fe Thin Films Modified with Ultrathin Layers of Ti," Paul A. Lee, Kurt F. Stork, Brian L. Maschhoff, and Ken W. Nebesny, Surface and Interface Analysis, 17, 48 (**1991**).
83. "Chemiresistor Gas Sensors Based on Photoconductivity Changes in Phthalocyanine Thin Films: Enhancement of Response Toward NH_3 by Photoelectrochemical Deposition with Metal Modifiers," Rossella Brina, Greg Collins, and Paul Lee, Anal. Chem., 62, 2357 (**1990**).
82. "Highly Photoactive Chemically Modified Thin Films of Chloroaluminum (and Bromoaluminum) Phthalocyanines Probed by NEXAFS and UPS: Determination of the Electronic Structure and the Molecular Orientation," D. Guay, G. Tourillon, L. Gastonguay, J.P. Dodelet, K.W. Nebesny, and R. Garrett, J. Phys. Chem., 95, 251 (**1991**).
81. "Surface Chemistries and Photoelectrochemistries of Thin Film Molecular Semiconductor Materials," C. Arbour, R. Brina, G. Collins, J. Danziger, J.-P.Dodelet, P. Lee, K.W. Nebesny, J. Pankow, and S. Waite, Molecular Crystals and Liquid Crystals, 183, 307 (**1990**).
80. "Thin Oxide Layers on Clean Iron Surfaces: Formation in Vacuum and Characterization by Photoelectron Spectroscopy and Electrochemical Reactions of Probe Molecules at the Oxide/Electrolyte Interface," B.L. Maschhoff, Langmuir, 7, 693 (**1991**).
79. "Surface Chemical and Electrochemical Processes of Well Characterized Lithium Thin Films: Electrochemical Reactions in SO_2/CH_3CN", K.R. Zavadil, J. Electrochem. Soc., 137, 2371 (**1990**).
78. "Surface Chemistries of Lithium: Detailed Characterization of the Reactions of H_2S, SO_2, and SO_2Cl_2 Using XPS, UPS and EELS", K.R. Zavadil, Surface Science, 230, 61 (**1990**).
77. "Surface Chemistries of Lithium: Detailed Characterization of the Reactions O_2 and H_2O Using XPS, EELS, and Microgravimetry," K.R. Zavadil, Surface Science, 230, 47 (**1990**).
76. "Oxide Formation on Rare Earth/Transition Metal Thin Films," Paul A. Lee, Kurt F. Stork, and Brian L. Maschhoff, "Materials for Magneto-optic Data Storage", Takao Suzuki, Clifford Robinson and Charles Falco, eds., Materials Research Society, Vol. 150, p. 227 (1989).
75. "Quantitation of Auger and X-Ray Photoelectron Spectroscopies: A Straight Forward Procedure for Most Spectroscopies, Complex Sample Matrix and Instrumental Parameters Make Quantitation of Surface Electron Spectroscopies a Real Challenge," K.W. Nebesny and B.L. Maschhoff, Anal. Chem., 61, 469A (1989).
74. "Interactions of NH_3 and O_2 with the Surfaces of GaPc-Cl Thin Films: Microcircuit Photoconductivity and Quartz-Crystal Microgravimetry Studies," S. Waite, J. Pankow, G. Collins and P. Lee, Langmuir, 5, 797 (1989).
73. "Reactions at the Interface between Multi-component Glasses and Metallic Lithium Films," K.R. Zavadil and C.H.F. Peden, J. Materials Research, 4(4), 978, (1989).

72. "Li-Reactivity of Silicate Glasses: Influence of Glass Composition," W.R. Cieslak, F.W. Reinhardt, B.L. Maschhoff and P.A. Lee, Materials and Processes for Lithium Batteries, K.M. Abraham and B.B. Owens, Eds., Electrochemical Society Publications, 1988.
71. "Comparison of Supramolecular Aggregate Structure and Spectroscopic and Photoelectrochemical Properties of Tetravalent and Trivalent Metal Phthalocyanine Thin Films," T. Sims, J.E. Pemberton and P. Lee, Chemistry of Materials, 1, 26, (1989).
70. "Voltammetry at the Thin Film Mercury Electrode (TFME): Anodic and Cathodic Stripping Voltammetries and Simple Potentiostat Construction," R.S.Pomeroy and M.B. Denton, J. Chem. Ed., 66(10), 877 (1989).
69. "The Interaction of Lithium with Sodium and Potassium Silicate Glasses," Brian L. Maschhoff, Surface & Interface Analysis, 14, 76 (1989).
68. "Probing of Basal Planes of MoS_2 by Scanning Tunneling Microscopy," D. Sarid, T. Hensen and L.S. Bell, Appl. Phys. Lett., 52, 2552 (1988).
67. "Characterization of Thin Film Molecular Semiconductors Using Photoelectrochemistry and Microcircuit Photoconductivity Measurements," P. Lee, J. Pankow, J. Danziger and K.W. Nebesny, Photoelectrochemistry and Electrosynthesis on Semi-Conducting Materials, D. Ginley, N. Armstrong, and A. Nozik, eds., Electrochemical Society Publications 1987, pp. 267-279.
66. "Chemical Modification of GaPc-Cl Thin Film Photoelectrodes," A. Nanthakumar, J. Electroanalytical Chem. 248 (1988) 349.
65. "Surface Chemistries and Electronic Properties of Molecular Semiconductor Thin Films Grown by Effusion Beams," P. Lee, J. Pankow, J. Danziger and K.W. Nebesny, "Deposition and Growth, Frontiers for Microelectronics," G. Rubeloff, ed., American Inst. of Physics, 167 (1988) 376.
64. "Quantitative Surface Electron Spectroscopies: Application to the Study of Corrosion of Metals and Glasses," B.L. Maschhoff, K.R. Zavadil and K.W. Nebesny, J. Vac. Sci. Technol. A 6(3) (1988) 907.
63. "Quantitation of Surface Electron Spectroscopies: Problems in Correct Description of Intrinsic Lineshape and Extrinsic Energy Loss Processes," B.L. Maschhoff, K.W. Nebesny, K.R. Zavadil and J.W. Fordemwalt, Spectrochemica Acta, 43B (1988) 535, and "Summary Abstract: Nonlinear Least-Squares Fitting Employing Fast Fourier Transform Background Generation for the X-ray Photoelectron Spectroscopy Analysis of Iron Oxidation," B.L. Maschhoff, J. Vac. Sci. Technol. A 6(3) (1988), 1044.
62. "Spectroscopic and Photoelectrochemical Studies of Trivalent Phthalocyanine Thin Films. The Role of Gaseous Dopants (O_2 and H_2) in Determining Photoelectrochemical Response," T. Klofta, T.D. Sims, J.W. Pankow, J. Danziger and K.W. Nebesny, J. Phys. Chem., 91 (1987) 5651.
61. "Photoelectrochemical and Spectroscopic Characterization of Thin Films on Titanyl Phthalocyanine (TiOPc): Comparisons Vanadyl Phthalocyanine," T.J. Klofta, J. Danziger, P. Lee, J. Pankow, and K.W. Nebesny, J. Phys. Chem., 91, 5646, (1987).
60. "Reactions of Evaporated Lithium Films on Oxide and Glass Surfaces," B.L. Maschhoff and K.R. Zavadil in, "Lithium Batteries II", A.N. Dey, ed., Electrochemical Society Publications, Princeton, NJ (1986).
59. "Problems in Quantitation in X-Ray Photoelectron Spectroscopy (XPS): The Use of Data Reduction Techniques to Obtain Peak Areas," B.L. Maschhoff, K.R. Zavadil, K.W. Nebesny, and J.W. Fordemwalt in, "X-Rays in Materials Analysis, Novel Applications and Recent Developments," T.W. Rusch and P.M.A. Sherwood, eds., SPIE, Bellingham, Washington, 1986.
58. "Surface Chemical Processes of Clean Lithium: Small Molecule and Solid State Corrosion Reactions Relevant to the Li/SO_2 Battery," K.R. Zavadil and B.L. Maschhoff in, "Corrosion," E. McCafferty, ed., Electrochemical Society Publications, Princeton, NJ (1986).
57. "Characterization of Pt/TiO_2 Surfaces by Means of Photoelectron-Spectroscopy of Adsorbed Xenon (PAX)," (P. Dolle, K. Markelt, W. Heichler, K.S. Kim, R.A. Fiato and K. Wandelt) J. Vac. Sci. Technol., A4, 1465 (1986).
56. "Reactions of Evaporated Lithium Films with Silica Surfaces," (B. Maschhoff and K. Zavadil) Appl. Surf. Sci., 27, 285-298 (1986).

55. "Effect of Crystallite Size and Hydrogen and Oxygen Uptake in the Photoelectrochemistries of Thin Films of Chlorogallium Phthalocyanine," (T. Klofta and W. Buttner) J. Electrochem. Soc., 133, 1531 (1986).
54. "Electrochemical Oxide Formation on Titanium and Titanium Hydride (Deuteride) Thin Films Surfaces," (M.C. Burrell) Langmuir, 2, 37 (1986).
53. "Oxides Formed on Polycrystalline Titanium Thin Film Surfaces: Rates of Formation and Composition of Oxides Formed at Low and High O_2 Partial Pressures," (M.C. Burrell) Langmuir, 2, 30 (1986).
52. "Deconvolution of Auger Electron Spectra for Lineshape Analysis and Quantitation Using a Fast Fourier Transform Algorithm," (K.W. Nebesny) J. Elect. Spec., 37, 355 (1986).
51. "Tin Oxide, Indium Oxide and Tungsten Oxide Semiconductor Electrodes" (A. Nanthakumar) "Semiconductor Electrodes", H. Finklea, ed., Elsevier-North Holland (1987), pp. 203-240.
50. "Reactions of Clean Lithium Surfaces with SO_2, O_2 and H_2O; Auger Lineshape Analysis and X-Ray Photoelectron Spectroscopic Analysis of the Initial Product Layers," (K.W. Nebesny, K. Zavadil and B. Burrow), Surface Science, 162, 292 (1985).
49. "An Ultra-High Vacuum Reaction Chamber/Transfer Mechanism Attached to an Auger Electron Spectrometer for the Study of Clean Lithium Surfaces," (K.W. Nebesny), J. Vac. Sci. Technol., 3, 1763 (1985).
48. "Reactions of Clean Lithium Surfaces with SO_2: Molecular Auger Lineshape Analysis and Reaction Dynamics," (K.W. Nebesny), Langmuir, 1, 469 (1985).
47. "Deuterium Uptake in Titanium Thin Films: The Effect of Oxide and Metal (Ti & Fe) Overlayers" (M.C. Burrell), Surface Sci., 160, 235 (1985).
46. "Tri- and Tetravalent Metal Phthalocyanine Thin-Film Photoelectrodes: Comparison with Other Metal and Demetallated Phthalocyanine Systems," (T.J. Klofta, P.C. Rieke, C.A. Linkous, W.J. Buttner, A. Nanthakumar and T. Mewborn), J. Electrochem. Soc., 132, 2134 (1985).
45. "The Au/GaPc-Cl/Ferri,Ferrocyanine/GaPc-Cl/Pt Photoelectrochemical Cell," (W.J. Buttner and P.C. Rieke), J. Amer. Chem. Soc., 107, 3738 (1985).
44. "Photoelectrochemical Studies of Vanadyl Phthalocyanine (VOPc) Thin Film Electrodes," (Thomas Klofta and Clovis Linkous), J. Electroanal. Chem., 185, 73-92 (1985).
43. "Pulsed Laser Coulostatic Studies of Phthalocyanine Photoconductor Electrodes," (Peter C. Rieke), J. Phys. Chem., 897, 1121 (1985).
42. "Evidence for Charge Trapping at the Gold/Chlorogallium Phthalocyanine Interface Using Photocurrent Spectroscopy with One or Two Illumination Sources," (William J. Buttner and Peter C. Rieke), J. Phys. Chem., 897, 1116 (1985).
41. "Quantitative Auger Electron Spectroscopy and Rutherford Backscattering of Potassium-Implanted Silicon, Silica and Sodium Trisilicate," (Brad J. Burrow), Appl. of Surf. Sci., 20, 167 (1984).
40. "Photoelectrochemical Response of GaPc-Cl Thin Film Electrodes Using Two Photon Sources and Two Illumination Directions," (W. Buttner and P. Rieke), J. Electrochem. Soc., 131, 226 (1984).
39. "Photoelectrochemical Studies of Thin Films of Monomer, Dimer and Trimer Stacked-Ring Silicon Phthalocyanines," (T. Mezza and M. Kenney), J. Electroanal. Chem., 176, 259 (1984).
38. "Light-assisted, Aqueous Redox Reactions at Chlorogallium Phthalocyanine, Thin-Film Photoconductors: Dependence of the Photopotential on the Formal Potential of the Redox Couple and Evidence for Photoassisted Hydrogen Evolution," (P. Rieke), J. Am. Chem. Soc., 106, 47 (1984).
37. "Chlorogallium Phthalocyanine Thin-Film Photoelectrochemistry: Effect of Surface Coverage and Physical Distribution of Micro-crystallites on the Photoelectrochemical Response," (P. Rieke and C. Linkous), J. Phys. Chem., 88(7), 1351 (1984).
36. "Voltammetric, Chronoamperometric and Chronoabsorptometric Studies of the Nucleation of n-Heptyl Viologen on Chemically-Modified and Ion-Beam Treated, SnO_2 and In_2O_3 Electrodes," (R.Cieslinski), J. Electroanal. Chem., 161, 59 (1984).

35. "Stoichiometry and Thickness of the Initial Oxide Formed on Clean Titanium Surfaces Determined by Quantitative Auger Electron Spectroscopy, Electron Energy Loss Spectroscopy and Microgravimetry," (M. Burrell), J. Vac. Sci. Technol. A. 1, 1831 (1983).
34. "Synthesis, Characterization, and Electrochemistry of the Bis-Bridged Complexes $Me_2Si[\eta^5\text{-}C_5H_4Fe(CO)]_2[Ph_2P(CH_2)_nPPh_2]$ (n=1,2,3) and $[Me_2Si[\eta^5\text{-}C_5H_4)_2Fe_2(CO)_3]]_2[Ph_2P(CH_2)_nPPh_2]$ Where n = 1 and 3," (M. Wright, T. Mezza and G. Nelson), Organometallics, 2 (1983) 1711.
33. "A Method for Sequential Subtraction of the Inelastic Background in Auger Electron Spectroscopic Data," (M. Burrell), Appl. Surf. Sci., 17, 53 (1983).
32. "Photoactivated Electrolysis on Nonporous Chlorogallium Phthalocyanine Thin Film Electrodes," (C. Linkous and T. Klofta), J. Electrochem. Soc., 130, 1050 (1983).
31. "Reactions of Lithium Surfaces with Gas-Phase and Solution Phase SO_2," (K. Nebesny, R. Kaller, and R.K. Quinn), J. Electrochem. Soc., 129, 2861 (1982).
30. "Data Acquisition and Processing Modes for Quantitative Auger Electron Spectroscopy," (M. Burrell and R. Kaller), Anal. Chem., 54, 2511, (1982).
29. "Improvements in Photoelectrochemical and Electrochromic Reactions at Chemically Modified Electrodes," in "Chemically Modified Surfaces in Catalysis and Electrocatalysis," J.S. Miller, ed., Amer. Chem. Soc., #192, Washington, DC (1982), pp. 205-222.
27. "Voltammetric Characterization of Gold, Metallized-Plastic Electrodes, Following Exposure to Ion Beams or RF-Plasmas," (J.R. White), J. Electroanal. Chem., 131, 121 (1982).
26. "Electrochemical Studies on Stacked-Ring Phthalocyanines," (T. Mezza and M. Kenney), J. Electroanal. Chem., 137, 227 (1982).
25. "Photoelectrolysis Using Linear Arrays of Chemically Modified Semitransparent Electrodes," (V.R. Shepard), J. Electroanal. Chem., 131, 113 (1982).
24. "Characterization of the Materials Comprising the Reactive Interface in the Li(Si)/FeS2 Primary Battery," (B. Burrow, K. Nebesny, R.K. Quinn, and D.E. Zurawski), J. Electrochem. Soc., 128, 1919 (1981).
23. "Improved Photoelectrochemical Efficiencies at Phthalocyanine-Modified SnO_2 Electrodes," (V.R. Shepard, M. Kenney, and R. Nohr), J. Electroanal. Chem., 124, 322 (1981).
22. "Differential Capacitance Studies of Silane-Modified SnO_2 Electrodes at Low Modulation Frequencies," (V.R. Shepard), J. Phys. Chem., 85, 2965 (1981).
21. "Electrochemical and Surface Analysis of the Reactive Interfaces in the Li(Si)/FeS_2 Primary Battery," (R.K. Quinn and D.E. Zurawski), Proceedings of the 12th International Power Sources Symposium, Brighton, England, 1980).
20. "Voltammetric and Electrochromic Behavior of n-Heptylviologen on Chemically Modified Metal Oxide Electrodes," (R. Cieslinski), J. Electrochem. Soc., 127, 2605 (1980).
19. "Voltammetric Studies of Silane Modified SnO_2 Surfaces in Selected Aqueous and Non-Aqueous Media," (V.R. Shepard), J. Electroanal. Chem., 115, 253 (1980).
18. "Metallized Plastic Optically Transparent Electrodes," (R. Cieslinski), Anal. Chem., 51, 565 (1979).
17. "Electrochemical and Photoelectrochemical Studies of Copper and Cobalt Phthalocyanine-Tin Oxide Electrodes," (V.R. Shepard), J. Phys. Chem., 83, 1268 (1979).
16. "Silylation Reaction Applied to Attachment of Dye Molecules to Semiconductor Electrodes," from Silylated Surfaces, D.E. Leyden and W. Collins, eds., Midland Macromolecular Monographs, Vol. 7, 1978, pp. 159-171.
15. "Electrochemical and Surface Analytical Characteristics of Titanium and Titanium Hydride Thin Film Electrode Oxidation," (R.K. Quinn), J. Electrochem. Soc., 125, 1790 (1978).
14. "X-ray Photoelectron Spectroscopy of TiO_2 and other Titanate Electrodes and Various Standard Titanium Oxide Materials: Surface Compositional Changes of the TiO_2 Electrode During Photoelectrolysis," (C.N. Sayers), Surf. Sci., 77, 301 (1978).
13. "Electrochemical Adsorption and Covalent Attachment of Erythrosin to Modified SnO_2 Electrodes and Measurement of the Photocurrent Sensitized to Visible Wavelength," (D. Hawn), J. Phys. Chem., 82, 1288 (1978).
12. "Auger and X-ray Photoelectron Spectroscopic and Electrochemical Characterization of Titanium Thin Film Electrodes," (R.K. Quinn), Surface Sci., 67, 451 (1977).

11. "X-ray Photoelectron/Auger Electron Spectroscopic Studies of Tin and Indium Metal Foils and Oxides," (A.W.C. Lin and T. Kuwana), Anal. Chem., 49, 1228, (1977).
10. "Auger Electron Spectroscopic Depth Profiling Techniques Applied to Ultrathin Electrochemically Deposited Metal Layers," (M.L. Knotek, R.K. Quinn and N.E. Vanderborgh), J. Vac. Sci. Tech., 14, 705 (1977).
9. "Spectroelectrochemical Investigation of the Reduction of Benzaldehyde and p-Cyano- and p-Phenylbenzaldehyde in Sulfolane," (R.K. Quinn and N.E. Vanderborgh), J. Phys. Chem., 81, 657 (1977).
8. "Electrochemical and Surface Characteristics of Tin Oxide and Indium Oxide Electrodes," (A.W.C. Lin, M. Fujihira, and T. Kuwana), Anal. Chem., 48, 741 (1976).
7. "Studies of the Ag-Pt Interface Formed by Ag Deposition from Sulfolane Solutions on Thin Film Electrodes," (R.K. Quinn, M.L. Knotek, and N.E. Vanderborgh), J. Electrochem. Soc., 123, 1794 (1976).
6. "Heterogeneous Charge Transfer Rates of the Ferrocene Oxidation in Sulfolane," (R.K. Quinn), J. Electrochem. Soc., 123, 646 (1976).
5. "The Electrochemistry of Nitrobenzene and Paranitrobenzaldehyde Studied by Transmission Spectroelectrochemical Methods in Sulfolane," (N.E. Vanderborgh and R.K. Quinn), J. Phys. Chem., 80, 2740 (1976).
4. "Electrochemistry at Thin Solid Films," (N.E. Vanderborgh), J. Vac. Sci. Tech., 12, 160 (1976).
3. "Rotating Ring-Disk Electrode Studies of the Electrochemistry and Aromatic Carbonyl Compounds in the Solvent Sulfolane," (N.E. Vanderborgh and R.K. Quinn), J. Electrochem. Soc., 122, 615 (1975).
2. "Voltammetry in Sulfolane: The Electrochemical Behavior of Benzaldehyde and Substituted Benzaldehydes," (R.K. Quinn and N.E. Vanderborgh), Anal. Chem., 46, 1759 (1974).
1. "A Cryoscopic Study of the Association of Phenolic Compounds in Benzene," (N.E. Vanderborgh and W.D. Spall), J. Phys. Chem., 74, 1739, (1970).

SELECTED LEADERSHIP/SERVICE ACTIVITIES

A) Associate Vice President for Research University of Arizona: 2015/2020: During this period I assisted in i) the development of new research initiatives, scholarly activities and faculty hiring; ii) provided leadership and oversight of UA Core Facilities, developed new University Cores and upgraded existing cores and, iii) accelerated activities to enhance the pace and breadth of acquisition of new shared instrumentation through extramural funding.

1) ***Research Development/Strategic Planning:*** From 2014-20 the SVPR and AVPRs in RDI focused on areas of UA strength, or aspirational strength, in: Optics and Photonics (and more recently Quantum Information Science), Space Sciences, Imaging, Water/Energy/Arid Environments, Defense and Security, Informatics, and Translational Biosciences (accompanied by a parallel SP process in our Health Sciences colleges). Products of these planning activities were key in guiding research investment at UA over that period, including new faculty hiring (including "cluster hires"), and new core facilities, instrumentation and research infrastructure. We systematically worked with groups of faculty and research staff to develop strategies for growth of research in new areas and took the first steps to establish a "culture of research development" at UA in general.

My most rewarding activities involved the development of new research capacity in materials for quantum information science (QIS), and in energy conversion and water re-use/purification. We interfaced with our Washington D.C. consulting firm, and Federal Relations staff, to make sure we were apprised of changing opportunities and challenges to the funding landscape. Most importantly we focused on making sure that our young and mid-career faculty were getting the kind of support from RDI that they need to be successful and grow their programs, first of all in their core disciplines and secondly in these emerging cross-disciplinary activities.

2) Core Facilities: From 2014-20 I had oversight of a significant investment in new and established core research facilities, for physical, biological and health science activities, based on principles of uniqueness, enabling new research directions and hires, full accessibility to all researchers, coupled with sustainable and robust business practices. These efforts are tightly coupled with new faculty hiring and the implementation of new strategic research initiatives. New core facility capabilities included: i) Optical Microscopy, Electron Microscopy; ii) Mass Spectrometry for Proteomics/Lipidomics/Metabolomics and Small Molecule (drug discovery, new materials); iii) Molecular Structure (protein crystallography/high-field NMR), and Scanning Probe Microscopies (Keck Center for Nanoscale Imaging); iv) Clean Room/Micro- and Nano-fab and Functional Genomics; v) oversight of the implementation of the complex Translational Bio-Imaging Resource (TBIR) in our new Biosciences Research Laboratories (BSRL), opening early 2018.

B) Co-Director of the Institute for Energy Solutions (IES) – www.energy.arizona.edu -- In close collaboration with Kim Ogden we built research capacity in energy science/technology/policy at UA, transforming what had been the UA Renewable Energy Network (UAREN) into a more robust institute, with a significantly broader impact, and with an evolving emphasis on Energy/Water/Food Nexus issues, rather than just on energy. Our focus was to: i) intensify the networking of faculty expertise at UA to compete for more and larger sources of extramural funding, and to enhance impact to the citizens of Arizona and; ii) enhance the contact between the public and the faculty/staff and students of IES. In addition to the enhancement of research capacity and funding (ROI = ca. 5:1) our most notable outreach achievements are the **IES Energy Talks** (Stephanie Sikora/Will Holmgren/Cara Duncan) – "Scientists at SkyBar Talking Energy," https://energy.arizona.edu/events/304-ies-energy-talks and the continued development of the **Arizona Student Energy Conference (AzSEC)**, which we started in 2010 as a partnership with Arizona State University, and expanded to include Northern Arizona University and more recently three universities within Mexico (Universidad Nacional Autónoma (UNAM), Universidad de Sonora, and Instituto Tecnológico y de Estudios Superiores de Monterrey -- https://energy.arizona.edu/azsec-2019

C) Director for the DOE Energy Frontier Center for Interface Science: Solar Electric Materials (CISSEM) – 2009-2014 (http://science.energy.gov/bes/efrc/centers/cissem/). Starting in 2008 I assembled a team of scholars in Chemistry, Optical Sciences, Physics, Materials Science and Electrical/Mechanical Engineering, at four universities and one national laboratory (Univ. Arizona, Georgia Tech, Princeton,

Washington, NREL) to form a Department of Energy -funded Energy Frontier Research Center (EFRC) – acting as the lead P.I. and Director. The Center was funded from 2009-2014 and I was Director and chief liaison between our center and DOE. Along with a Managing Director, Program Coordinator, and Business Office support, I managed a $15M 5-year budget, and was responsible for setting the scientific direction of the center (14 P.I.s), ca. 65 total faculty, graduate students and postdocs/research scientists), the creation and articulation of our Mission and Strategic Plan, and assessment of our progress. I also managed our interactions with the public, and help coordinated the activities of the Energy Science Group (graduate and undergraduate students at UA interested in energy science, engineering, and renewable energy policy), in collaboration with the Renewable Energy Network (UA-REN).

Our **Strategic Plan** focused our research on four "Goal" areas: *i)* New theories to describe charge transfer between molecular semiconductors and electrical contact or interlayer materials; *ii)* New methodologies for the characterization of the atomic and molecular composition of interfaces, and new approaches for the nanoscale characterization of electrical and electrochemical properties of these interfaces; iii) New nanostructured hybrid materials that lead to the formation of chemically and physically robust interfaces; iv) New device platforms. CISSEM produced > 140 publications in high impact journals, and graduated more than 60 Ph.D. and M.S. graduate students, postdocs and visiting scientists. All are placed in high quality research positions, throughout the world.

D) Associate Director for the National Science Foundation – Science and Technology Center – Center for Materials and Devices for information Technology (CMDITR) – the Science and Technology Center for Materials and Devices for Information Technology Research began in 2002 with the University of Washington as the lead institution, and the University of Arizona, and the Georgia Institute of Technology as the secondary leads, with a host of other minority serving institutions as partners. I was the Associate Director for the University of Arizona effort for Years 2-5, and the Associate Director for Education for the first three years of this grant. This ca. $32M effort (10 years – ca. 25 P.I.'s) produced a wide range of basic science results underpinning the development of new optical materials for telecommunications, broadly defined, and for the creation of new light emitting and energy conversion platforms, focusing on organic semiconductor and photonic materials. The last four years of this effort provided the springboard for funding of our EFRC, focusing on the development of new organic solar cell materials, and the interface science underpinning the optimization of their efficiencies and lifetimes. Details of our efforts can be found at http://stc-mditr.org/. This center had a significant educational/outreach component which I helped to direct in the first 5 years of the center (see below). Some of the products of that educational initiative are available at http://stc-mditr.org/education/index.cfm .

E) Department Head, Department of Chemistry, University of Arizona -- 1988-1994 -- I guided a Chemistry department with ca. 36 faculty members, ca. 200 graduate students and postdocs and ca. 50 undergraduate majors, ca. 24,000 student credit hours of undergraduate instruction, and ca. 200 support staff, through a tumultuous transition of departmental leadership, to help form a competitive, modern department. During this initial period of budget austerity for Arizona and UA specifically (a trend which has now continued for over 20 years), and with the help of excellent support staff (including an excellent Department Operations Manager), we still hired several key faculty and key research and teaching support staff and solidified the department's operational procedures to include faculty in decision making and goal setting, while retiring a substantial debt left by previous administrations. We also developed our first Affirmative Action hiring plan and our first codified budget. Operating units were established with separate budget lines within the department, and Arizona Board of Regents-consistent performance assessment procedures, for both faculty and staff were fully implemented. And it should be mentioned that we retired a ca. 550K structural budget deficit which we inherited in 1988. This all seems like standard procedure now but was challenging to implement at the time.

Other significant University of Arizona leadership activities from previous years:

- ***University Committee on Ethics and Commitment*** (1997-2000, Chair of this committee 1999-2000). This was one of the most challenging service assignments that I have ever undertaken, and pre-dated a real, fully staffed Compliance Office. During this period this committee attempted to

act as mediator and grand jury to the Committee on Academic Freedom and Tenure, at a time when high profile cases of faculty/staff malfeasance were being adjudicated at UA.

- ***Faculty Senate*** (1998 - 2002)
- ***College of Science Committee on Promotion and Tenure*** (1998 – 2001; Head 2000/2001)
- ***Intellectual Property Advisory Committee*** (1990-2005) At the request of the Vice President for Research, I served on this committee for 15 years, acting in an advisory capacity and also helping to set research and intellectual property policy for UA, to establish a Conflict of Interest and Commitment Policy now in place for all of UA, and to anticipate problems arising as a result of changes in Federal rules and guidelines affecting the Office of Technology Transfer.
- ***UA Research Policy Committee*** (2007-09) – This was a committee convened in the transition between Vice-President's for Research where advice and counsel was sought from research active faculty across campus.
- ***Advance Program Advisory Committee and Leadership Group*** (2007- 2013) -- One of my most visible and high impact roles during my tenure was the development of a seminar (with Professor LuAnn Gerken) on "***How to write a successful research proposal***." We continue to run this presentation to a packed audience each time it is offered (ca. once per year).

PROFESSIONAL ACTIVITIES/SOCIETIES (only most recent)

- Editorial Advisory Boards -- Chemistry of Materials 1989-97, Langmuir 1985-89, Analytical Chemistry 2006-2009; Journal of Physical Chemistry 2013 – present; ACS Applied Electronic Materials 2018 – present
- Member of the Scientific Advisory Board for The **C**enter for **H**ybrid **A**pproaches in **S**olar **E**nergy (**CHASE**), a DOE Energy Innovation Hub, UNC Chapel Hill, 2021-present
- Member of the External Advisory Board Nanotechnology Collaborative Infrastructure Southwest (NCI-SW) – 2018-present
- Director, Institute for Energy Solutions – July 1, 2018 – 2021 – Director Emeritus 2021 -
- 2018 Scientific and Technical Review of the Joint Center for Artificial Photosynthesis (JCAP) -- Cal Tech/LBNL/UC Berkeley – May 2018
- International Review Committee for "Energy" - Helmholtz-Zentrum Berlin für Materialien und Energie" (HZB) – Jan/Feb 2018
- Strategic Planning Committee for the Division of Materials Research, Optical and Photonic Materials (OPM) – National Science Foundation – Oct. 2017
- Strategic Planning Committee – Basic Research Needs (BRN) for Energy/Water – Department of Energy – Office of Science – Jan 2017
- Co-Chair Honors Dean Search Committee (UA) - 2017
- Chair, External Advisory Board for the UNC-Chapel Hill EFRC – "Center for Solar Fuels," – August 2015 – 2019
- Advisory Board Member Institute for the Environment – 2017 - 2019
- Galileo Circle Fellows Advisory Council – College of Science UA – March 2019 - 20
- UA Committee on Innovation – part of the Strategic Planning process at Univ. Arizona – 2013/15
- UA RCM2 Committee – VPR/Indirect Cost Recovery – 2013/14
- Advisory Board Member - The Micro/Nano Fabrication Center, University of Arizona – 2013
- EMSL/Pacific Northwest Nat'l Labs – Advisory Board – 2002 – 2012
- Numerous Review Panels since 1980 for NSF, DOE, NIH
- Member: American Chemical Society; Materials Research Society