

Carbon P. Dubbs Professor of Chemical Engineering  
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**Appointments**

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- 2013-pres. Carbon P. Dubbs Professor of Chemical Engineering, Department of Chemical Engineering, MIT
- 2012-2013 Professor of Chemical Engineering, Department of Chemical Engineering, MIT
- 2009-2012 Charles and Hilda Roddey Associate Professor of Chemical Engineering, Tenured, Department of Chemical Engineering, MIT
- 2007-2009 Charles and Hilda Roddey Associate Professor of Chemical Engineering, WOT, Department of Chemical Engineering, MIT
- 2006-2007 Associate Professor, Department of Chemical and Biomolecular Engineering, University of Illinois, Urbana-Champaign
- 2005-2007 Affiliate, Bioengineering Department, University of Illinois, Urbana-Champaign
- 2004-2007 Affiliate, Beckman Institute, University of Illinois, Urbana-Champaign
- 2003-2007 Faculty Appointment, Center for Nanoscale Science and Technology, University of Illinois, Urbana-Champaign
- 2003-2006 Assistant Professor, Department of Chemical and Biomolecular Engineering, University of Illinois, Urbana-Champaign
- 2002-2003 *Postdoctoral Fellow*, Center of Nanoscale Science and Technology with Prof. Richard E. Smalley, Rice University, Houston, TX
- 1998-2001 *Visiting Scientist*, Central Research and Development, DuPont Company Laboratory

**Education**

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- 1997-2001 Ph.D. Chemical Engineering, University of Delaware, Newark, DE  
*Thesis Title:* Nanoporous Reactive Membranes – the Influence of Pore Structure on Membrane Selectivity  
*Thesis Advisor:* Henry C. Foley  
Graduation *summa cum laude*
- 1993-1997 B.S. Chemical Engineering, Polytechnic University, Brooklyn, NY  
*Senior Thesis Title:* A Multivariable Metric Approach to Simultaneous Chemical and Physical Thermodynamic Equilibrium  
Graduation *summa cum laude*

**Awards and Honors**

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- 2016 Volume Editor, MRS Bulletin, Materials Research Society
- 2016 Thompson Reuters, Highly Cited Researcher
- 2016 Thompson Reuters, Listed as one of the World's Most Influential Scientific Minds
- 2016 Editorial Board, Carbon

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2016	Blavatnik National Award for Young Scientist, Finalist (Chemistry)
2015	Robert W. Vaughn Lecture, California Institute of Technology
2015	Blavatnik National Award for Young Scientist, Finalist (Chemistry)
2015	Selected for Defense Study Board, Department of Defense
2015	Edison Lecture, University of Notre Dame
2014	Selected for Defense Science Study Group, Department of Defense
2014	Blavatnik National Award for Young Scientist, Finalist (Chemistry)
2013	Stratis V. Sotirchos Lectureship
2013	Editorial Board, 2D Materials
2013	Associate Editor, Current Protocols in Chemical Biology
2013	Barnett F. Dodge Distinguished Lecture in Chemical Engineering, Yale University
2012	Nanoscale Science and Engineering Forum Award, American Institute of Chemical Engineering
2012	Editorial board, Langmuir
2011	Kavli Frontiers of Science Fellow, National Academy of Sciences
2011	Thompson Reuters, Ranked 19 <sup>th</sup> , Top 20 Chemist of the Decade 2000-2010
2010	Council of Scientific Society Presidents, Honorary Lecturer
2010	R. M. Langer Lectureship, Yale University
2010	Editorial Board, Advanced Energy Materials
2010	Editorial Board, Chemistry of Materials
2009	NSF Alan T. Waterman Award, Honorable Mention
2009	Brilliant 10, Popular Science Magazine
2009	Thiele Lectureship, Notre Dame University
2008	Allen P. Colburn Award, American Institute of Chemical Engineers
2008	Office of Naval Research, Young Investigator Award
2008	Colburn Memorial Lectureship, University of Delaware
2008	Outstanding Young Investigator Award, Materials Research Society
2008	Alfred P. Sloan Foundation Research Fellowship
2007	National Academy of Engineers, Frontiers of Engineering
2007	American Chemical Society Unilever Award for Colloidal Science
2007	Henry and Camille Dreyfus Teacher-Scholar Award
2006	Presidential Early Career Award for Scientists and Engineers (PECASE)
2006	Collaboration Success Award from the Council of Chemical Research
2006	Beckman Young Investigator Award
2006	3M Nontenured Faculty Award
2006	Coblentz Award for Excellence in Molecular Spectroscopy
2005	Young Investigator Award, Nanoscale Science and Engineering Forum, AIChE
2005	Top 1% of Highly Cited Researchers, Essential Science Indicators/Web of Science
2005	National Science Foundation Career Award
2004	Top Young Innovator Award, MIT Technology Review (TR100)
2004	Dupont Young Investigator Award

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**Selected Invited Lectures (2002-2016)**

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**2016**

“Fluorescent Carbon Nanotube Sensor Arrays and CoPhMoRe Binding for Label Free Glycoprofiling”, NIH-NCI, January 2016

“Mass and Energy Manipulation Using Carbon Nanotechnology”, University of South Carolina, Chapel Hill, SC, February 2016

“New Concepts in Biosensing using Single Walled Carbon Nanotubes and Graphene”, Pittcon, Atlanta, GA, March 2016

“Corona Phase Molecular Recognition (CoPhMoRe) to Enable New Nanosensor Interfaces”, Europt@ode XIII Austria, March 2016

“Emerging Applications of Carbon Nanosensor Technology to Precision Medicine”, Precision Medicine Meeting, Boston, MA, May 2016

“Electron Transfer Chemistry in Graphene and 2D Electronic Materials: Fundamentals and Applications to Optoelectronics”, Graphene Workshop, Madrid Spain, June 2016

“Bio-Implantable and Subcellular Sensors Based on Nanocarbon Systems”, Graphene Week, Warsaw, Poland, June 2016

“Using Carbon Nanotechnology for the Manipulation of Matter”, Carbon Conference, Penn State, State College, PA, July 2016

“Optoelectronic Properties of Monolayer MoS<sub>2</sub> and WSe<sub>2</sub>-MoS<sub>2</sub> Lateral Heterostructures Probed Using Photocurrent Spectral Atomic Force Microscopic Imaging”, American Chemical Society, Philadelphia, PA, August 2016

“Label-free Lectin Microarray Using Fluorescent Carbon Nanotube Sensors: Towards Rapid Glycan Characterization and Synthetic Lectin Design”, Glycobiology, Atlanta, GA, August 2016

“Mass and Energy Manipulation Using Carbon Nanotechnology”, Kyoto University, Kyoto, Japan, October 2016

“Mass and Energy Manipulation Using Carbon Nanotechnology”, University of Texas at Austin, Austin, Texas, October 2016

“The Emergence of Plant Nanobionics”, Keystone Symposia, Santa Fe, NM, November 2016

“Applications of Carbon Nanotube Sensor Arrays for Understanding Cellular Biochemical Signaling and Angiogenesis”, Angiogenesis Conference – Mayo, Amelia Island, Florida, November 2016

**2015**

“New Concepts in Molecular and Energy Transport within Carbon Nanotubes and Graphene: Optical Sensors, Resonant Ion Channels and Thermopower Waves”, Kyoto University, Kyoto, Japan, January 2015

“Corona Phase Molecular Recognition (CoPhMoRe) to Enable New Nanosensor Interfaces”, APS March Meeting 2015, San Antonio, TX, March 2015

“At the Interface of Molecules and Materials III”, Chair of Focus Session, APS March Meeting 2015, San Antonio, TX, March 2015

“Understanding Molecular Transport Through Single, Isolated Nanocarbon Pores: Single Walled Carbon Nanotubes and Graphene”, Kavli Royal Society, London, UK, April 2015

“New Concepts in Energy and Mass Manipulation Using Carbon Nanotubes and Graphene: CoPhMoRe, Thermopower Waves, Plant Nanobionics and Nanopores”, Northwestern University, April 2015

“In Vivo Detection of Cortisol Using Fluorescent Carbon Nanotube Sensors”, NSF Conference, Washington, DC, May 2015

“Modifying 2D Material Interfaces Through Chemistry and Controlled Stacking for Engineering Applications”, Penn State University, PA, May 2015

“Carbon Nanotubes for Solar Energy Harvesting in Plants”, Biomolecular Materials PI Meeting, August 2015

“New Concepts in Molecular and Energy Transport Within Carbon Nanotubes and Graphene: Optical Sensors, Resonant Ion Channels, and Thermopower Waves”, Glycobiology Conference, Philadelphia, PA, August 2015

“Modifying 2D Material Interfaces through Chemistry and Controlled Stacking for Engineering Applications”, GraphITA Conference, Milan, Italy, September 2015

“New Concepts in Energy Generation and Conversion Enabled by Nanomaterials: SPICIER Characterization, Nanocarbon Photovoltaics and Thermal Resonators”, Presentation at ENI, Novaro, Italy, September 2015

“Electron Transfer Chemistry and Molecular Transport Through Graphene and Carbon Nanotube Nanopores”, Presentation to Electrochemistry meeting, Bologna, Italy, September 2015

“New Concepts in Mass and Energy Manipulation Using Carbon Nanotechnology: CoPhMoRe, Thermopower Waves, Plant Nanobionics and Nanopores”, Erlangen Symposium, Erlangen, Germany, October 2015

“Plant Nanobionics”, Northeastern University, Boston, MA, October 2015

“Manipulating Mass and Energy Using Carbon Nanotechnology”, Drexel University, October 2015

“New Concepts in Biosensing Using Single Walled Carbon Nanotubes and Graphene”, Notre Dame University, Notre Dame, IN, November 2015

“Manipulating Mass and Energy Using Carbon Nanotechnology”, Caltech, December 2015

“Plant Nanobionics”, U.S. NAS-KAUST Frontiers of Sensor Science Symposium, KAUST, Thuwal, Saudi Arabia, December 2015

## 2014

“New Concepts in Molecular and Energy Transport within Carbon Nanotubes and Graphene: Optical Sensors, Resonant Ion Channels and Thermopower Waves”, RMIT University, Melbourne, Australia, January 2014

“New Concepts in Molecular and Energy Transport within Carbon Nanotubes and Graphene: Optical Sensors, Resonant Ion Channels and Thermopower Waves”, ICONN, Adelaide, Australia, February 2014

“Chemistry of Graphene Allotropes: Synthesis”, Discussion Leader, Gordon Conference, Ventura, CA, February 2014

“New Concepts in Biosensing using Single Walled Carbon Nanotubes and Graphene”, Kirchberg Tirol, Austria March 2014

“Precision Nanotech: The Next Generation of Nanoengineering and Nanomaterials”, Session Co-Chair, US-FOS&E Symposium, Rio de Janeiro, Brazil, March 2014

“New Concepts in Mass and Energy Transport Enabled by Nanotechnology: Thermopower Waves, Resonant Nanopore Transport and Stochastic Sensors”, U Michigan, Ann Arbor, MI, April 2014

“New Concepts in Mass and Energy Transport Enabled by Nanotechnology, Thermopower Waves, Resonant Nanopore Transport and Stochastic Sensors”, Stanford, Palo Alto, CA, April 2014

2D Technical Exchange, Gaithersburg, MD, August 2014

Aberdeen Proving Ground, MD, August 2014

“New Concepts in Molecular and Energy Transport Within Carbon Nanotubes and Graphene”, ISIS, Strasbourg, France, October 2014

“New Concepts in Molecular and Energy Transport Within Carbon Nanotubes and Graphene”, ILP Meetings in Madrid, Spain, October 2014

“New Concepts in Biosensing Using Single Walled Carbon Nanotubes and Graphene”, NTU Symposium, Singapore, November 2014

“Exciton Engineering – Using Transport and Reaction Engineering to Solve Problems in Solar Energy”, AIChE Conference, Atlanta, GA, November 2014

## 2012

“Reactive Oxygen Detection using SWNT” U. Albany seminar January 2012

“New Concepts in Energy and Mass Transport using Graphene and Carbon Nanotubes”, CalTech, March 2012

“New Concepts in Energy and Mass Transport” Winterschool, Kirchberg, Austria, March 2012

“In vivo glucose detection using SWNT” PITTCON, Orlando, Florida, speech March 2012

“New Concepts in Energy and Mass Transport” Purdue U., seminar March 2012

“The Graphene Consortium at MIT” Naval Warfare NSWC, Crane, Indiana, seminar March 2012

“Transport through Single Walled Carbon Nanotube Nanopores” Sunbury Res. Center BP, England, seminar March 2012

“Theory and Applications of Thermopower waves” Army Res. Lab, Adelphia, Maryland, seminar April 2012

“New Concepts in Energy and Mass Transport using Graphene and Carbon Nanotubes” N. Dakota State U., seminar April 2012

“Biomedical sensors based on SWNT” Mayo Clinic, Rochester, Minnesota, seminar, May 2012

““New Concepts in Energy and Mass Transport”” Gordon Conf., North Carolina, seminar June 2012

“SWNT ion channels” Barcelona (ICREA) speech July 2012

“Molecular sequencing”, RESPOL company, Madrid, Spain, seminar July 2012

“Sugar Recognition” Sanofi, Frankfurt, Germany, seminar July 2012

“Electron transport: New Concepts in Energy and Mass Transport” Gordon Conf., Newport, RI, seminar August 2012

“New Concepts in Energy and Mass Transport”, Mat. Res. Society, Brazil, speech September 2012

“Thermopower waves”, Embry-Riddle Aero Inst. Conference, Daytona Beach, Florida October 2012

“New Concepts in Energy and Mass Transport” Crystal/Graphene Symposium (SIWAN), Szeged, Hungary, speech October 2012

“New concepts in mass and energy transport” AIChE, Pittsburgh, speech, November 2012

“Thermopower Waves” AFOSR (MURI), Arlington, VA, report October 2012

“New Concepts in Energy and Mass Transport”, Tripathy Anniv. Symp., U. Mass, Lowell, MA, speech Dec 2012

## 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Japan/Korea – ILP, January 2011

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“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes”, Petrobras, Rio de J. Brazil, February 2011

“Hyperstable Chloroplasts and Self Repair in Photoelectrochemical Cells”, DARPA, LA, California, February 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Winterschool Kirchberg, Austria, February 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” NanoOasis, Richmond, CA, March 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” SRC, Abu Dhabi, March 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Univ Minn., Dept Chem Engr, April 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” 3M, St. Paul, MN, April 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Nat.Acad.Sci., Irvine, CA, April 2011

“Applications of Fluorescent Single Walled Carbon Nanotubes for Biomedical Problems” Wonton’11, Bordeaux, France, June 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Belo Horizonte, Brazil, June 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Sigma-Aldrich, St. Louis, July 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes: Thermopower Waves” & China Lake, CA; & USAF, July 2011

“Graphene Approaches to Terahertz Electronics: GATE MURI review, Arlington, VA, August 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” San Pedro Brazil; Free Radicals conf, August 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” MURI graphene, Arlington, VA, August 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” DoD, NY city & NIH-BMBI, Wash, DC, August 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” NanoMat Energy, Univ. Toronto, September 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Univ. Chicago, October 2011

“New Concepts in Mass and Energy Transport in Single Walled Carbon Nanotubes” Univ. Wisconsin, October 2011

**2010**

“The role of reactive oxygen signaling in Epidermal Growth Factor Receptor (EGFR) function: insights from single molecule detection using fluorescent carbon nanotubes”, Invited Speaker, Nanoworkshop Los Alamos National Laboratory, Sante Fe, April 2010

“Chemically driven carbon-nanotube-guided thermopower waves”, Invited Seminar, NETL, April 2010

“Chemically driven carbon-nanotube-guided thermopower waves”, Invited Seminar, Council of Scientific Society Presidents, June 2010

“New concepts in molecular and energy transport within carbon nanotubes: thermopower waves, stochastically resonant ion channels, and single molecule biosensors,” Invited Speaker, NT 10, Annual Carbon Nanotube Conference, June 2010.

“New concepts in molecular and energy transport within carbon nanotubes: thermopower waves, stochastically resonant ion channels, and single molecule biosensors”, Invited Speaker, American Vacuum Society, June 2010

“Single Molecule Analyte Detection using Stochastic Nanosensors”, Invited Lecture, University of Illinois at Urbana Champaign, July 2010

“New concepts in molecular and energy transport within carbon nanotubes: thermopower waves and stochastically resonant ion channels”, Invited Seminar, Chemistry, University of Maryland, Sept 2010

“A single walled carbon nanotube based optical glucose sensor for continuous in vivo glucose detection”, Procter and Gamble, September 2010

“Dancing on the Head of a Pin: the Coming Revolution in Nanosensors for Single Molecule Biodetection, Invited Seminar”, NIST, Oct. 2010

“Bi- and Tri- Layer Graphene Solutions and Electronic and Regio- Selective Chemistry of Graphene for Nanoelectronics”, MURI Review, MIT, Oct. 2010

“Dancing on the Head of a Pin: the Coming Revolution in Nanosensors for Single Molecule Biodetection, Invited Speaker”, TTI Vanguard, Dec. 2010

“Exciton Antennae, Solar Concentrators, and Carbon Cages from the Directed Assembly of Single Walled Carbon Nanotubes”, Invited Speaker, MRS Annual Meeting, Dec. 2010

“New concepts in molecular and energy transport within carbon nanotubes: thermopower waves and stochastically resonant ion channels”, Invited Seminar, University of Texas at Austin, Dec. 2010

## 2009

“Applications of single walled carbon nanotube sensors to Epidermal Growth Factor Signaling” University of Illinois, Biophysics, Sept 2009

“Near Infrared Fluorescent Sensors for In-Vivo Glucose Detection Based on Single Walled Carbon Nanotubes” A. Tech. Treatment Diabetes Athens, Greece, Feb 2009

“Optical sensors based on single walled carbon nanotubes” Am. Physics Soc., Pittsburgh, PA, March 2009

“The Chemistry of Single Walled Carbon Nanotubes: Biosensors and Thermopower Waves” SAINT, Seoul, S. Korea, March 2009

“The Wonders of One Dimensional Chemistry: Carbon Nanotubes for Single Molecule Biodetection and Energy Applications” Thiel Lecture, Notre Dame, South Bend, Indiana, April 2009

“Energy Harvesting using Chemically Driven, Nanotube Guided Thermopower Waves” AFOSR workshop, Arlington, VA, April 2009

“The Wonders of One Dimensional Chemistry: Carbon Nanotubes for Single Molecule Biodetection and Energy Applications Lecture”, U. Conn., Storrs, CN, April 2009

“Biological Applications of Near Infrared Fluorescent Sensors based on Single Walled Carbon Nanotubes “WONTON ’09, Japan, June 2009

“Progress in single walled carbon nanotube electronic networks for sensor applications” ICMAT, Singapore June 2009

“Transparent, Reactive Armor from Single Walled Carbon Nanotube Reactive Framework Materials” AFOSR, Arlington, VA, July 2009

“Biological Applications of Near Infrared Fluorescent Sensors based on Single Walled Carbon Nanotubes” ACS, Graphite Mat. Sci., Washington, DC, Aug 2009

“Biological Applications of Near Infrared Fluorescent Sensors based on Single Walled Carbon Nanotubes” Beckman Meeting, Irvine, CA, Aug 2009

“The Chemistry of Graphene” MURI Kickoff, Washington, DC, Sept 2009

“The Wonders of One Dimensional Chemistry: Carbon Nanotubes for Single Molecule Biodetection and Energy Applications” Penn State lecture, Univ. Park, PA, Sept 2009

“Biological Applications of Near Infrared Fluorescent Sensors based on Single Walled Carbon Nanotubes” NANO DDS, Tampa, FL, Sept 2009

“Photoelectrochemical Complexes for Solar Energy Conversion that Chemically and Autonomously Regenerate” DOE, 3<sup>rd</sup> Biennial Mtg., Warrenton, VA, Oct. 2009

“The Rational Design of Nitric Oxide Selectivity in Single-Walled Carbon Nanotube Near Infrared Fluorescence” “Sensors for Biological Detection Thermopower Waves” AIChE annual Mtg., Nashville, TN, Nov 2009

“The Wonders of One Dimensional Chemistry: Carbon Nanotubes for Single Molecule Biodetection and Energy Applications” Tufts seminar, Medford, Mass., Nov 2009

“The Wonders of One Dimensional Chemistry: Carbon Nanotubes for Single Molecule Biodetection and Energy Applications” Langer Lecture, Yale University, New Haven Conn., Dec 2009

The wonders of one dimensional chemistry: carbon nanotubes for single molecule biodetection and energy applications, Invited Seminar, University of Massachusetts at Lowell, Jan. 2010

## 2008

“The Chemistry and Applications of Single Walled Carbon Nanotubes,” KAIST, Korea, January 2008.

“The Chemistry and Applications of Single Walled Carbon Nanotubes,” SKKU, Suwon, Korea, January 2008.

“The Chemistry of Single Walled Carbon Nanotubes,” Tulane, New Orleans, LA, January 2008.

“The Chemistry of Single Walled Carbon Nanotubes,” University of Michigan, Ann Arbor, January 2008.

“Optical Modulation of Single Walled Carbon Nanotubes” IWEPNM Annual 2008 Winter School, Kirchberg, Austria, March 2008.

“The Chemistry of Single Walled Carbon Nanotubes,” Invited Award Lecture, Materials Research Society, Spring Meeting, YIA Award Lecture, San Fran. CA. March 2008.

“The Chemistry of Single Walled Carbon Nanotubes,” Invited Award Lecture, Colburn Memorial Lecture, University of Delaware, April 2008.

“Optical Modulation of Single Walled Carbon Nanotubes” Carbon 2008, Nagano, Japan, July 2008.

“Recent Progress towards Separation of Single Walled Carbon Nanotubes and Graphene,” 2008 DARPA workshop on RF electronics, Silver Springs, MD, Aug 2008.

“Optical Modulation of Single Walled Carbon Nanotubes” 2008 Gordon Research Conference, Sept 2008, Aussois, France

## 2007

“Fluorescence Applications of Single Walled Carbon Nanotubes,” Invited Lecturer, MOF Conference, Salsburg, Austria, Sept 2007



“Molecular Electronic Applications of Single Walled Carbon Nanotubes,” Royal Society of London, London, England, April 2007

“Optical Modulation of Single Walled Carbon Nanotubes,” Invited Speaker, Ottawa, Canada Wonton 2007

“Optical Modulation of Single Walled Carbon Nanotubes,” Invited Speaker, NIST Workshop, Bethesda, MD, Sept 2007

“Optical Modulation of Single Walled Carbon Nanotubes,” Invited Speaker, MRS Annual Meeting, Boston, MA Dec. 2007

“The Chemistry of Single Walled Carbon Nanotubes,” Cornell, Ithica, NY, Sept 2007

“Colloidal Chemistry of Single Walled Carbon Nanotubes,” Unilever Award Lecture, University of Delaware, Newark Delaware, June 2007

“The Chemistry of Single Walled Carbon Nanotubes,” UCLA Materials Science, Los Angeles, CA, Oct. 2007

## 2006

“Biomolecular Detection via Single Walled Carbon Nanotube Fluorescence,” UIUC, Center for Nanoscale Science and Technology, January 2006

“Detection of Aqueous Containments via nIR Carbon Nanotube Sensors,” UIUC, Center for Nanoscale Science and Technology, February 2006

“Understanding and Exploiting the Chemistry of Single Walled Carbon Nanotubes,” Brown University, Department of Chemical Engineering, April 2006

“Understanding and Exploiting the Chemistry of Single Walled Carbon Nanotubes,” Massachusetts Institute of Technology, Department of Chemical Engineering, April 2006

“Biomolecular Detection via Single Walled Carbon Nanotube Fluorescence,” FNano06, Boulder, CO, April 2006

Invited Speaker, “Single Walled Carbon Nanotube Chemistry,” Nanotube 2006, Nagano, Japan, June 2006

“Biomolecular Detection via Single Walled Carbon Nanotube Fluorescence,” American Chemical Society Annual Meeting, San Fran. CA, Sept 2006

“Understanding and Exploiting the Chemistry of Single Walled Carbon Nanotubes,” University of Oklahoma, Department of Chemical Engineering, Sept 2006

## 2005

Keynote Speaker, “Optical Characterization and Applications of Single Walled Carbon Nanotubes,” American Physical Society, March 2005

“Understanding and Exploiting the Chemistry of Single Walled Carbon Nanotubes,” University of California – Santa Barbara, Department of Chemical Engineering, May 2005

“Applications of Carbon Nanotube Surface Chemistry,” IWEPNM Annual 2005 Winterschool, Kirchberg, Austria, March 2005

“Understanding and Exploiting the Chemistry of Single Walled Carbon Nanotubes,” Georgia Institute of Technology, Department of Polymer Engineering, September 2005

“Understanding and Exploiting the Chemistry of Single Walled Carbon Nanotubes”, Purdue University, Department of Chemical Engineering, October 2005

## 2004

“Charge Transfer at the Single Walled Carbon Nanotube Interface,” Naval Research Laboratories, January 2004

“Understanding and Exploiting the Surface Chemistry of Single Walled Carbon Nanotubes,” Science at the Edge Seminar Series, Michigan State University, February 2004

“Selective Functionalization of Single Walled Carbon Nanotubes for Separation,” American Chemical Society Meeting, Spring 2004

“Selective Functionalization of Single Walled Carbon Nanotubes According to Electronic Structure,” American Physical Society Meeting, March 2004

“Understanding Carbon Nanotube Surface Chemistry,” Southern Illinois University, March 2004

“Applications of Nanotechnology in Medicine,” University of Illinois at Chicago, Grand Rounds, UIC Cancer Center, 2004

“Understanding the Surface Chemistry of Single Walled Carbon Nanotubes,” Oklahoma State University, EPSCoR Meeting, 2004

“Applications of Carbon Nanotube Surface Chemistry,” Nanotube 2004, San Louis Potosi, Mexico, July 2004

### **2003**

“Single Walled Carbon Nanotubes in Aqueous Suspension: Solution Phase Behavior, Enhanced Spectral Properties and Selective Reaction Pathways,” Dupont Experimental Station, Wilmington, DE, November 2002

“Spectroscopic Assignment and Selective Reaction Pathways of Metallic Single Walled Carbon Nanotubes,” IWEPNM Annual 2003 Winterschool, Kirchberg, Austria, March 2003

“Advances in Carbon Nanotube Spectroscopy,” Institute of Physical Chemistry, University of Karlsruhe, Germany, March 2003

“Selective Functionalization of Single Walled Carbon Nanotubes for Separation,” FACSS Meeting, October 2003

### **2002**

“Single Walled Carbon Nanotubes in Aqueous Suspension: Solution Phase Behavior, Enhanced Spectral Properties and Selective Reaction Pathways,” Dupont Experimental Station, Wilmington, DE, November 2002

## **Industrial Consulting (with Confidentiality Agreement)**

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Malvern (2014-pres)

Graphene Technologies (2012-pres)

DCM (2009-pres)

Nanterra (2009-pres)

Ross (2008-pres)

Nanoasis (2008-pres)

Luna Innovation (2006-pres.)

Intel, Portland OR (2005-pres.)

Dupont, Wilmington DE (2003-2004)

## **Recent Professional Activities**

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2012 American Institute of Chemical Engineers Awards Committee

2012 NT13 Conference, organizer, speaker selection

2012 National Institutes of Health, Ad Hoc Reviewer, Nanoscale Science and Technology

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- 2012 MIT Lemelson Award Committee, Panelist
  - 2012 National Science Foundation, Panel Reviewer
  - 2011 American Institute of Chemical Engineers Awards Committee
  - 2011 National Institutes of Health, Ad Hoc Reviewer, Nanoscale Science and Technology
  - 2011 MIT Lemelson Award Committee, Panelist
  - 2011 National Science Foundation, Panel Reviewer 2010 Nanoscale Science and Engineering Forum, Executive Committee, and Blue Ribbon Awards Panel, American Institute of Chemical Engineers
  - 2010 Session organizer/chairman for American Institute of Chemical Engineers Annual Meeting
  - 2010 Session organizer/chairman for Materials Research Society Annual Meeting
  - 2009 NIH Panel Reviewer, several study sections, Nanomedicine, NCI and Grand Challenges
  - 2008 Editorial board, Journal Carbon
  - 2007 Advisory board, Journal of Physical Chemistry, American Chemical Society
  - 2006 Editorial board member: Journal of Experimental Biology and Medicine
  - 2006 NSF Panel Reviewer, Nanotechnology Interdisciplinary Research Grants (NIRT)
  - 2006 American Chemical Society, Presidential Symposium Organizer
  - 2005 Panel Reviewer, NCI-NIH Nanotechnology Platforms
  - 2005-06 Treasurer, NSEF, AIChE
  - 2004 NSF Panel Reviewer, Sensors and Sensor Networks
  - 2004 NSF Panel Reviewer, Nanotechnology Interdisciplinary Research Grants (NIRT)
  - 2004 Reviewer, Department of Energy, Basic Energy Sciences
  - 2004 Organizer and Co-Chair, Nanoscale Science and Technology Plenary Sessions, AIChE
  - 2004 Organizer and Chair, Issues in Carbon Nanotubes Sessions, AIChE Annual Meeting
  - 2003 NSF Panel Reviewer, Sensors and Sensor Networks
  - 2003 Organizer and Chair, Issues in Carbon Nanotubes Sessions, AIChE Annual Meeting

Active reviewer for Journals: Science, PNAS, Nature Materials, Journal of the American Chemical Society, Advanced Materials, Nanoletters, Carbon, Journal of Physical Chemistry B, Langmuir, Physical Review Letters, Applied Physics Letters, Science, Nature Nanotechnology, Nature Materials, Nature Photonics, Nature Biotechnology

### Professional Associations

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American Chemical Society  
American Physical Society  
Materials Research Society  
American Institute of Chemical Engineers  
Federation of Analytical Chemistry and Spectroscopy Society  
Tau Beta Pi, Engineering Honor Society  
Omega Chi Epsilon, Chemical Engineering Honor Society

### Students and Postdoctoral Associates

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Current: 1 Research Scientist  
10 Ph.D. Graduate Students  
10 Post Doctorial Researchers

Jiyoung Ahn, PhD, Chemical Engineering  
Naveed Bakh, PhD, Chemical Engineering

Anton Lee Cottrill, PhD Chemical Engineering  
Lee William Draushuk, PhD Chemical Engineering  
Michael Lee, PhD Chemical Engineering  
Tianxing Liu, PhD Chemical Engineering  
Tedrick Salim Liu, PhD Chemical Engineering  
Ananth Govind Rajan, PhD Chemical Engineering  
Minkyung Park, PhD Chemical Engineering  
Daniel Parker Salem, PhD Chemical Engineering  
Min Hao Wong PhD Chemical Engineering

Visiting Researcher  
Dr. Yuichiro Kunai

Current postdoctoral researchers

Dr. Jesse Benck  
Dr. Gili Bisker  
Dr. Juyao Dong  
Dr. Amir Kaplan  
Dr. Volodymyr Koman  
Dr. Daichi Kozawa  
Dr. Seon-Yeong Kwak  
Dr. Pingwei Liu  
Dr. Freddy Nguyen

Past Graduate Students

Sayalee Mahajan, May 2016, PhD, Chemical Engineering  
Darin Bellisario, January 2016, PhD, Chemistry  
Rashib Jain, May 2015, PhD, Chemical Engineering  
Zachary Ulissi, May 2015, PhD, Chemical Engineering, currently at Stanford  
Nigel Reuel, May 2014, PhD, Chemical Engineering, currently Assistant Professor at Iowa State  
Jaeyun Sung, October 2006-2007, Masters Degree, Chemical Engineering, UIUC  
Daniel Heller, 2003-2009, PhD Chemistry, currently Assistant Professor at Sloan Ketterling, NY  
Rachel Graff, 2003-2007, Masters Degree, Chemical Engineering, UIUC  
Nitish Nair, "A Structure-Reactivity Relationship for Single Walled Carbon Nanotubes," PhD Chemical Engineering, MIT  
Esther Jeng, "The Detection of DNA Hybridization Using the Near-Infrared Fluorescence of Single-Walled Carbon Nanotubes," PhD Chemical Engineering, MIT  
Paul Barone, "Signal Transduction in Glucose Oxidase - Single Walled Carbon Nanotube Complexes: A Near-Infrared Glucose Sensor," PhD Chemical Engineering, UIUC  
Monica L. Usrey, "Selective Chemistry and Separation of Single Walled Carbon Nanotubes," December, 2006  
Hong Jin, PhD Chemical Engineering, MIT  
Chang Young Lee, Interior and Exterior Detection of Analytes Using Single Walled Carbon Nanotubes. PhD Chemical Engineering, MIT  
Richa Sharma, PhD Chemical Engineering, MIT, October 2010  
Joel Abrahamson, PhD Chemical Engineering, MIT

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Won Joon Choi, PhD Mechanical Engineering, MIT  
Arde Boghossian, PhD Chemical Engineering, MIT  
Jingqing Zhang, PhD Chemical Engineering, MIT  
Nigel Forest Reuel, PhD Chemical Engineering, MIT  
Chih-Jen Shih, PhD Chemical Engineering, MIT (co-advised)

#### Past Postdoctoral Researchers

2016 Postdoctoral Researcher Dr. Markita Landry  
2016 Postdoctoral Researcher Dr. Kumar Agrawal  
2015 Postdoctoral Researcher Dr. Sojin Kim  
2015 Postdoctoral Researcher Dr. Nicole Iverson  
2015 Postdoctoral Researcher Dr. Juan Pablo Giraldo  
2014 Postdoctoral Researcher Dr. Qing Hua Wang  
2014 Postdoctoral Researcher Dr. Sebastian Kruss

2008 Postdoctoral researcher, Dr. Marie Kalbacova (currently Assistant Professor, Department of Biology, Prague, Czech Republic)  
2007-2008 Postdoctoral researcher, Dr. Joon Hyun Baik (currently Post Doctorial Researcher, Department of Chemical and Biomolecular Engineering, Penn State University)  
2005-2009 Postdoctoral researcher, Dr. Woo Jae Kim (currently Assistant Professor, Department of Chemical and Biomolecular Engineering, University, Korea)  
2005-2009 Postdoctoral researcher, Dr. Cristiano Fantini (currently Assistant Professor, Department of Physics, University, Brazil)  
2006-2007 Postdoctoral researcher, Dr. Ryuichiro Maruyama (currently Sony Corp. Japan)  
2005-2008 Postdoctoral researcher, Dr. Jong Hyun Choi (currently Assistant Professor, Department of Mechanical Engineering, Purdue University, Indiana)  
2003-2004 Postdoctoral researcher, Dr. Seunghyun Baik (currently Assistant Professor, Department of Mechanical Engineering, Sungkyunkwan University, Korea)  
2004-2005 Postdoctoral researcher, *Dr. Jianqi Zhang* (whereabouts unknown)

#### Teaching Responsibilities

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ChE 261 Introduction to Chemical Engineering, 2003-2006 (UIUC)  
ChE 370 Chemical Engineering Thermodynamics, 2004-2007 (UIUC)  
ChE 574 Graduate Reaction Engineering, 2005-2007, (UIUC)  
Course 10.10 Introduction to Chemical Engineering, 2007 (MIT)  
Course 10.65 Graduate Reaction Engineering, 2007-present (MIT)  
Course 10.585 Engineering Nanotechnology, 2007-present (MIT)  
Course 10.27 Energy Laboratory Module, 2010-present (MIT)

#### Campus Service

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2003 Seminar Committee, Center for Nanoscale Science and Technology  
2003-date Library Committee, School of Chemical Sciences  
2003-date Academic Advising Committee, Department of Chemical Engineering  
2003-date Administrative Committee, Department of Chemical Engineering  
2007-date Graduate Admissions Committee, Chemical Engineering, MIT

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2007-date Seminar Committee, Chemical Engineering, MIT  
2007-date Faculty Hiring Committee, Chemical Engineering, MIT  
2011-date Committee on Toxic Chemicals, MIT  
2012-date Safety Committee, Department of Chemical Engineering, MIT

## Publications

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### Book Chapters

**Strano, M. S.**, J. Rempel, J. Halverson, C. Burket, J. Mathews and H. C. Foley. Structural Modeling of Nanoporous Carbon: A Review of Approaches Simulating an Aperiodic and Non-Equilibrium Solid. in *From Semiconductors to Proteins: Beyond the Average Structure*, edited by S. J. Billinge and M. F. Thorpe (Kluwer Academic/Plenum, New York, 2001)

**Strano, M. S.**, E. Haroz, C. Kittrell, R. H. Hauge, and R. E. Smalley. Assignment of  $(n,m)$  Raman and Absorption Spectral Features of Metallic Single-Walled Carbon Nanotubes. in *Electronic Properties of Novel Materials - Molecular Nanostructures*, edited by H. Kuzmany, J. Fink, M. Mehring, and S. Roth (Springer, New York, 2003), pp. 246-252.

Hennrich, F., M. M. Kappes, **M. S. Strano**, R. H. Hauge, and R. E. Smalley. Infrared Analysis of Amine Treated Single-Walled Carbon Nanotubes Produced by Decomposition of CO. in *Electronic Properties of Novel Materials - Molecular Nanostructures*, edited by H. Kuzmany, J. Fink, M. Mehring, and S. Roth (Springer, New York, 2003), pp. 197-201.

Weisman, R. B., S. M. Bachilo, **M. S. Strano**, C. Kittrell, R. H. Hauge, and R. E. Smalley.  $(n,m)$ -Assigned Absorption and Emission Spectra of Single-Walled Carbon Nanotubes. in *Electronic Properties of Novel Materials - Molecular Nanostructures*, edited by H. Kuzmany, J. Fink, M. Mehring, and S. Roth (Springer, New York, 2003), pp. 241-245.

### Patents

United States of America : PRO : 07/20/16 : 62/364396 : Not Issued : No Patent Num : LAYERED AND SCROLLED NANOCOMPOSITES WITH ALIGNED SEMI-INFINITE GRAPHENE INCLUSIONS AT THE PLATELET LIMIT : Pending

Patent Cooperation Treaty : ORD : 12/02/16 : PCT/US2016/064847 : Not Issued : No Patent Num : SENSOR FOR INFRARED COMMUNICATION USING PLANT NANOBIONICS : Pending

Patent Cooperation Treaty : ORD : 11/22/16 : PCT/US2016/063430 : Not Issued : No Patent Num : PROTEIN CORONA PHASE MOLECULAR RECOGNITION : Pending

Patent Cooperation Treaty : ORD : 11/04/16 : PCT/US2016/60704 : Not Issued : No Patent Num : NANOBIONIC LIGHT EMITTING PLANTS : Pending

Patent Cooperation Treaty : ORD : 09/18/15 : PCT/US2015/050885 : Not Issued : No Patent Num : RATIOMETRIC AND MULTIPLEXED SENSORS FROM SINGLE CHIRALITY CARBON NANOTUBES : Pending

"United States of America : PCT : 12/12/16 : 15/318337 : Not Issued : No Patent Num : SACCHARIDE RESPONSIVE OPTICAL NANOSENSORS : Pending

Patent Cooperation Treaty : ORD : 06/05/15 : PCT/US2015/034445 : Not Issued : No Patent Num : SACCHARIDE RESPONSIVE OPTICAL NANOSENSORS : Published application"

"United States of America : ORD : 09/16/14 : 14/488040 : Not Issued : No Patent Num : NEAR INFRARED FLUORESCENT SINGLE WALLED CARBON NANOTUBES AS TISSUE LOCALIZABLE BIOSENSORS : Published application

European Patent Convention : PCT : 09/16/14 : 14843793.2 : Not Issued : No Patent Num : NEAR INFRARED FLUORESCENT SINGLE WALLED CARBON NANOTUBES AS TISSUE LOCALIZABLE BIOSENSORS : Pending

China : PCT : 05/06/16 : 201480060937.6 : Not Issued : No Patent Num : NEAR INFRARED FLUORESCENT SINGLE WALLED CARBON NANOTUBES AS TISSUE LOCALIZABLE BIOSENSORS : Pending

Japan : PCT : 09/16/14 : NOT YET ASSIGNED : Not Issued : No Patent Num : NEAR INFRARED FLUORESCENT SINGLE WALLED CARBON NANOTUBES AS TISSUE LOCALIZABLE BIOSENSORS : Pending

Patent Cooperation Treaty : ORD : 09/16/14 : PCT/US2014/055911 : Not Issued : No Patent Num : NEAR INFRARED FLUORESCENT SINGLE WALLED CARBON NANOTUBES AS TISSUE LOCALIZABLE BIOSENSORS : NATIONALIZE"

United States of America : ORD : 08/07/14 : 14/454196 : Not Issued : No Patent Num : NANOBIONIC ENGINEERING OF ORGANELLES AND PHOTOSYNTHETIC ORGANISMS : Published application

United States of America : ORD : 02/20/14 : 14/185856 : Not Issued : No Patent Num : SENSOR FOR DETECTING ANALYTES : Published application

"Korea (south) : PCT : 03/14/13 : 10-2014-7034357 : Not Issued : No Patent Num : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : Pending

United States of America : ORD : 03/14/13 : 13/827478 : 08/02/16 : 9403684 : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : Issued

European Patent Convention : PCT : 03/14/13 : 13800999.8 : Not Issued : No Patent Num : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : Pending

China : PCT : 03/14/13 : 201380036164.3 : Not Issued : No Patent Num : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : Pending

Japan : PCT : 03/14/13 : 2015-511462 : Not Issued : No Patent Num : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : Pending

India : PCT : 03/14/13 : 8412/DELNP/2014 : Not Issued : No Patent Num : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : Pending

Patent Cooperation Treaty : ORD : 03/14/13 : PCT/US2013/031571 : Not Issued : No Patent Num : COMPOSITIONS, METHODS, AND SYSTEMS FOR SEPARATING CARBON-BASED NANOSTRUCTURES : NATIONALIZE"

"European Patent Convention : PCT : 07/30/12 : 12758678.2 : Not Issued : No Patent Num : PHOTOLUMINESCENT NANOSTRUCTURE-BASED SENSORS : Inactive

United States of America : RCE : 07/31/12 : 13/562403 : Not Issued : No Patent Num : PHOTOLUMINESCENT NANOSTRUCTURE-BASED SENSORS : Published application

Canada : PCT : 07/30/12 : 2843950 : Not Issued : No Patent Num : PHOTOLUMINESCENT NANOSTRUCTURE-BASED SENSORS : Pending

United States of America : PRO : 08/01/11 : 61/513790 : Not Issued : No Patent Num : ENCAPSULATION FORMS AND MODULATION CHEMISTRIES FOR RATIO-METRIC, INTERNALLY CALIBRATED NEAR INFRARED FLUORESCENT SINGLE-WALLED CARBON NANOTUBE SENSOR F : Expired

Patent Cooperation Treaty : ORD : 07/30/12 : PCT/US2012/048841 : Not Issued : No Patent Num : PHOTOLUMINESCENT NANOSTRUCTURE-BASED SENSORS : NATIONALIZE"

United States of America : RCE : 08/31/11 : 13/222706 : Not Issued : No Patent Num : NANOTUBE ARRAY FOR OPTICAL DETECTION OF PROTEIN-PROTEIN INTERACTIONS : Published application

United States of America : ORD : 04/19/11 : 13/090199 : Not Issued : No Patent Num : POLYMER-NANOSTRUCTURE COMPOSITION FOR SELECTIVE MOLECULAR RECOGNITION : Published application

"United States of America : ORD : 12/14/10 : 12/967563 : 06/11/13 : 8460608 : SYSTEMS AND METHODS RELATED TO OPTICAL NANOSENSORS COMPRISING PHOTOLUMINESCENT NANOSTRUCTURES : Issued



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United States of America : CON : 06/10/13 : 13/914236 : Not Issued : No Patent Num : SYSTEMS AND METHODS RELATED TO OPTICAL NANOSENSORS COMPRISING PHOTOLUMINESCENT NANOSTRUCTURES : Published application"

United States of America : ORD : 02/26/10 : 12/659193 : 02/19/13 : 8377700 : SYSTEMS AND METHODS USING PHOTOLUMINESCENT NANOSTRUCTURE BASED HYDROGELS : Issued

"United States of America : ORD : 08/20/10 : 12/860752 : 07/16/13 : 8486709 : OPTICAL NANOSENSORS COMPRISING PHOTOLUMINESCENT NANOSTRUCTURES : Issued

United States of America : RCE : 07/15/13 : 13/942241 : Not Issued : No Patent Num : OPTICAL NANOSENSOR COMPRISING PHOTOLUMINESCENT NANOSTRUCTURES : Pending"

"United States of America : ORD : 07/22/05 : 11/187706 : 07/01/14 : 8765488 : SENSORS EMPLOYING SINGLE-WALLED CARBON NANOTUBES : Issued

United States of America : CON : 06/30/14 : 14/320480 : Not Issued : No Patent Num : AN IMPLANTABLE GLUCOSE SENSOR BASED ON SINGLE WALLED CARBON NANOTUBE FLUORESCENCE : Pending"

"Korea (south) : PCT : 11/21/08 : 10-2010-7013460 : Not Issued : No Patent Num : SEPARATION OF NANOSTRUCTURES : Published application

United States of America : PCT : 09/03/10 : 12/743912 : 10/29/13 : 8568685 : SEPARATION OF NANOSTRUCTURES : Issued

China : PCT : 11/21/08 : 200880122806.0 : Not Issued : No Patent Num : SEPARATION OF NANOSTRUCTURES : Published application

Patent Cooperation Treaty : ORD : 11/21/08 : US08/012980 : Not Issued : No Patent Num : SEPARATION OF NANOSTRUCTURES : NATIONALIZE"

**Selected Peer Reviewed Journal Publications (355 total)**

**(h-index = 67 as of Jan 2017, total citations = 26192, 73.78 citations per article)**

- (1) Wong, M. H.; Misra, R. P.; Giraldo, J. P.; Kwak, S. Y.; Son, Y.; Landry, M. P.; Swan, J.W.; Blankschtein, D.; Strano, M. S., Lipid Exchange Envelope Penetration (LEEP) of Nanoparticles for Plant Engineering: A Universal Localization Mechanism. Nano letters 2016, 16 (2), 1161-1172.
- (2) Ulissi, Z. W.; Rajan, A. G.; Strano, M. S., Persistently Auxetic Materials: Engineering the Poisson Ratio of 2D Self-Avoiding Membranes under Conditions of Non-Zero Anisotropic Strain. ACS Nano 2016, 10 (8), 7542-7549.

- (3) Son, Y.; Li, M. Y.; Cheng, C. C.; Wei, K. H.; Liu, P. W.; Wang, Q. H.; Li, L. J.; Strano, M.S., Observation of Switchable Photoresponse of a Monolayer WSe<sub>2</sub>-MoS<sub>2</sub> Lateral Heterostructure via Photocurrent Spectral Atomic Force Microscopic Imaging. *Nano letters* 2016, 16 (6), 3571-3577.
- (4) Salem, D. P.; Nelson, J. T.; Kim, S.; Strano, M. S., A Dynamic, Mathematical Model for Quantitative Glycoprofiling Using Label-Free Lectin Microarrays. *ACS Sensors* 2016, 1 (8), 987-996.
- (5) Salem, D. P.; Landry, M. P.; Bisker, G.; Ahn, J.; Kruss, S.; Strano, M. S., Chirality dependent corona phase molecular recognition of DNA-wrapped carbon nanotubes. *Carbon* 2016, 97, 147-153.
- (6) Rajan, A. G.; Warner, J. H.; Blankschtein, D.; Strano, M. S., Generalized Mechanistic Model for the Chemical Vapor Deposition of 2D Transition Metal Dichalcogenide Monolayers. *ACS Nano* 2016, 10 (4), 4330-4344.
- (7) Rajan, A. G.; Sresht, V.; Padua, A. A. H.; Strano, M. S.; Blankschtein, D., Dominance of Dispersion Interactions and Entropy over Electrostatics in Determining the Wettability and Friction of Two-Dimensional MoS<sub>2</sub> Surfaces. *ACS Nano* 2016, 10 (10), 9145-9155.
- (8) Paulson, J. A.; Molaro, M. C.; Bellisario, D. O.; Strano, M. S.; Braatz, R. D., Mathematical Modeling and Analysis of Carbon Nanotube Photovoltaic Systems. *Ifac Papers on Line* 2016, 49 (7), 442-447.
- (9) Mahajan, S. G.; Liu, A. T.; Cottrill, A. L.; Kunai, Y.; Bender, D.; Castillo, J.; Gibbs, S. L.; Strano, M. S., Sustainable power sources based on high efficiency thermopower wave devices. *Energy & Environmental Science* 2016, 9 (4), 1290-1298.
- (10) Liu, P. W.; Strano, M. S., Toward Ambient Armor: Can New Materials Change Longstanding Concepts of Projectile Protection? *Advanced Functional Materials* 2016, 26 (6), 943-954.
- (11) Liu, P. W.; Jin, Z.; Katsukis, G.; Draushuk, L. W.; Shimizu, S.; Shih, C. J.; Wetzel, E. D.; Taggart-Scarff, J. K.; Qing, B.; Van Vliet, K. J.; Li, R.; Wardle, B. L.; Strano, M. S., Layered and scrolled nanocomposites with aligned semi-infinite graphene inclusions at the platelet limit. *Science* 2016, 353 (6297), 364-367.
- (12) Landry, M. P.; Zhang, J. Q.; Barone, P. W.; Kim, J. H.; Strano, M. S., Optical Detection of Biological Activity, One Molecule at a Time. *Biophysical Journal* 2016, 110 (3), 335A-336A.
- (13) Jo, W. J.; Nelson, J. T.; Chang, S.; Bulovic, V.; Gradecak, S.; Strano, M. S.; Gleason, K. K., Oxidative Chemical Vapor Deposition of Neutral Hole Transporting Polymer for Enhanced Solar Cell Efficiency and Lifetime. *Advanced Materials* 2016, 28 (30), 6399-+.
- (14) Iverson, N. M.; Bisker, G.; Farias, E.; Ivanov, V.; Ahn, J.; Wogan, G. N.; Strano, M. S., Quantitative Tissue Spectroscopy of Near Infrared Fluorescent Nanosensor Implants. *Journal of Biomedical Nanotechnology* 2016, 12 (5), 1035-1047.
- (15) Draushuk, L. W.; Wang, L.; Koenig, S. P.; Bunch, J. S.; Strano, M. S., Analysis of Time-Varying, Stochastic Gas Transport through Graphene Membranes. *ACS Nano* 2016, 10 (1), 786-795.
- (16) Bisker, G.; Dong, J.; Park, H. D.; Iverson, N. M.; Ahn, J.; Nelson, J. T.; Landry, M. P.; Kruss, S.; Strano, M. S., Protein-targeted corona phase molecular recognition. *Nature Communications* 2016, 7.

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- (17) Bellisario, D. O.; Paulson, J. A.; Braatz, R. D.; Strano, M. S., An Analytical Solution for Exciton Generation, Reaction, and Diffusion in Nanotube and Nanowire-Based Solar Cells. *Journal of Physical Chemistry Letters* 2016, 7 (14), 2683-2688.
- (18) Alsaif, M.; Chrimes, A. F.; Daeneke, T.; Balendhran, S.; Bellisario, D. O.; Son, Y.; Field, M. R.; Zhang, W.; Nili, H.; Nguyen, E. P.; Latham, K.; van Embden, J.; Strano, M. S.; Ou, J. Z.; Kalantar-zadeh, K., High-Performance Field Effect Transistors Using Electronic Inks of 2D Molybdenum Oxide Nanoflakes. *Advanced Functional Materials* 2016, 26 (1), 91-100.
- (19) Agrawal, K. V.; Draushuk, L. W.; Strano, M. S., Observation and analysis of the Coulter effect through carbon nanotube and graphene nanopores. *Philosophical Transactions of the Royal Society a-Mathematical Physical and Engineering Sciences* 2016, 374 (2060).
- (20) Wang, Y. C.; Ou, J. Z.; Chrimes, A. F.; Carey, B. J.; Daeneke, T.; Alsaif, M.; Mortazavi, M.; Zhuiykov, S.; Medhekar, N.; Bhaskaran, M.; Friend, J. R.; Strano, M. S.; Kalantar-Zadeh, K., Plasmon Resonances of Highly Doped Two-Dimensional MoS<sub>2</sub>. *Nano letters* 2015, 15 (2), 883-890.
- (21) Wang, L. D.; Draushuk, L. W.; Cantley, L.; Koenig, S. P.; Liu, X. H.; Pellegrino, J.; Strano, M. S.; Bunch, J. S., Molecular valves for controlling gas phase transport made from discrete angstrom-sized pores in graphene. *Nature Nanotechnology* 2015, 10 (9), 785-+.
- (22) Ulissi, Z. W.; Zhang, J. Q.; Sresht, V.; Blankschtein, D.; Strano, M. S., 2D Equation-of-State Model for Corona Phase Molecular Recognition on Single-Walled Carbon Nanotube and Graphene Surfaces. *Langmuir* 2015, 31 (1), 628-636.
- (23) Son, Y.; Wang, Q. H.; Paulson, J. A.; Shih, C. J.; Rajan, A. G.; Tvrdy, K.; Kim, S.; Alfeeli, B.; Braatz, R. D.; Strano, M. S., Layer Number Dependence of MoS<sub>2</sub> Photoconductivity Using Photocurrent Spectral Atomic Force Microscopic Imaging. *ACS Nano* 2015, 9 (3), 2843-2855.
- (24) Shimizu, S.; Strano, M. S., The Structubent: A Nanocomposite Solution to Compressed Natural Gas Storage. *Advanced Engineering Materials* 2015, 17 (3), 383-391.
- (25) Shimizu, S.; Agrawal, K. V.; O'Mahony, M.; Draushuk, L. W.; Manohar, N.; Myerson, A. S.; Strano, M. S., Understanding and Analyzing Freezing-Point Transitions of Confined Fluids within Nanopores. *Langmuir* 2015, 31 (37), 10113-10118.
- (26) Shih, C. J.; Wang, Q. H.; Lin, S. C.; Park, K. C.; Jin, Z.; Strano, M. S.; Blankschtein, D., Breakdown in the Wetting Transparency of Graphene (vol 109, 176101, 2012). *Physical Review Letters* 2015, 115 (4).
- (27) Shih, C. J.; Lin, S. C.; Strano, M. S.; Blankschtein, D., Understanding the Stabilization of Single-Walled Carbon Nanotubes and Graphene in Ionic Surfactant Aqueous Solutions: Large-Scale Coarse-Grained Molecular Dynamics Simulation-Assisted DLVO Theory. *Journal of Physical Chemistry C* 2015, 119 (2), 1047-1060.
- (28) Oliveira, S. F.; Bisker, G.; Bakh, N. A.; Gibbs, S. L.; Landry, M. P.; Strano, M. S., Protein functionalized carbon nanomaterials for biomedical applications. *Carbon* 2015, 95, 767-779.
- (29) Nelson, J. T.; Kim, S.; Reuel, N. F.; Salem, D. P.; Bisker, G.; Landry, M. P.; Kruss, S.; Barone, P. W.; Kwak, S.; Strano, M. S., Mechanism of Immobilized Protein A Binding to Immunoglobulin G on Nanosensor Array Surfaces. *Analytical Chemistry* 2015, 87 (16), 8186-8193.

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- (30) Mu, B.; Ahn, J.; McNicholas, T. P.; Strano, M. S., Generating Selective Saccharide Binding Affinity of Phenyl Boronic Acids by using Single-Walled Carbon Nanotube Corona Phases. *Chemistry-a European Journal* 2015, 21 (12), 4523-4528.
- (31) Landry, M. P.; Vukovic, L.; Kruss, S.; Bisker, G.; Landry, A. M.; Islam, S.; Jain, R.; Schulten, K.; Strano, M. S., Comparative Dynamics and Sequence Dependence of DNA and RNA Binding to Single Walled Carbon Nanotubes. *Journal of Physical Chemistry C* 2015, 119 (18), 10048-10058.
- (32) Kalantar-zadeh, K.; Ou, J. Z.; Daeneke, T.; Strano, M. S.; Pumera, M.; Gras, S. L., Two-Dimensional Transition Metal Dichalcogenides in Biosystems. *Advanced Functional Materials* 2015, 25 (32), 5086-5099.
- (33) Jain, R. M.; Ben-Naim, M.; Landry, M. P.; Strano, M. S., Competitive Binding in Mixed Surfactant Systems for Single-Walled Carbon Nanotube Separation. *Journal of Physical Chemistry C* 2015, 119 (39), 22737-22745.
- (34) Giraldo, J. P.; Landry, M. P.; Kwak, S. Y.; Jain, R. M.; Wong, M. H.; Iverson, N. M.; Ben-Naim, M.; Strano, M. S., A Ratiometric Sensor Using Single Chirality Near-Infrared Fluorescent Carbon Nanotubes: Application to In Vivo Monitoring. *Small* 2015, 11 (32), 3973-3984.
- (35) Cottrill, A. L.; Strano, M. S., Analysis of Thermal Diodes Enabled by Junctions of Phase Change Materials. *Advanced Energy Materials* 2015, 5 (23).
- (36) Bisker, G.; Iverson, N. M.; Ahn, J.; Strano, M. S., A Pharmacokinetic Model of a Tissue Implantable Insulin Sensor. *Advanced Healthcare Materials* 2015, 4 (1).
- (37) Bisker, G.; Ahn, J.; Kruss, S.; Ulissi, Z. W.; Salem, D. P.; Strano, M. S., A Mathematical Formulation and Solution of the CoPhMoRe Inverse Problem for Helically Wrapping Polymer Corona Phases on Cylindrical Substrates. *Journal of Physical Chemistry C* 2015, 119 (24), 13876-13886.
- (38) Bhimanapati, G. R.; Lin, Z.; Meunier, V.; Jung, Y.; Cha, J.; Das, S.; Xiao, D.; Son, Y.; Strano, M. S.; Cooper, V. R.; Liang, L. B.; Louie, S. G.; Ringe, E.; Zhou, W.; Kim, S. S.; Naik, R. R.; Sumpter, B. G.; Terrones, H.; Xia, F. N.; Wang, Y. L.; Zhu, J.; Akinwande, D.; Alem, N.; Schuller, J. A.; Schaak, R. E.; Terrones, M.; Robinson, J. A., Recent Advances in Two-Dimensional Materials beyond Graphene. *ACS Nano* 2015, 9 (12), 11509-11539.
- (39) Zhang, J. Q.; Landry, M. P.; Barone, P. W.; Kim, J. H.; Lin, S. C.; Ulissi, Z. W.; Lin, D. H.; Mu, B.; Boghossian, A. A.; Hilmer, A. J.; Rwei, A.; Hinckley, A. C.; Kruss, S.; Shandell, M. A.; Nair, N.; Blake, S.; Sen, F.; Sen, S.; Croy, R. G.; Li, D. Y.; Yum, K.; Ahn, J. H.; Jin, H.; Heller, D. A.; Essigmann, J. M.; Blankschtein, D.; Strano, M. S.; Ieee, Molecular recognition using corona phase complexes made of synthetic polymers adsorbed on carbon nanotubes. 2014 40th Annual Northeast Bioengineering Conference (NEBEC) 2014.
- (40) Zhang, J. Q.; Kruss, S.; Hilmer, A. J.; Shimizu, S.; Schmois, Z.; De La Cruz, F.; Barone, P. W.; Reuel, N. F.; Heller, D. A.; Strano, M. S., A Rapid, Direct, Quantitative, and Label-Free Detector of Cardiac Biomarker Troponin T Using Near-Infrared Fluorescent Single-Walled Carbon Nanotube Sensors. *Advanced Healthcare Materials* 2014, 3 (3), 412-423.
- (41) Yun, J.; Jeon, W.; Drahusuk, L. W.; Baik, S.; Strano, M. S., Extraordinary High Microwave Absorption Cross Section of Ultralong Carbon Nanotubes. *Journal of Physical Chemistry C* 2014, 118 (25), 13757-13763.
- (42) Wang, Q. H.; Bellisario, D. O.; Drahusuk, L. W.; Jain, R. M.; Kruss, S.; Landry, M. P.; Mahajan, S. G.; Shimizu, S. F. E.; Ulissi, Z. W.; Strano, M. S., Low Dimensional Carbon

- Materials for Applications in Mass and Energy Transport. *Chem. Mat.* 2014, 26 (1), 172-183.
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- (44) Strano, M. S., New concepts in biosensing using single walled carbon nanotubes and graphene. *Abstr. Pap. Am. Chem. Soc.* 2014, 248.
- (45) Shih, C. J.; Wang, Q. H.; Son, Y.; Jin, Z.; Blankschtein, D.; Strano, M. S., Tuning On-Off Current Ratio and Field-Effect Mobility in a MoS<sub>2</sub>-Graphene Heterostructure via Schottky Barrier Modulation. *ACS Nano* 2014, 8 (6), 5790-5798.
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- (47) Ou, J. Z.; Chrimes, A. F.; Wang, Y. C.; Tang, S. Y.; Strano, M. S.; Kalantar-zadeh, K., Ion-Driven Photoluminescence Modulation of Quasi-Two-Dimensional MoS<sub>2</sub> Nanoflakes for Applications in Biological Systems. *Nano letters* 2014, 14 (2), 857-863.
- (48) Mu, B.; Zhang, J. Q.; McNicholas, T. P.; Reuel, N. F.; Kruss, S.; Strano, M. S., Recent Advances in Molecular Recognition Based on Nanoengineered Platforms. *Accounts of Chemical Research* 2014, 47 (4), 979-988.
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