

Biographical Sketch— Jiaxing Huang

Materials Science & Engineering
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PROFESSIONAL PREPARATION

- Miller Research Fellow (2004-2007), University of California, Berkeley
Sponsor: Prof. Peidong Yang
- PhD in Chemistry (2000-2004), University of California, Los Angeles
Advisor: Prof. Richard B. Kaner
- BS in Chemical Physics (1995-2000), University of Science and Technology of China
Research Advisor: Prof. Yi Xie

PROFESSIONAL APPOINTMENTS

2017- Professor of Materials Science and Engineering, Northwestern University
2013-17 Associate Professor of Materials Science and Engineering, Northwestern University
2011-13 Morris E. Fine Junior Professor in Materials and Manufacturing, Northwestern University
2007-13 Assistant Professor of Materials Science and Engineering, Northwestern University

RESEARCH AND TEACHING PHILOSOPHIES

- Create new knowledge, materials and techniques that are potentially useful for better living
- Teach to develop intuition, “unlock” creativity and bring the best out of students and ourselves

HONORS AND AWARDS

- JITRI International Fellow Award (Jiangsu Industrial Technology Research Institute, 2018)
- Highly Cited Researcher (Thomson Reuters/Clarivate Analytics, 2014, 2015, 2016, 2017)
- Humboldt Research Award (Alexander von Humboldt-Foundation, 2016)
- Most Cited Researcher in Materials Science and Engineering (Scopus, Elsevier, 2016)
- JSPS Short-term Invitation Fellowship (Japan Society for the Promotion of Science, 2016)
- Guggenheim Fellowship (John Simon Guggenheim Memorial Foundation, 2014-2015)
- Fissan-Pui-TSI Award (International Aerosol Research Assembly, 2014)
- AVS Prairie Chapter Early Career Award (American Vacuum Society, 2014)
- Gustav Olling Outstanding Young Manufacturing Engineer Award (Society of Manufacturing Engineers, 2013)
- Inaugural ISEN Early Career Investigator Award (Initiative for Sustainability and Energy at Northwestern, 2011)
- Searle Center for Teaching Excellence Junior Fellow (Northwestern University, 2011-2012)
- Sloan Research Fellow (The Alfred P. Sloan Foundation, 2011)
- NSF CAREER Award (National Science Foundation, 2010-2015)
- Miller Research Fellow (UC-Berkeley, 2004-2007)
- National Starch and Chemical Award for Outstanding Graduate Research in Polymer Science and Engineering (POLY/PMSE divisions, American Chemical Society, 2006)
- IUPAC Young Chemists Prize (The International Union of Pure & Applied Chemistry, 2005)

SELECTED EXTERNAL PROFESSIONAL SERVICES

- Member of editorial/advisory board:
 - *Carbon* (American Carbon Society, Elsevier, 2014-)

- *Journal of Materials Chemistry - A* (Royal Society of Chemistry, 2014-)
- *Chemistry of Materials* (American Chemical Society, 2015-)
- *Applied Materials Today* (Elsevier, 2015-)
- *Science China Technological Sciences* (Science China Press/Springer, 2018-)
- *Science China Chemistry* (Science China Press/Springer, 2018-)
- Guest editor:
 - *Special issue for Journal of Solid State Chemistry* (Elsevier, 2015)
 - *Special issue for Advanced Drug Delivery Review* (Elsevier, 2016)
 - *Web theme issue for ACS Nano, ACS Photonics, Chemistry of Materials, Nano Letters* (American Chemical Society, 2016)

For professional societies and conferences

- Member of advisory committee:
 - New Diamond and Nano Carbons Conference (2013 and 2016)
 - International Conference of Young Researchers on Advanced Materials (2014)
- Symposium organizer/leader:
 - Founding organizer of International Workshop on Graphene Oxide and Related Materials (2016, 2017), ENFL Symposium on Graphene for Energy and Fuels, ACS Meeting (2012-14)
 - Founding organizer of the Northwestern Workshop on Visual Representation of Research (2016, 2018)
 - The 5th International Conference on Multifunctional, Hybrid and Nanomaterials (Lisboa, Portugal, 2017)
 - Functional 2D Layered Materials, MRS meeting (2011)

Reviewer, evaluator and judge for award agencies

- Official Nominator for the Japan Prize (Japan)
- President's Science Award (Singapore)
- State Natural Science Award (China)
- Tan Kah Kee Science Awards (China)

SELECTED RESEARCH DISCOVERIES/TOPICS IN MATERIALS CHEMISTRY AND PROCESSING

- 2D nanofluidics
- Materials for safer cosmetics
- Fatigue-resistant electrocatalysis
- Self-healing anti-corrosion coatings for metals
- Physical functions of information-bearing patterns
- Crumpled graphene balls: Energy storage, water treatment, and lubrication
- Carbon nanotube dispersions with polymer-like properties and processability
- Bulk nanostructured materials from well-defined nanoscale building blocks
- Electrospray assisted Langmuir-Blodgett assembly
- Up-cycling of silicon sludge waste for Li ion batteries
- Defect-mediated surface functionalization of 2D metal dichalcogenide sheets
- All-carbon photovoltaics
- Graphene oxide sheets as 2D surfactant
- Fluorescence quenching microscopy for seeing 2D materials
- Metal nanocrystals: Synthesis, assembly and bulk processing
- Organic nanocrystals: Orientation-controlled growth and chemical reactivity

PATENTS AND INVENTION DISCLOSURES

- From Northwestern research: 5 US and 1 Korean patents issued, 14 more pending
- From prior research: 4 US patents issued

From Northwestern research

1. "Crumpled graphene balls made directly from graphite powders", NU2017-205
2. "Enhanced Broadband Solar Absorber Based on Morphologically Tailored Graphene", NU2017-203
3. "Self-healing coatings for anti-corrosion", NU2017-195
4. "A Cut-and-paste approach to 3D architectures", NU2017-167
5. "Fatigue-resistant electrocatalysis", NU2017-096
6. "Graphene-based multifunctional dye", NU2017-068, US provisional patent filed, #62/573,775
7. "Additive-free carbon nanotube dispersions, pastes, gels and doughs", NU2017-147, US provisional patent filed, #62/549,634 and 62/670,150
8. "Conducting polymer inks and writing devices", NU2017-001, US provisional patent filed, #62/449,786
9. "Crumpled graphene balls as non-reactive scaffold for high performance lithium metal anodes", NU2016-162, U.S. patent filed, # 62/411,798
10. "Crumpled graphene balls as lubricant additive for friction and wear reduction" U.S. patent application filed, #62/235,201
11. "Method and system for Langmuir-Blodgett assembly" U.S. patent application filed, # 15/223,617
12. "Crumpled Graphene-Encapsulated Nanostructures and Lithium Ion Battery Anodes Made Therefrom" U.S. patent application filed, # 13/930,031 (**licensed**)
13. "Crumpled particles, methods of synthesizing same and applications using same" U.S. patent application filed, #13/537,686 (**licensed**)
14. "Emulsions, compositions and devices including graphene oxide, and methods for using same" U.S. patent application filed, 13/467,590 (**licensed**)
15. "Composite of graphene oxide and nanostructures, methods of making and applications of same" U.S. patent 9,917,255, **issued** on 03/13/2018
16. "Optical discs as low-cost, quasi-random nanoimprinting templates for photon management" U.S. patent 9,786,845, **issued** on 10/10/2017
17. "Two dimensional assembly of graphene oxide single layers, and applications of the same" U.S. patent 9,118,078, **issued** on 8/25/2015
18. "Methods of flash reduction and patterning of graphite oxide and its polymer composites", U.S. patent 8,968,525, **issued** on 3/3/2015
19. "Manufacturing method for graphene hollow particle and graphene hollow particle using the same" Korean patent 10-1452397, **issued** on 10/23/2014
20. "High-throughput imaging of graphene based sheets by fluorescence quenching microscopy" U.S. patent 8,426,120, **issued** on 4/23/2013

From prior research

21. "Fabrication of polyaniline nanofiber dispersions and films", U.S. Patent 8470203, **issued** on 6/25/2013 (**licensed**)
22. "Flash welding of conducting polymer nanofibers", U.S. Patent 7850798, **issued** on 12/14/2010 (**licensed**)
23. "Conducting polymer nanofiber sensors", U.S. Patent 7226530, **issued** on 6/05/2007 (**licensed**)
24. "Synthetic method for conducting polymer nanofibers", U.S. Patent 7144949, **issued** on 12/05/2006 (**licensed**)

SELECTED PUBLICATIONS

Google scholar profile: <http://scholar.google.com/citations?user=sbfLJqUAAAAJ&hl=en>

Total number of publications: 122; Total number of citations: > 24,000; H-index: 68 (as of May 2018)

Selected publications at Northwestern (* Denotes corresponding author)

1. Kevin Chiou, Segi Byun, Jaemyung Kim and Jiaying Huang* "Additive-free Carbon Nanotube Dispersions, Pastes, Gels and Doughs in Cresols" *Proceeding of National Academy of Sciences*, **2018**, DOI: 10.1073/pnas.1800298115 (featured in *Materials Today*, *Chem Europe*, *Ceramic Tech Today*)
2. Chong Luo, Lingye Zhou, Kevin Chiou and Jiaying Huang* "Multifunctional Graphene Hair Dye" *Chem*, **2018**, 4, 784-794 (featured on cover, and in *Science*, *Scientific American*, *C&EN*, *Chemistry World*, *The New York Times*, *Daily Mail*, *Huffington Post*, *BBC*, *NPR*, *Fast Company*, *TeenVogue*, *Refinery29*, *Allure* and many other places)
3. Wei Hao, Kevin Chiou, Yiming Qiao, Yanming Liu, Chengyi Song, Tao Deng* and Jiaying Huang* "Crumpled Graphene Balls-based Broadband Solar Absorber" *Nanoscale*, **2018**, 10, 6306-6312
4. Chong Luo, Che-Ning Yeh, Jesus M. Lopez Baltazar, Chao-Lin Tsai and Jiaying Huang* "A Cut-and-paste Approach to 3D Graphene Oxide-based Architectures" *Advanced Materials*, **2018**, 30, 1706229 (featured in *Polymer Science Forum*)
5. Jun Gao, Andrew R. Koltonow, Kalyan Raidongia, Bernard Beckerman, Niels Boon, Erik Luijten, Monica Olvera de la Cruz, Jiaying Huang* "Kirigami Nanofluidics" *Materials Chemistry Frontiers*, **2018**, 2, 475-482 (featured on the inside cover, and in a Spotlight article in *Nanowerk.com*)
6. Shan Liu, Aoxuan Wang, Qianqian Li, Jinsong Wu, Xianfei Hu, Feiyu Kang, Quan-Hong Yang, Jiaying Huang* and Jiayan Luo* "Crumpled Graphene Balls Stabilized Dendrite-Free Lithium Metal Anodes" *Joule*, **2018**, 2, 184-193 (featured on cover)
7. Aoxuan Wang, Shan Tang, Debin Kong, Shan Liu, Kevin Chiou, Linjie Zhi, Jiaying Huang, Yong-Yao Xia, and Jiayan Luo* "Bending-Tolerant Anodes for Lithium-Metal Batteries" *Advanced Materials*, **2018**, 30, 1703891 (featured on frontispiece)
8. Andrew Koltonow, Chong Luo, Jiayan Luo and Jiaying Huang* "Graphene Oxide Sheets in Solvents: To Crumple or Not To Crumple?" *ACS Omega*, **2017**, 2, 8005-8009
9. Chenlong Cui, Alane T.O. Lim and Jiaying Huang* "A Cautionary Note on Graphene Anti-corrosion Coatings" *Nature Nanotechnology*, **2017**, 12, 834-835 (Commentary on the fundamental hypothesis, problems and potential solutions in graphene-based anti-corrosion coatings)
10. Fernando Luis Reyes Tirado, Jiaying Huang and David Dunand* "Ice-Templated Silicon Foams with Aligned Lamellar Channels" *MRS Communications*, **2017**, in press
11. Hongyun Ma, Debin Kong, Yue Xu, Xiaoying Xie, Ying Tao, Zhichang Xiao, Wei Lv, Hee Dong Jang, Jiaying Huang* and Quan-Hong Yang* "A Disassembly-reassembly Approach to RuO₂/Graphene Composites for Ultrahigh Volumetric Capacitance Supercapacitor" *Small*, **2017**, 13, 1701026 (featured on back cover)
12. Zhao Wang, Rajesh Sahadevan, Che-Ning Yeh, Todd J. Menkhaus, Jiaying Huang* and Hao Fong* "Hot-Pressed Polymer Nanofiber Supported Graphene Membrane for High-Performance Nanofiltration" *Nanotechnology*, **2017**, 28, 31LT02
13. Victor Brar,* Andrew R. Koltonow and Jiaying Huang* "New Discoveries and Opportunities from Two-Dimensional Materials" *ACS Photonics*, **2017**, 4, 407-411

14. Andrew R. Koltonow and Jiaying Huang* "Two-dimensional Nanofluidics" *Science*, **2016**, 351, 1395-1396 ([Perspective on the hypothesis, progress and challenges of 2D nanofluidics](#))
15. Xuan Dou, Andrew R. Koltonow, Xingliang He, Hee Dong Jang, Qian Wang,* Yip-Wah Chung* and Jiaying Huang* "Self-dispersed Crumpled Graphene Balls in Oil for Friction and Wear Reduction" *Proceeding of National Academy of Sciences*, **2016**, 13, 1528–1533 ([Cover article, featured in C&EN, Tribology & Lubrication Technology, Fortune.com](#))
16. Guillermo Ivan Guerrero-Garcia, Kalyan Raidongia, Jiaying Huang and Monica Olvera de la Cruz* "Control of Selective Ion Transfer across Liquid-Liquid Interfaces: A Rectifying Heterojunction Based on Immiscible Electrolytes" *ACS Central Science*, **2016**, 2, 857-866
17. 10. Sun Kyung Kim, Hyekyoung Kim, Hankwon Chang, Bong-Gyoo Cho, Jiaying Huang,* Hyundong Yoo, Hansu Kim* and Hee Dong Jang* "One-Step Formation of Silicon-Graphene Composites from Silicon Sludge Waste and Graphene Oxide via Aerosol Process for Lithium Ion Batteries" *Scientific Reports*, **2016**, 6, 33688
18. Jiayan Luo, Jun Gao, Aoxuan Wang, and Jiaying Huang* "Bulk Nanostructured Materials Based on Two-Dimensional Building Blocks: A Roadmap" *ACS Nano*, **2015**, 9, 9432-9436 ([Perspective advocating the study of new bulk nanostructured materials. Featured in a Spotlight article in Nanowerk.com on Feb 2016](#))
19. Huali Nie, Xuan Dou, Zhihong Tang, Hee Dong Jang and Jiaying Huang* "High-Yield Spreading of Water-Miscible Solvents on Water for Langmuir-Blodgett Assembly" *Journal of the American Chemical Society*, **2015**, 137, 10683-10688 ([Featured in C&EN, ChemEurope.com. First author H. Nie profiled in the blog "Women in Nanoscience"](#))
20. Xiaoding Wei, Lily Mao, Rafael A. Soler-Crespo, Jeffrey T. Paci, Jiaying Huang,* SonBinh T. Nguyen* and Horacio D. Espinosa* "Plasticity and Ductility in Graphene Oxide - A Novel Mechanochemically Induced Damage-Tolerance Mechanism", *Nature Communications*, **2015**, 6, 8029
21. Jiao-Jing Shao, Kalyan Raidongia, Andrew R. Koltonow and Jiaying Huang* "Self-assembled Two-dimensional Nanofluidic Proton Channels with High Thermal Stability" *Nature Communications*, **2015**, 6, 7602 ([Featured in Materials360](#))
22. Hee Dong Jang,* Hyekyoung Kim, Hankwon Chang, Jiwoong Kim, Kee Min Roh, Ji-Hyuk Choi, Bong-Gyoo Cho, Eunjun Park, Hansu Kim,* Jiayan Luo and Jiaying Huang* "Aerosol-Assisted Extraction of Silicon Nanoparticles from Wafer Slicing Waste for Lithium Ion Batteries" *Scientific Reports*, **2015**, 5, 9431 ([Featured in C&EN](#))
23. Stanley S. Chou,* Yi-Kai Huang, Jaemyung Kim, Bryan Kaehr, Brian M. Foley, Ping Lu, Conner Dykstra, Patrick E. Hopkins, C. Jeffrey Brinker, Jiaying Huang* and Vinayak P. Dravid* "Controlling the Metal to Semiconductor Transition of MoS₂ and WS₂ in Solution" *Journal of the American Chemical Society*, **2015**, 137, 1742-1745 ([In JACS Spotlights](#))
24. Che-Ning Yeh, Kalyan Raidongia, Jiaojing Shao, Quan-Hong Yang and Jiaying Huang* "On the Origin of the Stability of Graphene Oxide Membrane in Water" *Nature Chemistry*, **2015**, 7, 166-170 ([Featured in Science, C&EN, Materials Today, Materials360. First author C-N. Yeh profiled in the blog "Women in Nanoscience"](#))
25. Alexander J. Smith, Chen Wang, Dongning Guo, Cheng Sun*, Jiaying Huang* "Repurposing Blu-ray Movie Discs as Low-cost, Quasi-random Nanoimprinting Templates for Photon Management" *Nature Communications*, **2014**, 5, 5517 ([Featured in Nature, C&EN, Scientific American, The Washington Post, NBC, PBS, NPR and many other places](#))

26. Alexander J. Smith, Yung-Huang Chang, Kalyan Raidongia, Tzu-Yin Chen, Lain-Jong Li*, and Jiaying Huang* "Molybdenum Sulfide Supported on Crumpled Graphene Balls for Electrocatalytic Hydrogen Production" *Advanced Energy Materials*, **2014**, 4, 1400398
27. Cheng Wei Lin, Zhibo Zhao, Jaemyung Kim and Jiaying Huang* "Pencil Drawn Strain Gauges and Chemiresistors on Paper" *Scientific Reports*, **2014**, 4, 3812 ([Featured in Materials360, Fox News – Tech Take Live](#))
28. Deepti Krishnan, Kalyan Raidongia, Jiaojing Shao and Jiaying Huang* "Graphene Oxide Assisted Hydrothermal Carbonization of Carbon Hydrates" *ACS Nano*, **2014**, 8, 449-457
29. Alvin T. L. Tan, Jaemyung Kim, Jing-Kai Huang, Lain-Jong Li and Jiaying Huang* "Seeing 2D Sheets on Arbitrary Substrates by Fluorescence Quenching Microscopy" *Small*, **2013**, 9, 3253-3258 ([Featured on frontispiece](#))
30. Sheneve Z. Butler, Shawna M. Hollen, Linyou Cao, Yi Cui, Jay A. Gupta, Humberto R. Gutiérrez, Tony F. Heinz, Seung Sae Hong, Jiaying Huang, Ariel F. Ismach, Ezekiel Johnston-Halperin, Masaru Kuno, Vladimir V. Plashnitsa, Richard D. Robinson, Rod Ruoff, Sayeef Salahuddin, Jie Shan, Li Shi, Michael G. Spencer, Mauricio Terrones, Wolfgang Windl, Joshua E. Goldberger* "Progress, Challenges, and Opportunities in Two Dimensional Materials Beyond Graphene" *ACS Nano*, **2013**, 7, 2898-2926 ([Review](#))
31. Stanley S. Chou,* Bryan Kaehr*, Jaemyung Kim, Brian Foley, Mrinmoy De, Patrick Hopkins, Jiaying Huang, C. Jeffrey Brinker and Vinayak P. Dravid "Chemically Exfoliated MoS₂ as Near-Infrared Photothermal Agents" *Angewandte Chemie International Edition*, **2013**, 52, 4160-4164
32. Jaemyung Kim, Segi Byun, Alexander J. Smith, Jin Yu, and Jiaying Huang* "Enhanced Electrocatalytic Properties of Transition Metal Dichalcogenides Sheets by Spontaneous Gold Nanoparticle Decoration", *Journal of Physical Chemistry Letters*, **2013**, 4, 1227-1232 ([Featured in Chemistry World](#))
33. Stanley S. Chou, Mrinmoy De, Jaemyung Kim, Conner Dykstra, Jiaying Huang*, Vinayak P. Dravid* "Ligand conjugation of chemically exfoliated MoS₂", *Journal of the American Chemical Society*, **2013**, 134, 16725-16733
34. Jiayan Luo, Hee Dong Jang and Jiaying Huang* "Effect of Sheet Morphology on the Scalability of Graphene-Based Ultracapacitors" *ACS Nano*, **2013**, 7, 1464-1471 ([Featured in C&EN](#))
35. Hee Dong Jang,* Sun Kyung Kim, Hankwon Chang, Jeong-Woo Choi, Jiayan Luo and Jiaying Huang* "One Step Synthesis of Pt-nanoparticles-Laden Graphene Crumples By Aerosol Spray Pyrolysis and Evaluation of Their Electrocatalytic Activity" *Aerosol Science and Technology*, **2013**, 47, 93-98
36. Jiayan Luo, Jaemyung Kim and Jiaying Huang* "Material Processing of Chemically Modified Graphene: Some Challenges and Solutions" *Accounts of Chemical Research*, **2013**, 46, 2225-2234 ([Cover article](#))
37. Jaemyung Kim, Laura J. Cote and Jiaying Huang* "Two Dimensional Soft Material: New Faces of Graphene Oxide" *Accounts of Chemical Research*, **2012**, 45, 1356-1364
38. Kalyan Raidongia and Jiaying Huang* "Nanofluidic Ion Transport through Reconstructed Layered Materials" *Journal of the American Chemical Society*, **2012**, 134, 16528-16531 ([Featured in Materials Today, IEEE Spectrum](#))

39. Stanley S. Chou, Mrinmoy De,* Jiayan Luo, Vincent M. Rotello, Jiaxing Huang* and Vinayak P. Dravid* "Nanoscale Graphene Oxide (nGO) as Artificial Receptors: Implications for Biomolecular Interactions and Sensing" *Journal of the American Chemical Society*, **2012**, 134, 16725-16733
40. Jian Yao Zheng, Yongli Yan, Xiaopeng Wang, Yong Sheng Zhao,* Jiaxing Huang and Jiannian Yao* "Wire-on-wire Growth of Fluorescent Organic Heterojunctions" *Journal of the American Chemical Society*, **2012**, 134, 2880-2883 ([Featured in Chemistry World](#))
41. Jiayan Luo, Xin Zhao, Jinsong Wu, Hee Dong Jang, Harold H. Kung and Jiaxing Huang* "Crumpled Graphene-Encapsulated Si Nanoparticles for Lithium Ion Battery Anodes" *Journal of Physical Chemistry Letters*, **2012**, 3, 1824-1829
42. Vincent C. Tung, Jen-Hsien Huang, Jaemyung Kim, Alexander J. Smith, Chih-Wei Chu, Jiaxing Huang* "Towards Solution Processed All-Carbon Solar Cells: A Perspective" *Energy & Environmental Science*, **2012**, 5, 7810-7818 ([Featured on inside cover, and in RSC web themed issue: "Rising stars and young nanoarchitects in materials science"](#))
43. Jiayan Luo, Vincent C. Tung, Hee Dong Jang, and Jiaxing Huang* "Graphene Oxide based Conductive Glue as Binder for Ultracapacitor Electrodes" *Journal of Materials Chemistry*, **2012**, 22, 12993-12996
44. Kwonnam Sohn, Yoon Joo Na, Hankwon Chang, Ki-Min Roh, Hee Dong Jang and Jiaxing Huang* "Capillary Molding Route to Oil Absorbing Graphene Capsules" *Chemical Communications*, **2012**, 48, 5968-5970 ([Cover article, featured in Chemistry World](#))
45. Deepti Krishnan, Franklin Kim, Jiayan Luo, Rodolfo Cruz-Silva, Laura J Cote, Hee Dong Jang and Jiaxing Huang* "Energetic Graphene Oxide: Challenges and Opportunities" *Nano Today*, **2012**, 7, 137-152 ([invited Review, a top 25 Hot Article](#))
46. Vincent C. Tung, Jaemyung Kim and Jiaxing Huang* "Graphene Oxide:Single Walled Carbon Nanotube Based Interfacial Layer for All-solution-processed Multijunction Solar Cells in Both Regular and Inverted Geometries" *Advanced Energy Materials*, **2012**, 2, 299-303 ([Featured on frontispiece](#))
47. Mark Kruger, Shannon Berg, D'Arcy Stone, Evgheni Strelcov, Dmitriy A. Dikin, Jaemyung Kim, Laura J. Cote, Jiaxing Huang and Andrei Kolmakov* "Drop Casted Self Assembling Graphene Oxide Membranes for Scanning Electron Microscopy on Wet and Dense Gaseous Samples" *ACS Nano*, **2011**, 5, 10047-10054
48. Jiayan Luo, Hee Dong Jang, Tao Sun, Li Xiao, Zhen He, Alexandros P. Katsoulidis, Mercouri G. Kanatzidis, J. Murray Gibson, and Jiaxing Huang* "Compression and Aggregation-resistant Particles of Crumpled Soft Sheets" *ACS Nano*, **2011**, 5, 8943-8949 ([cover article, featured in Nature, C&EN, Materials Today and Chemistry & Industry](#))
49. Jaemyung Kim, Vincent C. Tung and Jiaxing Huang* "Water Processable Graphene Oxide:Single Walled Carbon Nanotube Composite as Anode Modifier for Polymer Solar Cells" *Advanced Energy Materials*, **2011**, 1, 1052-1057 ([Featured on frontispiece](#))
50. Ken C. Pradel, Kwon Nam Sohn and Jiaxing Huang* "Cross-flow Purification of Nanowires" *Angewandte Chemie International Edition*, **2011**, 50, 3412-3416 ([Named a "hot paper", featured on frontispiece, and in ChemViews Magazine](#))

51. Fei Guo, Franklin Kim, Tae Hee Han, Vivek Shenoy, Jiaying Huang and Robert H. Hurt* "Hydration-Responsive Folding and Unfolding in Graphene Oxide Liquid Crystal Phases" *ACS Nano*, **2011**, 5, 8019-8025
52. Andrei Kolmakov,* Dmitriy A. Dikin, Laura J. Cote, Jiaying Huang, Majid Kazemian Abyaneh, Matteo Amati, Luca Gregoratti, Sebastian Günther and Maya Kiskinova "Graphene Oxide Windows for In-situ Environmental Cell Photoelectron Spectroscopy" *Nature Nanotechnology*, **2011**, 6, 651-657 ([Featured in Nature Nanotechnology – News and Views](#))
53. Tae Hee Han, Yi-Kai Huang, Alvin T. L. Tan, Vinayak P. Dravid* and Jiaying Huang* "Steam Etched Porous Graphene Oxide Network for Chemical Sensing" *Journal of the American Chemical Society*, **2011**, 133, 15264-15267 ([Selected for JACS and Analytical Chemistry virtual issue on "Nanomaterials in Analytical Chemistry"](#))
54. Vincent C. Tung, Jaemyung Kim, Laura J. Cote, and Jiaying Huang* "Sticky Interconnect for Solution-Processed Tandem Solar Cells" *Journal of the American Chemical Society*, **2011**, 133, 9262-9265 ([Featured in Nanowerk.com – Spotlight](#))
55. Vincent C. Tung, Jen-Hsien Huang, Ian Tevis, Franklin Kim, Jaemyung Kim, Chih-Wei Chu, Samuel I. Stupp, and Jiaying Huang* "Surfactant-free Water-processable Photoconductive All-carbon Composite" *Journal of the American Chemical Society*, **2011**, 133, 4940-4947 ([Featured in C&EN, Renewables International, and Fast Company](#))
56. Laura J. Cote, Jaemyung Kim, Vincent C. Tung, Jiayan Luo, Franklin Kim, and Jiaying Huang* "Graphene Oxide as Surfactant Sheets" *Pure and Applied Chemistry*, **2011**, 83, 96-110 ([Cover article, invited Perspective for IUPAC special issue commemorating IYC 2011. Chinese translation published in Industrial Materials \(工業材料雜誌\) by ITRI, Taiwan](#))
57. Jiayan Luo, Laura J. Cote, Vincent C. Tung, Alvin T. L. Tan, Philip E. Goins, Jinsong Wu and Jiaying Huang* "Graphene Oxide Nanocolloids" *Journal of the American Chemical Society*, **2010**, 132, 17667-17669 ([Featured in Materials Today](#))
58. Laura J. Cote, Jaemyung Kim, Zhen Zhang, Cheng Sun* and Jiaying Huang* "Tunable Assembly of Graphene Oxide Surfactant Sheets: Wrinkles, Overlaps and Impacts on Thin Film Properties" *Soft Matter*, **2010**, 6, 6096-6101 ([Featured on inside cover](#))
59. Hee Dong Jang*, Hankwon Chang, Kuk Cho, Franklin Kim, Kwonnam Sohn and Jiaying Huang* "Co-assembly of Nanoparticles in Evaporating Aerosol Droplets: Preparation of Nanoporous Pt/TiO₂ Composite Particles" *Aerosol Science & Technology*, **2010**, 44, 1140-1145
60. Franklin Kim, Jiayan Luo, Rodolfo Cruz-Silva, Laura J. Cote, Kwonnam Sohn and Jiaying Huang* "Self-Propagating Domino-Like Reactions in Oxidized Graphite" *Advanced Functional Materials*, **2010**, 20, 2867-2873 ([Featured on frontispiece and in C&EN, Materials Views, Chemistry & Industry. Became the subject of a Research Highlight article in Journal of Materials Chemistry](#))
61. Jaemyung Kim, Franklin Kim, Laura J. Cote, Wa Yuan, Kenneth R. Shull and Jiaying Huang* "Graphene Oxide Sheets at Interfaces" *Journal of the American Chemical Society*, **2010**, 132, 8180-8186 ([Featured in Nature Chemistry, Ars Technica](#))
62. Jaemyung Kim, Franklin Kim and Jiaying Huang* "Seeing Graphene-Based Sheets" *Materials Today*, **2010**, 13, 28-38 ([Invited Review, cover article, a top 25 Hot Article](#))
63. Franklin Kim, Laura J. Cote and Jiaying Huang* "Graphene Oxide: Surface Activity and Two Dimensional Assembly" *Advanced Materials*, **2010**, 22, 1954-1958 ([invited Research News article](#))

64. Jaemyung Kim, Laura J. Cote, Franklin Kim and Jiaying Huang* "Visualizing Graphene Based Sheets by Fluorescence Quenching Microscopy" *Journal of the American Chemical Society*, **2010**, 132, 260-267 ([Featured in Nature Chemistry, C&EN, Photonics.com](#))
65. Yongsheng Zhao, Peng Zan, Jaemyung Kim, Cheng Sun and Jiaying Huang* "Patterned Growth of Vertical Organic Nanowire Waveguide Arrays" *ACS Nano*, **2010**, 4, 1630-1636
66. Yongsheng Zhao, Jinsong Wu and Jiaying Huang* "Vertical Organic Nanowire Arrays: Controlled Synthesis and Chemical Sensors" *Journal of the American Chemical Society*, **2009**, 131, 3158-3159
67. Kwon Nam Sohn, Franklin Kim, Ken Pradel, Jinsong Wu, Yong Peng, Feimeng Zhou and Jiaying Huang* "Construction of Evolutionary Tree for Morphological Engineering of Nanoparticles" *ACS Nano*, **2009**, 3, 2191-2198 ([Featured in Nature Nanotechnology, Nanowerk.com](#))
68. Laura J. Cote, Rodolfo Cruz-Silva and Jiaying Huang* "Flash Reduction and Patterning of Graphite Oxide and Its Polymer Composite" *Journal of the American Chemical Society*, **2009**, 131, 11027-11032 ([Featured in C&EN and again its 2009 end of year review, Physics World, Current Science, The Engineer](#))
69. Laura J. Cote, Franklin Kim and Jiaying Huang* "Langmuir-Blodgett Assembly of Graphite Oxide Single Layers" *Journal of the American Chemical Society*, **2009**, 131, 1043-2049 ([cover article, featured in C&EN twice](#))
70. Dan Li, Jiaying Huang, Richard B. Kaner* "Synthesis and Applications of Conducting Polymer Nanofibers" *Accounts of Chemical Research*, **2009**, 42, 135-145 ([Cover article](#))
71. Franklin Kim, Kwon Nam Sohn, Jinsong Wu and Jiaying Huang* "Chemical Synthesis of Au Nanowires in Acidic Solutions" *Journal of the American Chemical Society*, **2008**, 130, 14442-14443
72. Andrea R. Tao, Jiaying Huang and Peidong Yang,* "Nanocrystal and Nanowire Langmuir-Blodgett" *Accounts of Chemical Research*, **2008**, 41, 1662-1673
73. Shabnam Virji, Bruce H. Weiller, Jiaying Huang*, Heather Shepherd, Phil Haussmann, Tanya Faltens, Richard Blair, Sarah Tolbert* and Richard B. Kaner* "Construction of a Polyaniline Nanofiber Gas Sensor" *Journal of Chemical Education*, **2008**, 158, 1102-1104

Selected Publications Prior to Northwestern

Postdoctoral research: Dewetting instability and patterning of nanostructures

1. Ruoxue Yan, Peter Pausauskie, Jiaying Huang and Peidong Yang "Direct Photonic-Plasmonic Coupling and Routing in Single Nanowires" *Proceedings of the National Academy of Sciences*, **2009**, 106, 21045-21050
2. Jiaying Huang, Rong Fan, Stephen Connor and Peidong Yang "One Step Patterning of Aligned Nanowire Arrays by Programmed Dip Coating" *Angewandte Chemie International Edition*, **2007**, 119, 2466-2469
3. Jiaying Huang, Andrea R. Tao, Stephen Connor and Peidong Yang "A General Method for Assembling Single Colloidal Particle Lines", *Nano Letters*, **2006**, 6, 524-529
4. Jiaying Huang, Franklin Kim, Andrea R. Tao, Stephen Connor and Peidong Yang "Spontaneous Formation of Nanoparticle Stripe Patterns via Dewetting" *Nature Materials*, **2005**, 4, 896-900

Graduate research: Conducting polymer nanostructures

5. Jiaxing Huang* "Syntheses and Applications of Conducting Polymer Polyaniline Nanofibers" *Pure and Applied Chemistry*, **2006**, 78, 15-27 (invited Review)
6. Jiaxing Huang and Richard B. Kaner "The Intrinsic Nanofiber Morphology of Polyaniline" *Chemical Communications*, **2006**, (4), 367-376 (invited Feature Article, cover article)
7. Jiaxing Huang, James A. Moore, J. Henry Acquaye and Richard B. Kaner "A Mechanochemical Route to the Conducting Polymer Polyaniline" *Macromolecules*, **2005**, 38, 317-321
8. Ricky J. Tseng, Jiaxing Huang, Jianyong Ouyang, Jun He, Richard B. Kaner and Yang Yang "Polyaniline Nanofiber/Gold Nanoparticle Non-Volatile Memory" *Nano Letters*, **2005**, 5, 1077-1080
9. Shabnam Virji, Christina Baker, Jiaxing Huang, Richard B. Kaner and Bruce H. Weiller "Polyaniline Nanofiber Composites with Metal Salts: Chemical Sensors for Hydrogen Sulfide" *Small*, **2005**, 1, 624-627
10. Jiaxing Huang and Richard B. Kaner "Flash Welding of Conducting Polymer Nanofibers" *Nature Materials*, **2004**, 3, 783-786
11. Jiaxing Huang and Richard B. Kaner "Nanofiber Formation in the Chemical Polymerization of Aniline: A Mechanistic Study" *Angewandte Chemie International Edition*, **2004**, 43, 5941-5945
12. Jiaxing Huang and Richard B. Kaner "A General Chemical Route to Polyaniline Nanofibers" *Journal of the American Chemical Society*, **2004**, 126, 851-855
13. Jiaxing Huang, Shabnam Virji, Bruce H. Weiller and Richard B. Kaner "Nanostructured Polyaniline Sensors" *Chemistry-A European Journal*, **2004**, 10, 1314-1319 (invited Concept Article)
14. Shabnam Virji, Jiaxing Huang, Richard B. Kaner and Bruce H. Weiller "Polyaniline Nanofibers as Gas Sensors: Response to Classes of Vapors and Comparison to Thin Films" *Nano Letters*, **2004**, 4, 491-496
15. Jiaxing Huang, Shabnam Virji, Bruce H. Weiller and Richard B. Kaner "Polyaniline Nanofibers: Facile Synthesis and Chemical Sensors" *Journal of the American Chemical Society*, **2003**, 125, 314-315
16. Jiaxing Huang, Veronica M. Egan, Hailan Guo, Jeong-Yeol Yoon, Alejandro L. Briseno, Iris E. Rauda, Robin L. Garrell, Charles M. Knobler, Feimeng Zhou and Richard B. Kaner "Enantioselective Discrimination of D- and L-Phenylalanine by Chiral Polyaniline Films" *Advanced Materials*, **2003**, 15, 1158-1161

Undergraduate research: Synthesis of inorganic nanoparticles

17. Jiaxing Huang, Yi Xie, Bin Li, Yu Liu, Yitai Qian and Shuyuan Zhang "In-Situ Source-Template-Interface Reaction Route to Semiconductor CdS Submicrometer Hollow Spheres" *Advanced Materials*, **2000**, 12, 808-811
18. Bin Li, Yi Xie, Jiaxing Huang, Yu Liu and Yitai Qian "Sonochemical Synthesis of Nanocrystalline Copper Tellurides Cu₇Te₄ and Cu₄Te₃ at Room Temperature" *Chemistry of Materials*, **2000**, 12, 2614-2616
19. Yi Xie, Jiaxing Huang, Bin Li, Yu Liu and Yitai Qian "A Novel Peanut-like Nanostructure of II-VI Semiconductor CdS and ZnS" *Advanced Materials*, **2000**, 12, 1523-1526
20. Bin Li, Yi Xie, Jiaxing Huang, Yitai Qian "Synthesis by Solvothermal Route and Characterization of CuInSe₂ Nano-whisker and Nanoparticle" *Advanced Materials*, **1999**, 11, 1456-1459

INVITED TALKS

Over 100 plenary, keynote and invited talks at conferences, workshops and academic, industry and government research institutes since 2013.

SELECTED EDUCATIONAL OUTREACH ACTIVITIES

- “Learning Materials Science with Pencils and Paper”
This lecture/workshop uses hands-on examples, aided by pencils and paper, to teach some basic material principles such as fracture and defects. It also explains some of the material discoveries made in my lab and classrooms. It has been given, in various forms, at the following locations/events:
 - MRSEC summer lectures for REU and RET researchers, Northwestern University, IL (2013, 2016, 2017)
 - Seminars for Murphy Institute Scholars, Northwestern University, IL (2014 and 2015)
 - International Education Forum at Beijing University of Chemical Technology, Beijing, July 2013
- “Curiosity Inspired Discoveries: Some Examples from My Classroom”
This lecture module introduces innovative course projects done by students in my Northwestern courses, as well as those by students from elsewhere inspired by my previous guest lectures. It has been given, in various forms, at the following locations/events:
 - Department of Molecular Engineering, Kyoto University, Katsura campus, Kyoto, Japan, May 2016
 - Department of Chemistry, Ewha Womans University, South Korea, September 2015
 - Annual Class Trip of Max Planck Institute of Colloids and Interfaces, Klützt, Germany, April 2015
 - School of Engineering, Hanyang University, South Korea, September 2014
 - International Forum for Higher Education, Shanghai University, July 2013
- Panelist for Preparing for Academic Careers in Engineering, Colleague of Engineering, University of Washington, WA, October 2013
- Panelist and speaker for Women in Science and Engineering (WISE) Symposium, NSF-KAUST Research Conference, KAUST, Saudi Arabia, January 2017

RESEARCH GROUP MEMBERS AND THEIR ACHIEVEMENTS

Former trainees (i.e. students and postdocs) in faculty positions (13):

- [Postdoc] Franklin Kim, Associate Professor (independent track), Institute for Integrated Cell-Material Sciences, Kyoto University, Japan
- [Postdoc] Yong Sheng Zhao, Professor, Institute of Chemistry, Chinese Academic of Science, China
- [Postdoc] Rodolfo Cruz-Silva, Associate Professor, Shinshu University, Japan
- [Postdoc] Vincent Tung, Assistant Professor, University of California, Merced, USA
- [Postdoc] Bo Hu, Professor, Xidian University, China
- [Postdoc] Tae Hee Han, Assistant Professor, Hanyang University, South Korea
- [PhD student] Jiayan Luo, 1000 talent Professor, Tianjin University, China
- [Visiting PhD student] Jiao-Jing Shao, Professor, Guizhou University, China
- [Postdoc] Kalyan Raidongia, Assistant Professor, Indian Institute of Technology, Guwahati, India
- [Postdoc] Ying Tao, Associate Professor, Tianjin University, China
- [Postdoc] Victor Hugo R. de Souza, Associate Professor, Federal University of Grande Dourado (UFGD), Brazil
- [Visiting PhD student] Xiao-Jiao Zhu, Associate Professor, Anhui University, China
- [Postdoc] Yige Zhou, Professor, Hunan University, China

Former PhD students in industry (7):

- [PhD student] Laura Cote, Senior Material and Process Engineer, Continental
- [PhD student] Kwon Nam Sohn, Senior Manager, LG Chem
- [PhD student] Jaemyung Kim, Materials Scientist, Merck.
- [PhD student] Alexander Smith, Senior Reliability Engineer, Apple
- [PhD student] Deepti Krishnan, Process Engineer, Intel
- [PhD student] Andrew Koltonow, Cardinal Intellectual Property
- [PhD student] Lily Mao, Process Engineer, Intel

Former MS trainees (6):

- [B.S./M.S student] Alvin T.L. Tan, PhD student at MIT
Thesis title: Imaging 2D Sheets by Fluorescence Quenching Microscopy (2012)
- [B.S./M.S student], Ken Pradel, PhD student at Georgia Institute of Technology
Thesis title: Cross-flow Purification of Nanowires (2011)
- [MS student] Hao Wei
Research topic: Carbon based multifunctional coatings (2016)
- [MS student] Lingye Zhou
Research topic: Light Absorption of Graphene-based sheets (2017)
- [MS student] James Chou
Research topic: Conductive adhesives (2017)
- [MS student] Wendy Tsai
Research topic: Cut and paste of graphene oxide architectures (2017)

Significant external awards received by students based on their work in the group

- NSF-KAUST DIY Electronics Innovation Contest (2017)
- ECS Nanocarbons Division SES Young Investigator Award 2016 (For Dr. Jiayan Luo, based partially on his thesis work in the group)
- Carbon Journal Prize for Outstanding PhD Thesis in Carbon Research (2 awards in 2014) (typically 1 award per year, an exception was made in 2014 to give 2 awards)
- Josephine de Karman Fellowship (<8 awards per year to PhD candidates in any discipline in North America)
- P.E.O. Scholar Awards (recognizes outstanding female PhD candidates in North America)
- MRS Graduate Student Awards (2 Gold and 2 Silver awards)
- 1000 Plan Program for Young Talents, China
- Chinese Government Award for Outstanding Self-Financed Students Abroad
- Taiwanese Ministry of Education's Scholarship for Studying Abroad
- NSF East Asia and Pacific Summer Institutes (EAPSI) Fellowship
- NSF Graduate Fellowship (4 awards+1 honorable mention)
- NSF Engineering Innovation Fellowship
- NDSEG Fellowship
- Forbes 30 Under 30
- Clean Energy Trust Consumer Favorite Prize
- Illinois Technology Foundation Fifty For The Future Award
- Phi Beta Kappa

INTERNAL SERVICE ACTIVITIES (FY REFERS TO FISCAL YEAR)

MSE Department (3 committees/year)

- Chair of the Hilliard Symposium (2018), select, organize and train graduate students to highlight their research at the one-day symposium for the annual MSE alumni visit event.
- MSE director of graduate admission (FY2015, 2016, 2017), pre-screening and organizing the review of 600-750 PhD applicants and 200-250 MS applications, annually.
- MSE graduate admission committee member (FY2009-2014)
- Co-director of Energy Materials Lab (battery section), supporting related student learning and research activities (2013-)
- Various other committees including Colloquium, Freshman Advisor, Class Advisor, Space Planning, Undergraduate Recruiting, and Students Awards

McCormick School of Engineering

- Founding organizer of Workshop on Visual Representation of Research
This is a week-long workshop teaching researchers how to best express their science using figures. The products were featured in an exhibition at the end. A renowned science photographer Felice Frankel was invited as the teacher for 2016 (2018 workshop planned).

University committees

- Office of Research Development, Limited Submission Advisory Committee (2016)
- Joint Faculty Search Committee (IIN, Chemistry, Bioengineering and MSE) (2016)
- Undergrad Research Advisory Council (2016-)
- International Institute of Nanotechnology (IIN) Steering Committee (2012-)
- Organizing Committee, Annual Symposium of Nanoscience and Nanotechnology (2012-)
- Co-chair, Annual Symposium of Nanoscience and Nanotechnology (2015)
- Ryan Fellowship Committee (FY2012-FY2014)

Other committees

- Serve about 2 dozens of times annually on PhD qualification, thesis defense and MS thesis defense committees for students in Materials Science and Engineering, Mechanical Engineering, Chemical and Biological Engineering, and Chemistry.

SUMMARY OF TEACHING ACTIVITIES/STORIES

Selected news and stories about teaching activities

- Northwestern Engineering students awarded for class project (news release in 2017)
 - Two students in MSE-337 won the NSF-KAUST DIY Electronics Innovation Challenge Award and were invited to KAUST to present their projects "PolySketch", a conducting polymer based writing device, to the attendees and middle school students.
 - It includes observations and comments from conference chairs and attendees, including Profs. Mark Lundstrom (Purdue), Muhammad Hussain and Boon Ooi (KAUST).
- MSE-337 video report "Polyaniline Touch Gloves" cited in *Journal of Chemical Education* (2017)
 - Dr. Nedat Y. Abu-Thabit at Jubail Industrial College in Saudi Arabia reported a student project of polyaniline coated touch gloves based on one of the MSE-337 DIY projects.
- Materials 360 interview about MSE-337 and the innovative student projects (2014)
 - It described some of the products from student project and included guest commentary on such teaching activities.
- Pencil drawn strain gauges and chemiresistors on paper (2014)
 - MSE-337 students and TA published a paper based on results started in their class project.

- Tech Take Live program on Fox News used over 8 min to talk about this work, with the title “Ordinary, back-to-school supplies become threat detectors”
- C&E News – Chemistry in Picture: Handwriting
- Materials Views: Drawing chemical sensors on paper with a flexible toy pencil
- htxt.africa: Paper and pencils used to create chemical vapour detection system

Courses taught at Northwestern

- MSE-337: Introduction to Conducting Polymers (technical elective)
New undergraduate course with lab component, technical elective
Fall 2007-2011; Winter 2013-2014; Fall 2015-2017
- MSE-331: Soft Materials (required for major)
Undergraduate course, updated with new lab component, required for major
Winter 2008-2011, 2016-2018
- MSE-201: Principles of the Properties of Materials
Undergraduate course for non-majors in McCormick School of Engineering
Spring 2014
- MSE-301: Materials Science Principles (required for major)
Undergraduate core course, updated with new lab components
Spring 2010, 2011, 2012, 2013, 2018
- MSE-380: Introduction to Surface Science and Spectroscopy (technical elective)
Undergraduate course, technical elective
Fall 2012, 2013