

## Biographical Sketch— Jiaxing Huang

Chair Professor of Materials, Westlake University, Hangzhou, China

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### PROFESSIONAL PREPARATION

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

### PROFESSIONAL APPOINTMENTS

- 2021- Chair Professor of Materials, Westlake University
- 2021-24 Adjunct Professor, Department of Materials Science and Engineering,  
Northwestern University, Evanston, IL USA
- 2017-2021 Professor of Materials Science and Engineering, Northwestern University
- 2013-2017 Associate Professor of Materials Science and Engineering, Northwestern  
University
- 2011-2013 Morris E. Fine Junior Professor in Materials and Manufacturing, Northwestern  
University
- 2007-2013 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
- Develop intuition, “unlock” creativity and bring the best out of students and ourselves

### SELECTED HONORS AND AWARDS

- 2014-2021 Highly Cited Researcher (Thomson Reuters/Clarivate Analytics)
- 2021 Member, European Academy of Sciences and Arts
- 2020 Fellow, American Association for the Advancement of Science
- 2019 Monash Engineering Distinguished Lectureship (Monash University, Australia)
- 2016 Humboldt Research Award (Alexander von Humboldt-Foundation, Germany)
- 2016 JSPS Invitation Fellowship (Japan Society for the Promotion of Science)
- 2014 Guggenheim Fellowship (John Simon Guggenheim Memorial Foundation)
- 2014 Fissan-Pui-TSI Award (International Aerosol Research Assembly)
- 2014 AVS Prairie Chapter Early Career Award (American Vacuum Society)
- 2013 Gustav Olling Outstanding Young Manufacturing Engineer Award (Society of  
Manufacturing Engineers)
- 2011 Sloan Research Fellow (The Alfred P. Sloan Foundation)
- 2019 NSF CAREER Award (National Science Foundation)
- 2006 National Starch and Chemical Award for Outstanding Graduate Research in  
Polymer Science and Engineering (POLY/PMSE divisions, American Chemical  
Society)
- 2005 IUPAC Young Chemists Prize (The International Union of Pure & Applied  
Chemistry)

## SELECTED EXTERNAL PROFESSIONAL SERVICES

### *For academic research journals*

- Founding Editor-in-Chief (2020-)  
*Accounts of Materials Research* (American Chemical Society/ShanghaiTech University)
- Guest editor  
Ad hoc guest editor for *PNAS*, special issues for *Materials Chemistry Frontiers* (Royal Society of Chemistry, 2019), *Journal of Materials Science & Technology* (Elsevier, 2019), *Advanced Drug Delivery Review* (Elsevier, 2016), Web theme issue for *ACS Nano*, *ACS Phonics*, *Chemistry of Materials*, *Nano Letters* (ACS, 2016), *Journal of Solid State Chemistry* (Elsevier, 2015)
- Member of editorial advisory board  
*Chemistry of Materials* (American Chemical Society), *Matter* (Cell Press), *Carbon*, *Applied Materials Today* (Elsevier), *Journal of Materials Chemistry – A*, *Materials Advances*, *Materials Chemistry Frontiers* (Royal Society of Chemistry), *Science China Technological Sciences*, *Science China Chemistry* (Springer), *Aggregates* (Wiley)

### *For professional societies and conferences*

- Founding organizer  
International Workshop on Graphene Oxide and Related Materials (2016-2020)  
ENFL Symposium on Graphene for Energy and Fuels, ACS Meeting (2012-14)  
Northwestern Workshop on Visual Representation of Research (2016)
- Symposium organizer  
Materials Chemistry Frontier Symposium (RSC, 2019)  
The 5<sup>th</sup> International Conference on Multifunctional, Hybrid and Nanomaterials (Lisbon, Portugal, 2017)  
Various symposiums in MRS, ACS, AVS, PacifiChem and many others

### *Services for awards and grant agencies*

- Collegiate Inventors Competition (National Inventors Hall of Fame, USA)
- Official nominator for the Japan Prize and the Kyoto Prize (Japan)
- President's Science Award (Singapore)
- State Natural Science Awards, Tan Kah Kee Science Awards, Qiushi Awards (China)
- Chair of proposal review panel (European Science Foundation)

### *Other services*

- Science panelist  
World premiere of two ETOPIA plays "Breaking Point" and "The Little World", discussing "Science Under a Pandemic" (April 9, 2021).
- Guest scientist  
New York based WBAI 99.5FM Radio, "Coping with Covid-19: A Helpful, Hopeful, Call-in Show" (February 6, 2021)
- Fact-check scientist  
For USA Today and Associated Press, on topics related to the pandemic (2020-2021)
- Co-host and co-organizer  
"A Dialogue with Frontline Clinical and Public Health Experts on COVID-19 in China", a Public Webinar hosted by Northwestern Global Health institute, featuring two eminent female researchers from China (May 5, 2020)
- Inaugural steering committee member (2020)  
Advanced Material Pandemic & Future Preparedness Taskforce (AMPT), which is an international Public-Benefit initiative focused on using Advanced Material to help solve some of humanity's most pressing challenges.

Activities: Strategic planning, public speaking (through webinars), social media engagement (e.g., LinkedIn) and attending regular weekly/monthly meetings.

- Inaugural academic council member (2019)  
National Graphene Association, which is the leading organization in the U.S. advocating and promoting the commercialization of graphene and graphene-like materials.  
Activities: Strategic planning, speaking in support of basic materials research at an event at the Russell Senate Office Building in the Washington DC, and public seminars for students and general audience.

#### **SELECTED RESEARCH INTERESTS AND ORIGINAL DISCOVERIES**

- Materials concepts for personal care and public health
- Bulk nanostructured materials from well-defined nanoscale building blocks
- Colloidal doughs of 1D and 2D carbon materials
- Fatigue-resistant electrocatalysis
- Oil-based self-healing coatings for corrosion control
- Additive-free solution processing of carbon nanotubes
- Physical functions of information-bearing patterns
- Up-cycling of silicon sludge waste for Li ion batteries
- Electrospray assisted Langmuir-Blodgett assembly
- Defect-mediated surface functionalization of 2D metal dichalcogenide sheets
- 2D nanofluidics
- Graphene oxide sheets as 2D surfactant
- All-carbon photovoltaics
- Fluorescence quenching microscopy for seeing 2D materials
- Crumpled graphene balls: Energy storage, water treatment, and lubrication
- Metal nanocrystals: Gold nanowires, evolutionary tree, and crossflow purification
- Organic nanocrystals: Orientation-controlled growth and chemical reactivity

#### **PATENTS, PATENT APPLICATIONS AND INVENTION DISCLOSURES**

- 14 US and 1 Korean patents issued, 7 licensed, nearly 30 more pending

#### **PUBLICATIONS**

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

Total number of publications: ~150; H-index: 82; total citations >35,000 (as of October 2021)

(\* Denotes corresponding author)

#### **Editorials**

1. Jiaying Huang "A Conversation with Dr. Nieves Lopez-Salas: Old Chemistry for New Materials" *Accounts of Materials Research*, **2020**, 2, 385–386
2. Jiaying Huang "Introducing Viewpoints" *Accounts of Materials Research*, **2020**, 2, 115–116
3. Jiaying Huang "Welcome to Accounts of Materials Research" *Accounts of Materials Research*, **2020**, 1, 1–2
4. Cynthia J. Burrows, Jiaying Huang, Shu Wang, Hyun Jae Kim, Gerald J. Meyer, Kirk Schanze, T. Randall Lee, Jodie L. Lutkenhaus, David Kaplan, Christopher Jones, Carolyn Bertozzi, Laura Kiessling, Mary Beth Mulcahy, Craig W. Lindsley, M. G. Finn, Joel D. Blum, Prashant Kamat, Wonyong Choi, Shane Snyder, Courtney C. Aldrich, Stuart Rowan, Bin Liu, Dennis Liotta, Paul S. Weiss, Deqing Zhang, Krishna N. Ganesh, Harry A. Atwater, J. Justin Gooding, David T. Allen, Christopher A. Voigt, Jonathan Sweedler, Alanna

- Schepartz, Vincent Rotello, Sébastien Lecommandoux, Shana J. Sturla, Sharon Hammes-Schiffer, Jillian Buriak, Jonathan W. Steed, Hongwei Wu, Julie Zimmerman, Bryan Brooks, Phillip Savage, William Tolman, Thomas F. Hofmann, Joan F. Brennecke, Thomas A. Holme, Kenneth M. Merz Jr., Gustavo Scuseria, William Jorgensen, Gunda I. Georg, Shaomeng Wang, Philip Proteau, John R. Yates III, Peter Stang, Gilbert C. Walker, Marc Hillmyer, Lynne S. Taylor, Teri W. Odom, Erick Carreira, Kai Rossen, Paul Chirik, Scott J. Miller, Joan-Emma Shea, Anne McCoy, Martin Zanni, Gregory Hartland, Gregory Scholes, Joseph A. Loo, James Milne, Sarah B. Tegen, Daniel T. Kulp, and Julia Laskin “Confronting Racism in Chemistry Journals”, *ACS Applied Materials and Interfaces*, **2020**, 12, 28925–28927 ([joint editorial of ACS editor-in-chiefs and staff](#))
5. Victor W. Brar, Andrew R. Koltonow and Jiaying Huang “New Discoveries and Opportunities from Two-Dimensional Materials” *ACS Photonics*, **2017**, 4, 407-411
  6. Yu-Kyoung Oh and Jiaying Huang “Graphene-based materials in nanomedicine” *Advanced Drug Delivery Reviews*, **2016**, 105, 107-108
  7. Jiaying Huang and Joshua E. Goldberger “Two-dimensional Materials” *Journal of Solid State Chemistry*, **2015**, 224, 1

### Research papers, perspectives, commentaries and personal reviews

8. Simona Fine, Pan He and Jiaying Huang\* “Self-charging Textile Woven from Dissimilar Household Fibers for Air Filtration: A Proof of Concept” *ACS Omega*, **2021**, 6, 40, 26311–26317
9. Han Fu, Jiaying Huang and Kimberly Gray\* “Crumpled Graphene Balls Adsorb Micropollutants from Water Selectively and Rapidly” *Carbon*, **2021**, 183, 958-969
10. Luke C.O. Prestowitz and Jiaying Huang\* “Glycol-thermal Continuous Flow Synthesis of Graphene Gel” *ACS Omega*, **2021**, 6, 18663-18667
11. Luke C.O. Prestowitz, Sahin Coskun, Xiaobing Hu, Vinayak P. Dravid, David C. Dunand\* and Jiaying Huang\* “Bulk Nanostructured Silver from Pre-synthesized Multiply-twinned Nanowires” *Nano Letters*, **2021**, 21, 5627-5632
12. Zhilong Yu, Murat Kadir, Yihan Liu and Jiaying Huang\* “Droplet-capturing Coatings on Environmental Surfaces Based on Cosmetic Ingredients” *Chem*, **2021**, 7, 2201-2211  
[Research highlights:](#) [C&E News](#), [Nature Review Chemistry](#), [Popular Science](#), [Fast Company](#), [Physics World \(UK\)](#), [Materials World \(UK\)](#), [Materials Today](#)  
[General media coverage:](#) [News Week \(US\)](#), [Agence France Presse](#), [Futura Santé \(France\)](#), [Österreichischer Rundfunk \(ORF, Austria\)](#), [The Citizen \(South Africa\)](#), [The Straight Times \(Singapore\)](#), [Malay Mail \(Malaysia\)](#), [The ASEAN Post](#), [Nhân Dân \(Vietnam\)](#), [WION \(India\)](#), [Clean India journal \(India\)](#), [Xinhua Net \(China\)](#), [科技日报 \(China\)](#), [科学ニュースメディア \(Japan\)](#), [Cosmos Magazine](#), [Innovators Magazine](#)  
[Video and radio clips:](#) [The Naked Scientists \(UK, an interview by Adam Murphy\)](#)
13. Luke C.O. Prestowitz,\* Jonathan D. Emery\* and Jiaying Huang\* “Polysketch Pen: Drawing from Materials Chemistry to Create Interactive Art and Sensors Using a Polyaniline Ink” *Journal of Chemical Education*, **2021**, 98, 2055-2061 ([featured on the front cover](#))
14. Limei Liu,\* Zhi-Long Yu, Junle Qu and Jiaying Huang\* “Spray-Coated Barrier Coating on Copper Based on Exfoliated Vermiculite Sheets” *Materials Chemistry Frontiers*, **2021**, 5, 4658-4663

15. Pan He and Jiaying Huang\* "Detrimental Effects of Surface Imperfections and Unpolished Edges on the Cycling Stability of Zinc Foil Anode" *ACS Energy Letters*, **2021**, 6, 1990-1995
16. Lars Klemeyer, Hun Park and Jiaying Huang\* "Geometry-depended Thermal Reduction of Graphene Oxide Solid" *ACS Materials Letters*, **2021**, 3, 511-515
17. Haiyue Huang, Hun Park, Yihan Liu and Jiaying Huang\* "On-mask Chemical Modulation of Respiratory Droplets" *Matter*, **2020**, 3, 1791-1810  
[C&E News, "COVID-19 pandemic has spurred materials researchers to develop antiviral masks"](#)  
[The Engineer, "Breathable face mask aims to kill viruses in coughs and sneezes"](#)  
[Healthline, "New Sanitizing Mask Could Help Reduce Coronavirus Respiratory Droplets"](#)
18. Kevin Chiou and Jiaying Huang\* "Cresol-carbon nanotube charge-transfer complex: Stability in common solvents and implications for solution processing" *Matter*, **2020**, 3, 302-319
19. Haiyue Huang, Chunhai Fan, Min Li, Hua-Li Nie, Fu-Bing Wang, Hui Wang, Ruilan Wang, Jianbo Xia, Xin Zheng, Xiaolei Zuo, and Jiaying Huang\* "COVID-19: A Call for Physical Scientists and Engineers" *ACS Nano*, **2020**, 14, 3747-3754 ([Perspective on the hypotheses, questions and research needs in physical sciences and engineering to address challenges associated with the spread of infectious respiratory diseases](#))
20. Yi-Ge Zhou\*, Yijin Kang\* and Jiaying Huang\* "Fluidized Electrocatalysis" *CCS Chemistry*, **2020**, 2, 31-41 ([featured on the front cover](#))  
[C&E News, "Free-floating electrocatalysts outperform tethered ones"](#)  
[Chemical Processing Magazine, "Fluidization Foils Electrocatalyst Fatigue"](#)
21. Zhizhi Kong, Matthias Daab, Hitomi Yano, Haiyue Huang, Josef Breu, Takayoshi Sasaki, SonBinh T. Nguyen\* and Jiaying Huang\* "Visualizing Transparent Two-dimensional Sheets by Fluorescence Quenching Microscopy" *Small Methods*, **2020**, 2000036
22. Zhilong Yu, Alane T.O. Lim, Shannon L. Kollasch, Hee Dong Jang and Jiaying Huang\* "Oil-based Self-healing Barrier Coatings: To Flow and Not to Flow" *Advanced Functional Materials*, **2020**, 29, 1906273 ([invited Progress Report article](#))
23. David Pritchett\*, Kornel Ehmman, Jian Cao and Jiaying Huang "Manipulation and Localized Deposition of Particle Groups with Modulated Electric Fields" *Micromachines*, **2020**, 11, 226
24. Hua-Li Nie and Jiaying Huang\* "Working with Minions: Assisted Scalable Bio-Nanomanufacturing of Functional Materials" *Matter*, **2019**, 1, 1430-1432 ([Perspective/Opinion article](#))
25. Ming-Chi Shih, Ren-Huai Jhang, Ya-Ting Tsai, Chia-Wei Huang, Yung-Jr Hung, Mei-Yi Liao, Jiaying Huang\* and Chun-Hu Chen\* "Discontinuity-Enhanced Thin Film Electrocatalytic Oxygen Evolution" *Small*, **2019**, 15, 1903363 ([featured on the inside cover](#))
26. Qingchang Liu, Jiaying Huang and Baoxing Xu\* "Evaporation-driven Crumpling and Assembling of Two-Dimensional Materials: A Rotational Spring – Mechanical Slider Model" *Journal of the Mechanics and Physics of Solids*, **2019**, 133, 103722
27. Lily Mao, Hun Park, Rafael A. Soler-Crespo, Horacio D. Espinosa,\* Tae Hee Han,\* SonBinh T. Nguyen\* and Jiaying Huang\* "Stiffening of Graphene Oxide Films by Soft Porous Sheets" *Nature Communications*, **2019**, 10, 3677  
[MRS Bulletin, "In-plane porosity strengthens multilayered graphene-oxide paper"](#)

28. Rafael A. Soler-Crespo, Lily Mao, Jianguo Wen, Hoang T. Nguyen, Xu Zhang, Xiaoding Wei, Jiaxing Huang,\* SonBinh T. Nguyen\* and Horacio D. Espinosa\* “Atomically Thin Polymer Layer Enhances Toughness of Graphene Oxide Monolayers” *Matter*, **2019**, 1, 369-388 (featured on the front cover)  
[Matter, “Nature’s Way: Hierarchical Strengthening through Weakness”](#)
29. Wei Huang, Gang Wang, Chong Luo, Yaobin Xu, Ying Xu, Brian J. Eckstein, Yao Chen, Binghao Wang, Jiaxing Huang, Yijin Kang, Jinsong Wu, Vinayak P. Dravid, Antonio Facchetti and Tobin J. Marks “Controllable growth of LiMn<sub>2</sub>O<sub>4</sub> by carbohydrate-assisted combustion synthesis for high performance Li-ion batteries” *Nano Energy*, **2019**, 64, 103936 (featured on the front cover)
30. Che-Ning Yeh, Haiyue Huang, Alane Tarianna O. Lim, Ren-Huai Jhang, Chun-Hu Chen\* and Jiaxing Huang\* “Binder-free Graphene Oxide Doughs” *Nature Communications*, **2019**, 10, 422  
[MRS Bulletin, “GO doughs build versatile graphene-based structures”](#)  
[The Chemical Engineer, “GO dough: transforming graphene oxide”](#)  
[News Atlas, “Graphene in Play-Doh-like form can be molded into any shape”](#)
31. Alane Tarianna O. Lim, Chenlong Cui, Hee Dong Jang and Jiaxing Huang\* “Self-healing Microcapsule-thickened Oil Barrier Coatings” *Research*, **2019**, Article 3517816  
[Selected for Best Paper Award in 2021](#)  
[C&E News, “Liquid film self-heals and sticks to metals”](#)  
[News Atlas, “Self-healing coating protects metals from corrosion”](#)  
[Tribology & Lubrication Technology \(TLT\), “Self-healing coating to prevent corrosion”](#)
32. Hun Park, Ki Hyun Lee, Young Bae Kim, Swapnil B. Ambade, Sung Hyun Noh, Wonsik Eom, Jun Yeon Hwang, Won Jun Lee,\* Jiaxing Huang\* and Tae Hee Han\* “Dynamic Assembly of Liquid Crystalline Graphene Oxide Gel Fibers for Ion Transport” *Science Advances*, **2018**, 4(11), eaau2104
33. Aoxuan Wang, Xinyue Zhang, Ying-Wei Yang, Jiaxing Huang, Xingjiang Liu and Jiayan Luo\* “Horizontal Centripetal Plating in the Patterned Voids of Li/Graphene Composites for Stable Lithium-Metal Anodes” *Chem*, **2018**, 4, 2192-2200
34. Rafael A. Soler-Crespo, Wei Gao, Lily Mao, Hoang T. Nguyen, Michael R. Roenbeck, Jeffrey T. Paci, Jiaxing Huang,\* SonBinh T. Nguyen\* and Horacio D. Espinosa\* “The Role of Water in Mediating Interfacial Adhesion and Shear Strength in Graphene Oxide” *ACS Nano*, **2018**, 12, 6089-6099
35. Kevin Chiou, Segi Byun, Jaemyung Kim and Jiaxing Huang\* “Additive-free Carbon Nanotube Dispersions, Pastes, Gels and Doughs in Cresols” *Proceeding of National Academy of Sciences*, **2018**, 115, 5703-5708  
[Ceramic Tech Today, “New process makes carbon nanotubes more usable”](#)  
[Materials Today, “Common solvent produces carbon nanotube dough”](#)
36. Chong Luo, Lingye Zhou, Kevin Chiou and Jiaxing Huang\* “Multifunctional Graphene Hair Dye” *Chem*, **2018**, 4, 784-794 (featured on cover)  
[Research highlights: Chem, Science, C&E News, Chemistry World](#)  
[General press coverage: The New York Times, Huffington Post \(UK\), Daily Mail, Australian Broadcasting Corporation \(ABC\), Fast Company, Allure, Refinery29, Teen Vogue](#)  
[Video and radio clips: BBC Inside Science – Buzz kill \(March 15 episode\), NPR – Science Friday \(March 16 episode\)](#)

37. Wei Hao, Kevin Chiou, Yiming Qiao, Yanming Liu, Chengyi Song, Tao Deng\* and Jiaxing Huang\* “Crumpled Graphene Balls-based Broadband Solar Absorber” *Nanoscale*, **2018**, 10, 6306-6312
38. Chong Luo, Che-Ning Yeh, Jesus M. Lopez Baltazar, Chao-Lin Tsai and Jiaxing Huang\* “A Cut-and-paste Approach to 3D Graphene Oxide-based Architectures” *Advanced Materials*, **2018**, 30, 1706229 ([featured in Polymer Science Forum](#))
39. Jun Gao, Andrew R. Koltonow, Kalyan Raidongia, Bernard Beckerman, Niels Boon, Erik Luijten, Monica Olvera de la Cruz, Jiaxing Huang\* “Kirigami Nanofluidics” *Materials Chemistry Frontiers*, **2018**, 2, 475-482 ([featured on the inside cover](#))  
[Nanowerk.com](#), “Kirigami nanofluidic devices”
40. Shan Liu, Aoxuan Wang, Qianqian Li, Jinsong Wu, Kevin Chiou, Jiaxing Huang\* and Jiayan Luo\* “Crumpled Graphene Balls Stabilized Dendrite-Free Lithium Metal Anodes” *Joule*, **2018**, 2, 184-193 ([featured on the front cover](#))  
[News Atlas](#), “Building better batteries using crumpled graphene balls”  
[Engineering.com](#), “Lithium Batteries and the Destructive Dendrite Debacle”
41. Aoxuan Wang, Shan Tang, Debin Kong, Shan Liu, Kevin Chiou, Linjie Zhi, Jiaxing Huang, Yong-Yao Xia, and Jiayan Luo\* “Bending-Tolerant Anodes for Lithium-Metal Batteries” *Advanced Materials*, **2018**, 30, 1703891 ([featured on the frontispiece](#))
42. Andrew Koltonow, Chong Luo, Jiayan Luo and Jiaxing Huang\* “Graphene Oxide Sheets in Solvents: To Crumple or Not To Crumple?” *ACS Omega*, **2017**, 2, 8005-8009
43. Chenlong Cui, Alane T.O. Lim and Jiaxing 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](#))
44. Fernando Luis Reyes Tirado, Jiaxing Huang and David Dunand\* “Ice-Templated Silicon Foams with Aligned Lamellar Channels” *MRS Communications*, **2017**, 7, 928-932
45. Hongyun Ma, Debin Kong, Yue Xu, Xiaoying Xie, Ying Tao, Zhichang Xiao, Wei Lv, Hee Dong Jang, Jiaxing Huang\* and Quan-Hong Yang\* “A Disassembly-reassembly Approach to RuO<sub>2</sub>/Graphene Composites for Ultrahigh Volumetric Capacitance Supercapacitor” *Small*, **2017**, 13, 1701026 ([featured on the back cover](#))
46. Zhao Wang, Rajesh Sahadevan, Che-Ning Yeh, Todd J. Menkhaus, Jiaxing Huang\* and Hao Fong\* “Hot-Pressed Polymer Nanofiber Supported Graphene Membrane for High-Performance Nanofiltration” *Nanotechnology*, **2017**, 28, 31LT02
47. Andrew R. Koltonow and Jiaxing Huang\* “Two-dimensional Nanofluidics” *Science*, **2016**, 351, 1395-1396 ([Perspective on the original hypothesis, progress and research needs in 2D nanofluidics](#))
48. Xuan Dou, Andrew R. Koltonow, Xingliang He, Hee Dong Jang, Qian Wang,\* Yip-Wah Chung\* and Jiaxing Huang\* “Self-dispersed Crumpled Graphene Balls in Oil for Friction and Wear Reduction” *Proceeding of National Academy of Sciences*, **2016**, 13, 1528-1533 ([featured on the cover article](#))  
[Fortune](#), “How Scientists Are Boosting Motor Oil Performance”  
[C&E News](#), “Graphene Balls Reduce Friction”  
[Tribology & Lubrication Technology \(TLT\)](#), “Evaluation of a new lubricant additive: Crumpled graphene balls”

49. 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
50. 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
51. 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 on the fundamental hypothesis and research opportunities in new bulk nanostructured materials](#))  
[Nanowerk-Spotlight](#), "A roadmap for bulk nanomaterials based on 2D building blocks (Feb 2016)"
52. 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  
[C&E News](#), "80-Year-Old Langmuir-Blodgett Technique Gets An Electro spray Update"  
[ChemEurope](#), "Electrospray solves longstanding problem in Langmuir-Blodgett assembly"  
[Women in Nanoscience](#), "Transporting nanoparticles via tiny water droplets to make smooth thin films (featuring first author Hua-Li Nie)"
53. Hee Dong Jang\*, Sun Kyung Kim, Hankwon Chang, Ji-Hyuk Choi, Bong-Gyoo Cho, Eun HeeJo, Jeong-Woo Choi and Jiaying Huang\* "Three-dimensional Crumpled Graphene-based Platinum-gold Alloy Nanoparticle Composites as Superior Electrocatalysts for Direct Methanol Fuel Cells" *Carbon* **2015**, 93, 869-877
54. 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
55. 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  
[Materials 360](#), "Stacked clay sheets form large arrays of nanofluidic channels"
56. 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  
[C&E News](#), "Researchers Recycle Silicon Nanoparticles Into Lithium Ion Battery Electrodes"
57. Rodrigo A. Bernal, Amin Aghaei, Sangjun Lee, Seunghwa Ryu, Kwonnam Sohn, Jiaying Huang, Wei Cai, and Horacio Espinosa\* "Intrinsic Bauschinger Effect and Recoverable Plasticity in Pentatwinned Silver Nanowires Tested in Tension" *Nano Letters*, **2015**, 15, 139-146 ([featured on the cover article](#))
58. 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 MoS<sub>2</sub> and WS<sub>2</sub> in Solution" *Journal of the American Chemical Society*, **2015**, 137, 1742-1745 ([In JACS Spotlights](#))



59. Che-Ning Yeh, Kalyan Raidongia, Jiaojing Shao, Quan-Hong Yang and Jiaxing Huang\* "On the Origin of the Stability of Graphene Oxide Membrane in Water" *Nature Chemistry*, **2015**, 7, 166-170  
[C&E News](#), "Why Graphene Oxide Thin Films Are Water Stable"  
[Science](#), "Editor's choice: For stability just add some debris"  
[Materials Today](#), "Graphene oxide stability"  
[Materials 360](#), "Mystery of graphene oxide membrane's stability in water solved"  
[Women in Nanoscience](#), "Uncovering the mystery of graphene oxide paper (featuring first author Che-Ning Yeh)"
60. Alexander J. Smith, Chen Wang, Dongning Guo, Cheng Sun\*, Jiaxing Huang\* "Repurposing Blu-ray Movie Discs as Low-cost, Quasi-random Nanoimprinting Templates for Photon Management" *Nature Communications*, **2014**, 5, 5517  
[Research highlights](#): [C&E News](#), [Ceramics.org](#), [Chemistry Views](#), [IEEE Spectrum](#), [Materials 360](#), [Nanotech Web](#), [Nature](#), [Popular Science](#), [Science News](#),  
[General press coverage](#): [The Washington Post](#), [ABC News](#), [Gizmag](#), [Fox News](#), [NBC News](#), [NBC Chicago](#), [PBS News Hour](#), [The Verge](#)  
[Video and radio clips](#): [Newsy](#), [Scientific America](#), [NPR-Marketplace](#), [NPR-How to make everything](#)
61. Alexander J. Smith, Yung-Huang Chang, Kalyan Raidongia, Tzu-Yin Chen, Lain-Jong Li\*, and Jiaxing Huang\* "Molybdenum Sulfide Supported on Crumpled Graphene Balls for Electrocatalytic Hydrogen Production" *Advanced Energy Materials*, **2014**, 4, 1400398
62. Cheng Wei Lin, Zhibo Zhao, Jaemyung Kim and Jiaxing Huang\* "Pencil Drawn Strain Gauges and Chemiresistors on Paper" *Scientific Reports*, **2014**, 4, 3812  
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*Postdoctoral research: Dewetting instability and patterning of nanostructures*

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2. Jiaxing 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. Jiaxing Huang, Andrea R. Tao, Stephen Connor and Peidong Yang\* "A General Method for Assembling Single Colloidal Particle Lines", *Nano Letters*, **2006**, 6, 524-529
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*Graduate research: Conducting polymer nanostructures*

5. [Book chapter] Jiaxing Huang and Richard B. Kaner\* "Polyaniline Nanofibers: Syntheses, Properties and Applications" Chapter 7 (page 1-49) for Handbook of Conducting Polymers, 3<sup>rd</sup> Ed., Edited by Skotheim T.A. and Reynolds, J.R. CRC Press, 2007
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*Undergraduate research: Synthesis of inorganic nanoparticles*

19. Jiaxing Huang, Yi Xie\*, Bin Li, Yu Liu, Jun Lu and Yitai Qian "Ultrasound-Induced Formation of CdS Nanostructures in Oil-in-Water Microemulsions" *Journal of Colloid and Interface Science*, **2001**, 236, 382-384.
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**SELECTED PLENARY/KEYNOTE/INVITED TALKS**

About 10-30 plenary, keynote and invited talks annually at conferences and workshops, and academic, industry and government research institutes in many countries.

**SELECTED EDUCATIONAL OUTREACH LECTURES AND ACTIVITIES**

- "COVID-19: A Call for Physical Scientists and Engineers"  
This webinar has been delivered several times for undergraduate students at Northwestern, and for Indian and Brazilian audience through ACS Science Talks and other webinars.
- "Wood or Plastics?"  
This lecture is based on an earlier course project assigned to students in MSE 331, in which the audience is challenged to analyze the choice of materials used to manufacture disposal utensils, debate the economics, manufacturing, sustainability, culture and consumer habits behind such material selection, and propose what could be done better.



- *“Materials Innovations for Better Living”*  
This lecture includes a few examples from my lab and my classroom to show how materials innovations inspired by ordinary people’s experience provide solutions in health, beauty and arts for better living. It encourages the audience to define unique, experience-inspired research problems, which tend to well connect to the general public.
- *“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.
- *“Curiosity and 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.
- Panelist, Preparing for Academic Careers in Engineering, Colleague of Engineering, University of Washington, WA, October 2013.
- Panelist and speaker, Women in Science and Engineering (WISE) Symposium, NSF-KAUST Research Conference, KAUST, Saudi Arabia, January 2017
- Tutorial instructor, Joint Undertaking for an Africa Materials Institute (JUAMI), Kampala, Uganda, December 2018
- Organizer, “Being Bold in STEM - Learn about career paths in academia from successful women faculty across the globe”, Joint symposium of the Royal Society of Chemistry and Women in Science and Engineering (WISE), Evanston, IL, December 2019

#### **RESEARCH GROUP MEMBERS AND THEIR ACHIEVEMENTS (female members)**

Former trainees (*i.e.* graduate students and postdocs) in faculty positions (19):

1. [Postdoc] Yong Sheng Zhao, Professor, Institute of Chemistry, Chinese Academic of Sciences (NSF-C Outstanding Young Investigator awardee, Chemical Communication Lectureship)
2. [Postdoc] Franklin Kim, Associate Professor, Shanghai Tech University (previously a faculty member at Kyoto University, Japan)
3. [Postdoc] Rodolfo Cruz-Silva, Associate Professor, Shinshu University, Japan
4. [Postdoc] Vincent Tung, Associate Professor, King Abdullah University for Science and Technology (KAUST), Saudi Arabia (previously at UC Merced, USA)
5. [Postdoc] Bo Hu, Professor, Xidian University
6. [Postdoc] Tae Hee Han, Associate Professor, Hanyang University, South Korea
7. [Postdoc] Kalyan Raidongia, Associate Professor, Indian Institute of Technology, Guwahati, India
8. [Postdoc] Ying Tao, Associate Professor, Tianjin University
9. [Postdoc] Victor Hugo R. de Souza, Associate Professor, Federal University of Grande Dourado (UFGD), Brazil
10. [Postdoc] Yu-Cong Jiao, Professor, Donghua University
11. [Postdoc] Yige Zhou, Professor, Hunan University
12. [Postdoc] Jun Gao, Professor, Qingdao Institute of Bioenergy and Bioprocessing Technology, Chinese Academy of Sciences
13. [PhD student] Jiayan Luo, Professor, Shanghai Jiao Tong University (Electrochemical Society Nanocarbons Young Investigator awardee)
14. [PhD student] Che-Ning Yeh, Assistant Professor, National Tsinghua University

15. [PhD student] Kevin Chiou, Assistant Professor, National Sun Yat-sen University
16. [Visiting graduate student] Jiao-Jing Shao, Professor, Guizhou University (youngest Full Professor in her university)
17. [Visiting graduate student] Sahin Coskun, Assistant Professor, Osmangazi University, Eskişehir, Turkey
18. [Visiting graduate student] Xiao-Jiao Zhu, Associate Professor, Anhui University
19. [MS student] Alvin T.L. Tan, Adjunct Assistant Professor, Singapore University of Technology and Design (SUTD), Singapore

*Former trainees in industry:*

- [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
- [MS student] Wendy Tsai, Process Integration Engineer, Headway Technologies
- [PhD student] Alexander Smith, Senior Quality Engineer, GM Cruise
- [PhD student] Deepti Krishnan, Process Engineer, Intel
- [PhD student] Andrew Koltonow, Cardinal Intellectual Property
- [PhD student] Lily Mao, Process Engineer, Intel
- [PhD student] Xuan Dou, in financial industry
- [Visiting PhD student] Chenlong Cui, in financial industry
- [PhD student] Alane Lim, in Data analysis industry
- [Research associate] Murat Kadir, Staff Scientist, Combe Incorporated

*Selected former MS and BS trainees (📄 indicated those with a significant publication):*

- 📄 [B.S./M.S student], Ken Pradel (1<sup>st</sup> author publication, PhD from Georgia Tech)  
Thesis title: Cross-flow Purification of Nanowires (2011)
- 📄 [B.S./M.S student] Alvin L.T. Tan (1<sup>st</sup> author publication, PhD from MIT)  
Thesis title: Imaging 2D Sheets by Fluorescence Quenching Microscopy (2012)
- 📄 [MS student] Cheng Wei Lin (1<sup>st</sup> author publication, PhD from UCLA)  
Research topic: Pencil-drawn strain gauges and chemiresistors on paper (2013)
- 📄 [MS student] Wendy Tsai (co-authored a publication, in industry)  
Research topic: 3D graphene oxide architectures from thin films
- 📄 [MS student] Hao Wei (1<sup>st</sup> author publication, moved to UT Austin for PhD)  
Research topic: Carbon based multifunctional coatings (2016)
- 📄 [MS student] Lingye Zhou (1<sup>st</sup> author publication, moved to UT Austin for PhD)  
Research topic: Graphene-based hair dyes (2017)
- 📄 [MS student] Zhizhi Kong (1<sup>st</sup> author publication, moved to UC Berkeley for PhD)  
Research topic: Fluorescence quenching microscopy (2018)
- 📄 [Visiting MS student] Lars Klemeyer (1<sup>st</sup> author publication, returned to Hamburg University for PhD)  
Research topic: Geometry-dependent chemical reaction in graphene oxide solids (2019)
- 📄 [MS student] Chier Zhang (coauthored a manuscript, to be in Australia for PhD)  
Research topic: Carbon nanotube/resin composites (2019)
- 📄 [MS student] Yihan Liu (coauthored 2 publications, moved to Duke for PhD)  
Research topic: Chemical modulation of respiratory droplets (2020)
- 📄 [BS student] Philip E. Goins (coauthored 1 publication, PhD from Carnegie Mellon)  
Research topic: Graphene oxide nanocolloids (2010)
- 📄 [BS student] Zakaria Y. Al Balushi (coauthored 1 publication, PhD from PennState, currently Assistant Professor at UC Berkeley)  
Research topic: Graphene oxide nanocolloids (2010)

- [BS student] Yoo Joo Na (coauthored a publication, PhD from Gorgia Tech)  
Research topic: Graphene capsules in oil (2012)
- [BS student] Zhibo Zhao (1<sup>st</sup> author publication, PhD from MIT)  
Research topic: Pencil draw circuits on paper (2013)
- [BS student] Jesus M. Lopez Baltazar (moved to Cornell for PhD)  
Research topic: Healing of graphene oxide structure by water (2018)
- [BS student] Yakira Mirabito (winner of the top department award for Leadership, Scholarship and Service, an exchanged student at ETH Zurich in Switzerland, TU Munich in Germany, and currently at UC Berkeley for PhD)  
Research topic: Electronic composite for monitoring athlete conditions (2019)
- [BS student] Simona G. Fine (1<sup>st</sup> authored manuscript, currently an DAAD RISE intern in Germany)  
Research topic: Self-charging textiles for air filtration and face masks (2021)

*Significant recognitions received by students based on their work in the group*

- One group member featured in *University World News* as an example of how US international students are poised to play a significant role in fostering international collaboration and coordination to respond to the COVID-19 pandemic.
- NSF-KAUST DIY Electronics Innovation Contest
- Two group members featured in “Women in Nanoscience”
- ECS Nanocarbons Division SES Young Investigator Award
- TomKat Center Postdoctoral Fellows in Sustainable Energy (Stanford University)
- 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)
- MRS Graduate Student Awards (2 Gold and 2 Silver awards, 2 female winners)
- P.E.O. Scholar Awards (recognizes outstanding female PhD candidates in North America)
- NSF East Asia and Pacific Summer Institutes (EAPSI) Fellowship
- NSF Graduate Fellowship (6 awards+1 honorable mention, 3 female winners)
- 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
- Ryan Fellowship in Nanoscience and Nanotechnology (5 awards, 3 female winners)
- Hilliard Award for Leadership, Scholarship and Service

**TEACHING ACTIVITIES/STORIES**

*Significant products and selected highlights about teaching activities*

- A cover article in *Journal of Chemical Education* (2021), describing teaching projects, ideas, and extended activities.
- Two Northwestern students received award for their class project (NU news release in 2017)
- Two students in my course 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. With observations and comments from conference attendees, including Profs. Mark Lundstrom (Purdue), Muhammad Hussain and Boon Ooi (KAUST).
- Student video report “Polyaniline Touch Gloves” cited in *Journal of Chemical Education* (2017)

- Dr. Nedal Y. Abu-Thabit at Jubail Industrial College in Saudi Arabia reported a student project of polyaniline coated touch gloves based on one of my student projects.
- An interview on Materials Research Society news website (Materials 360) about my new way of teaching to unlock student creativity and the innovative student projects (2014)
- It described some of the products from student project and included guest commentary on such teaching activities.
- Scientific Reports paper (2014) authored by 2 students and their TA on their course 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
- Journal of Chemical Education (2007) paper mentioning teaching activities.

*Courses taught at Northwestern (all undergraduate level, with 20 to 150 students)*

- MSE-337: Introduction to Conducting Polymers (technical elective course created by me)
- MSE-331: Soft Materials (required for major, updated with materials for society components)
- MSE-201/301: Principles of Materials (introductory course to materials)
- MSE-380: Introduction to Surface Science and Spectroscopy (technical elective)