Jingshan S. Du

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EDUCATION

11/2017	PhD Candidate in Materials Science and Engineering, Northwestern University Prospectus: Complex Nanoparticle Systems: Structures and Structural Dynamics Supervised by Prof. Chad A. Mirkin and Prof. Vinayak P. Dravid
06/2015	BSc (Hons) in Engineering: Materials Science and Engineering, Chu Kochen Honors College, Zhejiang University Thesis: Direct Observation of AgCl-Ag Transformation Dynamics Using In-situ Transmission Electron Microscopy Supervised by Prof. Deren Yang and Prof. David A. Weitz

RESEARCH EXPERIENCE

10/2015–present	Research Assistant, Department of Materials Science and Engineering and International Institute for Nanotechnology, Northwestern University Ryan Fellow (2017–); Fellow, Hierarchical Materials Cluster Program (2016–2017) Faculty Advisors: Prof. Chad A. Mirkin and Prof. Vinayak P. Dravid
10/2014–05/2015	Visiting Undergraduate, School of Engineering and Applied Sciences, Harvard University Fellow, Chu Kochen Honors College Overseas Thesis Training Program Faculty Advisor: Prof. David A. Weitz
07/2014–09/2014	Visiting Undergraduate, Department of Chemistry and Biochemistry and California NanoSystems Institute, University of California, Los Angeles Fellow, Cross-disciplinary Scholars in Science and Technology (CSST) Program Faculty Advisor: Prof. Xiangfeng Duan
03/2013–08/2015	Undergraduate Research Assistant, Department of Materials Science and Engineering and State Key Laboratory of Silicon Materials, Zhejiang University MOE China National University Student Innovation Program Grant (2013–2014) Faculty Advisors: Prof. Deren Yang and Prof. Hui Zhang

TEACHING AND MENTORING

Teaching Assistant, Department of Materials Science and Engineering, Northwestern University

MAT_SCI 301 Materials Science Principles (with Labs): Fall 2017

MAT_SCI 466 Analytical Electron Microscopy (with Labs): Spring 2018

Mentored graduate research:

Donghoon Shin, PhD Student in Materials Science and Engineering: Fall 2018–present

Topic: Patterning and optoelectronics of halide perovskite nanocrystals

Qian Rong, Visiting PhD Student: Winter 2019–present

Topic: Hierarchically porous multicomponent oxide electrocatalysts for oxygen evolution

Mentored undergraduate research:

Benjamin Kaiser, REU (NU MRSEC): Summer 2018

Topic: Graphene-liquid interaction

Kevin Qiu. REU (NU MRSEC), Undergraduate Research Assistant: Fall 2016–Winter 2018

Topic: Graphene-liquid interaction; graphene-encapsulated imaging of soft materials

Juan Martin, REU (NU NNIN/SHyNE): Summer 2017

Topic: Graphene-encapsulated imaging of microbes

PROFESSIONAL EXPERIENCE

07/2013–08/2013 Assistant Engineer, Development Center, Kuang-Chi Institute of Advanced Technology

SIGNIFICANT RECOGNITIONS

Chou Pei-yuan Award for Youths in Science and Technology Innovation (Shared), Chou Pei-yuan Foundation

Chu Kochen Scholarship (Presidential Award), Zhejiang University

Chu Kochen Honors College Scholarship for Excellence (Dean's Award), Zhejiang University

Cross-disciplinary Scholars in Science and Technology (CSST) Award, University of California, Los Angeles

IPMI Sabin Metal Ron Bleggi Award, International Precious Metals Institute

Kwanjeong Educational Foundation Scholarship

National Scholarship (Undergraduate), Ministry of Education of China

Park AFM Scholarship, Park Systems Inc.

Perkin Scholarship, Society of Chemical Industry America

Top 100 Bachelor's Thesis Award, Zhejiang University

MEDIA HIGHLIGHTS AND VOICES

Primarily Featured by:

"Park AFM Scholarship Awards - JINGSHAN DU"

NanoScientific **2018**, *13*, 23–24 and the Park AFM website. May 2018

"Ask Myself at the Finish Line of College"

Zhejiang University Homepage. April 2015

Voices and Opinions Appeared in:

"As DFT matures, will it become a push-button technology?" by Sam Lemonick

Chemical & Engineering News **2019**, *97* (35), 16. September 2019

JOURNAL ARTICLES

†Contributed Equally

[15] Particle Analogs of Electrons in Colloidal Crystals.

Martin Girard†, Shunzhi Wang†, **Jingshan S. Du**†, Anindita Das†, Ziyin Huang, Vinayak P. Dravid, Byeongdu Lee, Chad A. Mirkin, Monica Olvera de la Cruz.

Science **2019**, *364* (6446), 1174–1178.

► Highlighted by *Quanta Magazine*, *The Economist Espresso*, *Northwestern Now*, and Argonne National Laboratory Press Release; also reprinted by PHYS.ORG, Advanced Photon Source Science Highlights, *Civic + Structural Engineer*, etc.

[14] Interface and Heterostructure Design in Polyelemental Nanoparticles.

Peng-Cheng Chen, Mohan Liu, **Jingshan S. Du**, Brian Meckes, Shunzhi Wang, Haixin Lin, Vinayak P. Dravid, Chris

Wolverton, Chad A. Mirkin.
Science **2019**, *363* (6430), 959–964.
► Highlighted by *Nano Today* **2019**, *26*, 5-6 and *Northwestern Now*; also reprinted by *Materials Today* News, PHYS.ORG, ScienceDaily, etc.

[13] Catalyst Discovery Through Megalibraries of Nanomaterials.
Edward J. Kluender†, James L. Hedrick†, Keith A. Brown, Rahul Rao, Brian Meckes, **Jingshan S. Du**, Liane M. Moreau, Benji Maruyama, Chad A. Mirkin.
Proceedings of the National Academy of Sciences of the United States of America **2019**, *116* (1), 40–45.
► Highlighted by *Science* News, *Nature Review Chemistry* **2019**, *3* (2), 66, and *Northwestern Now*; also reprinted by PHYS.ORG, Nanowerk News, etc.

[12] Windowless Observation of Evaporation-Induced Coarsening of Au-Pt Nanoparticles in Polymer Nanoreactors.
Jingshan S. Du, Peng-Cheng Chen, Brian Meckes, Edward J. Kluender, Zhuang Xie, Vinayak P. Dravid, Chad A. Mirkin.
Journal of the American Chemical Society **2018**, *140* (23), 7213–7221.
► Highlighted by International Institute for Nanotechnology News.

[11] Multi-Stage Transformation and Lattice Fluctuation at AgCl-Ag Interface.
Jingshan S. Du, Jungwon Park, QHwan Kim, Wonho Jhe, Vinayak P. Dravid, Deren Yang, David A. Weitz.
The Journal of Physical Chemistry Letters **2017**, *8* (23), 5853–5860.

[10] The Structural Evolution of Three-component Nanoparticles in Polymer Nanoreactors.
Peng-Cheng Chen, **Jingshan S. Du**, Brian Meckes, Liliang Huang, Zhuang Xie, James L. Hedrick, Vinayak P. Dravid, Chad A. Mirkin.
Journal of the American Chemical Society **2017**, *139* (29), 9876–9884.

[9] Solution-Phase Photochemical Nanopatterning Enabled by High-Refractive-Index Beam Pen Arrays.
Zhuang Xie†, Pavlo Gordiichuk†, Qing-Yuan Lin, Brian Meckes, Peng-Cheng Chen, Lin Sun, **Jingshan S. Du**, Jinghan Zhu, Yuan Liu, Vinayak P. Dravid, and Chad A. Mirkin.
ACS Nano **2017**, *11* (8), 8231–8241.
► Highlighted by *ACS Nano* **2017**, *11* (9), 8537-8541.

[8] The Structural Fate of Individual Multicomponent Metal-Oxide Nanoparticles in Polymer Nanoreactors.
Jingshan S. Du†, Peng-Cheng Chen†, Brian Meckes, Zhuang Xie, Jinghan Zhu, Yuan Liu, Vinayak P. Dravid, Chad A. Mirkin.
Angewandte Chemie International Edition **2017**, *56* (26), 7625–7629.

[7] Embedding Ultrafine Pt Nanoparticles at Ceria Surface for Enhanced Thermal Stability.
Jingshan S. Du†, Ting Bian†, Junjie Yu, Yingying Jiang, Xiaowei Wang, Yucong Yan, Yi Li, Chuanhong Jin, Hui Zhang, Deren Yang.
Advanced Science **2017**, *4* (9), 1700056.

[6] Intermetallic Nanocrystals: Syntheses and Catalytic Applications.
Yucong Yan, **Jingshan S. Du**, Kyle D. Gilroy, Deren Yang, Younan Xia, Hui Zhang.
Advanced Materials **2017**, *29* (14), 1605997. (Invited Review)

[5] Developing an Aqueous Approach for Synthesizing Au and M@Au (M = Pd, CuPt) Hybrid Nanostars with Plasmonic Properties.
Jingshan Du, Junjie Yu, Yalin Xiong, Zhuoqing Lin, Hui Zhang, Deren Yang.
Physical Chemistry Chemical Physics **2015**, *17* (2), 1265–1272.

[4] Kinetically-controlled Growth of Cubic and Octahedral Rh-Pd Alloy Oxygen Reduction Electrocatalysts with High Activity and Durability.
Yucong Yan†, Fangwei Zhan†, **Jingshan Du**, Yingying Jiang, Chuanhong Jin, Maoshen Fu, Hui Zhang, Deren Yang.
Nanoscale **2015**, *7* (1), 301–307.

[3] Facile Synthesis of High-quality Pt Nanostructures with Controlled Aspect-ratio for Methanol Electro-oxidation.
Yi Li, Ting Bian, **Jingshan Du**, Yalin Xiong, Fangwei Zhan, Hui Zhang, Deren Yang.
CrystEngComm **2014**, *16* (36), 8340–8343.

[2] Langmuir Isotherm in Solution Adsorption Experiment.
Jingshan Du.
Research and Exploration in Laboratory **2014**, *33* (10), 207–210.

[1] A Design of a Remote-Control Telescope System for High-School Students.
Jingshan Du, Yanzhi Liu, Shenming Fu, Lan Lin.
Astronomical Research and Technology (PNAOC) **2013**, *10* (2), 194–200. (Front Cover)

INVITED TALKS

[2] Accelerating Complex Nanomaterial Discovery Using A Combinatorial Library Approach (Award Address).
43rd International Precious Metals Institute Annual Conference, June 15th–18th, 2019. Reno, NV, United States.

[1] Classical Electron Equivalent Nanoparticles in Metal-like Colloidal Crystals.
36th John E. Hilliard Symposium, Northwestern University, May 16th, 2019. Evanston, IL, United States.

CONTRIBUTED PRESENTATIONS

Presenter

[7] Polymer Nanoreactor Approach for Combinatorial Investigation of Complex Nanoparticles.
Jingshan S. Du, Vinayak P. Dravid, Chad A. Mirkin.
Gordon Research Conference & Seminar: Crystal Growth and Assembly, June 22nd–28th, 2019. Manchester, NH, United States. (Poster)

[6] Attoliter Polymer Reactors as Combinatorial Tools for Understanding Alloy Nanocrystal Structure–Function Relationship.
Jingshan S. Du, Vinayak P. Dravid, Chad A. Mirkin.
257th American Chemical Society National Meeting, March 31st–April 4th, 2019. Orlando, FL, United States. (Oral talk)

[5] Site-Specific Polymer Nanoreactors for Studying Complex Nanoparticles Using Correlative Electron Microscopy.
Jingshan S. Du, Peng-Cheng Chen, Vinayak P. Dravid, Chad A. Mirkin.
2018 Materials Research Society Spring Meeting, April 2nd–6th, 2018. Phoenix, AZ, United States. (Oral talk)

[4] Using STEM to Probe the in-situ Dynamics of Multimetallic Nanoparticles Grown in Polymer Nanoreactors.
Jingshan S. Du, Peng-Cheng Chen, Vinayak P. Dravid, Chad A. Mirkin.
Microscopy & Microanalysis 2017, August 6th–10th, 2017. St. Louis, MO, United States. (Oral talk)

[3] Multi-stage Transformation and Lattice Fluctuation at AgCl-Ag Nanoparticle Interface.
Jingshan S. Du, Jungwon Park, QHwan Kim, Vinayak P. Dravid, Deren Yang, David A. Weitz.
253rd American Chemical Society National Meeting, April 2nd–6th, 2017. San Francisco, CA, United States. (Oral talk)

[2] Surface-embedded Pt/CeO_2 Hybrid Nanostructure with High Catalytic Activity and Thermal Stability.
Jingshan Du, Junjie Yu, Ting Bian, Yi Jiang, Hui Zhang, Deren Yang.
7th National Meeting of Undergraduate Innovation and Entrepreneurship, October 18th–19th, 2014. Xi'an, China. (Oral talk, Outstanding Paper Award)

► Highlighted by Zhejiang University Undergraduate School News.

[1] Controlled Synthesis of Au and M@Au Nanostars and Their LSPR Properties.
Jingshan Du, Hui Zhang, Deren Yang.
Graduate Joint Forum on Technologies & Sensors, Cyrus Tang Center for Sensor Materials and Applications, Zhejiang University, June 13th, 2014. Hangzhou, China. (Poster)

PATENTS

[2] Polymer-assisted synthesis of ultrasmall nanoparticles.
Chad A. Mirkin, Pengcheng Chen, Yuan Liu, **Jingshan S. Du**. 62/824,617. U.S. Patent Application, Provisional.

[1] Device and method for fluid flow rate measurement.
Jingshan Du, Shuiqiao Chen. CN 103063868. China Patent.

PROFESSIONAL AFFILIATIONS AND SERVICES

Member, American Association for the Advancement of Science; American Chemical Society; American Physical Society; SPIE; Materials Research Society; Microscopy Society of America; Microanalysis Society

Vice President, SPIE Northwestern University Chapter, 2018–present

Coordinator, SPIE-MRSEC Student Seminar Series, Northwestern University, 2017–2018

Conference Chair, *SPIE FOCUS: Light and Matter*, October 12th–13th, 2019. Evanston, IL, United States

ACADEMIC COMPETITIONS

Outstanding Winner, Zhejiang University Challenge Cup Undergraduate Academic Research Contest, 2015
Report Title: Platinum-based Nanostructures with High Catalytic Activity and Thermal Stability

Meritorious Winner, Interdisciplinary Contest in Modeling, 2014 (Shared)
Report Title: Bibliometrics, Biosystem, Better Choice: The Interdisciplinary Analysis of Network Influence

First Prize, Kuang-Chi Metamaterials Mathematical Modeling Contest, 2013 (Shared)
Report Title: Microstructure Effect on the Electromagnetic Responses of Metamaterials

First Prize, Chinese Adolescents Science and Technology Innovation Contest, 2010 (Shared)
Report Title: Design and Implementation of Quantitative Astronomical Experiments for High School Students

POPULAR SCIENCE AND SECONDARY EDUCATION ARTICLES

China Science and Technology Education, 2011 (11), 27-29. *Amateur Astronomer*, 2010 (4), 72-73. *Physics Bulletin*, 2010 (6), 20-24. *Science in 24 Hours*, 2009 (7-8), 13-15. *Science in 24 Hours*, 2009 (7-8), 16-17. *Chinese National Astronomy*, 2009 (7), 110. *Science in 24 Hours*, 2009 (6), 38-39.