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PROFESSIONAL SUMMARY Dr. Du studies the structural complexities of nanoscale organized systems. He developed techniques for creating multicomponent metal and oxide nanocrystal libraries and discovered several structures, including two new classes of metal nanoprisms. He invented a patent-pending technique for synthesizing multiplexed halide perovskite nanocrystal arrays and elucidated a size-dependent emission mechanism in these materials. His work on DNA-directed nanoparticle assembly led to the discovery of metal-like colloidal crystals. His research recently emphasized hydrogen-bonded crystals and interfaces, highlighted by the first atomic-resolution electron micrographs of the ice-water interface. Dr. Du is an Associate Editor of *Frontiers for Young Minds*, a barrier-breaking journal publishing accessible science articles for young audiences. He serves on the Community Board of *Nanoscale Horizons*.

EDUCATION **Northwestern University** Evanston, IL
Ph.D., Materials Science and Engineering September 2021
Thesis: Complex Nanoparticle Systems: Structures, Structure–Property Relationships, and Dynamics
Supervised by Prof. Chad A. Mirkin and Prof. Vinayak P. Dravid
Certificate, Management for Scientists and Engineers, Kellogg School of Management August 2021
Zhejiang University Chu Kochen Honors College Hangzhou, China
B.Sc. (Hons), Engineering Science: Materials Science and Engineering June 2015
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 AND PROFESSIONAL APPOINTMENTS **Pacific Northwest National Laboratory** Richland, WA
Staff Scientist, Physical & Computational Sciences Directorate 2025–present
Post Doctorate Research Associate, Physical & Computational Sciences Directorate 2021–2025
Advisor: Dr. James J. De Yoreo
Washington Research Foundation Postdoctoral Fellow (2022–2025, \$287.5k)
Principal Investigator, Directorate Seed LDRD “Crashing Pathways: Enabling Direct Observation of Solution Segregation and Precipitation Driven by Temperature Reduction” (2025, \$42k), [Environmental Molecular Sciences Laboratory \(DOE SC BER\) Large-Scale Research Award 60789: “Elucidating the Ice Formation and Transformation Pathways in Aerosols at Atomic Resolution”](#) (2023–2025, \$110.5k in-kind); [Capacity Awards 60620](#) (2022–2023), [60286](#) (2022). Co-Lead Investigator, [Capacity Award 60575](#) (2022–2023)
Topics: nanoscale crystal formation and transformation; ice nanostructures and their formation pathways; non-covalent material interfaces; assembly of sequence-programmed polymers

Northwestern University Evanston, IL
Graduate Research Assistant, International Institute for Nanotechnology 2015–2021
Faculty Advisors: Prof. Chad A. Mirkin and Prof. Vinayak P. Dravid
Ryan Fellow (2017–2020); Fellow, Hierarchical Materials Cluster Program (2016–2017)
Nanolithography Subgroup Leader (2019–2021)

Topics: nanoparticles as complex systems; nanoscale phase transformation; correlated and in-situ electron microscopy; combinatorial synthesis and characterization

Harvard University

Cambridge, MA

Visiting Undergraduate, School of Engineering and Applied Sciences

2014–2015

Faculty Advisor: Prof. David A. Weitz

Topics: nanoscale interfacial reactions; in-situ electron microscopy; graphene liquid cells

University of California, Los Angeles

Los Angeles, CA

Visiting Undergraduate, California NanoSystems Institute

Summer 2014

Faculty Advisor: Prof. Xiangfeng Duan

Fellow, Cross-Disciplinary Scholars in Science and Technology Program

Topics: mixed oxide electrocatalysts for oxygen evolution reaction

Kuang-Chi Institute of Advanced Technology

Shenzhen, China

Assistant Engineer (Intern), Development Center

Summer 2013

Topics: composite metamaterial design; joint structures in carbon fiber-reinforced polymer plates

Zhejiang University

Hangzhou, China

Undergraduate Research Assistant, State Key Laboratory of Silicon Materials

2013–2015

Faculty Advisors: Prof. Deren Yang and Prof. Hui Zhang

Project Lead, Ministry of Education of China National University Student Innovation Program Grant

201310335067: “Composite Nanostructures of Noble Metals and Oxide Semiconductors and Their Applications in Clean Energy” (2013–2014)

Topics: thermal-resistant metal/oxide hybrid nanostructures; shaped-controlled synthesis of noble metal nanocrystals

**TEACHING AND
MENTORING**

Teaching Assistantship

MAT_SCI 466 Analytical Electron Microscopy (with Labs), Northwestern University, Spring 2018

MAT_SCI 301 Materials Science Principles (with Labs), Northwestern University, Fall 2017

Tutorial and Workshop Instruction

Deciphering Structural Complexities in Materials on the Molecular Scale with Volume-Confined Crystallization, *2024 Materials Research Society Fall Meeting: Tutorial NM07—Building Advanced Materials via Aggregation and Self-Assembly*, December 1st, 2024

Fundamentals of Electron Microscopy: A Crash Course, Electrochemical Society Student Chapter at the University of Washington, May 9th, 2024

Coherent Electron Microscopy Imaging and Analysis, Center for the Science of Synthesis Across Scales (DOE SC BES EFRC), April 26th, 2022

Mentored Graduate Research

Carolyn B. Wahl, Ph.D. Student, Materials Science and Engineering, Northwestern University, 2019–2021

Topics: complex metal alloy nanoparticles

David D. Xu, Ph.D. Student, Chemistry, Northwestern University, 2019–2021

Topics: upconverting nanoparticle arrays and libraries

Mingue Shin, Visiting Ph.D. Student, Materials Science and Engineering, Northwestern University, 2019–2020

Topics: halide perovskite nano-LEDs

Qian Rong, Visiting Ph.D. Student, Materials Science and Engineering, Northwestern University, 2019

Topics: hierarchically porous multicomponent oxide electrocatalysts for oxygen evolution

Donghoon Shin, Ph.D. Student, Materials Science and Engineering, Northwestern University, 2018–2021

Topics: patterning and optoelectronics of halide perovskite nanocrystals

Mentored Undergraduate Research

Benjamin Kaiser, REU (NU MRSEC), Northwestern University, Summer 2018

Topics: graphene-liquid interaction

Juan Diego Martin, REU (NNCI/SHyNE), Northwestern University, Summer 2017

Topics: graphene-encapsulated electron imaging of microbes

Kevin Qiu, REU (NU MRSEC) and Undergraduate Research Assistant, Northwestern University, 2016–2018

Topics: graphene-liquid interaction; graphene-encapsulated electron imaging of soft materials

SYNERGISTIC ACTIVITIES

Society and Government Services

International Committee Member, *Microscopy Society of America*, 2024–present

Early Career Professionals Subcommittee Member, Career Advancement Committee, *Materials Research Society*, 2023–2026

Planning Committee Representative, DOE Office of Science Basic Energy Sciences Early Career Network (BES ECN), 2022–2023

President, SPIE Northwestern University Chapter, 2019–2020

Vice President, SPIE Northwestern University Chapter, 2018–2019

Editorial Roles

Associate Editor, *Frontiers for Young Minds*, 2023–present

Guest Editor, *MRS Advances*, Crystallization and Assembly at Interfaces, 2023–2024 (companion special issue for 2023 MRS Fall Meeting Symposium SF02)

Guest Associate Editor, *Frontiers in Chemistry*, Nanotechnology for Natural Products, 2022

Advisory Board Membership

Community Board, *Nanoscale Horizons*, 2023–present

Early Career Board, *ACS Biomaterials Science & Engineering*, 2022–2024

Conference and Seminar Organization

Symposium Organizer, *The International Chemical Congress of Pacific Basin Societies (Pacifichem) 2025*, December 15th–20th, 2025. Honolulu, HI. Symposium MAT017: Multicomponent Nanostructures: Novel Synthesis, Rational Design, and Materials Discovery

Chair, *Gordon Research Seminar: Crystal Growth and Assembly 2025*, June 21st–22nd, 2025. Manchester, NH.

Symposium Organizer and Poster Judge, *Microscopy & Microanalysis 2024*, July 28th–August 1st, 2024.

Cleveland, OH. Symposium C05: Correlative Microscopy Using Light, Electron, and X-ray Microscopy

Symposium Organizer, *2023 Materials Research Society Fall Meeting*, November 26th–December 1st, 2023.

Boston, MA. Symposium SF02: Crystallization and Assembly at Interfaces: Fundamental Breakthroughs Enabled by Data-Centric Analysis and In-Situ/Operando Techniques

Session Organizer, *2023 DOE EFRC-Hub-CMS-CCS Virtual Principal Investigators' Meeting*, September 18th–20th, 2023. Student and Postdoc Mixer

Session Chair, *American Physical Society March Meeting 2023*, March 5th–10th, 2023. Las Vegas, NV.

Session T04: Surfaces, Interfaces & Materials

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

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

Journal Peer Review (select titles)

Accounts of Materials Research, *ACS Nano*, *Advanced Engineering Materials*, *Chemical Communications*,

Communications Chemistry, CrystEngComm, International Journal of Hydrogen Energy, Journal of Alloys and Compounds, Journal of Crystal Growth, Journal of Materials Science, Journal of Physics: Condensed Matter, Materials Today Chemistry, Nanotechnology, Nature Communications, Optical Engineering, Physical Reviews Materials, Proceedings of the National Academy of Sciences, Small, Thin Solid Films

Proposal Review

2025 DOE Office of Science Graduate Student Research (SCGSR) Program (mail-in)

2025 AAAS Annual Meeting Scientific Sessions (mail-in)

Business Consultation and Assessment

Venture Technical Assessor, Creative Destruction Lab Seattle, 2023–2024 (4 ventures in total)

K–12 Education

Competition Official, DOE Pacific Northwest High School Regional Science Bowl (2023–2025)

Category Lead Judge, Central Sound Regional Science and Engineering Fair (2025)

Judge, Washington State Science and Engineering Fair (2022), Central Sound Regional Science and Engineering Fair (2022, 2024), Mid-Columbia Regional Science and Engineering Fair (2024, 2025)

NOTABLE RECOGNITIONS

2025 CAS Future Leaders, Chemical Abstracts Service, American Chemical Society
 2025 APS Topical Group on the Physics of Climate Early Career Investigator Award, American Physical Society
 2024 Pacific Northwest National Laboratory Outstanding Performance Award
 2024 AVS Nanoscale Science and Technology Division Early Career Award, American Vacuum Society
 2024 Microscopy & Microanalysis Postdoctoral Scholar Award, Microscopy Society of America
 2024 Lindau Spirit Fellowship, 73rd Lindau Nobel Laureate Meeting (Physics)
 2023 David Galas Distinguished Fellow Award, Washington Research Foundation
 2023 APS Forum on International Physics Distinguished Student Award, American Physical Society
 2021 Carl Samans Excellence Award, ASM Chicago Regional Chapter
 2021 MRS Graduate Student Award, Materials Research Society
 2020 Extraordinary Potential Prize, Chinese Government Award for Outstanding Self-Financed Students Abroad
 2020 International Institute for Nanotechnology Outstanding Research Award, Northwestern University
 2020 SPIE Optics and Photonics Education Scholarship
 2019 Perkin Scholarship, Society of Chemical Industry America
 2019 IPMI Sabin Metal Ron Bleggi Award, International Precious Metals Institute
 2018 Park AFM Scholarship, Park Systems Inc.
 2015 Top 100 Bachelor's Thesis Award, Zhejiang University
 2014 Chu Kochen Scholarship, Zhejiang University
 2014 Chu Kochen Honors College Scholarship for Excellence, Zhejiang University
 2014 National Scholarship (Undergraduate), Ministry of Education of China
 2014 Cross-Disciplinary Scholars in Science and Technology Award, University of California, Los Angeles
 2012 Kwanjeong Educational Foundation Scholarship (received consecutively from 2012 to 2014)
 2010 Chou Pei-yuan Award for Youths in Science and Technology Innovation, Chou Pei-yuan Foundation

PUBLICATIONS **Metrics:** *h*-index = 17, citations > 1,600 ([Google Scholar](#))

Reviews and Commentaries

[1] 33 Unresolved Questions in Nanoscience and Nanotechnology.
 Mirkin, C. A.; Petrosko, S. H.; ...; **Du, J. S.**; ... (110 co-authors listed alphabetically).
ACS Nano **2025**, *19* (36), 31933–31968. DOI:10.1021/acsnano.5c12854

- [2] Crystallization and Assembly at Interfaces: Celebrating the Achievements of a Vibrant Research Community.
Du, J. S.; Qi, X.; Seo, S. E.; Zhang, S.; Borkiewicz, O. J.
MRS Advances 2024, 9 (13), 1037–1038. DOI:10.1557/s43580-024-00922-0
 ► Highlighted by [PNNL News](#).
- [3] Non-Classical Crystallization in Soft and Organic Materials.
Du, J. S.; Bae, Y.; De Yoreo, J. J.
Nature Reviews Materials 2024, 9 (4), 229–248. DOI:10.1038/s41578-023-00637-y
 ► Featured on the [Front Cover](#). Highlighted by [PHYS.ORG](#) and [PNNL Research Highlight](#).
- [4] Time's Dance with Gold: Tracking the Isomeric Fluctuations of Au Clusters.
Du, J. S.
Nanoscale Horizons 2024, 9 (4), 504–505. DOI:10.1039/d4nh90007c
- [5] Preventative Studies Should Begin Now for Detecting AI-Generated Microscopy Images.
Du, J. S.; Zhang, M.
Matter 2023, 6 (6), 1673–1674. DOI:10.1016/j.matt.2023.04.009
- [6] Editorial: Nanotechnology for Natural Products.
Du, J. S.; Chen, T.; Liu, F.; Wang, S.; Zhang, J.; Zhang, R.
Frontiers in Chemistry 2022, 10, 1069892. DOI:10.3389/fchem.2022.1069892
- [7] Is Open Access Worth the Cost?
Du, J. S.
The Scientist 2022, 36 (2), 15–16. Online version: *TS Digest* 2022 (6:1), 9–10.
 ► Cited in the [G7 OSWG Research on Research Sub-Working Group Final Report](#).
- [8] Twin Pathways: Discerning the Origins of Multiply Twinned Colloidal Nanoparticles.
Du, J. S.; Zhou, W.; Rupich, S. M.; Mirkin, C. A.
Angewandte Chemie International Edition 2021, 60 (13), 6858–6863. DOI:10.1002/anie.202015166
- [9] Intermetallic Nanocrystals: Syntheses and Catalytic Applications.
 Yan, Y.; **Du, J. S.;** Gilroy, K. D.; Yang, D.; Xia, Y.; Zhang, H.
Advanced Materials 2017, 29 (14), 1605997. DOI:10.1002/adma.201605997
 ► Invited review.

Representative Research Reports

- [10] Molecular-Resolution Imaging of Ice Crystallized from Liquid Water by Cryogenic Liquid-Cell TEM.
Du, J. S.; Banik, S.; Chan, H.; Fritsch, B.; Xia, Y.; Karakoti, A. S.; Hutzler, A.; Sankaranarayanan, S. K. R. S.; De Yoreo, J. J.
Nature Communications 2025, 16, 8342. DOI:10.1038/s41467-025-62451-0
 ► Highlighted by [Science News](#), [PNNL News](#), and [PNNL Research Highlight](#); adapted by [PHYS.ORG](#), [AZoNano](#), [MSN News UK](#), etc. See also: [Gatan Inc. Experiment Brief](#).
- [11] Ru/MgO Catalyst with Dual Ru Structure Sites for Efficient CO Production from CO₂ Hydrogenation.
 Xie, S.[†]; Ye, K.[‡]; **Du, J. S.[†]**; Zhang, X.; Kim, D.; Loukusa, J.; Ma, L.; Ehrlich, S. N.; De Yoreo, J. J.; Liu, F.
 (†equal contribution)
Chemical Engineering Journal 2024, 487, 150486. DOI:10.1016/j.cej.2024.150486
 ► Invited research article.
- [12] Discovering Polyelemental Nanostructures with Redistributed Plasmonic Modes Through Combinatorial Synthesis.
Du, J. S.[‡]; Cherqui, C.[‡]; Ueltschi, T. W.; Wahl, C. B.[‡]; Bourgeois, M.; Van Duyne, R. P.; Schatz, G. C.; Dravid, V. P.; Mirkin, C. A. (†equal contribution, ‡mentored student)

- Science Advances* **2023**, 9 (51), eadj6129. DOI:10.1126/sciadv.adj6129
- [13] Intermetallic Nanocrystal Discovery Through Modulation of Atom Stacking Hierarchy.
Du, J. S.; Dravid, V. P.; Mirkin, C. A.
ACS Nano **2022**, 16 (12), 20796–20804. DOI:10.1021/acsnano.2c08038
 ► Featured on the [Front Cover](#).
- [14] The Emergence of Valency in Colloidal Crystals Through Electron Equivalents.
 Wang, S.†; Lee, S.†; **Du, J. S.†**; Partridge, B. E.; Cheng, H. F.; Zhou, W.; Dravid, V. P.; Lee, B.; Glotzer, S. C.;
 Mirkin, C. A. (†equal contribution)
Nature Materials **2022**, 21 (5), 580–587. DOI:10.1038/s41563-021-01170-5
 ► Highlighted by *Materials Today News*, *Northwestern Engineering News*, *University of Michigan News*, and *Argonne National Laboratory Press Release*; adapted by *PHYS.ORG*, *NANO Magazine*, *International Institute for Nanotechnology News*, *Advanced Photon Source Science Highlights*, *Laboratory Equipment*, *Nanotechnology World Association*, *SciTechDaily*, *Technology Org*, *AZoMaterials*, *Nanowerk News*, etc.
- [15] Galvanic Transformation Dynamics in Heterostructured Nanoparticles.
Du, J. S.; He, K.; Xu, Y.; Wahl, C. B.‡; Xu, D. D.‡; Dravid, V. P.; Mirkin, C. A. (‡mentored student)
Advanced Functional Materials **2021**, 31 (46), 2105866. DOI:10.1002/adfm.202105866
- [16] Bidirectional Nanomodification Enables Hierarchically Structured Mixed Oxide Electrodes for Oxygen Evolution.
 Rong, Q.†‡; **Du, J. S.†**; Chen, X.; Liu, Q.; Dravid, V. P. (†equal contribution, ‡mentored student)
Small **2021**, 17 (17), 2007287. DOI:10.1002/sml.202007287
 ► Highlighted by *Northwestern Engineering News*; adapted by *International Institute for Nanotechnology News*.
- [17] Halide Perovskite Nanocrystal Arrays: Multiplexed Synthesis and Size-Dependent Emission.
Du, J. S.†; Shin, D.†‡; Stanev, T. K.; Musumeci, C.; Xie, Z.; Huang, Z.; Lai, M.; Sun, L.; Zhou, W.; Stern, N. P.;
 Dravid, V. P.; Mirkin, C. A. (†equal contribution, ‡mentored student)
Science Advances **2020**, 6 (39), eabc4959. DOI:10.1126/sciadv.abc4959
 ► Highlighted by *Nature Electronics*, *Perovskite-Info*, and *Northwestern Engineering News*; adapted by *International Institute for Nanotechnology News*.
- [18] Colloidal Crystal “Alloys.”
 Wang, S.; **Du, J. S.**; Diercks, N. J.; Zhou, W.; Roth, E. W.; Dravid, V. P.; Mirkin, C. A.
Journal of the American Chemical Society **2019**, 141 (51), 20443–20450. DOI:10.1021/jacs.9b11109
- [19] Particle Analogs of Electrons in Colloidal Crystals.
 Girard, M.‡; Wang, S.†; **Du, J. S.†**; Das, A.†; Huang, Z.; Dravid, V. P.; Lee, B.; Mirkin, C. A.;
 Olvera de la Cruz, M. (†equal contribution)
Science **2019**, 364 (6446), 1174–1178. DOI:10.1126/science.aaw8237
 ► Highlighted by *MRS Bulletin*, *Quanta Magazine*, *The Economist Espresso*, *Mashable India*, *Northwestern Now*, and *Argonne National Laboratory Press Release*; adapted by *PHYS.ORG*, *Advanced Photon Source Science Highlights*, *Civil + Structural Engineer*, *Nanowerk News*, etc.
- [20] Interface and Heterostructure Design in Polyelemental Nanoparticles.
 Chen, P.-C.; Liu, M.; **Du, J. S.**; Meckes, B.; Wang, S.; Lin, H.; Dravid, V. P.; Wolverton, C.; Mirkin, C. A.
Science **2019**, 363 (6430), 959–964. DOI:10.1126/science.aav4302
 ► Highlighted by *Nano Today* and *Northwestern Now*; adapted by *Materials Today News*, *PHYS.ORG*, *ScienceDaily*, *Nanowerk News*, etc.
- [21] Windowless Observation of Evaporation-Induced Coarsening of Au-Pt Nanoparticles in Polymer Nanoreactors.

- Du, J. S.;** Chen, P.-C.; Meckes, B.; Kluender, E. J.; Xie, Z.; Dravid, V. P.; Mirkin, C. A.
Journal of the American Chemical Society **2018**, *140* (23), 7213–7221. DOI:10.1021/jacs.8b03105
 ► Highlighted by International Institute for Nanotechnology News.
- [22] Multi-Stage Transformation and Lattice Fluctuation at AgCl-Ag Interface.
Du, J. S.; Park, J.; Kim, Q.; Jhe, W.; Dravid, V. P.; Yang, D.; Weitz, D. A.
The Journal of Physical Chemistry Letters **2017**, *8* (23), 5853–5860. DOI:10.1021/acs.jpcclett.7b02875
- [23] The Structural Evolution of Three-Component Nanoparticles in Polymer Nanoreactors.
 Chen, P.-C.; **Du, J. S.;** Meckes, B.; Huang, L.; Xie, Z.; Hedrick, J. L.; Dravid, V. P.; Mirkin, C. A.
Journal of the American Chemical Society **2017**, *139* (29), 9876–9884. DOI:10.1021/jacs.7b03163
- [24] The Structural Fate of Individual Multicomponent Metal-Oxide Nanoparticles in Polymer Nanoreactors.
Du, J. S.†; Chen, P.-C.†; Meckes, B.; Xie, Z.; Zhu, J.; Liu, Y.; Dravid, V. P.; Mirkin, C. A. (†equal contribution)
Angewandte Chemie International Edition **2017**, *56* (26), 7625–7629. DOI:10.1002/anie.201703296
- [25] Embedding Ultrafine Pt Nanoparticles at Ceria Surface for Enhanced Thermal Stability.
Du, J. S.†; Bian, T.†; Yu, J.; Jiang, Y.; Wang, X.; Yan, Y.; Li, Y.; Jin, C.; Zhang, H.; Yang, D. (†equal contribution)
Advanced Science **2017**, *4* (9), 1700056. DOI:10.1002/advs.201700056
- [26] Developing an Aqueous Approach for Synthesizing Au and M@Au (M = Pd, CuPt) Hybrid Nanostars with Plasmonic Properties.
Du, J.; Yu, J.; Xiong, Y.; Lin, Z.; Zhang, H.; Yang, D.
Physical Chemistry Chemical Physics **2015**, *17* (2), 1265–1272. DOI:10.1039/C4CP04757E

Other Contributions

- [27] Achieving Electrode Smoothing by Controlling the Nucleation Phase of Metal Deposition Through Polymer-Substrate Binding.
 Xia, Y.; Song, D.; Zhang, M.; Wang, Z.; Shi, C.; **Du, J. S.;** Shin, S. H.; Engelhard, M. H.; Thallapally, P. K.; Orme, C. A.; Tao, J.; Sushko, M. L.; De Yoreo, J. J.; Liu, J.
Advanced Materials **2025**. DOI:10.1002/adma.202503218
- [28] Assembly of Short Amphiphilic Peptoids into Nanohelices with Controllable Supramolecular Chirality.
 Zheng, R.; Zhao, M.; **Du, J. S.;** Sudarshan T. R.; Zhou, Y.; Paravastu, A. K.; De Yoreo, J. J.; Ferguson, A. L.; Chen, C.-L.
Nature Communications **2024**, *15*, 3264. DOI:10.1038/s41467-024-46839-y
 ► Highlighted by PNNL News; adapted by PHYS.ORG, Technology Networks, BioEngineer.org, NanoWerk News, etc.
- [29] Colloidal Quasicrystals Engineered with DNA.
 Zhou, W.†; Lin, Y.†; Lin, H.†; Lee, S.†; Li, Y.; Huang, Z.; **Du, J. S.;** Wang, S.; Sánchez-Iglesias, A.; Grzelczak, M.; Liz-Marzán, L. M.; Glotzer, S. C.; Mirkin, C. A. (†equal contribution)
Nature Materials **2024**, *23* (3), 424–428. DOI:10.1038/s41563-023-01706-x
 ► Highlighted by TunisieSoir News, Tech Explorist, BNN Breaking, University of Michigan News, CIC biomaGUNE News, and International Institute for Nanotechnology News; adapted by PHYS.ORG, Tech Xplore, Futurity, Agencia SINC, Nanotechnology Now, BioTech Spain, SciTechDaily, etc.
- [30] From Heterostructures to Solid-Solutions: Structural Tunability in Mixed Halide Perovskites.
 Shin, D.†‡; Lai, M.†; Shin, Y.; **Du, J. S.;** Jibril, L.; Rondinelli, J. M.; Mirkin, C. A. (†equal contribution, ‡mentored student)
Advanced Materials **2023**, *35* (11), 2205923. DOI:10.1002/adma.202205923
- [31] Site-Isolated Upconversion Nanoparticle Arrays Synthesized in Polyol Nanoreactors.
 Xu, D. D.‡; Wahl, C. B.‡; **Du, J. S.;** Irgen-Gloro, S.; Weiss, E. A.; Mirkin, C. A. (‡mentored student)
The Journal of Physical Chemistry C **2021**, *125* (47), 26125–26131. DOI:10.1021/acs.jpcc.1c08562

- [32] Position- and Orientation-Controlled Growth of Wulff-Shaped Colloidal Crystals Engineered with DNA. Sun, L.; Lin, H.; Li, Y.; Zhou, W.; **Du, J. S.**; Mirkin, C. A. *Advanced Materials* **2020**, *32* (47), 2005316. DOI:10.1002/adma.202005316
- [33] Chain-End Functionalized Polymers for the Controlled Synthesis of Sub-2 nm Particles. Chen, P.-C.; Liu, Y.; **Du, J. S.**; Meckes, B.; Dravid, V. P.; Mirkin, C. A. *Journal of the American Chemical Society* **2020**, *142* (16), 7350–7355. DOI:10.1021/jacs.0c02244
- [34] Light-Responsive Colloidal Crystals Engineered with DNA. Zhu, J.; Lin, H.; Kim, Y.; Yang, M.; Skakuj, K.; **Du, J. S.**; Lee, B.; Schatz, G. C.; Van Duyne, R. P.; Mirkin, C. A. *Advanced Materials* **2020**, *32* (8), 1906600. DOI:10.1002/adma.201906600
- [35] Catalyst Discovery Through Megalibraries of Nanomaterials. Kluender, E. J.[†]; Hedrick, J. L.[†]; Brown, K. A.; Rao, R.; Meckes, B.; **Du, J. S.**; Moreau, L. M.; Maruyama, B.; Mirkin, C. A. (†equal contribution) *Proceedings of the National Academy of Sciences* **2019**, *116* (1), 40–45. DOI:10.1073/pnas.1815358116
► Highlighted by *Science News*, *Nature Reviews Chemistry*, and *Northwestern Now*; adapted by PHYS.ORG, Nanowerk News, etc.
- [36] Solution-Phase Photochemical Nanopatterning Enabled by High-Refractive-Index Beam Pen Arrays. Xie, Z.[†]; Gordiichuk, P.[†]; Lin, Q.-Y.; Meckes, B.; Chen, P.-C.; Sun, L.; **Du, J. S.**; Zhu, J.; Liu, Y.; Dravid, V. P.; Mirkin, C. A. (†equal contribution) *ACS Nano* **2017**, *11* (8), 8231–8241. DOI:10.1021/acsnano.7b03282
► Highlighted by *ACS Nano* **2017**, *11* (9), 8537.
- [37] Kinetically-Controlled Growth of Cubic and Octahedral Rh-Pd Alloy Oxygen Reduction Electrocatalysts with High Activity and Durability. Yan, Y.[†]; Zhan, F.[†]; **Du, J.**; Jiang, Y.; Jin, C.; Fu, M.; Zhang, H.; Yang, D. (†equal contribution) *Nanoscale* **2015**, *7* (1), 301–307. DOI:10.1039/c4nr04942j
- [38] Facile Synthesis of High-Quality Pt Nanostructures with Controlled Aspect-Ratio for Methanol Electro-Oxidation. Li, Y.; Bian, T.; **Du, J.**; Xiong, Y.; Zhan, F.; Zhang, H.; Yang, D. *CrystEngComm* **2014**, *16* (36), 8340–8343. DOI:10.1039/c4ce00713a
- [39] Langmuir Isotherm in Solution Adsorption Experiment. **Du, J.** *Research and Exploration in Laboratory* **2014**, *33* (10), 207–210. DOI:10.3969/j.issn.1006-7167.2014.10.049
- [40] A Design of a Remote-Control Telescope System for High-School Students. **Du, J.**; Liu, Y.; Fu, S.; Lin, L. *Astronomical Research & Technology* **2013**, *10* (2), 194–200. DOI:10.3969/j.issn.1672-7673.2013.02.014
► Featured on the [Front Cover](#).

PATENTS AND DISCLOSURES

- [1] Structurally Modified Nanosheets of Metal Oxides and Related Methods. *US 11,982,005*. U.S. Patent.
- [2] Halide Perovskite Nanocrystal Array and Its Preparation. *PCT/US2020/063324*. PCT Application (AU/CA/CN/EP/JP/KR/US). Publication No. WO 2021/188168
- [3] Polymer-Assisted Synthesis of Ultrasmall Nanoparticles. *US 11,599,020*. U.S. Patent.
- [4] Device and Method for Fluid Flow Rate Measurement. *CN 103063868*. China Patent.

- INVITED TALKS**
- [1] Direct Observation of Atomic-Scale Facet Evolution During Ice Crystallization.
Gordon Research Conference: Crystal Growth and Assembly. June 22nd–27th, 2025. Manchester, NH. (Short talk)
 - [2] Directly Observing the Ice-Water Interface with Molecular Resolution.
Caltech Engineering and Applied Sciences Trailblazers Symposium. November 7th–8th, 2024. Pasadena, CA.
 - [3] Molecular-Resolution Electron Imaging of Defects and Dynamics at the Ice-Water Interface.
2024 Environmental Molecular Sciences Laboratory User Meeting. October 8th–10th, 2024. Richland, WA.
 - [4] Molecular-Resolution Electron Imaging of Defects and Dynamics at the Ice-Water Interface.
Microscopy & Microanalysis 2024. July 28th–August 1st, 2024. Cleveland, OH.
8th Annual Pre-Meeting Congress for Students, Post-Docs, and Early-Career Professionals in Microscopy and Microanalysis. July 27th, 2024. Cleveland, OH. (Award talk)
Proceedings paper: *Microscopy and Microanalysis 2024*, 30 (S1), 1751–1752.
DOI:10.1093/mam/ozae044.865
 - [5] Deciphering Nanoscale Complexities: From Synthetic to Natural Crystal Systems.
Titans of the Tiny Symposium, Northwestern University. July 13th, 2024. Evanston, IL.
 - [6] Imperfections Make a Perfect Revelation: Discovering Complex Local Structures in Crystalline Materials and Ice.
Materials Science and Engineering Seminar, University of Washington. January 8th, 2024. Seattle, WA.
 - [7] Nanoscale Defects and Melting Behaviors of Ice Revealed at Atomic Resolution.
Gordon Research Seminar: Crystal Growth and Assembly. June 17th–18th, 2023. Manchester, NH.
 - [8] Discovering and Deciphering Bimetallic Nanocrystal Structures from a Library-on-a-Chip.
Ryan Fellows Reunion Symposium. September 9th, 2022. Evanston, IL.
 - [9] From Making Crystals to Seeing Crystal Evolution: Developing New Imaging Capabilities to Understand Molecular Icing.
Linus Pauling Seminar, Pacific Northwest National Laboratory. February 24th, 2021. Online.
 - [10] Halide Perovskite Nanocrystal Arrays: Multiplexed Synthesis and Size-Dependent Emission.
SPIE Student Seminar Series. August 4th, 2020. Online.
 - [11] Accelerating Complex Nanomaterial Discovery Using a Combinatorial Library Approach.
43rd International Precious Metals Institute Annual Conference. June 15th–18th, 2019. Reno, NV. (Award talk)
 - [12] Classical Electron Equivalent Nanoparticles in Metal-like Colloidal Crystals.
36th John E. Hilliard Symposium, Northwestern University. May 16th, 2019. Evanston, IL.
- CONTRIBUTED PRESENTATIONS**
- [1] Direct Observation of Atomic-Scale Facet Evolution During Ice Crystallization.
Du, J. S.; Yao, L.; Banik, S.; Sankaranarayanan, S. K. R. S.; Ziatdinov, M.; De Yoreo, J. J.
American Chemical Society Fall 2025 National Meeting. August 17th–21st, 2025. Washington, DC. (Oral talk)
 - [2] Observing Liquid Water Crystallization at Atomic Resolution.
Du, J. S.; De Yoreo, J. J.
2025 American Physical Society Global Physics Summit. March 16th–21st, 2025, Anaheim, CA. (Oral talk)
 - [3] Molecular-Resolution Imaging of Ice Crystallized from Liquid Water.
Du, J. S.; Banik, S.; Chan, H.; Fritsch, B.; Xia, Y.; Hutzler, A.; Sankaranarayanan, S. K. R. S.; De Yoreo, J. J.
2024 Materials Research Society Fall Meeting. December 1st–6th, 2024. Boston, MA. (Oral talk)
 - [4] Molecular-Resolution Elucidation of Ice Defects Formed by Liquid Water Crystallization.
Du, J. S.; Banik, S.; Chan, H.; Fritsch, B.; Xia, Y.; Hutzler, A.; Sankaranarayanan, S. K. R. S.; De Yoreo, J. J.
AVS 70th International Symposium. November 3rd–8th, 2024. Tampa, FL. (Oral talk)
 - [5] Molecular Resolution Electron Imaging of Ice-Water Interfacial Dynamics.
Du, J. S., De Yoreo, J. J.
Princeton-Nature Conference: 3rd Frontiers in Electron Microscopy for Physical and Life Sciences.

- October 16th–18th, 2024. Princeton, NJ. (Poster)
- [6] Molecular-Resolution Elucidation of Ice Defects Formed by Liquid Water Crystallization.
Du, J. S.; Banik, S.; Chan, H.; Fritsch, B.; Xia, Y.; Hutzler, A.; Sankaranarayanan, S. K. R. S.; De Yoreo, J. J.
American Chemical Society Fall 2024 National Meeting. August 18th–22nd, 2024. Denver, CO. (Oral talk)
- [7] Discovering Plasmonic Hetero-Nanoparticles Through Combinatorial Synthesis.
Du, J. S.; Cherqui, C.; Ueltschi, T. W.; Schatz, G. C.; Dravid, V. P.; Mirkin, C. A.
American Chemical Society Fall 2024 National Meeting. August 18th–22nd, 2024. Denver, CO. (Oral talk)
- [8] Watching Ice-Water Interfacial Dynamics at Molecular Resolution.
Du, J. S.; De Yoreo, J. J.
Gordon Research Conference: Water and Aqueous Solutions. July 21st–26th, 2024. Holderness, NH. (Poster)
Gordon Research Seminar: Water and Aqueous Solutions. July 20th–21st, 2024. Holderness, NH. (Poster)
- [9] Molecular-Resolution Elucidation of Ice Defects Formed by Liquid Water Crystallization.
Du, J. S.; Banik, S.; Chan, H.; Fritsch, B.; Xia, Y.; Hutzler, A.; Sankaranarayanan, S. K. R. S.; De Yoreo, J. J.
98th ACS Colloids and Surface Science Symposium. June 23rd–26th, 2024. Seattle, WA. (Oral talk)
- [10] Nanoscale Defects and Melting Behaviors of Ice Revealed at Atomic Resolution.
Du, J. S.; De Yoreo, J. J.
2023 Society of Engineering Science Annual Technical Meeting. October 8th–11th, 2023. Minneapolis, MN. (Poster)
- [11] Nanoscale Defects and Melting Behaviors of Ice Revealed at Atomic Resolution.
Du, J. S.; De Yoreo, J. J.
2023 Environmental Molecular Sciences Laboratory User Meeting. October 3rd–5th, 2023. Richland, WA. (Oral talk)
- [12] Nanoscale Defects and Melting Behaviors of Ice Revealed at Atomic Resolution.
Du, J. S.; De Yoreo, J. J.
Gordon Research Conference: Crystal Growth and Assembly. June 18th–23rd, 2023. Manchester, NH. (Poster)
- [13] Revealing the Flexibility of Hydrogen Bond Networks in Hexagonal Ice by Frozen Liquid-Cell Electron Microscopy.
Du, J. S.; De Yoreo, J. J.
American Physical Society March Meeting 2023. March 5th–10th, 2023. Las Vegas, NV. (Oral talk)
 ► APS Division of Chemical Physics New Investigator Travel Award.
- [14] Modulation of Atom Stacking Hierarchy Leads to New Intermetallic Nanocrystal Structures.
Du, J. S.; Dravid, V. P.; Mirkin, C. A.
American Physical Society March Meeting 2023. March 5th–10th, 2023. Las Vegas, NV. (Poster)
- [15] Revealing the Flexibility of Hydrogen Bond Networks in Hexagonal Ice by Frozen Liquid Cell.
Du, J. S.; De Yoreo, J. J.
Gordon Research Conference: Liquid Phase Electron Microscopy. October 9th–14th, 2022. Ventura, CA. (Poster)
Gordon Research Seminar: Liquid Phase Electron Microscopy. October 8th–9th, 2022. Ventura, CA. (Poster)
- [16] Elucidating the Plasmonic Modes in Metal Nanojunctions with Nanoparticle Libraries.
Du, J. S.; Cherqui, C.; Schatz, G. C.; Dravid, V. P.; Mirkin, C. A.
2021 Materials Research Society Spring Meeting. April 18th–23rd, 2021. Online. (Oral talk)
- [17] Multiplexed Nanocrystal Arrays of Halide Perovskites.
Du, J. S.; Shin, D.; Dravid, V. P.; Mirkin, C. A.
2021 Materials Research Society Spring Meeting. April 18th–23rd, 2021. Online. (Oral talk)
- [18] Microscopy-Based Approaches to Characterizing Analogs of Classical Electrons in Colloidal Crystals Engineered with DNA.
Du, J. S.; Wang, S.; Dravid, V. P.; Mirkin, C. A.

- Microscopy & Microanalysis 2020*. August 3rd–7th, 2020. Online. (Oral talk)
 Proceedings paper: *Microscopy and Microanalysis 2020*, 26 (S2), 2016–2019.
 DOI:10.1017/S1431927620020152
- [19] Hierarchically Structured Mixed Oxide Electrodes for Oxygen Evolution Reaction: A Multimodal Electron Microscopy Study.
Du, J. S.; Rong, Q.; Chen, X.; Liu, Q.; Dravid, V. P.
Microscopy & Microanalysis 2020. August 3rd–7th, 2020. Online. (Oral talk)
 Proceedings paper: *Microscopy and Microanalysis 2020*, 26 (S2), 618–620.
 DOI:10.1017/S1431927620015305
- [20] Polymer Nanoreactor Approach for Combinatorial Investigation of Complex Nanoparticles.
Du, J. S.; Dravid, V. P.; Mirkin, C. A.
Gordon Research Conference: Crystal Growth and Assembly, June 23rd–28th, 2019. Manchester, NH. (Poster)
Gordon Research Seminar: Crystal Growth and Assembly, June 22nd–23rd, 2019. Manchester, NH. (Poster)
- [21] Attoliter Polymer Reactors as Combinatorial Tools for Understanding Alloy Nanocrystal Structure–Function Relationship.
Du, J. S.; Dravid, V. P.; Mirkin, C. A.
American Chemical Society Spring 2019 National Meeting, March 31st–April 4th, 2019. Orlando, FL (Oral talk)
- [22] Site-Specific Polymer Nanoreactors for Studying Complex Nanoparticles Using Correlative Electron Microscopy.
Du, J. S.; Chen, P.-C.; Dravid, V. P.; Mirkin, C. A.
2018 Materials Research Society Spring Meeting, April 2nd–6th, 2018. Phoenix, AZ. (Oral talk)
- [23] Using STEM to Probe the in-situ Dynamics of Multimetallic Nanoparticles Grown in Polymer Nanoreactors.
Du, J. S.; Chen, P.-C.; Dravid, V. P.; Mirkin, C. A.
Microscopy & Microanalysis 2017, August 6th–10th, 2017. St. Louis, MO. (Oral talk)
 Proceedings paper: *Microscopy and Microanalysis 2017*, 23 (S1), 872–873.
 DOI:10.1017/S1431927617005025
- [24] Multi-Stage Transformation and Lattice Fluctuation at AgCl-Ag Nanoparticle Interface.
Du, J. S.; Park, J.; Kim, Q.; Dravid, V. P.; Yang, D.; Weitz, D. A.
253rd American Chemical Society National Meeting, April 2nd–6th, 2017. San Francisco, CA. (Oral talk)
- [25] Surface-Embedded Pt/CeO₂ Hybrid Nanostructure with High Catalytic Activity and Thermal Stability.
Du, J.; Yu, J.^S; Bian, T.; Jiang, Y.; Zhang, H.; Yang, D. (§stand-in speaker)
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](#).
- [26] Controlled Synthesis of Au and M@Au Nanostars and Their LSPR Properties.
Du, J.; Zhang, H.; Yang, D.
Graduate Joint Forum on Technologies & Sensors, Cyrus Tang Center for Sensor Materials and Applications, Zhejiang University, June 13th, 2014. Hangzhou, China. (Poster)