

# Prashant K. Jain

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## PERSONAL INFORMATION

Born: Bijowa, India; Naturalized US Citizen

## CURRENT POSITION

University of Illinois - Urbana Champaign, IL

G.L. Clark Professor of Physical Chemistry and Professor of Chemistry

University Scholar

Professor of the Materials Research Lab

Faculty Affiliate, Department of Physics

Faculty Affiliate, Illinois Quantum Information Science and Technology (IQUIST)

## EDUCATION

**2003-07**     **Georgia Institute of Technology** - Atlanta, GA  
Doctor of Philosophy in Physical Chemistry; Minor in Materials Science & Engineering  
GPA:4.0; Best Chemistry PhD Student Award

**1999-03**     **Institute of Chemical Technology (UIC T)** - Mumbai, India  
B. Tech with Honors in Polymer Engineering  
First Class with Distinction; Top-ranked of ~140 students over 4 years

## ACADEMIC POSITIONS HELD

**2020-2022**     **University of Illinois** - Urbana Champaign, IL  
Alumni Research Scholar, Department of Chemistry

**2020-2023**     **University of Illinois** - Urbana Champaign, IL  
Professor, Beckman Institute for Advanced Science and Technology

**2018-2021**     **University of Illinois** - Urbana Champaign, IL  
Richard and Margaret Romano Scholar, Department of Chemistry

**2017-2020**     **University of Illinois** - Urbana Champaign, IL  
Associate Professor (Tenured), Department of Chemistry

**2018-2020**     **University of Illinois** - Urbana Champaign, IL  
Associate Professor (Tenured), Materials Research Lab

**2019-2020**     **University of Illinois** - Urbana Champaign, IL  
Associate Professor (Tenured), Beckman Institute for Advanced Science and Technology

**2017-2018**     **University of Illinois** - Urbana Champaign, IL  
I. C. Gunsalus Scholar, College of Liberal Arts and Sciences

**2013-2017**     **University of Illinois** - Urbana Champaign, IL  
Assistant Professor, Materials Research Laboratory

**2011-2019**     **University of Illinois** - Urbana Champaign, IL  
Faculty Affiliate, Beckman Institute for Advanced Science and Technology

- 2011-2017**    **University of Illinois** - Urbana Champaign, IL  
Assistant Professor, Department of Chemistry
- 2009-2011**    **Miller Fellow, University of California** - Berkeley, CA  
Host: A. Paul Alivisatos, Dept. of Chemistry  
Research focus: Interfacing semiconductor quantum dots and plasmonics
- 2008-2008**    **Postdoctoral Fellow, Harvard University** - Cambridge, MA  
Adviser: Adam E. Cohen, Dept. of Chemistry & Chemical Biology and of Physics  
Research focus: Nanoscale magneto-optics & chiro-optics
- 2004-2007**    **Graduate Researcher, Georgia Institute of Technology** - Atlanta, GA  
Adviser: Mostafa A. El-Sayed, Director, Laser Dynamics Laboratory  
Doctoral dissertation: Plasmons in assembled metal nanostructures, Defended Jan 2008

#### SCIENTIFIC ADVISORY ROLES

- 2014-20**        **Sebacia Inc, Duluth, GA**  
Scientific advisor
- 2017-18**        **Clean Science and Technology Pvt. Ltd., Pune, India**  
Scientific consultant
- 2014-17**        **Fuel Technology Solutions Group, Ft. Lauderdale, FL**  
Scientific advisor for facilitation of technology transfer

#### EXPERT ROLES

- 2017**            Patent Expert Witness for US Patent on nanoparticles for photothermal therapy
- 2017**            Patent Expert for European Patent Application on nanoparticles for photothermal therapy

#### LEADERSHIP AND SERVICE ON BOARDS AND PANELS

- Editorial Advisory Board Member (2024-26) - The Journal of Chemical Physics, American Institute of Physics
- Editorial Advisory Board Member (2024-) - Journal of the American Chemistry Society, American Chemical Society
- Guest Editor (202224) - The Journal of Physical Chemistry, Virtual Special Issue (VSI) on Hot Electrons in Catalysis
- Editorial Advisory Board Member (2019-2021) - The Journal of Physical Chemistry, American Chemical Society
- Guest Editor (2021-2023) - The Journal of Chemical Physics, Special Issue on Plasmonically Powered Energy Conversion
- Guest Editor (2020) - Proceedings of the National Academy of Sciences
- Editorial Advisory Board (2013-19) - Nanospectroscopy, De Gruyter publishing
- United States Funding Agencies and Institutes: AFOSR, ACS-PRF, NSF MSN, NSF DMR MMN, NSF SSMC, NSF CMI, NSF Surface Chemical Catalysis, W. M. Keck Foundation, DOE BES, DOE BES CEM, DOE CPIMS, DOE Catalysis Science, Davidson Institute, Lawrence Berkeley National Lab Molecular Foundry Review Panel, UIUC OVCR, UIUC Campus Special Programs, Research Corporation for Science Advancement Cottrell Scholars program

- International Funding Agencies: ETH Zurich Research Commission, DFG Germany, Poland National Science Center, New Zealand Ministry of Science and Innovation, Austrian Science Fund, Heinz Foundation, Portuguese Foundation for Science and Technology, Research Grants Council (RGC) of Hong Kong, Govt. of Hong Kong Special Administrative Unit, Excellence Initiative for the site Bourgogne Franche-Comt of France, Aix-Marseille University Excellence Initiative, Domain Science of the Netherlands Organization for Scientific Research (NWO), Science Foundation Ireland, Instituto Serrapilheira Brazil, Japan Society for the Promotion of Science, Czech Science Foundation, King Abdullah University of Science and Technology, University of Sharjah

## LEADERSHIP ROLES AT UNIVERSITY

- 2021-23**      **University of Illinois** - Urbana Champaign, IL  
Advisory Committee, Department of Chemistry
- 2021-**         **University of Illinois** - Urbana Champaign, IL  
Diversity Advocate for Faculty Hiring and Promotions, Department of Chemistry
- 2020-**         **University of Illinois** - Urbana Champaign, IL  
Member of the Staff Committee for Faculty Hiring and Promotion, Department of Chemistry
- 2018-20**      **University of Illinois** - Urbana Champaign, IL  
Associate Head of Major Projects, Department of Chemistry
- 2013-19**      **University of Illinois** - Urbana Champaign, IL  
Chemical Physics PhD Program Chair
- 2017-18**      **University of Illinois** - Urbana Champaign, IL  
Physical Chemistry Area Head
- Fall 2017**     **University of Illinois** - Urbana Champaign, IL  
Chair of Search Committee, School of Chemical Sciences Financial Analyst
- 2013-14**      **University of Illinois** - Urbana Champaign, IL  
Vice-Chair of Graduate Admissions

## HONORS AND AWARDS

- 2024**         LAS Deans Award for Excellence in Undergraduate Teaching
- 2023**         Akron American Chemical Society (ACS) award
- 2023**         Endowed G. L. Clark Professor
- 2020, 21,&23** Blavatnik National Award for Young Scientists Finalist Medal
- 2023**         World Laureates Association (WLA) Forum
- 2022**         Elected Fellow of the American Physical Society
- 2022**         Guggenheim Fellowship, John Simon Guggenheim Memorial Foundation
- 2022**         Chemist Featured by NSF for Asian American and Pacific Islander Heritage Month
- 2022**         University Scholar
- 2022-23**      UIUC Center for Advanced Study Associate
- 2022**         Kavli Fellow, National Academy of Sciences
- 2021**         Leo Hendrik Baekeland Award, American Chemical Society, North Jersey Section

- 2020&21** Blavatnik National Award for Young Scientists Finalist and Medal
- 2020** Elected Fellow of the American Association for the Advancement of Science (AAAS)
- 2019-23** Top 2% in World Ranking of Scientists in Stanford study of citation indicators
- 2020** Science News Magazine Ten Scientists to Watch (SN10)
- 2020** Alumni Research Scholar
- 2020** Campus Distinguished Promotion Award, UIUC
- 2019** Presidential Early Career Award in Science and Engineering (PECASE)
- 2019** Beilby Medal and Prize, Royal Society of Chemistry, IOM3, and SCI
- 2021-24** Defense Science Study Group
- 2018** Highly Cited Researchers, Clarivate Analytics Web of Science
- 2018** Fellow of the Royal Society of Chemistry
- 2018** Chemistry Discovery Fund Award
- 2018** Richard and Margaret Romano Professorial Scholar
- 2017** Kavli Emerging Leader in Chemistry and Lectureship, ACS
- 2017** Campus Distinguished Promotion Award, UIUC
- 2017** American Vacuum Society Prairie Chapter Early Career Award
- 2017-18** I. C. Gunsalus Scholar
- 2017** UIUC Center for Advanced Study Beckman Fellow
- 2017** Selected as one of 2017 Emerging Investigators by Journal of Materials Chemistry
- 2016** Most Cited Researchers in ChemE as per Elsevier Scopus 2016
- 2016-17** Institute of Chemical Technology Alumni Association Young Achiever Award (declined)
- 2015** National Science Foundation CAREER Award
- 2015** Journal of Physical Chemistry C Lectureship Award
- 2015, 16, 17** 3M Nontenured Faculty Award
- 2014** American Chemical Society Petroleum Research Fund Doctoral New Investigator Award
- 2014** Arnold and Mabel O. Beckman Foundation Young Investigator Award
- 2014** Alfred P. Sloan Research Fellowship
- 2013** Golden Jubilee Visiting Fellowship, Institute of Chemical Technology
- 2013** IChemE Energy Award, Highly Commended Technology
- 2013** DuPont Young Professor Award
- 2013** National Academy of Engineering, US Frontiers Engineer
- 2013** Unilever Award for Outstanding Young Investigator - ACS Colloid & Surface Chemistry Division
- 2013** National Academy of Engineering Educate-to-Innovate Program Innovator

2013	Google Solve for [X] Moonshot Thinkers/Speakers
2012	MIT Technology Review TR35: Top 35 innovators under 35
2012-13	IACAT Faculty Fellowship, National Center for Supercomputing Applications
2012	Cottrell Scholars Collaborative New Faculty Workshop
2008-11	Miller Fellowship of the University of California at Berkeley
2008	Atlanta Area Chemical Physics (AACP) Prize and Lecture
2007	Gold Award for Graduate Students, Materials Research Society
2007	Georgia Tech CoS Recognition for Outstanding Chemistry Graduate Student
2006	Best Chemistry PhD Student Award, Georgia Tech
2006	ACS Physical Chemistry Outstanding Poster Award
2006	ACS Graduate Student Symposium Planning Committee Scholarship
2005	Elected to Full Membership, Sigma Xi
2003-06	University of Mumbai Sir Mangaldas Nathubai Doctoral Research Abroad Fellowship
2003	Lotus Trust Doctoral Scholarship, Mumbai
2003	American Alumni Association Study-Abroad Grant Award, Mumbai
2001&02	UICT B. Tech Merit Prize
2002	Sohrab and Coomi Mistry Foundation Prize, UICT
2001	L.V. Pitre Prize, UICT
2000&01	Polymer Technology Departmental Scholarship, UICT
1996	Homi Bhabha Young Scientist Title and Gold Medal, Mumbai

#### TEACHING AWARDS AND RECOGNITION

2011-22	UIUC List of Teachers Ranked as Excellent by Their Students (Fall 12, 15, 16, 19, 21, 22; Spring 14, 15, 18, 20, 21; for 12 of 17 eligible course assignments)
2019-20	UIUC Outstanding Teachers (Fall 19, Spring 20, & Fall 22)
2015	School of Chemical Sciences Faculty Teaching Award

#### RESEARCH PROGRAM

- **Photosynthesis and Energy Conversion:** Using photons and plasmons for multielectron chemistry, synthesis of fuels and energetic chemicals, and accessing new catalytic pathways.
- **Catalysis:** Discovering active sites and reaction pathways of catalysts by super-resolution imaging.
- **Nanoscience:** Unconventional excitations, phases, and transport in nanostructures.

**REPRESENTATIVE RECENT PUBLICATIONS**

(out of 116, ~32,100 citations, h = 55, \* = corresponding author)

1. Y. Kim, J. G. Smith, and **P. K. Jain\***, Harvesting multiple electron-hole pairs generated via plasmonic excitation of Au nanoparticles, *Nature Chemistry*, **2018**, 10 (7), 763-769.
2. S. Yu and **P. K. Jain\***, Plasmonic photosynthesis of C<sub>1</sub>-C<sub>3</sub> hydrocarbons from carbon dioxide assisted by an ionic liquid, *Nature Communications*, **2019**, 10, 2022.
3. E. Contreras (co-first), R. Nixon (co-first), C. Litts, W. Zhang, F. M. Alcorn, and **P. K. Jain\***, Plasmon-assisted ammonia electrosynthesis, *Journal of the American Chemical Society*, **2022**, 144 (24), 10743-10751.
4. D. Devasia, A. J. Wilson, J. Heo, V. Mohan, and **P. K. Jain\***, A rich catalog of C-C bonded species formed in CO<sub>2</sub> reduction on a plasmonic photocatalyst, *Nature Communications*, **2021**, 12, 2612.
5. S. L. White (co-first), P. Banerjee (co-first), and **P. K. Jain\***, Liquid-like cationic sub-lattice in copper selenide clusters, *Nature Communications*, **2017**, 8, 14514.
6. S. Yu, A. J. Wilson, J. Heo, and **P. K. Jain\***, Plasmonic control of multi-electron transfer and C-C coupling in visible-light-driven CO<sub>2</sub> reduction on Au nanoparticles, *Nano Letters*, **2018**, 18 (4), 2189-2194.
7. X. Zhang, G. Kumari, J. Heo, and **P. K. Jain\***, In-situ formation of catalytically active graphene in ethylene photo-epoxidation, *Nature Communications*, **2018**, 9, 3056.
8. J. Heo, D. Dumett Torres, P. Banerjee, and **P. K. Jain\***, In-situ electron microscopy mapping of an order-disorder transition in a superionic conductor, *Nature Communications*, **2019**, 10, 1505.
9. G. Kumari, X. Zhang, D. Devasia, J. Heo, and **P. K. Jain\***, Watching visible light-driven CO<sub>2</sub> reduction on a plasmonic nanoparticle catalyst, *ACS Nano*, **2018**, 12 (8), 8330-8340.
10. S. White, J. G. Smith, M. Behl, and **P. K. Jain\***, Co-operativity in a nanocrystalline solid-state transformation, *Nature Communications*, **2013**, 4, 2933.
11. M. Behl, J. Yeom, Q. Lineberry, **P. K. Jain\***, and M. Shannon, A regenerable oxide-based hydrogen sulfide adsorbent with nanofibrous morphology, *Nature Nanotechnology*, **2012**, 7 (12), 810-815.

**PAPERS IN REVIEW/PREPRINTS**

1. J. Wan, J. Yang\*, H. Zhang\*, J. Zheng, Z. Han, W. Yuan, B. Lan, **P. K. Jain**, and X. Li\*, A tandem strategy for electrochemical nitrate reduction to ammonia over Fe-Mo dual single-atom catalyst, **2023**, submitted.

**FULL LIST OF PUBLICATIONS IN PEER-REVIEWED JOURNALS**

(~32,100 citations, h = 55, \* = corresponding author, # = UG author)

1. R. J. Maurer and **P.K.Jain\***, Hot electrons in catalysis, *Journal of Physical Chemistry C*, 2024, in press  
EDITORIAL FOR VIRTUAL SPECIAL ISSUE ON HOT ELECTRONS IN CATALYSIS
2. **P.K.Jain\***, Solving the LK-99 puzzle, *Matter*, 2023, 6 (12), P41184120.  
INVITED 'MATTER OF OPINION' ARTICLE  
FEATURED IN EDITORIAL (MATTER, 2023, 6 (12), P41074110, [HTTPS://DOI.ORG/10.1016/J.MATT.2023.11.011](https://doi.org/10.1016/j.matt.2023.11.011))
3. **P. K. Jain\***, Superionic phase transition of copperI sulfide and its implication for purported superconductivity of LK-99, *Journal of Physical Chemistry C*, **2023**, 127 (37), 1825318255.  
INVITED VIEWPOINT ARTICLE  
TOPMOST READ ARTICLE OF THE JOURNAL IN SEP AND OCT 2023 AND AMONG TOP 20 OF THE YEAR  
PREPRINT ON ARXIV: ARXIV:2308.05222v3

FEATURED IN NATURE NEWS ARTICLE: LK-99 ISNT A SUPERCONDUCTOR HOW SCIENCE SLEUTHS SOLVED THE MYSTERY

-FEATURED IN ARS TECHNICA MAGAZINE: THE ROOM-TEMPERATURE SUPERCONDUCTOR THAT WASNT FEATURED IN SCINEXX DAS WISSENSMAGAZIN: RAUMTEMPERATUR-SUPRALEITER IST KEINER LINK

FEATURED ON TECHSPOT: WORLDWIDE SCIENTIFIC COLLABORATION FINDS LK-99 IS NOT A ROOM-TEMPERATURE SUPERCONDUCTOR

FEATURED IN PORTUGUESE NATIONAL NEWSPAPER PUBLICO: COMO A INTERNET AJUDOU A RESOLVER O MISTRIO DO LK-99, O FALSO SUPERCONDUTOR

FEATURED IN THE ISTANBUL CHRONICLE: UNDERSTANDING SUPERCONDUCTIVITY: BETWEEN REVOLUTION AND SCAM LK-99

FEATURED BY CHEMISTRY AT UIUC: PRASHANT JAIN HELPS UNRAVEL LK-99 SUPERCONDUCTOR MYSTERY

FEATURED ON TECH BLOGS, MAGAZINES, AND NEWS SITES IN US, KOREA, CHINA, GERMANY, FRANCE, SLOVAKIA, BRAZIL, TURKEY, PORTUGAL, & OTHERS

4. **P. K. Jain\***, Z. H. Kim, D. D. Wei, The physics of plasmon-driven energy conversion, *The Journal of Chemical Physics*, **2023**, in press.  
GUEST EDITORIAL FOR SPECIAL ISSUE ON PLASMON-DRIVEN ENERGY CONVERSION
5. G. P. Wiederrecht\*, R. Bachelot\*, H. Xiong, K. Termentzidis, A. Nomin, J. Huang, P. V. Kamat, E. A. Rozhkova, A. Sumant, M. Ostraat, **P. K. Jain**, C. Heckle, J. Li, and K. Z. Pupek, Nanomaterials and sustainability, *ACS Energy Letters*, **2023**, 8 (8), 34433449.  
INVITED ENERGY FOCUS ARTICLE
6. F. M. Alcorn, M. Chattoraj#, R. M. van der Veen, and **P. K. Jain\***, Watching plasmon-induced nanoparticle Ostwald ripening, *Journal of Physical Chemistry C*, **2023**, 127 (33), 1653816544.  
INVITED ARTICLE FOR VIRTUAL SPECIAL ISSUE ON HOT ELECTRONS IN CATALYSIS
7. F. M. Alcorn, R. M. van der Veen\*, and **P. K. Jain\***, In situ electron microscopy of transformations of Cu nanoparticles under plasmonic excitation, *Nano Letters*, **2023**, 23 (14), 65206527.  
AMONG MOST ACCESSED ARTICLES OF THE JOURNAL IN THE MONTH OF AUG 2023.
8. R. Nixon (co-first), E. Contreras (co-first), and **P. K. Jain\*** Electrochemistry with plasmons, *Trends in Chemistry*, **2023**, 5 (8), 605-619.  
INVITED REVIEW FOR SPECIAL 4TH ANNIVERSARY ISSUE
9. F. M. Alcorn, **P. K. Jain\***, and R. M. van der Veen\*, Time-resolved transmission electron microscopy for nanoscale chemical dynamics, *Nature Reviews Chemistry*, **2023**, 2023, 7, 256272.
10. **P. K. Jain\***, Primary role of photothermal heating in light-driven reduction of nitroarenes, *Nature Nanotechnology*, **2023**, 18 (6), 326-327.
11. R. Wan, S. Liu, Y. Wang, Y. Yang, Y. Tian, **P. K. Jain\***, and X. Kang\*, Hot carrier lifetimes and electrochemical water dissociation enhanced by nickel doping of a plasmonic electrocatalyst, *Nano Letters*, **2022**, 22 (19), 7819-7825.
12. K.-H. Cho and **P. K. Jain\***, Superionic conduction in one-dimensional nanostructures, *ACS Nano*, **2022**, 16 (8), 12445-12451.
13. E. Contreras (co-first), R. Nixon (co-first), C. Litts, W. Zhang, F. M. Alcorn, and **P. K. Jain\***, Plasmon-assisted ammonia electrosynthesis, *Journal of the American Chemical Society*, **2022**, 144 (24), 10743-10751.  
FEATURED IN NATURE ENERGY ARTICLE: ILLUMINATING ELECTROCATALYSIS, NATURE ENERGY, 2022, 7, 568.
14. K.-H. Cho, F. M. Alcorn, J. Heo, and **P. K. Jain\***, Plasmon resonances and structures of chalcogenide alloy nanocrystals, *Chemistry of Materials*, **2022**, 34, 11, 4992-4999.

15. S. B. Ramakrishnan, F. Mohammadparast, A. P. Dadgar, T. Mou, T. Le, B. Wang, **P. K. Jain**, and M. Andiappan\*, Photoinduced electron and energy transfer pathways and photocatalytic mechanisms in hybrid plasmonic photocatalysis, *Advanced Optical Materials*, **2021**, 9 (21), 2101128.  
FEATURED IN HOT TOPICS: SURFACES AND INTERFACES
16. D. Devasia and **P. K. Jain\***, Stochastic noise in single-nanoparticle catalysis, *Journal of Physical Chemistry C*, **2021**, 125 (32), 17734-17741.
17. V. Mohan, B. Dutta R. Ripani#, and **P. K. Jain\***, Room-temperature catalyst-free methane chlorination, *Cell Reports Physical Science*, **2021**, 2 (9), 100545.  
US PATENT AWARDED
18. D. Devasia, A. J. Wilson, J. Heo, V. Mohan, and **P. K. Jain\***, A rich catalog of C-C bonded species formed in CO<sub>2</sub> reduction on a plasmonic photocatalyst, *Nature Communications*, **2021**, 12, 2612.  
UIUC NEWS BUREAU PRESS RELEASE: LIGHT-HARVESTING NANOPARTICLE CATALYSTS SHOW PROMISE IN QUEST FOR RENEWABLE CARBON-BASED FUELS  
EDITORS' HIGHLIGHT ON CATALYSIS  
FEATURED ON EUREKA ALERT AND OTHER SCIENCE MEDIA
19. V. Mohan, E. Wu#, J. Heo, A. Das, and **P. K. Jain\***, Synergistic photochemistry of alcohols catalyzed by plasmonic nanoparticles and a metal complex, *ACS Energy Letters*, **2021**, 6 (5), 1980-1989.
20. J. Heo, K.-H. Cho, and **P. K. Jain\***, Motion of defects in ion-conducting nanowires, *Nano Letters*, **2021**, 21 (1), 556-561.
21. A. Laucht\*, F. Hohls, N. Ubbelohde, M. F. Gonzalez-Zalba, D. J. Reilly, S. Stobbe, T. Schrder, P. Scarlino, J. V. Koski, A. Dzurak, H. Yang, J. Yoneda, F. Kuemmeth, H. Bluhm, J. Pla, C. Hill, J. Salfi, A. Oiwa, J. Muhonen, E. Verhagen, M. LaHaye, H. H. Kim, A. W. Tsen, D. Culcer, A. Geresdi, J. A. Mol, V. Mohan, **P. K. Jain** and J. Baugh, Roadmap on quantum nanotechnologies, *Nanotechnology*, **2021**, 32 (16), 162003.  
INVITED CONTRIBUTION  
POSTED ON ARXIV AS ARXIV:2101.07882V1 [COND-MAT.MES-HALL].  
TOP TEN MOST READ ARTICLES OF THE JOURNAL AS PER MAR 2021 LIST  
MOST READ ARTICLE OF THE JOURNAL AS PER APR 2021 LIST
22. D. Devasia, A. Das, V. Mohan, and **P. K. Jain\***, Control of chemical reaction pathways by light-matter coupling, *Annual Review of Physical Chemistry*, **2021**, 72, 423-443.  
INVITED REVIEW ARTICLE
23. D. Dumett Torres and **P. K. Jain\***, Ab initio investigation of cooperativity in ion exchange, *Journal of Physical Chemistry C*, **2020**, 124 (46), 25615-25620.
24. S. Yu and **P. K. Jain\***, Isotope effects in plasmonic photosynthesis, *Angewandte Chemie International Edition*, **2020**, 59 (50), 22480-22483.  
FEATURED UNDER HOT TOPIC: CARBON DIOXIDE
25. A. J. Wilson and **P. K. Jain\***, Light-induced voltages in catalysis by plasmonic nanostructures, *Accounts of Chemical Research*, **2020**, 53 (9), 1773-1781.  
INVITED ACCOUNT FOR SPECIAL ISSUE ON TRANSFORMATIVE INORGANIC NANOCRYSTALS MOST READ ACCOUNT OF JOURNAL AS PER SEP 2020 LIST
26. J. Wang, J. Heo, C. Chen, A. J. Wilson, and **P. K. Jain\***, Ammonia oxidation enhanced by photopotential generated by plasmonic excitation of a bimetallic electrocatalyst, *Angewandte Chemie International Edition*, **2020**, 59 (42), 18430-18434.  
HOT PAPER
27. A. J. Wilson, D. Devasia, and **P. K. Jain\***, Nanoscale optical imaging in chemistry, *Chemical Society Reviews*, **2020**, 49 (16), 6087-6112.



28. **P. K. Jain\***, Phenomenological Arrhenius analyses in plasmon-enhanced catalysis: Comment on “Thermal effects – an alternative mechanism for plasmon-assisted photocatalysis by Y. Dubi, I. W. Un and Y. Sivan, *Chem. Sci.*, 2020, 11 (33), 5017”, *Chemical Science*, **2020**, 11, 9022-9023.  
POSTED ON ARXIV AS ARXIV:1908.05373 [PHYSICS.CHEM-PH].
29. D. Dumett Torres, S. Pamidighantam, and **P. K. Jain\***, Crystal symmetry, strain, and facet-dependent nature of topological surface states in mercury selenide, *Journal of Physical Chemistry C*, **2020**, 124 (19), 10344-10352
30. S. Yu and **P. K. Jain\***, The chemical potential of plasmonic excitations, *Angewandte Chemie International Edition*, **2020**, 59 (5), 2085-2088.
31. S. Yu, V. Mohan, and **P. K. Jain\***, Using plasmonically generated carriers as redox equivalents, *MRS Bulletin*, **2020**, 45 (1), 43-48.  
INVITED REVIEW FOR THEMED ISSUE ON MATERIALS FOR HOT-CARRIER CHEMISTRY
32. A. J. Wilson, V. Mohan, and **P. K. Jain\***, Mechanistic understanding of plasmon-enhanced electrochemistry, *Journal of Physical Chemistry C*, **2019**, 123 (48), 29360-29369.
33. **P. K. Jain\***, Taking the heat off of plasmonic chemistry, *Journal of Physical Chemistry C*, **2019**, 123 (40), 24347-24351.  
INVITED VIEWPOINT  
MOST READ ARTICLE OF JOURNAL AS PER OCT 2019 AND NOV 2019 LISTS  
POSTED ON ARXIV AS ARXIV: 1908.09415 [PHYSICS.CHEM-PH]
34. S. Yu and **P. K. Jain\***, Selective branching of plasmonic photosynthesis into hydrocarbon production and hydrogen generation, *ACS Energy Letters*, **2019**, 4 (9), 2295-2300.
35. J. Gong and **P. K. Jain\***, Room-temperature superionic-phase nanocrystals synthesized with a twinned lattice, *Nature Communications*, **2019**, 10, 3285.  
EDITORS’ HIGHLIGHT ON RECENT RESEARCH ON INORGANIC AND PHYSICAL CHEMISTRY
36. X. Liu, Y. Zhang, T. Chen, **P. K. Jain**, and W. Xu\*, Revealing the thermodynamic properties of elementary chemical reactions at the single-molecule level, *Journal of Physical Chemistry B*, **2019**, 123 (29), 6253-6259.
37. L. Huang, J. Zou, J.-Y. Ye, Z.-Y. Zhou, Z. Lin, X. Kang\*, **P. K. Jain\***, and S. Chen, Synergy between plasmonic and electrocatalytic activation of methanol oxidation on palladium-silver alloy nanotubes, *Angewandte Chemie International Edition*, **2019**, 58 (26), 8794-8798.
38. K. Cho, J. Heo, Y.-M. Sung, and **P. K. Jain\***, One-dimensional cuprous selenide nanostructures with switchable plasmonic and super-ionic attributes, *Angewandte Chemie International Edition*, **2019**, 58 (25), 8410-8415.
39. S. Yu and **P. K. Jain\***, Plasmonic photosynthesis of C<sub>1</sub>-C<sub>3</sub> hydrocarbons from carbon dioxide assisted by an ionic liquid, *Nature Communications*, **2019**, 10, 2022.  
TOP 50 NATURE COMMUNICATIONS CHEMISTRY AND MATERIALS SCIENCE ARTICLES PUBLISHED IN 2019  
UIUC NEWS BUREAU PRESS RELEASE: ARTIFICIAL PHOTOSYNTHESIS TRANSFORMS CARBON DIOXIDE INTO LIQUEFIABLE FUELS  
EDITORS’ HIGHLIGHT ON RECENT RESEARCH ON ENERGY MATERIALS  
FEATURED ON EUREKAALERT, NANOTECHNOLOGY NOW, TIMES OF INDIA, EXPRESS UK, PHYS.ORG, SCIENCE DAILY, AND OTHER SCIENCE NEWS MEDIA
40. J. Heo, D. Dumett Torres, P. Banerjee, and **P. K. Jain\***, In-situ electron microscopy mapping of an order-disorder transition in a superionic conductor, *Nature Communications*, **2019**, 10, 1505.
41. J. Heo, D. Dumett Torres and **P. K. Jain\***, Unconventional long-range cation ordering in copper selenide nanocrystals, *Chemistry of Materials*, **2019**, 31 (1), 68-72.  
STRUCTURE DEPOSITED IN CAMBRIDGE CRYSTALLOGRAPHIC DATA CENTER

42. G. Kumari, X. Zhang, D. Devasia, J. Heo, and **P. K. Jain\***, Watching visible light-driven CO<sub>2</sub> reduction on a plasmonic nanoparticle catalyst, *ACS Nano*, **2018**, 12 (8), 8330-8340.  
MOST READ ARTICLE OF THE JOURNAL AS PER SEP 2018 LIST
43. P. Banerjee and **P. K. Jain\***, Mechanism of sulfidation of small ZnO nanoparticles, *RSC Advances*, **2018**, 8 (60), 34476-34482.
44. X. Zhang, G. Kumari, J. Heo, and **P. K. Jain\***, In-situ formation of catalytically active graphene in ethylene photo-epoxidation, *Nature Communications*, **2018**, 9, 3056.  
EDITORS' HIGHLIGHT ON RECENT RESEARCH ON INORGANIC AND PHYSICAL CHEMISTRY  
FEATURED IN RESEARCH STORIES BY TELEDYNE PRINCETON INSTRUMENTS
45. F. Shaik, I. Peer, **P. K. Jain**, and L. Amirav, Plasmon-enhanced multi-carrier photocatalysis, *Nano Letters*, **2018**, 18 (7), 4370-4376.  
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## PATENTS

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Process for making a regenerable oxide-based adsorbent, US Patent No. 9,561,488, Issued Feb 7, 2017, **P. K. Jain**, M. Behl, M. A. Shannon, J. Yeom.

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## BOOK CHAPTERS

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**P. K. Jain\***, Shape-induced optical activity of chiral nanocrystals: Spotlight Summary, *Optical Society of America*, May **2016**.

## DOCTORAL DISSERTATIONS SUPERVISED

**Francis Alcorn**, PhD in Chemistry, Defended May 2023

Title: Investigating nanoscale dynamics in light absorbing nanostructures using transmission electron microscopy

**Dinumol Devasia**, PhD in Chemistry, Defended Jun 2021

Title: Label-free tracking of photocatalysis on a single nanoparticle

**Jaeyoung Heo**, PhD in Materials Science and Engineering, Defended Oct 2020



Novel phase and phase transition behavior of a superionic conductor observed on the nanoscale

**Varun Mohan**, PhD in Materials Science and Engineering, Defended Nov 2020

Title: Tracking the evolution of photoexcitations in strongly light-absorbing systems

**Daniel Dumett Torres**, PhD in Chemistry, University of Illinois - Urbana Champaign, Defended Sep 2019

Title: Computational electronic structure studies of novel condensed matter phases

**Progna Banerjee**, PhD in Physics, University of Illinois - Urbana Champaign, Defended Apr 2018

Title: An exploration of the emergent properties and phase transition behavior in engineered semiconducting nanocrystals prepared by cation exchange transformations

**Jeremy Smith**, PhD in Chemistry, University of Illinois - Urbana Champaign, Defended Jun 2016

Title: Revealing hidden dynamics via single-nanoparticle studies

**Aaron Routzahn**, PhD in Chemistry, University of Illinois - Urbana Champaign, Defended May 2016

Title: Single nanocrystal microscopy and spectroscopy unveils hidden mechanistic information in cation exchange

**Sarah White**, PhD in Chemistry, University of Illinois - Urbana Champaign, Defended Mar 2016

Title: Transformations in inorganic nanomaterials: Role of defects, surfaces, and size

**Mayank Behl**, PhD in ChBE, University of Illinois - Urbana Champaign, Defended Feb 2014

Title: Reactive chemistry and catalysis by doped metal-oxide nanostructures in environment-related applications

## SENIOR THESES SUPERVISED

**Maya Chatteraj**, B.S. in Specialized Chemistry, May 2022

Title: Electrocatalytic CO<sub>2</sub> reduction by intermetallic gold-copper nanoparticles

## SYMPOSIA ORGANIZED

Plasmonic Nanomaterials: From Physical Chemistry Fundamentals to Societal Impact, Apr 5-6 2017, Spring 2017 ACS National Meeting, San Francisco, CA, Co-Organizer with Catherine Murphy

nanoBIO node Workshop on Light/Matter Interactions at the nanoBIO interface, Nov 28-29, 2016, UIUC, Urbana-Champaign, IL Lead Organizer with Nahil Sobh, Alexsei Aksimentiev, Progna Banerjee, Chen-Yu Li, Abby Sobh, and Bara Saadah.

Physical Principles in Functional Nanoscience: Symposium in Honor of Mostafa A. El-Sayed, Mar 13-17, 2016, Spring 2016 ACS National Meeting, San Diego, CA, Lead Organizer with Stephan Link and Christy Landes

nanoBIO node Workshop on Plasmonics and Its Applications, Mar 21-22, 2016, University of Colorado at Boulder, Boulder, CO Co-Organizer with Sayantani Ghosh, Nahil Sobh, and Ivan Smalyukh

Functional Plasmonics, Nov 27 - Dec 2, 2016, Fall 2016 MRS National Meeting, Boston MA, Co-organizer with Laura Na Liu (lead), Yuebing Zheng, and Yongmin Liu

## MEDIA COVERAGE AND HIGHLIGHTS

- The room-temperature superconductor that wasn't: Ars Technica article
- Understanding superconductivity: Feature in the Istanbul Chronicle

- Como a Internet ajudou a resolver o mistério do LK-99, o falso supercondutor: Portuguese national newspaper feature on our contribution to the puzzle of purported room-temperature superconductor LK-99
- LK-99 isn't a superconductor - how science sleuths solved the mystery (Nature news article on our contribution to the puzzle of purported room-temperature superconductor LK-99)
- Illuminating electrocatalysis (Nature Energy article on our light- and electricity-powered ammonia synthesis process)
- Plasmonic catalyst smashes record for reducing vital chemical feedstock (Features opinion from interview for Chemistry World article)
- Light-harvesting nanoparticle catalysts show promise in quest for renewable carbon-based fuels (UIUC News Bureau press release)
- Breakthrough in creating fuel from sunlight puts Us closer to carbon-neutral energy: Feature article in Leaps magazine article
- Taking lessons from nature: Science News feature on top 10 scientists of 2020 to watch
- Forschende zeigen uns wie es richtig geht: Künstliche Photosynthese an der University of Illinois: Feature on our artificial photosynthesis efforts in PhoSy magazine of Freie Universität, Berlin
- Professor Prashant Jain's path to Chemistry at Illinois: feature by Department of Chemistry
- Cheap nanoparticles pave the way for carbon-neutral fuel: Wired magazine article
- Scientists create photosynthesis-inspired fuel from CO<sub>2</sub> and water: Express UK article
- Scientists have copied plants and turned CO<sub>2</sub> into fuel: Sustainability Times article
- Artificial photosynthesis could clean up polluted air and produce fuel (The Week Magazine article)
- New artificial photosynthesis breakthrough uses gold to turn CO<sub>2</sub> into liquid fuel (Science Alert article)
- Artificial photosynthesis may alleviate climate change by transforming greenhouse gas carbon dioxide into liquid fuel (TechTimes article)
- Artificial photosynthesis transforms carbon dioxide into liquefiable fuels (UIUC News Bureau press release)
- Forcing reactions with plasmons (RSC Chemistry World Feature Article)
- Nine Illinois researchers rank among world's most influential (UIUC News Bureau press release)
- Prashant K. Jain selected as a member of the 2020-2021 Defense Science Study Group (UIUC Department of Chemistry News article)
- First round of Chemistry Discovery Fund launches innovative projects by Burke, Jain, and Mitchell (UIUC Department of Chemistry news article)
- Carbon-recycling system (Science Daily article on our plasmonic photocatalysis work)
- 2 electrons are better than 1 (Highlight of our multi-electron photocatalysis on NSF Science360 Now)
- Team achieves two-electron chemical reactions using light energy, gold (Illinois News Bureau highlights our work multi-electron photocatalysis)
- Prashant interviewed about lithium ion batteries and solid electrolytes by *Brains On* American Public Radio podcast.
- Superionic nanoclusters highlighted in cover story in India's Outlook Magazine (Storing the Change)
- Prashant Jain shines a light on achieving goals (Article on ACS Show Daily)

- Artificial photosynthesis, materials with unprecedented properties (Highlight on Kavli lectures at Fall 2017 ACS National Meeting)
- Chemistry World article quotes Prashant on recent plasmonic catalysis advance (Article: Plasmonic catalyst makes light work of carbon monoxide)
- Prashant interviewed about nanocrystals in future optical computing (Featured in La Recherche, France's monthly science magazine)
- Charging ahead: the future of batteries (Smithsonian Magazine)
- Layered graphene, imaging nematodes, preventing battery explosions (CEMag)
- Nanoclusters and the future of lithium batteries (AzoNano)
- Nanoclusters help improve lithium-ion batteries (R&D Magazine)
- Tiny nanoclusters could solve big problems for lithium-ion batteries (UIUC News Bureau)
- Illinois faculty among most highly cited worldwide (Engineering at Illinois News)
- Nanocrystal atoms cooperate like biomolecules, making better photonic devices possible (Laser Focus World article)
- Three faculty members awarded 2014 Sloan Fellowships (UIUC News Bureau)
- Perspective on quantum dot plasmons featured on cover of JPC Letters, featured in editorial and selected as ACS Editor's Choice Article
- Top Cited Paper Award from Elsevier: top 5 most-cited paper from 2009-2013 in Chemical Physics Letters
- Atoms in a nanocrystal cooperate, much like in biomolecules (UIUC News Bureau)
- Gas clean-up technology triumphs at global IChemE Awards (Sulfur cleanup chemistry highly commended as Energy award runner up)
- The Energy Award: Nanosponge soaks up sulphur (tce magazine summary of finalists)
- DuPont Celebrates Scientific Innovation by Recognizing Young Professors (Reuters article)
- Among select American innovators interviewed for National Academy of Engineering's "Educate to innovate program": contribution to become part of NAE workshop in Oct 2013
- Interviewed about quantum dots and nanoscience by Discovery Channel's Brave New World series
- Improved sulfur removal from petroleum-based fuels, Tech Beat article in Tribology and Lubrication Technology Magazine
- Nanofibers work featured by NSF and nano.gov
- Nanofibers clean sulfur from fuel, UIUC News Bureau + Science Daily, PhysOrg, The Engineer, R&D Magazine, New Energy and Fuel, and others
- Metal oxide fibers scrub sulphur from petrol fuels, theengineer.co.uk science news
- Big Little Matter: Two Indian scientists on controlling particles and creating possibilities
- Two Illinois chemists named top young innovators, UIUC News Bureau
- Five of South Asian origin amongst top 35 innovators under 35
- IACAT Fellowships support diverse collaborative projects, UIUC SCS News
- Rewriting selection rules, Nature Nanotechnology commentary

- Berkeley Lab Researcher Discover Why Pure Quantum Dots and Nanorods Shine Brighter (LBNL press release)
- Scientists make advancements in the field of quantum dots (Daily Cal article)
- Breaking Kasha's Rule: Berkeley Lab Scientists Find Unique Luminescence in Tetrapod Nanocrystals (LBNL press release)
- Berkeley Lab researchers find plasmonic resonances in semiconductor nanocrystals (LBNL press release)
- Quantum dots enable plasmonic semis (EE Times feature)
- Feature on Miller Fellow Prashant Jain (Miller Newsletter)
- Frontier Article and Cover of Chemical Physics Letters (2010 Mar issue) on Plasmonic Coupling
- #1 most cited papers of all time in Nano Today
- #1 most cited papers of all time in Nanomedicine
- #1 most cited papers of all time in Plasmonics

### CONTRIBUTED TALKS

- **Key intermediates of carbon dioxide reduction on silver from vibrational nanospectroscopy**, Mini-symposium: Multiple Potential Energy Surfaces, International Symposium on Molecular Spectroscopy, Urbana, IL, Jun 2017.
- **Imaging carbon dioxide reduction on single nanoparticles**, Session on Applications of Microspectroscopy for Materials Characterization, Pittcon 2017, Chicago, IL, Mar 2017.

### INVITED/AWARD/SPECIAL TALKS

1. **Catalysts dressed in light**, Akron ACS Award Seminar, Department of Chemistry, University of Akron, Akron, OH, Nov 2023.
2. **The photoficiation of chemical manufacturing**, Akron ACS Award Evening Lecture, Kent State University, Kent, OH, Nov 2023.
3. **The chemical potential of light**, Jeffrey I. Zink Inorganic Chemistry Seminar, University of California at Los Angeles, Los Angeles, CA, Nov 2023.
4. **The rise and fall of LK-99**, Data Sciences Institute Reproducibility Thematic Program Workshop, University of Toronto, Toronto, ON, Canada, Oct 2023.
5. **Holes in the LK-99 story**, Physical Chemistry Seminar, University of Illinois Urbana-Champaign, Urbana, IL Sep 2023.
6. **Uncovering mechanisms and intermediates in plasmonic catalysis**, Invited talk, Symposium on Catalyst Dynamics of Active Sites, Catalyst Structure, and Reaction Environment, American Chemical Society Fall 2023 National Meeting, San Francisco, CA, Aug 2023.
7. **Plasmonic nanoparticle electrodes for zero-carbon fuels**, Invited talk, Colloid & Surface Chemistry (COLL) Division Nanomaterials Symposium, American Chemical Society Fall 2023 National Meeting, San Francisco, CA, Aug 2023.
8. **Chemical reactivity at the interface of catalysis and plasmonics**, Invited talk, Symposium on Molecular and Heterogeneous Photocatalysts: Advances in Experiments and Theory, American Chemical Society Fall 2023 National Meeting, San Francisco, CA, Aug 2023.

9. **Cold truths about hot electrons**, Invited talk, Telluride Workshop on Solar Solutions to Energy and Environmental Problems, Telluride, CO, Jul 2023.
10. **Opportunities and challenges in plasmonically powered processes**, Invited discussion leader, Gordon Research Conference on Plasmonically Powered Processes, Ventura, CA, Jun 2023.
11. **Non-equilibrium conversion using plasmons**, Invited talk, International Conference on Surface Plasmon Photonics (SPP10), Rice University, Houston, TX, May 2023.
12. **The interface of plasmonics and catalysis**, Chemistry colloquium, Northwestern University, Chicago, IL, May 2023.
13. **Manufacturing fuels and chemicals using plasmonically concentrated light**, Nanomaterials and Sustainability virtual workshop at the APS/CNM user meeting, Argonne National Laboratory, Argonne, IL, May 2023 (delivered virtually).
14. **Catalysis in photonic fields**, Physical Chemistry Seminar, MIT, Cambridge, MA, Apr 2023.
15. **The interface of plasmonics and catalysis**, Invited talk, Symposium on Molecular and Colloidal Plasmonics Synthesis and Applications, 2023 MRS Spring Meeting, San Francisco, CA, Apr 2023.
16. **Electroconversion beyond the equilibrium limit using plasmons**, Invited talk, Symposium on Nanosized Photocatalysts From Fundamentals to Applications, 2023 MRS Spring Meeting, San Francisco, CA, Apr 2023.
17. **Catalysis in photonic fields**, Invited lecture, International Lecture Series on Nanophotonics, organized by Faculty of Physics, Ludwig-Maximilians University (LMU), Munich, Germany, Jan 2023 (delivered virtually).
18. **Novel forms of catalysis using plasmons**, Invited talk, International Symposium on Emerging Nanoarchitectures and Plasmonics for Energy Conversion 2022 (ENAPEC22), organized by Curtin University and Australian National University, Nov 2022 (delivered virtually).
19. **Manufacturing fuels and chemicals using light**, Invited talk, Conference on Advances in Catalysis for Energy and Environment (CACEE-2022), Mumbai, India, Oct 2022 (delivered virtually).
20. **The interface of optics and catalysis**, CBE Shell seminar series, Colorado School of Mines, Golden, CO, Oct 2022.
21. **Non-equilibrium electroconversion using plasmons**, Invited talk, Symposium on Photocatalysts, Photoelectrochemical Cells, and Solar Fuels, 242nd ECS Meeting, Atlanta, GA, Oct 2022.
22. **Manufacturing fuels and chemicals using concentrated light**, Invited webinar, 3M NTFA Symposium, Aug 2022.
23. **Manufacturing fuels and chemicals using concentrated light**, British Petroleum International Center for Advanced Studies (bp-ICAM) webinar, Aug 2022.
24. **Opto-catalysis**, Keynote talk, Advanced Photonic Congress, Optical Society of America (OSA) Novel Optical Materials and Applications (NOMA) conference, Session on Hot Electrons and Non-thermal Processes, Maastricht, Netherlands, UK, Jul 2022 (delivered virtually).
25. **Energetic charge states in plasmonic catalysis**, Invited talk, CECAM workshop on Light-matter interaction and ultrafast nonequilibrium dynamics in plasmonic materials, University of Warwick, Coventry, UK, Jul 2022.
26. **Harvesting the free energy of light by plasmonic excitation**, Invited talk, Gordon research conference (GRC) on Plasmonics and Nanophotonics, Newry, ME, Jul 2022.
27. **The interface of plasmonics and catalysis**, Keynote talk, Symposium on Plasmonics: From Synthesis to Applications, CCCE 2022, Calgary, Canada, Jun 2022.

28. **The photification of chemical manufacturing**, Keynote talk, Baekeland award symposium, Farleigh Dickinson University, Morristown, NJ, May 2022.
29. **Lights, catalyst, action!** Department of Chemistry and Biochemistry, The University of Texas at El Paso, TX, Mar 2022.
30. **Nanoantennas for harvesting light and driving chemical transformations**, Keynote lecture, Nanomaterials for Energy Conversion and Storage Application (NECSA- 2022), held virtually, Jan 2022.
31. **Inducing new catalytic behavior in noble metal nanoparticles by light excitation**, Session on Trends in Plasmonic Photochemistry, Pacifichem 2021, held virtually, Dec 2021.
32. **Storing light energy in chemical bonds**, Southern Illinois University, Carbondale, IL Oct 2021.
33. **Manufacturing chemicals using light**, Truman State University, American Chemical Society Chapter talk, Kirksville, MO, held virtually, Oct 2021.
34. **Fast ions in nanostructures**, 1st International Shell Advanced Energy Storage Battery Conference, held virtually, Sep 2021.
35. **Holes in the plasmonic chemistry story**, Session on Plasmonically driven processes and energy conversion II, METANANO 2021, held virtually, Sep 2021.
36. **Storing energy from plasmons in chemical bonds**, Nanoplasmonics Track, 21st IEEE International Conference on Nanotechnology (NANO 2021), held virtually, Jul 2021.
37. **From photons to chemical bonds**, Keynote lecture, Plasmonics session, 95th ACS Colloid and Surface Science Symposium, held virtually, Jun 2021.
38. **Three surprises from single-molecule-level probing of a photocatalyst**, Probing Chemical Reactions by Single-Molecule Spectroscopy 2021 Conference, held virtually, Jun 2021.
39. **Using concentrated light for the manufacturing of fuels and chemicals**, Chemistry in the times of Corona seminar (held virtually), Shell Oil, Apr 2021.
40. **Harnessing light using chemistry**, Guest lecture (held virtually), ACS Student Chapter, University of Illinois at Urbana-Champaign, Urbana, IL Apr 2021.
41. **The path from light to chemical bonds**, Division of Chemistry and Biological Chemistry Virtual Seminar Series, Nanyang Technological University, Singapore, Mar 2021.
42. **Light-matter coupling for energy harvesting and chemical manufacturing**, International Physics Webinar, Department of Physics, Pabna University of Science and Technology, Bangladesh, Feb 2021.
43. **Special relativity and optical control of chemistry**, Department of Physics & Astronomy colloquium (held virtually), Ohio University, Athens, OH, Feb 2021.
44. **An emerging paradigm in nanoparticle-based photocatalysis**, Webinar for News in Nanocrystals Community (NiNC), Jan 2021.
45. **Plasmonic chemistry: concepts and controversies**, Opening webinar in series on Elementary Processes of Light-Driven Reactions at Nanoscale Metals, Institut für Physik und Astronomie, Universität Potsdam, Potsdam and Ultrafast Dynamics group, Helmholtz-Zentrum, Berlin, Germany, Jan 2021.
46. **Harnessing the chemical potential of light**, Department of Chemistry seminar (held virtually), Dalhousie University, Halifax, NS, Canada, Nov 2020.
47. **Harvesting the free energy of light using gold**, Invited webinar on Gold for catalysis by a highly cited research over the past 3 years, International GOLD conference, Nov 2020.
48. **Plasmonic materials**, VAIBHAV summit of the Government of India, session on Advanced Materials co-organized by IISER Thiruvananthapuram, held virtually, Oct 2020.

49. **Capturing intermediates and intrinsic noise in CO<sub>2</sub> reduction catalysis (as published title)**, 260th ACS National meeting, PHYS symposium on Spectroscopy for Understanding Catalysis, held virtually, Aug 2020.
50. **Harvesting charge carriers and free energy from plasmonic excitations**, Plasmonic Photonics Session, Virtual Conference on Nanoscale Science and Technology (VC-NST) 2020, Hosted online amid COVID-19 outbreak, Mar 2020.
51. **The chemical potential of plasmonic excitations**, 2nd Frontiers in Photochemistry Conference, Nassau, The Bahamas, Feb 2020.
52. **Plasmonic photosynthesis**, Physical Chemistry seminar, Purdue University, West Lafayette, IN, Dec 2019.
53. **Turning plasmons in C-C and C-H bonds**, Graduate seminar series, Chemical Engineering, Oklahoma State University, Nov 2019.
54. **What goes on at the surface of a plasmonic catalyst?**, Innovative Nanomaterials for Electronics, Energy, Photonics & Bioanalytics, 2019 ACS Southwest-Rocky Mountain Regional Meeting, El Paso, TX, Nov 2019.
55. **Using plasmons for harvesting energy and tuning reaction selectivity**, Light for Energy: Photonic & Thermal Nanotechnology, 2019 ACS Southwest-Rocky Mountain Regional Meeting, El Paso, TX, Nov 2019.
56. **Plasmonic photosynthesis**, Plasmonics and Solar Energy Conversion (I04), 236th ECS National Meeting, Atlanta, GA, Oct 2019.
57. **Unusual catalog of hydrocarbons captured in plasmon-catalyzed chemistry**, Symposium on Getting to the Bottom: Optical & Electron Imaging of Reactive Chemical Systems, 258th ACS National Meeting, San Diego, CA, Aug 2019.
58. **Harvesting plasmons for the formation of energy-rich bonds**, Research seminar, University of Hong Kong, Hong Kong, Aug 2019.
59. **Plasmonically-powered energy storage in carbon-carbon bonds**, Gordon Research Conference on Plasmonically Powered Processes, Hong Kong, Jul 2019.
60. **Label-free single-molecule-imaging of a catalytic reaction**, Plenary Talk, 4th International Conference on Enhanced Spectroscopies, London, Ontario, Canada, Jun 2019.
61. **Plasmon excitation-driven reduction and coupling of carbon dioxide molecules**, Symposium on Renewable Fuels via Artificial Photosynthesis or Heterocatalysis (I03), 235th ECS National Meeting, Dallas, TX, May 2019.
62. **Multi-electron harvesting and catalysis using plasmonic nanoparticles: A mechanistic understanding**, Symposium on Light Energy Conversion (B07), 235th ECS National Meeting, Dallas, TX, May 2019.
63. **Plasmonic photosynthesis**, Fitzpatrick Institute of Photonics Seminar Co-hosted with Chemistry, MEMS & MatSci, Duke University, Durham, NC, Apr 2019.
64. **Fixing carbon with assistance from plasmon excitations**, Physical/Analytical Seminar, Texas A&M University, College Station, TX, Oct 2018.
65. **Watching carbon fixation on a plasmonic catalyst nanoparticle**, Symposium on Technical Developments & Applications of Optical Chemical Imaging, 256th ACS National Meeting, Boston, MA, Aug 2018.
66. **Carbon fixation on plasmonic catalysts**, Department of Chemical Sciences, Tata Institute of Fundamental Research, Jun 2018.

67. **Carbon fixation on plasmonic catalysts**, College of Environment and Energy, South China University of Science and Technology, May 2018.
68. **Carbon fixation on plasmonic catalysts**, School of Chemistry and Chemical Engineering, Nanjing University, May 2018.
69. **Carbon fixation on plasmonic catalysts**, Electroanalytical Chemistry Lecture series, Changchun Institute of Applied Chemistry, May 2018.
70. **Carbon dioxide to hydrocarbon conversion on plasmonic catalysts**, Frontiers in Photochemistry Conference, Cancun, MX, Feb 2018.
71. **Turning Photons into Chemical Bonds: artificial photosynthesis, sculpting EM fields, multi-electronic states and energy-rich bonds**, Lunch hour seminar, American Vacuum Society UIUC student chapter, Urbana, IL, Oct 2017.
72. **Turning photons into chemical bonds**, Chemistry seminar, Wabash College, Crawfordsville, IN, Oct 2017.
73. **Turning photons into chemical bonds using strong light-matter coupling**, Invited award talk, AVS Prairie Chapter meeting, Milwaukee, WI, Sep 2017.
74. **Turning photons into chemical bonds**, Kavli Emerging Leader in Chemistry Lecture, 254th ACS National Meeting, Washington DC, Aug 2017.
75. **Key insights into carbon dioxide photoreduction from single-nanoparticle catalysis studies**, Invited talk, Colloidal Metal and Semiconductor Nanostructures Symposium, 254th ACS National Meeting, Washington DC, Aug 2017.
76. **Advanced energy materials based on nanocrystals**, Invited talk, NaNaX8, Braga, Portugal, Jul 2017.
77. **Light/matter interactions for the biomedical researcher**, Tutorial lecture, NSF-funded Workshop on Light/Matter Interactions at the nanoBIO interface, UIUC, Urbana, IL, Nov 2016.
78. **Chemical secrets told, one nanocrystal at a time**, Physical chemistry seminar, UIUC, Urbana, IL, Sep 2016.
79. **Plasmon in a box**, Symposium on new directions in nanoplasmonics, SciX 2016, Minneapolis, MN, Sep 2016.
80. **Dynamics and heterogeneity of carbon dioxide adsorption and photoreduction uncovered from single-nanoparticle studies**, 252nd ACS National Meeting, Philadelphia, PA, Aug 2016.
81. **The nature of nanocrystalline transformations**, Seminar in Catalysis Chapter, 3M, St. Paul, MN, Jun 2016.
82. **Learning atomistic secrets of chemistry from nanosolids**, Physical chemistry seminar, MIT, Cambridge, MA, May 2016.
83. **Atomic secrets of solid-state transformations**, Physical chemistry seminar, Stanford University, Palo Alto, CA, May 2016.
84. **Atomic secrets of solid-state transformations**, Physical chemistry seminar, Rice University, Houston, TX, Apr 2016.
85. **Learning atomistic secrets of chemistry from nanosolids**, Physical/Analytical chemistry seminar, Iowa State University, Ames, IA, Apr 2016.
86. **The nature of nanocrystalline transformations**, Webinar, Center for Sustainable Nanotechnology, University of Wisconsin-Madison, WI, Mar 2016.



87. **Plasmon in a box**, Invited lecture in honor of Priestley medalist M. A. El-Sayed, PHYS Symposium on Physical principles in functional nanoscience, 251st ACS National Meeting, San Diego, CA, Mar 2016.
88. **Some hidden facts about chemistry in the solid-state**, Chemical Physics seminar, Caltech, Pasadena, CA, Feb 2016.
89. **Some hidden facts about chemistry in the solid-state**, Physical Chemistry seminar, University of Wisconsin-Madison, Madison, WI, Nov 2015.
90. **Some hidden facts about chemistry in the solid-state**, Physical Chemistry seminar, University of Colorado at Boulder, Boulder, CO, Nov 2015.
91. **Some hidden facts about chemistry in the solid-state**, Physical Chemistry seminar, University of California at Berkeley, CA, Oct 2015.
92. **Some hidden facts about chemistry in the solid-state**, James Frank Institute Colloquium, University of Chicago, Chicago, IL, Sep 2015.
93. **Hidden dynamics of solid-state reactions, revealed one nanocrystal at a time**, JPC C Award lecture, 250th ACS National Meeting, Boston, MA, Aug 2015.
94. **Collective behavior in the solid-state**, MRSEC colloquium, Northwestern University, Evanston, IL, May 2015.
95. **Collective behavior in the solid-state elucidated by plasmonic spectroscopy**, Invited talk, Session on Probing Nano-Plasmonic Phenomena at the Single Molecule, Single Electron, & Single Photon Level, 249th ACS National Meeting, Denver, CO, Mar 2015.
96. **Atomistic insights into chemical reactions, one nanocrystal at a time**, DuPont, Mar 2015.
97. **Atomistic insights into reactive and catalytic transformations, one nanocrystal at a time**, Physical chemistry seminar, Cornell University, Mar 2015.
98. **Atomistic insights into reactive and catalytic transformations, one nanocrystal at a time**, Physical chemistry seminar, UCLA, Mar 2015.
99. **Atomistic insights into reactions, one nanocrystal at a time**, MRSEC colloquium, Columbia University, Jan 2015.
100. **Collective behavior of electrons and atoms in the solid-state**, CeNSE seminar, Indian Institute of Science, Bengaluru, India, Jan 2015.
101. **Making a difference through your work: Some examples from nanoscience research**, Keynote address, National Honor Society Induction Ceremony, Champaign Central High School, Dec 2014.
102. **Atomistic insights into reactive transformations obtained one nanocrystal at a time**, Department of Chemical Engineering, University of Illinois at Chicago, Nov 2014.
103. **Collective behavior of electrons and atoms in nanosolids**, Materials Chemistry seminar, Department of Chemistry and Biochemistry, Indiana University, Bloomington, IL, Nov 2014.
104. **Atomistic insights into reactive and catalytic transformations obtained from single-nanocrystal studies**, Physical Chemistry seminar, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA, Sep 2014.
105. **Deciphering solid-state chemistry and catalysis one nanocrystal at a time**, Noble Metal Nanoparticles Gordon Research Conference, Mount Holyoke, MA, Jun 2014.
106. **Collective Behavior of Electrons and Ions**, Institut des NanoSciences de Paris, Universite Pierre et Marie Curie, Paris, France, Jun 2014.

107. **Collective Behavior of Electrons and Ions**, Laboratory for Nanoscience, Instrumentation, and Optics, Universite de Technologie de Troyes, France, Jun 2014.
108. **Chemistry on the nanoscale**, Radiation Lab and Physical/Analytical Chemistry seminar, University of Notre Dame, IN, May 2014.
109. **Deciphering solid-state chemistry on the nanoscale**, MSE Department, Stanford University, Palo Alto, CA, Apr 2014.
110. **Deciphering chemistry on the nanoscale using optical spectroscopy**, Modern Optics Seminar, MIT, Cambridge, MA, Apr 2014.
111. **Elucidating chemical transformations one nanocrystal at a time**, Chemistry dept, Indiana University-Purdue University, Indianapolis, IN, Mar 2014.
112. **Chemistry on the nanoscale**, Golden Jubilee Visiting Fellow lecture, Institute of Chemical Technology, Mumbai, India, Jan 2014.
113. **Elucidating chemical transformations one nanocrystal at a time**, Institute of Materials Science and Engineering, Washington University at St. Louis, MO, Nov 2013.
114. **Elucidating chemical transformations one nanocrystal at a time**, Invited talk, M. A. El-Sayed 80th Birthday Symposium, ACS Southeastern Regional Meeting, Atlanta, GA, Nov 2013.
115. **Chemical transformations on the nanoscale**, Invited talk, Nanocrystal Analytical Chemistry Session, 246th ACS National Meeting, Indianapolis, IN, Sep 2013.
116. **Single-nanocrystal reaction trajectories reveal co-operative nature of transition**, Invited Young Investigator Talk, Gordon Research Conference on Nanocrystals, Mount Holyoke, MA, Aug 2013.
117. **Nanoscience in the Classroom: Nanoparticles, light, and solar energy**, Hot Topic Session, Beginning Teacher STEM Conference, Champaign, IL, Jul 2013.
118. **Chemical transformations on the nanoscale**, Plenary talk, 87th ACS Colloids and Surface Science Symposium, Riverside, CA, Jun 2013.
119. **Computational Nano-Optics**, Institute for Advanced Computing Applications and Technologies, UIUC, Urbana, IL, Jun 2013.
120. **Optical computing**, Google Solve for [X], San Martin, CA, Feb 2013.
121. **Nanocrystal Chemistry and Photochemistry**, Genesys Crystal and Graphene Science Symposium, Boston, MA, Sep 2012.
122. **Controlling electrons, ions, and photons using inorganic nanostructures**, Dow Chemical Day, Young Investigators talk, UIUC, IL, May 2012.
123. **Nano-optics and chemistry**, Berkeley Nanotechnology Forum 2012, UC Berkeley, CA, Apr 2012.
124. **Light on the nanoscale**, Center for Advanced Theory and Material Simulation (CATMS) Lunch Series talk, UIUC, IL, Apr 2012.
125. **Nano-optics and chemistry: From Metals to Semiconductors**, CGSA-sponsored talk, Chemistry Dept., University of Maryland, Baltimore County, MD, Feb 2012.
126. **Nano-optics and chemistry: From Metals to Semiconductors**, Invited talk, Chemistry Dept., University of Louisville, Louisville, KY, Jan 2012.
127. **Nano-optics and chemistry**, Invited talk, Argonne National Lab, Center for Nanoscale Materials, IL, Jan 2012.

128. **Actively tunable plasmon resonances in doped semiconductor quantum dots**, Invited Hot topic talk, Gordon Research Conference on Nanocrystals, Clusters, and Nanostructures, Mount Holyoke, MA, Jul 2011.
129. **Photons, ions, and defects on the nanoscale**, Invited talk, IIT Bombay, Chemistry Dept., Mumbai, India, Jun 2011.
130. **Lighting up the nanoscale**, Invited keynote speech, National Science Teachers Association Symposium, San Francisco, CA, Mar 2011.
131. **Photons, ions, and defects on the nanoscale**, Invited talk, Materials Science and Engineering Dept., Cornell University, Ithaca, NY, Mar 2011.
132. **Photons, ions, and defects on the nanoscale**, Dept. of Chemistry, UC Berkeley, CA, Jan 2011.
133. **Photons, ions, and defects on the nanoscale**, Dept. of Chemistry, Yale University, New Haven, CT, Jan 2011.
134. **Photons, ions, and defects on the nanoscale**, Dept. of Chemistry, University of Chicago, Chicago, IL, Dec 2010.
135. **Photons, ions, and defects on the nanoscale**, Dept. of Chemistry, University of Wisconsin, Madison, WI, Dec 2010.
136. **Photons, ions, and defects on the nanoscale**, Dept. of Chemistry, University of Illinois, Urbana-Champaign, IL Dec 2010.
137. **Photons, ions, and defects on the nanoscale**, Depts. of Chemical Sciences and of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai, India, Nov 2010.
138. **Lighting up nanostructures**, Chemical Engineering and Physics Depts., Institute of Chemical Technology, Mumbai, India, Feb 2010.
139. **Rational design of noble metal nanostructures: Implications for nanosensing**, Program track on NanoScience, SPIE Optics + Photonics Annual Meeting, San Diego, CA, Aug 2009.
140. **Using nanostructures to control Light: Implications for biomedicine**, University of California San Francisco Medical School, CA, Jul 2009.
141. **Controlling light at the nanoscale using noble metals**, Department of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai, Feb 2009.
142. **Gold nanoparticles: Properties and some applications in medicine and biology**, Program Track on Nano/Biophotonics, SPIE Photonics West, San Jose, CA, Jan 2009.
143. **Surface plasmon resonance-enhanced magneto-optics (SuPREMO)**, Walsworth group, Center for Astrophysics, Harvard University, Cambridge, MA, Nov 2008.
144. **Plasmonic nanostructures for enhancing optical activity**, Chemistry and Chemical Biology Student and Postdoc Seminar Series, Harvard University, Cambridge, MA, Nov 2008.
145. **A universal scaling model for materials design of plasmonic nanostructures**, Graduate Student Awards Symposium, Fall MRS Meeting, Boston, MA, Nov 2007.
146. **The physical nature of coupling between noble metal plasmons**, Atlanta Area Chemical Physics Prize Lectures, Emory University, Atlanta, GA, Mar 2008.
147. **The physical nature of plasmon coupling**, University of California at Berkeley, Liphardt Lab, Dept. of Physics, Nov 2007.
148. **How do noble metal plasmons couple**, Harvard University, Department of Chemistry and Chemical Biology, Oct 2007.

149. **Plasmonic gold nanotechnology for the diagnosis and selective photothermal therapy of cancer**, Elan Drug Technologies Georgia Tech Visit, Petit Institute for Bioscience and Bioengineering, Georgia Institute of Technology, Atlanta, GA, Jan 2007.
150. **Coupling in nanoparticle assemblies: An interesting look at plasmons and their nanotechnological applications**, PhD Student Awards Symposium, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA, Oct 2006.

## FUNDING/GRANTS AWARDED

- Aramco Services Company, A plasmonic redox technology for hydrogen production, PI, \$699,000 awarded, 09/16/2023-09/15/2026
- National Science Foundation CHE Division, Maximizing the harvesting of photogenerated electron-hole pairs in hybrid plasmonic nanosystems, PI, \$441,678 awarded, 06/15/2023-06/14/2026
- American Chemical Society Petroleum Research Fund New Directions, Mechanistic elucidation of C-H activating carboxylation on heterogeneous catalysts, PI, \$110,000 awarded, 01/01/2023-08/31/2025
- University Scholar, Awardee, \$45,000 awarded, 08/16/2022-08/15/2025
- John Simon Guggenheim Memorial Foundation, Energy from light stored, shuttled, and used on demand, Guggenheim fellowship of \$70,000 awarded, 05/01/2022-04/30/2023
- National Science Foundation CAREER Award Supplement, Elucidation of the mechanistic origins of plasmon-induced chemical reactions, PI, \$119,848 awarded, 09/01/2021-02/28/2023
- Alumni Research Scholar, Awardee, \$75,000 awarded, 08/16/2020-08/15/2025
- Discovery Fund, Department of Chemistry, Awardee, \$40,000 awarded, 09/01/2018-8/31/2020
- Richard and Margaret Romano Professorial Scholar, Awardee, \$45,000 awarded, 01/01/2018-12/31/2020
- Energy and Biosciences Institute/Shell, Enhancing clean energy technologies by visible light plasmonic excitation, PI, \$879,736 awarded, 09/01/2017-05/31/2021
- Energy and Biosciences Institute/Shell, Fast-ion transport in nanostructured solid electrolytes, PI, \$750,000 awarded, 09/01/2017-05/31/2021
- National Science Foundation CAREER Award, Elucidation of the mechanistic origins of plasmon-induced chemical reactions, PI, \$655,580 awarded, 08/01/2015-08/31/2021
- 3M Nontenured Faculty Award, PI, \$45,000 awarded, 08/01/2015-07/31/2018
- American Chemical Society Petroleum Research Fund Doctoral New Investigator, Discovery of active sites on nanostructured oxides for desulfurization, PI, \$110,000 awarded, 09/01/2015-08/31/2017
- Arnold and Mabel O. Beckman Young Investigator Award, PI, \$750,000 awarded, 09/01/2014-08/31/2019
- Alfred P. Sloan Foundation Research Fellowship in Chemistry, Awardee, \$50,000 awarded, 09/15/2014-09/14/2016
- DuPont Young Professor grant, Discovery of Structure-Activity Relationships on the Nanoscale, PI, \$75,000 awarded, 09/01/2013-08/31/2016
- UIUC Campus Research Board, PI, \$14,240 awarded, 10/10/2013-07/01/2015
- NCSA Faculty fellowship, A Platform for Characterization and Prediction of Novel Nano-optic Phenomena, PI, \$25,000 awarded, 09/01/2012-08/31/2013

**COLLABORATIVE GRANTS AWARDED**

- National Science Foundation, Designing Materials to Revolutionize and Engineer our Future (DMREF) program, Rational design of redox-responsive materials for critical element separations, Co-PI with lead PI Xiao Su and co-PIs Shukla, Mironenko, and Calabrese, \$2,000,000 awarded, 10/01/2023-09/31/2027.
- National Science Foundation, EAGER: Quantum Manufacturing: Machine learning-powered deterministic nanoassembly of ultrafast quantum photonic devices, co-PI with lead PI Bogdanov and co-PI Clark, \$250,000 awarded, 09/15/2023-08/31/2025
- UNAM and U of I Research Partnership Program, Electricity and solar-powered upconversion of waste nitrate to ammonia, UIUC PI with UNAM PI Romo-Herrera, \$39,990 awarded, 03/01/2023-12/31/2023
- National Science Foundation, ECLIPSE program, Mechanistic understanding and control of nitrogen activation in an atmospheric-pressure plasma-liquid reaction, co-PI with lead PI Sankaran, \$457,087 awarded, 08/15/2022-07/31/2025
- Strategic research initiatives (SRI), Phase II award, Grainger College of Engineering, Scalable fabrication of ultrafast quantum photonic devices by a machine learning-powered deterministic assembly process, co-PI with PI Bogdanov and co-PI Clark, \$75,000 awarded, 05/16/2022-05/15/2023
- Strategic research initiatives (SRI), Phase I award, Grainger College of Engineering, Scalable fabrication of ultrafast quantum photonic devices by a machine learning-powered deterministic assembly process, co-PI with PI Bogdanov and co-PI Clark, \$70,000 awarded, 05/16/2021-05/15/2022
- iSEE Research Seed Funding, Integrated electrochemical separation technologies for nutrient recovery and valorization, co-PI with PI Su and co-PIs Sankaran and Wang, \$30,000 awarded, 01/16/2021-01/15/2022
- ACES Future Interdisciplinary Research Explorations, Electrified production of ammonia and its energy and environmental impact, co-PI with PI Wang and co-PIs Sankaran and Su, \$59,931 awarded, 10/01/2020-09/30/2022
- National Science Foundation, Major Research Instrumentation, Acquisition of an electron energy-loss spectrometer for in situ time-resolved chemical mapping of nanomaterials, co-PI with PI Renske van der Veen and others, \$561,254 (+ cost-sharing), awarded, 08/01/2018-07/31/2021
- National Science Foundation, Major Research Instrumentation, Development of a dynamic environmental transmission electron microscope, Senior Personnel with PI Jian Min-Zuo and several others, \$1,792,000 (+ cost-sharing), awarded, 08/01/2012-07/31/2015
- National Science Foundation, Network for Computational Nanotechnology, NanoBIO Node, Key participant with PI Emad Tajkhorshid and several others, \$3,777,990 awarded, 09/01/2012-08/31/2017

**COMPUTATIONAL TIME AWARDS**

- Spring 2023 Illinois Quantum Applications Grant Program, Quantum simulations of plasmons, Funding for PI Jain to take the two-part Quantum Computing for Everyone EdX course and \$1000 in AWS Braket computing credits for running code on a 34 qubit simulator and real quantum computing hardware, awarded Nov 2022
- Fall 2022 Illinois Quantum Applications Grant Program, Quantum simulations of plasmons, Funding for PI Jain to take the two-part Quantum Computing for Everyone EdX course and \$1000 in AWS Braket computing credits for running code on a 34 qubit simulator and real quantum computing hardware, awarded Apr 2022
- NCSA Blue Waters General Allocation Renewal & Supplement, Investigation of Novel Crystal Phases & Electronic Topologies in Semiconductor Nanostructures, 440,000 NUs (equivalent to \$273,000) awarded, 1/16/2019-12/20/2019

- XSEDE Renewal Research Allocation, DFT Computational Study of Cation Exchange & Transport in Crystalline Solids, 350,000 SUs awarded, 1/1/2019-12/31/2019
- XSEDE Full Research Allocation, DFT Computational Study of Cation Exchange & Transport in Crystalline Solids, 300,000 SUs awarded, 1/1/2018-12/31/2018
- NCSA Blue Waters General Allocation, Investigation of Novel Crystal Phases & Electronic Topologies in Semiconductor Nanostructures, 75,000 NUs awarded (equivalent to \$46,000), 11/22/2017-11/21/2018
- XSEDE Full Research Allocation, DFT Computational Study of Cation Exchange & Transport in Crystalline Solids, 350,000 SUs awarded, 10/16/2016-9/30/2017
- XSEDE Supplemental Allocation, DFT Study of Doping & Cation Exchange in CdSe Nanocrystals, 50,000 SUs awarded, 7/16/2016-2/2/2017
- NCSA Blue Waters Exploratory Allocation, Atomistic Modeling of Transformations in Ionic Semiconductor Nanocrystals, 30,000 NUs awarded, 5/16/2016-12/16/2016
- XSEDE Scholar (DDT) Award, DFT Study of Doping & Cation Exchange in CdSe Nanocrystals, 30,000 SUs awarded, 5/16/2016-10/16/2016
- XSEDE Supplemental Allocation, DFT Study of Doping & Cation Exchange in CdSe Nanocrystals, 50,000 SUs awarded, 4/16/2016-2/2/2017
- XSEDE Startup Allocation, DFT Study of Doping & Cation Exchange in CdSe Nanocrystals, 50,000 SUs awarded, 2/3/2016-2/2/2017

## SERVICE AS PEER-REVIEWER

- Outstanding (top 5%) reviewer for JPC Letters
- Outstanding (top 5%) of reviewers for Angewandte Chemie in 2016
- Refereeing for journals: Science, Nature, Nature Chemistry, Nature Catalysis, Nature Energy, Science Advances, Nature Communications, Journal of the American Chemical Society, Nature Materials, Nature Nanotechnology, Proceedings of the National Academy of Sciences, Chemical Society Reviews, Chemistry - A European Journal, Applied Physics A, Journal of Physical Chemistry (A, B, C, and Letters), ACS Photonics, Journal of Chemical Physics, Langmuir, Accounts of Chemical Research, Analytical Chemistry, ACS Nano, Nano Letters, Nanotechnology, Nanomedicine, Small, Journal of Nanoscience & Nanotechnology, Colloids & Surfaces, Colloids & Polymer Science, Chemistry of Materials, Applied Physics Letters, ACS Catalysis, Solid State Communications, Journal of Applied Physics, Physica Status Solidi, IEEE Transactions on Nanotechnology, ACS Energy Letters, ChemPhysChem, Angewandte Chemie, Ionics, Nanoscale, ACS Sustainable Chemistry and Engineering, Industrial and Engineering Chemistry, Chemical Science, Journal of Materials Chemistry A
- Books: Angewandte Chemie book review, Book proposals reviewed for John Wiley and Sons, Springer, and Elsevier

## TEACHING

- Sp' 15,18,20,21 Fa' 19-22**     **University of Illinois** - Urbana Champaign, IL  
 Instructor for CHEM 444, Physical Chemistry II: Statistical Thermodynamics  
 Listed Teachers Ranked as Excellent by Their Students  
 Outstanding Ratings in Fall 19, Spring 20, and Fall 22
- Sp' 13,14,18, Fa' 14,15**     **University of Illinois** - Urbana Champaign, IL  
 Instructor for CHEM 447, Physical Principles laboratory II  
 Listed Teachers Ranked as Excellent by Their Students

- Sp' 13,14,18, Fa' 13-16**      **University of Illinois** - Urbana Champaign, IL  
Instructor for CHEM 445, Physical Principles laboratory I  
Listed Teachers Ranked as Excellent by Their Students
- Fa' 11,12**                      **University of Illinois** - Urbana Champaign, IL  
Instructor for CHEM 544A, Graduate-Level Statistical Mechanics  
Listed Teachers Ranked as Excellent by Their Students
- Sp' 19,22**                      **University of Illinois** - Urbana Champaign, IL  
Instructor for CHEM 545, Graduate Physical Chemistry Seminar

### SERVICE TO UNIVERSITY

- 2020-**                      **University of Illinois** - Urbana Champaign, IL  
Materials Research Laboratory Facilities Committee
- 2018-20**                      **University of Illinois** - Urbana Champaign, IL  
School of Chemical Sciences Committee for Energy Service Company (ESCO) Project
- 2015-16**                      **University of Illinois** - Urbana Champaign, IL  
Physical Chemistry Graduate Student Advising
- 2013&14**                      **University of Illinois** - Urbana Champaign, IL  
NSF-3M REU Program Committee
- 2013-17**                      **University of Illinois** - Urbana Champaign, IL  
Physical Chemistry Seminar Chair
- 2011-13**                      **University of Illinois** - Urbana Champaign, IL  
Graduate Admissions and Recruiting for Physical Chemistry
- 2012-13**                      **University of Illinois** - Urbana Champaign, IL  
Radiation and Laser Safety Committee
- 2012-14**                      **University of Illinois** - Urbana Champaign, IL  
Organizer for Chemistry Faculty Lunch Meetings
- 2011-**                      **University of Illinois** - Urbana Champaign, IL  
Thesis Committee - Chris Berg (Chem), Subalakshmi Kumar (MatSE)  
Sumit Ashtekar (Chem), Bruno Giuliano Nicolau (Chem)  
William Shaw (Chem), Jonathan Eller (Chem), Nardine Abadeer (Chem)  
Melinda Sindoro (Chem), Hyo Na Kim (Chem), Nuri Oh (MatSE)  
Lisa Jacob (Chem), Neil Wilson (ChBE), Kandis Gillard (Chem)  
Lea Nienhaus (Chem), Zachary Goldsmith (Chem), Huy Nguyen (Chem)  
Jordan Dennison (Chem), Alan Sykes (Chem), Michael Counihan (Chem)  
Kendrich Hatfield (Chem), Sean Meyer (Chem), Yiming Wang (Chem)  
Abinaya Sampath (ChBE), Alex Schrader (Chem), Mahima Unnikrishnan (Chem)  
Stanley Bram (Chem), Stephen Cotty (ChBE)  
Lakshmy Priya Ajayakumar (Chem), Grant Barton (Chem)  
Ziqiu Chen (ChBE), Jonathan Matsuura (Chem)  
Nathan Forney (Chem), Lawrence Salvati (Chem)  
Katherine Greskovich (Chem), Kristin Martin (Chem)  
Pin-Yi Lu (Phys)  
Vanessa DeMarco (Chem senior thesis)

## MENTORING AND OUTREACH

2011-

**University of Illinois** - Urbana Champaign, IL

**PhDs graduated**

Francis Alcorn (Chem, Summer 2023) Currently at Sandia National Laboratories as postdoctoral research a

Dimumol Devasia (Chem, Summer 2021) Currently at Intel as Process Engineer

Varun Mohan (MatSE, Fall 2020) Currently at Intel as Mask Operations Engineer

Jaeyoung Heo (MatSE, Fall 2020) Currently Postdoctoral Researcher at Argonne National Lab

Daniel Dumett Torres (Chem, Fall 2019), Currently Physicist at

Lawrence Livermore National Lab

Progna Banerjee (Physics, Fall 2018) Currently NST Postdoctoral Researcher at UT Austin

Sarah White (Chem, Spring 2016) Currently at MKS Instruments as Sr. Scientist

Jeremy Smith (Chem, Spring 2016) Currently at KLA as Sr. Applications Engineer

Aaron Routzahn (Chem Spring 2016) Currently at Lam Research Corp. as Process Engineer

Mayank Behl (CHBE, Spring 2014) Currently at Intel as Process Engineer

**PhD candidates:** Rachel Nixon (Chem)

Chloe Litts (Chem), Wenxin Zhang (MatSE), Sreelekshmi Venu (Chem)

Omar Ghaleb (Chem), Arda Turk (Chem)

**Postdocs:** Dr. Enrique Contreras, Dr. Daeho Kim,

Dr. Hyun-Hang Shin

**Undergraduates:** Timothy Njuguna (Phys)

Molly Deely (Chem), Ram Ganesan (Computer Science and Chem),

Tharun Baburaj (ChBE)

**Former Postdocs:** Biswanath Dutta (Currently Heterogeneous Catalysis Scientist

Leidos/National Energy Technology Lab)

Ki-Hyun Cho (Currently postdoctoral research in ChBE, UIUC)

Ankita Das

Youngsoo Kim (Currently Assistant Professor in School of Chemistry and Biochemistry, Yeungnam University)

Andrew Wilson (Currently Assistant Professor of Chemistry at the University of Louisville)

Sungju Yu (Currently Assistant Professor in Departments of Chemistry and Energy Systems, Ajou University)

Jianxiao Gong (Currently Professor at National Center for Nanoscience and Technology)

Jun Wang (Currently Professor at Nanjing Tech University)

Indranath Chakraborty (Currently Assistant Professor

in the School of Basic Sciences at the Indian Institute of Technology, Kharagpur

Pooja Tyagi (Currently Senior Data Science Consultant at QuantumBlack)

Gayatri Kumari (Completed Postdoctoral Research at DIFFER, Netherlands)

Xueqiang Zhang (Currently Professor at the Beijing Institute of Technology

Advanced Research Institute of Multidisciplinary Science and

the Department of Mechanical Engineering)

Former UG Researchers:

Xindi Yang (Chem), Maya Chatteraj (Chem), Omar Ghaleb (Chem), Bladen Lee (Chem)

Haobo Wu (Chem exchange program), Roma Frances Ripani (Chem)

Qing Yang (Chem), Melika Fini (Chem), Luis Garibay (NSF REU student)

Jiayi Fu (NSF REU student), Dinumol Devasiya (Bose Scholar)

Ryan Sanders (ChBE), Naveed Akhter (Chem), Priya Patel (Chem)

Roarke Burnett (Chem), Johan Yapo (Chem), Aditi Sharma (Bose Scholar)

Bara Saadah (BioE), Ria Christie Christina (Chem)

Tobias Blickhan (UG exchange, TMU Germany), Mahima Unnikrishnan (Bose Scholar)

Junqi Fressia Peng (Chem), Paul Butkovich (Chem)

Zhe Zhang (Peking University UG summer intern), Eric Wu (ChBE), David Qiu (Chem)

Aidan Lindsay (Chem), Emmet Rubin (Chem)

**Other Former Researchers:** Juhee Ha (visiting researcher for Yeungnam University, S. Korea)



Jose Manuel Ruiz Marizcal (visiting researcher from CNyN-Universidad Nacional Autnoma de Mxico, Mexico)  
Lucas Germano (visiting researcher from University of São Paulo, Brazil)  
Wei Lin (visiting scientist), Shengjie Xia (visiting professor)  
Lam-Kiu Fong (intern), Rebecca Smith (intern)  
Milo Russell (Chem grad 2011-2013), Jacob Fauchaux (Chem grad 2012-2014)  
Alexandria Stanton (Chem grad 2012-2014), Cecilia Gentle (Chem grad 2015)  
Cody Tripp (Masters program), Alexander Kurzhals (Masters program)

- Aug 2023** **Arnold and Mabel O. Beckman Foundation**  
Panelist on the Matriculating Through Academia Panel at the 2023 Beckman Symposium, Irvine, CA
- Oct 2022** **Electrochemical Society**  
Co-chair on session on Plasmonics and Photocatalysis at 242nd Electrochemical Society (ECS) Meeting, Atl
- Feb 2022** **University of Illinois Urbana-Champaign**  
Panelist on strategies for dissemination of research for Chem 590F Preparing Future Faculty class
- Aug 2020** **American Chemical Society**  
Session Chair, 260th ACS National Meeting PHYS symposium on Spectroscopy for Understanding Catalysis
- Jan 2019** **American Chemical Society**  
Awards committee, PHYS Division and Journal of Physical Chemistry
- Apr 2017** **253rd ACS National Meeting, San Francisco, CA**  
Judging panel, PHYS Poster Session
- Mar 2016** **251st ACS National Meeting, San Diego, CA**  
Lead Organizer, Physical Principles in Functional Nanoscience Symposium
- Mar 2016** **nanoBIO node Plasmonics workshop, University of Colorado at Boulder**  
Organizing committee member
- Sep 2015** **University of Illinois - Urbana Champaign, IL**  
Panelist for President's Executive Leadership Program (PELP) selected by Chancellor
- Nov 2013** **University of Illinois - Urbana Champaign, IL**  
Panelist, Professional development workshop for postdoctoral scholars
- 2012-17** **nanoBIO node at University of Illinois - Urbana Champaign, IL**  
Lead scientific developer of nanoDDSCAT, educational/research tool for nanophotonic simulations
- Jul 2013** **STEM Beginning Teacher Conference, Illinois New Teacher Collaborative - Urbana, IL**  
Discussed nanoscience education as featured breakout session speaker
- Spring 2013** **EnLiST/University of Illinois Chemistry Outreach Program - Urbana, IL**  
Faculty mentor for chemistry outreach program at ML King school
- Apr 2012** **Eastern Illinois ACS WCC Undergraduate Symposium - Urbana, IL**  
Judging panel, Undergraduate research oral presentations
- Apr 2012** **Berkeley Nanotechnology Forum - Berkeley, CA**  
Judging panel, Nanotechnology research poster presentation
- 2009-10** **Community in the Classroom - Berkeley, CA**  
Instructor for lesson activities on solar energy and photochemistry at local schools
- 2005-06** **Nano@Tech, Georgia Institute of Technology - Atlanta, GA**  
Participated in Nanotechnology Outreach (CEISMC camp, 'Ask a Scientist') for school students

**LAB MEMBER ACHIEVEMENTS**

- 2023** Francis Alcorn - Klemperer Award for Outstanding Materials Chemistry PhD Thesis
- 2023** Chloe Litts - University Block Grant
- 2023** Chloe Litts - Peixin He and Xiaoming Chen PhD4 Graduate Fellowship
- 2023** Omar Ghaleb - Robert F. Carr Fellowship in Chemistry
- 2023** Sreelekshmi Venu - John and Margaret Witt Fellowship
- 2023** Wenxin Zhang Racheff Teaching Fellow (twice)
- 2023** Aidan Lindsay - ACS PHYS Division Undergraduate Award in Physical Chemistry for UIUC
- 2023** Aidan Lindsay UIUC Undergraduate Research Symposium Honorable Mention for Poster Presentation
- 2023** Aidan Lindsay Barry M. Goldwater Scholarship
- 2023** Wenxin Zhang Racheff Teaching Fellow
- 2023** Molly Deeley John E. Giesecking Scholarship for Undergraduate Research
- 2022** Aidan Lindsay East Central Illinois ACS Undergraduate Research Conference Outstanding Oral Presentation
- 2022** Rachel Nixon - Thor R. Rubin Fellowship
- 2022** Sreelekshmi Venu - Carl S. Marvel Fellowship
- 2022** Chloe Litts - Thor R. Rubin Fellowship
- 2022** Aidan Lindsay - Oliver J. Bell Merit Scholarship in Chemical Sciences
- 2022** Aidan Lindsay - Glenn Rhodes Wilson Scholarship in Chemistry
- 2022** Rachel Nixon - ACS Summer School on Green Chemistry & Sustainable Energy
- 2022** Rachel Nixon - National Defense Science and Engineering Graduate Fellowship Honorable Mention
- 2022** Aidan Lindsay - Peter Beak Scholarship for Undergraduate Research (declined)
- 2022** Rachel Nixon - Diffenbaugh Fellowship
- 2021** Chloe Litts - Thor R. Rubin Fellowship
- 2021** Rachel Nixon - Thor R. Rubin Fellowship
- 2021** Frank Alcorn - Thor R. Rubin Fellowship
- 2021** Maya Chatteraj - Clare Boothe Luce Research Scholar
- 2021** Maya Chatteraj - Mary-Dell and Scott Chilton Scholarship for Undergraduate Research
- 2021** Maya Chatteraj - Campus Honors Program Summer Research Grant (declined)
- 2021** Rachel Nixon - NSF Graduate Research Fellowship Honorable Mention
- 2020** David Qiu - Worth H. Rodebush Award
- 2020** David Qiu - ACS Division of Physical Chemistry Undergraduate Award
- 2020** Varun Mohan - Racheff-Intel Award for Outstanding MatSE Graduate Students
- 2020** Maya Chatteraj - Campus Honors Program Summer Research Grant

- 2020 Dinumol Devasia - TechnipFMC Fellowship
- 2021 Frank Alcorn - NSF Graduate Research Fellowship Honorable Mention
- 2019 Dinumol Devasia - Women in Chemistry Committee Travel Award
- 2019 Daniel Dumett Torres - Physical Chemistry Dissertation Award
- 2019 Dinumol Devasia - Victor E. Buhrke Graduate Fellowship
- 2019 David Qiu - John E. Giesecking Scholarship for Undergraduate Research
- 2019 Dinumol Devasia - J.C. Martin Memorial Student Travel Award
- 2018 Stanley Bram - Roger Adams Fellowship
- 2018 Frank Alcorn - Springborn Graduate Fellowship and Roger Adams Fellowship
- 2018 Daniel Dumett Torres - Workshop for Nanomaterials for Energy Storage and Conversion, Tel Aviv
- 2018 Dinumol Devasia - Sloan Chemical Prize
- 2018 Alex Kurzhals - Mark Pytosh Fellowship
- 2018 Progna Banerjee - Scott Anderson Outstanding (Physics) Graduate Assistant Award
- 2017 Sungju Yu Bronze Medal at 2017 Samsung Electro-Mechanics Paper Competition
- 2017 Daniel Dumett Torres - Dorothy M. and Earl S. Hoffman Travel Grant, American Vacuum Society
- 2017 Daniel Dumett Torres - Drickamer Fellowship
- 2017 Dinumol Devasia - Mark Pytosh Fellowship
- 2017 Progna Banerjee - First Prize, Monsanto Research Symposium Poster Presentation
- 2017 Progna Banerjee - Department of Physics Grad Student Travel Award
- 2016 Bara Saadah - Mayo Clinic Summer UG Research Fellowship
- 2016 Andrew Wilson - Springborn Postdoctoral Fellowship
- 2016 Daniel Dumett Torres- Mr. Chinoree T. and Mrs. Kimiyo Enta Fellowship
- 2016 Daniel Dumett Torres - Eastman Travel Award
- 2016 Progna Banerjee - Academic Leadership for Women Engineers Program & Travel Award
- 2016 Daniel Dumett Torres- XSEDE Scholar
- 2015 Jeremy Smith - Geerdes Travel Award
- 2015 Cody Tripp - SCS Graduate Teaching Travel Award
- 2015 Aaron Routzahn - Eastman Travel Award
- 2015 Daniel Dumett Torres - Chinoree T. Kimiyo Enta Scholarship
- 2015 Naveed Akhter - John E. Giesecking Scholarship
- 2015 Sarah White - Klemperer/Materials Chemistry Best Dissertation Award
- 2015 Jeremy Smith - Eastman Travel Grant Award
- 2014 Sarah White- J. & M. Witt Fellowship

- 2014 Cody Tripp - J. & M. Witt Fellowship
- 2014 Jeremy Smith - Buhrke Fellowship
- 2014 Cody Tripp - Dept. of Chemistry Teaching Excellence Fellowship
- 2013 Mayank Behl - Hanratty Travel Award
- 2013 Chemistry in Motion College and University Challenge, ACS Indianapolis
- 2013 Sarah White - University Fellowship and Jeremy Smith - James R. Beck Fellowship
- 2013 Paul Butkovich - Summer Research Scholarship from Chemistry Dept.
- 2013 Aaron Routzahn - NSF Graduate Fellowship
- 2013 Jacob Faucheaux - NSF Graduate Fellowship
- 2012-13 Mayank Behl - FMC Graduate Fellowship
- 2012 Qing Yank and Melika Fini - Summer Research Scholarships from Chemistry Dept.
- 2012 Luis Garibay - NSF-3M REU Fellowship
- 2012 Aaron Routzahn - NSF Graduate Research Fellowship Honorable Mention
- 2012 Mayank Behl - Dow Chemical Company Graduate Fellowship
- 2012 Lam-Kiu Fong - NSF Graduate Student Fellowship
- 2011-12 Sarah White - Sylvia Stoesser Departmental Fellowship
- 2012 Melika Fini and Qing Yang - Summer Research Fellowships
- 2012 Qing Yang - Wilson Scholarship
- 2012 Sarah White and Mayank Behl - ACS International-Domestic Student Summit

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