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OVERVIEW

I am an Assistant Professor in the Chemical and Materials Engineering Department at the University of Dayton looking to establish a research program on realizing new materials through nanochemistry for synergistic applications in photovoltaics and light emitting diodes, drug delivery, and precision agriculture. I earned my Ph.D. in Chemical Engineering from The University of Alabama (UA) and have completed postdoctoral trainings from Yale, University of South Carolina, and UA. Since then, I have served as a Visiting and Assistant Professor at University of Tennessee Chattanooga, a primarily undergraduate institution. Here, I have won the Outstanding Teaching and Outstanding Service awards for teaching chemical engineering laboratory and lecture courses, developing new online graduate courses, serving as graduate coordinator and faculty advisor of SWE, ABET evaluations, and winning an NSF-REU grant during my career. I have founded S&J NanoChemicals, an agri-tech start-up producing sustainable nanofertilizers.

EDUCATION

Ph.D. The University of Alabama, Chemical Engineering, Tuscaloosa, Alabama, 2012

M.S. The University of Alabama, Chemical Engineering, Tuscaloosa, Alabama, 2010

B.S. National Institute of Technology, Durgapur, Chemical Engineering, India, 2008

PROFESSIONAL EXPERIENCE

- **University of Dayton**, Assistant Professor, Aug 2021- Present
- **University of Tennessee at Chattanooga**, Assistant Professor, Aug 2017- Jul 2021
- **University of Tennessee at Chattanooga**, Visiting Assistant Professor, Aug 2015-Aug 2017
- **S&J NanoChemicals Inc.**, Founder and President, Jun 2020 - Present
- **The University of Alabama**, Center for Materials and Information Technology (MINT) Tuscaloosa, Alabama, Postdoctoral Researcher, Feb 2014-Aug 2015
- **University of South Carolina**, Arnold School of Public Health, Columbia, South Carolina, Postdoctoral Researcher, Jun 2013-Feb 2014
- **Yale University**, Chemical and Environmental Engineering, New Haven, Connecticut, Postdoctoral Researcher, Jun 2012-Jun 2013

AREAS OF EXPERTISE

- Chemical and biomedical engineering
- Nanochemistry: Synthesis of inorganic, bio-hybrid, magnetic, and semiconductor nanoparticles
- Multimodal material characterization of novel nanostructures
- Biomedical applications of nanotechnology
- Nanomaterials for emerging energy applications such as supercapacitors, photovoltaics, and light emitting devices
- Environmental nanoscience
- Soft materials (e.g., hydrogels and protein cages)

UNIVERSITY AND COLLEGE SERVICE

- Serving as a member of our departmental committee for developing a School of Engineering-wide research minor program for the undergraduate students, 2021

PRIOR UNIVERSITY AND COLLEGE SERVICE

- Committee Member for the UTC Graduate Curriculum Committee, 2019
- Committee Member for the UTC Technology Symposium, 2019
- Member of the Search Committee for Online Graduate Program Co-ordinator for the College of Engineering and Computer Science, 2019
- Evaluator for Student SEARCH research grants, 2019
- Faculty Advisor of Society of Women Engineers UT Chattanooga Student Chapter, 2018-Present
- Graduate co-ordinator of Chemical Engineering, 2015-Present
- Taught science section at the SAT workshop for high-school students organized by NSBE, 2015-Present
- Organized monthly outreach activities involving hands-on science experiments at local high schools to enhance recruitment of female and underrepresented minority students in STEM fields
- Mentored high school student research projects
- Member of the Chemical Engineering Faculty Search Committee, 2017
- Quality Matters Co-ordinator for Chemical Engineering, 2017
- Represented UTC at Chamber of Commerce Spirit of Innovation Exhibit, 20th Oct 2017
- Undergraduate course advisor for 9 students in Spring 2017-Fall 2018
- Research mentor for 17 undergraduate students and 8 graduate students in total since 2015

PROFESSIONAL SERVICE

- Serving as a reviewer for the Department of Energy's Science, Mathematics, and Research for Transformation (SMART) 2022 scholarship program
- Served as Safety Judge for AIChE Chem-E-Car Regional and National Competition 2020
- Editor for the Special Issue "Biohybrid Nanostructures: Design, Characterization, and Biomedical Applications", Nanomaterials, MDPI, In progress
- Editor for the Special Issue "Advances in Smart Nanomaterials: Environmental Perspective" of the Journal of Nanomaterials, Hindawi
- Editor of the book "Strategic Applications of Measurement Technologies and Instrumentation", IGI Global, 2018
- Editorial board member for International Journal of Measurement Technologies and Instrumentation Engineering, IGI Global
- Reviewer for high-impact journals in nanotechnology, inorganic chemistry, and engineering such as: Dalton Transactions, Inorganic Chemistry, Nanoscale, Environmental Science & Technology, Langmuir, Journal of Applied Physics, Applied Physics Materials, Nanomaterials, Journal of Energy Storage, Dovepress, MDPI journals, International Journal of Nanotechnology, and Yale Journal of Biology and Medicine
- Reviewed 20 journal articles from 2017 - present
- Reviewer for the book, Fundamentals of Chemical Engineering Thermodynamics, K. Dahm and D. Visco, Cengage.

CERTIFICATIONS OR PROFESSIONAL REGISTRATIONS

- E.I.T., NCEES

CURRENT MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

- Materials Research Society (MRS)
- The Minerals, Metals & Materials Society (TMS)
- Magnetism and Magnetic Materials (MMM)

HONORS AND AWARDS

- Outstanding Teaching Award, Chemical Engineering Department, University of Tennessee Chattanooga (2020)
- University wide Outstanding Service Award, University of Tennessee Chattanooga (2020)
- Outstanding Service Award, Chemical Engineering Department, University of Tennessee Chattanooga (2019)
- Associate Member of Royal Society of Chemistry since 2016
- Outstanding Paper Award at MINT Review Meeting (2011)
- The American Institute of Chemists Graduate Student Award (2011)
- Graduate Student Research and Travel Support Fund, University of Alabama (2011, 2010)
- Graduate Student Association Research and Travel Fund, University of Alabama (2011, 2010)

GRANTS

Submitted

2021

- National Science Foundation, A new class of cadmium-free quinary chalcogenide nanocrystals for quantum dot light emitting devices, PI, \$598,776
- NSF-SBIR, HemaX nanoparticle pre-germination fertilizer for sustainable synergy between farm and farming, \$256,000
- Research Council Seed Grant, Nanoparticle pre-germination fertilizer for a sustainable synergy between farm and farming, PI, \$5,000, 2021
- Hanley Sustainability Institute Graduate Funding, Realizing sustainability in urban agriculture through a green nanofertilizer packaging multiple micronutrients, PI
- ISE CoRPs Fellowship 2022, Bio-inspired nanogels for novel drug delivery and hyperthermia, PI, in preparation

2020

- National Science Foundation- CAREER, A New Class of Cadmium-Free Multinary Chalcogenide Nanocrystals for Quantum Dot Light Emitting Device, PI, \$537,923
- CEACSE Tennessee Board of Higher Education Grant, Computational Fluid Dynamic Approach for Point-of-Care Diagnostics with Au Nanoparticles, PI, \$100,000
- Tennessee Valley Authority, A More Sustainable and Efficient Hydrogen Production with Novel 2D Photocatalytic Chalcogenide Nanosheets, PI, \$100,000
- Archer Daniels Midlands, A New and Sustainable Analytical Approach for Assessing Viscosity of Cellulose Structures using FTIR and SEM, PI, \$40,000
- American Lung Association, Investigating the Dynamics and Therapeutics for SARS-CoV-2 through an Integrated Computational and Experimental Approach, co-PI, \$200,000
- United States Department of Agriculture – National Institute of Food and Agriculture, A New Family of Iron Oxide Nanoparticle Fertilizers Opens an Innovative Avenue Towards Precision Agriculture, PI, \$499,999
- One UT, Multifunctional Rain Barrel Technology Merging Nanophotocatalysis and Bioremediation, PI, \$49,632
- American Lung Association, Investigating the dynamics and therapeutics for SARS-CoV-2 through an integrated computational and experimental approach, co-PI, \$200,000

- National Science Foundation, Acquisition of a Customized Metal Additive Manufacturing System for Multidisciplinary Research Activities, co-PI, \$360,467
- United States Environmental Protection Agency, Microplastics Sampling for Stormwater Management, co-PI, \$24,995

2019

- National Science Foundation- CAREER, A New Library of Cadmium-Free Multinary Chalcogenide Nanocrystals for Engineered Quantum Dot Light Emitting Device, PI, \$508,358
- National Science Foundation Fluid Dynamics- Particulates and Multiphase Processes Program, Coupled Computational and Experimental Approach to Understand the Flow of Nanodrugs, PI, \$311,734
- Tennessee Department of Transportation, Evaluation of an Integrated Nanophotocatalytic and Bioremediation Approach with Rain Barrels as a Green Infrastructure for Storm Water Management, PI, \$199,891
- American Chemical Society Petroleum Research Fund, A New Class of Enhanced Sensors with Iron Oxide-Protein Cage Nanoarchitectures for Petroleum Tracers, PI, \$55,000
- Center for Nanophase Materials Sciences, Oak Ridge National Laboratories User Proposal, Characterization of a New Class of Integrated Copper Chalcogenide Nanocrystals, PI
- UTC Faculty PREP Grant, A New Library of Quantum Dots for Flexible Biomedical Devices, PI, \$15,000
- National Science Foundation- MRI, Acquisition of a Customized Metal Additive Manufacturing System for Multidisciplinary Research Activities, co-PI, \$300,500

2018

- National Science Foundation Major Research Instrument Acquisition (2018, submitted for internal review), Acquisition of a High Resolution Scanning Electron Microscope Equipped with Energy Dispersive X-ray Spectroscopy and Electron Backscatter Diffraction for Multidisciplinary Research, PI, \$1,354,440
- CEACSE Tennessee Board of Higher Education Grant (2018), Computational Fluid Dynamic Approach for Point-of-Care Diagnostics with Au Nanoparticles, PI, \$100,000
- National Science Foundation Research Experience for Undergraduates (2018), ICompBio – Engaging Undergraduates in Interdisciplinary Computing for Biological Research, Co-PI, \$359,484

2017

- Oak Ridge Associated Universities Ralph E. Powe Junior Faculty Enhancement Award (2017), A New Class of Penternary Chalcogenide Nanocrystals and Thin Films for Solar Energy Conversion Applications, PI, \$10,000
- National Science Foundation Research Experience for Undergraduates (2017), ICompBio – Engaging Undergraduates in Interdisciplinary Computing for Biological Research, Co-PI, \$359,484

2016

- Royal Society of Chemistry Researcher Mobility Grant (2016), Developing a Reliable Strategy for Risk Assessment of Hybrid Nanoparticles through DNA Damage and Metabolomic Studies, PI, € 5,000

Won

Total grants received to date: \$275,785.00

2021

- SURE 2022 Summer Project, A novel multi-modal material characterization approach for the detection of nanomaterials in the Great Miami River, PI

- UT Research Foundation Technology Maturation Grant (2020-2021), HemX Nanofertilizers for Enhanced Agricultural Production, PI, \$10,000
- Integer (2021), FTIR-Guided Method Development for Polyimide Curing Efficiency Analysis to Phase Out Mercury Dissipation Test, Co-PI, \$15,453
- Oak Ridge National Laboratory CNMS User Proposal, A Combined Computational and Experimental Approach to Understand the Structure-Property Relations for Optical Band Gap in Multinary Copper Chalcogenide Nanocrystals, PI

2020

- UT Research Foundation Technology Maturation Grant (2020), HemX Nanofertilizers for Enhanced Agricultural Production, PI, \$10,000
- Integer (2020), FTIR-Guided Method Development for Polyimide Curing Efficiency Analysis to Phase Out Mercury Dissipation Test, Co-PI, \$15,453
- Oak Ridge National Laboratory CNMS User Proposal, A Combined Computational and Experimental Approach to Understand the Structure-Property Relations for Optical Band Gap in Multinary Copper Chalcogenide Nanocrystals, PI
- CEACSE Tennessee Board of Higher Education Grant, Computational Fluid Dynamic Approach for Point-of-Care Diagnostics for COVID-19 with Au Nanoparticles, PI, \$20,000

2019

- Contract: Usage of scanning electron microscopy, Archer Daniels Midland Company, PI, \$600 to date (ongoing)
- Contract: Fourier transform infrared analysis of oil sample, Chattanooga Times Free Press, PI, \$250
- National Science Foundation Research Experience for Undergraduates (2019), ICompBio – Engaging Undergraduates in Interdisciplinary Computing for Biological Research, Co-PI, \$359,484
- Integer (2019), FTIR-Guided Method Development for Polyimide Curing Efficiency Analysis to Phase Out Mercury Dissipation Test, Co-PI, \$24,935
- Faculty Development Grant (2019), Experimental and Numerical Simulation of Nanoparticle Flow through Hydrogel Channels, PI, \$1,500

2018

- CEACSE Tennessee Board of Higher Education Grant, Investigating the Flow of Nanodrugs through Bio-Inspired Hydrogel Channels, PI, \$100,000
- *Student SEARCH Award UTC (Student: Dell Zimmerman), UTC, Characterization and Biological Response of Legumes Fertilized with Engineered Nanoparticles, \$1,000*

2017

- CEACSE Tennessee Board of Higher Education Grant, Computational Fluid Dynamic Approach to Predict Transport and Distribution of Nanodrugs, PI, \$99,221
- Center for Integrated Nanotechnologies User Proposal Award, Sandia National Lab, Understanding the Effect of Engineered Nanoparticles in Agriculture, PI

2016

- Center for Integrated Nanotechnologies User Proposal Award, Sandia National Lab, Developing a New Family of Wurtzite $\text{CuZn}_2\text{ASe}_4$ (A= Al, Ga, In) Nanocrystals for Solar Cell Applications, PI
- *Provost Student Research Award UTC (Student: Megan Downs), UTC, Cost-Effective Synthesis and In-Vitro Evaluation of a New Multifunctional DNA-Conjugated Iron Oxide Nanodrug, \$1,000*

2015

- Tennessee Board of Architectural and Engineering Examiners (TBAAE) Laboratory Equipment Grant for Chemical Eng., UTC, Co-PI, \$26,761

PROFESSIONAL DEVELOPMENT

- Successful completion of Inclusive STEM Teaching course (NSF-sponsored), Dec 2021
- Oral presentations at AgLaunch Row Crop Challenge 2021 (online)
- Oral presentation at MRS Conference in Nov 2020
- Winner of AgLaunch Summer Training Bootcamp for agri-tech start-ups, Jul 2020
- Oral presentation at TMS Conference in Mar 2019
- Attended the NSF-Bio REU Workshop in Arlington, Virginia (2019)
- Poster presenting at MRS Conference in Nov 2018
- Attended the NIH Regional Seminar on Program Funding and Grants Administration held at Washington, DC (2018)
- Successfully completed the Fall 2017 New Faculty Pedagogy Course
- Quality Matters Certification (2017)
- Poster presentation at the NanoBio Summit Conference (2017)
- Presented an invited lecture at International Conference and Exhibition on Materials Science and Engineering (2016)
- Presented invited seminar talks at two of India's premier engineering institutes, Indian Institute of Technology, Kharagpur and Indian Institute of Science, Bangalore (2016)
- Oral talk at ACS SERMACS-SWRM (2015)
- Attended Fundamentals in Teaching Engineering Workshop at Yale University (2012)
- Presented invited lecture at Sammilani College, India (2012)
- Poster presentation at Biomaterials Conference (2011)
- Oral talk at TMS Conference (2011)
- Oral talk and poster at MMM Conference (2010)

EDUCATIONAL ACTIVITIES

Courses taught at UD:

Fall 2021

CME 324 Sec 01: Transport Phenomena I

CME 324 Sec 02: Transport Phenomena I

PRIOR EDUCATIONAL ACTIVITIES

Courses taught at UTC:

Fall 2020

ENCH 4320: Fractional Distillation Separation Processes

ENCH 4350: Chemical Processes Laboratory

ENCH 5360: Mass Transfer Operations

ENCH 7900: Doctoral Research

Spring 2020

ENCH 3040: Chemical Thermodynamics

ENEE 3280L: Control Systems Laboratory

ENCH 5910: Special Topics in Engineering: Transport of Nanomaterials II

ENCH 5910: Special Topics in Engineering: Scanning Electron Microscopy

Fall 2019

ENCH 4320: Fractional Distillation Separation Processes

ENCH 4350: Chemical Processes Laboratory
ENCH 5900: Engineering Project
ENCH 5910: Special Topics: Scanning Electron Microscopy

Spring 2019

ENCH 3040: Chemical Thermodynamics
ENEE 3280L: Control Systems Laboratory
ENCH 4997: Research (Undergraduate)
ENCH 4995: Departmental Thesis
ENCH 5900: Engineering Project
ENCH 5910: Special Topics in Engineering: Nanomaterials

Fall 2018

ENCH 4320: Fractional Distillation Separation Processes
ENCH 4350: Chemical Processes Laboratory
ENCH 4995: Departmental Thesis
ENCH 5900: Engineering Project
ENCH 5910: Special Topics: Transport of Nanomaterials

Spring 2018

ENCH 3040: Chemical Thermodynamics
ENEE 3280L: Control Systems Laboratory
ENCH 4997: Research (Undergraduate)
ENCH 5900: Engineering Project
ENCH 5999: Thesis
ENCH 5910: Special Topics in Engineering

Fall 2017

ENCH 4320: Fractional Distillation Separation Processes
ENCH 4350: Chemical Processes Laboratory
ENEV 4350: Environmental Processes Laboratory }
ENCH 4997: Research (Undergraduate)
ENCH 5900: Engineering Project
ENCH 5910: Special Topics: Understanding the Transport of Nanomaterials
ENCH 5999: Thesis

Spring 2017

ENCH 3040: Chemical Thermodynamics
ENME 3070L(Sec 02): Fluid Mechanics Laboratory
ENME 3070L(Sec 03): Fluid Mechanics Laboratory
ENGR 5900R: Engineering Project

Fall 2016

ENCH 3310: Chemical Process Principles
ENCH 3350: Unit Operations Laboratory
ENCH 4350: Chemical Processes Laboratory }
ENEV 4350: Environmental Processes Laboratory }
ENCH 4997: Research
ENGR 5999R: Thesis

Summer 2016

ENME 3070L: Fluid Mechanics Laboratory

Spring 2016

ENCH 3040: Chemical Thermodynamics

ENCH 3280L: Control Systems Laboratory
ENME 3070L(Sec 0): Fluid Mechanics Laboratory
ENME 3070L(Sec 03): Fluid Mechanics Laboratory

Fall 2015

ENCH 4320: Fractional Distillation Separation Processes
ENCH 3350: Unit Operations Laboratory
ENME 3070L: Fluid Mechanics Laboratory

Graduate Students Advised (Major advisor to the following students)

Name	Option	Graduation
Zeyad Al Abri	Thesis	Fall 2025
Prior experience:		
Syed Mohammad Tareq	Thesis	Fall 2020
Armel Boutchuen	Project	Fall 2020
Eric Pritchard	Thesis	Fall 2021
Chimmezirim Oguoma	Project	Fall 2020
Yaqeen Al Hussain	Project	Fall 2020
Uday Gharge	Thesis	Spring 2018
Abdulaziz Albattah	Project	Spring 2018
Sadhvi Arora	Project	Spring 2018
Shikha Patel	Thesis	Fall 2016

Graduate Thesis Mentored

Uday Gharge, Impact of engineered nanoparticles on the growth of roots, Committee Chair, Completed 2018

Shikha Patel, Electrochemical NO_x reduction using a carbon nanospiked catalyst, Committee Chair, Completed 2016

Syed Mohammad Tareq, Detection and characterization of nanoparticles in the surface water: challenges and findings, Co-Advisor, Completed 2020

Undergraduate Honors Thesis Mentored

- Olivia George, Synthesizing multifunctional iron oxide nanodrugs and developing a model for their size analysis using dynamic light scattering, Committee Chair, Completed 2019; *She won the NSF Graduate Research Fellowship 2019*
- Dell Zimmerman, who is currently conducting his thesis with me won the *2020 Barry C. Goldwater Scholarship*

Undergraduate Students Advised

I plan to serve as a Research Mentor for the following Chemical Engineering students in Spring 2021:

1. Madison Jones
2. Aaron Winget
3. Nicholas Saunders

PUBLICATIONS

Publications: 37, Book chapters: 5, Book: 1, Highlight in Nature: 1, Journal cover arts: 2, h-index: 20, Citations ~ 1258

2021

1. Tareq, S.; Boutchuen, A.; Roy, S.; Bathi, J. R.; *Palchoudhury, S.* "A Dynamic Light Scattering Approach for Detection of Nanomaterials in Tennessee River" Water Resources Research (2021)

2. **Patent: Palchoudhury, S.** “A New Seed Pre-Soak Technology with a Drop of Hematite Nanoparticle Fertilizer for Increased Plant Growth” (U.S. utility patent submitted)
3. Book Chapter: **Palchoudhury, S.;** Palchoudhury, S. “Bionanomaterials for diagnosis and therapy of SARS-CoV-2”, *Bionanotechnology: Emerging Applications of Bionanomaterials*”, Elsevier (2021)
4. Bathi, J.R.; Roy, S.; Potts, G.; Tareq, S.; **Palchoudhury, S.;** Sweck, S.; Gadhamshetty, V. “Dispersion and Aggregation Fate of Individual and Co-existing Metal Nanoparticles Under Environmental Aqueous Suspension Conditions” *Environmental Science: Processes & Impacts*, RSC, submitted
5. Das, P.; **Palchoudhury, S.;** Cox, D.; Lackey, K.; Bao, Y.; Elliott, M. “Antibacterial effects of engineered iron oxide nanoparticles on Escherichia coli and drug resistant Staphylococcus aureus” *Environmental Science & Technology*, to be submitted

2020

6. **Patent: Palchoudhury, S.** “A New Seed Pre-Soak Technology with a Drop of Hematite Nanoparticle Fertilizer for Increased Plant Growth” (Provisional patent submitted)
7. **Palchoudhury, S.;** Ramasamy, K.; Gupta, A. “Multinary Copper-based Chalcogenide Nanocrystal Systems from the Perspective of Device Applications” *Nanoscale Advances* (2020, Highlighted as Themed Review)
8. Book Chapter: Jeevanandam, J.; **Palchoudhury, S.;** Danquah, M.K. “Effects of Nano-Biofertilizer on Plant Yield and Growth”, Elsevier (submitted)
9. Boutchuen, A.; Zimmerman, D.; Arabshahi, A.; Melnyczuk, J.; **Palchoudhury, S.** “Understanding Nanoparticle Flow with a New *In Vitro* Experimental and Computational Approach using Hydrogel Channels” *Beilstein Journal of Nanotechnology* (2020)

2019

10. Boutchuen, A.; Zimmerman, D.; Aich, N.; Masood, A.; Arabshahi, A.; **Palchoudhury, S.** “Increased Plant Growth with Hematite Nanoparticle Fertilizer Drop and Determining Nanoparticle Uptake in Plants Using Multimodal Approach” *Journal of Nanomaterials* (2019, Editor of the Special Issue)
11. **Palchoudhury, S.;** Aich, N.; Zhou, Z. “Advances in Smart Nanomaterials: Environmental Perspective” Editorial, *Journal of Nanomaterials* (2019)
12. Gayen, B.; **Palchoudhury, S.;** Chowdhury, J. “Carbon Dots: A Mystic Star in the World of Nanoscience” *Journal of Nanomaterials* (2019)
13. **Palchoudhury, S.;** Arabshahi, A.; Gharge, U.; Albattah, A.; George, O.; Foster, Y. “Integrated Experimental and Computational Approach for Nanoparticle Flow Analysis” *Physics Letters A* (2019)
14. **Palchoudhury, S.;** Ramasamy, K.; Gupta, R.; Gupta, A. “Flexible Supercapacitors: A Materials Perspective” *Frontiers in Materials* (2019)
15. Li, H.; He, Z.; Ouyang, Z.; **Palchoudhury, S.;** Ingram, C.W.; Harruna, I.I.; Li, D. “Modifying Electrical and Magnetic Properties of Single-Walled Carbon Nanotubes by Decorating with Iron Oxide Nanoparticles” *Journal of Nanoscience and Nanotechnology* (2019)

2018

16. **Palchoudhury, S.;** Jungjohann, K.; Weerasena, L.; Arabshahi, A.; Gharge, U.; Albattah, A.; Miller, J.; Patel, K.; Holler, R. “Enhanced Legume Root Growth with Pre-soaking in α -Fe₂O₃ Nanoparticle Fertilizer” *RSC Advances* (2018, **featured in Themed Editor’s Choice Collection**)
17. **Book: Palchoudhury, S.** “Strategic Applications of Measurement Technologies and Instrumentation”, IGI Global (2018, Editor)

2017

18. Zhang, C.; Wang, Z.; Bhojate, S.; Morey, T.; Neria, B.; Vasiraju, B.; Gupta, G.; **Palchoudhury, S.;** Kahol, P.K.; Mishra, S.R.; Perez, F.; Gupta, R. “MoS₂ Decorated Carbon Nanofibers as Efficient and Durable Electrocatalyst for Hydrogen Evolution Reaction” *C* (2017, **featured as cover art**)

19. Zhou, Z.; Bedwell, G.; Li, R.; **Palchoudhury, S.**; Prevelige, P.E.; Gupta, A. “Pathways for Gold Nucleation and Growth over Protein Cages” *Langmuir* (2017)
20. Negi, D.S.; Sharona, H.; Bhat, U.; **Palchoudhury, S.**; Gupta, A.; Datta, R. “Surface Spin Canting in Fe₃O₄ and CoFe₂O₄ Nanoparticles Probed by High-Resolution Electron Energy Loss Spectroscopy” *Phys. Rev. B* (2017)
21. **Palchoudhury, S.**; Zhou, Z.; Ramasamy, K.; Okirie, F.; Prevelige, P.; Gupta, A. “Self-Assembly of P22 Protein Cages with Iron Oxide Nanoparticles and Polyamidoamine Dendrimers” *JMR* (2017)
22. **Book Chp.:** Ramasamy, K.; **Palchoudhury, S.**; Gupta, A. “Synthesis and Properties of Magnetic Chalcogenide Nanostructures”, Wiley (2017)

2016

23. **Palchoudhury, S.**; Ramasamy, K.; Gupta, A. “Recent Progress in Spintronics” *Material Matters* (2016, Invited Paper)
24. Ghosh, A.; **Palchoudhury, S.**; Thangavel, R.; Zhou, Z.; Naghibolashrafi, N.; Ramasamy, K.; Gupta, A. “A New Family of Wurtzite-Phase Cu₂ZnAS_{4-x} and CuZn₂AS₄ (A= Al, Ga, In) Nanocrystals for Solar Energy Conversion Applications” *ChemComm* (2016, **featured as cover art, communicating author**)
25. **Palchoudhury, S.**; Palchoudhuri, S. “Rapid Determination of Hexavalent Chromium in ppb Level and Speciation of the Metal with a New Organic Reagent, Bis(pyrrole-2aldehydo)thiocarbohydrazone (BPATCH) in Presence of Vanadium(V)” *J. Indian Chem. Soc.* (2016)
26. **Book Chp.:** Melnyczuk, J; **Palchoudhury, S.** “Introduction to Bio-Inspired Hydrogel and Their Applications”, *Emerging Research on Bioinspired Materials Engineering*, IGI Global (2016)

2015

27. **Book Chp.:** **Palchoudhury, S.**; Baalousha, M.; Lead, J.R. “Methods for Measuring Concentration of Nanoparticles”, *Frontiers in Nanoscience.*, Elsevier (2015)
28. Gupta, R; Candler, J.; **Palchoudhury, S.**; Ramasamy, K.; Gupta, B. “Flexible and High Performance Supercapacitors based on NiCo₂O₄ for Wide Temperature Range Applications” *Sci. Rep.* (2015)
29. Candler, J.; Elmore, T.; Gupta, B.; Dong, L.; **Palchoudhury, S.**; Gupta, R. “New Insight into High-Temperature Driven Morphology Reliant CoMoO₄ Flexible Supercapacitor” *NJC* (2015)
30. Ramasamy, K.; Gupta, R.; Sims, H.; **Palchoudhury, S.**; Ivanov, S.; Gupta, A. “Layered Ternary Sulfide CuSbS₂ Nanoplates for Flexible Solid-State Supercapacitors” *JMC A* (2015)

2014

31. **Palchoudhury, S.**; Lead, J.R. “A Facile and Cost-Effective Method for Separation of Oil-Water Mixtures using Polymer-Coated Iron Oxide Nanoparticles” *Env. Sci. Technol.* (2014)
32. Ramasamy, K.; Gupta, R.; **Palchoudhury, S.**; Ivanov, S.; Gupta, A. “Layer-Structured Copper Antimony Chalcogenides (CuSbSe_xS_{2-x}): Stable Electrode Materials for Supercapacitors” *Chem. Mater.* (2014)
33. Li, H.; Melnyczuk, J.; Lauchon, L.; **Palchoudhury, S.**; Wu, J.; Nagappan, P.; Harruna, I.; Wang, X. “Selectively Self-assembling Graphene Nanoribbons with Shaped Iron Oxide Nanoparticles” *RSC Adv.* (2014)
34. **Book Chp.:** Melnyczuk, J; **Palchoudhury, S.** “Synthesis and Characterization of Iron Oxide Nanoparticles”, *Handbook of Research on Nanoscience, Nanotechnol. & Adv Mater.*, IGI Global (2014)

2013

35. **Palchoudhury, S.**; Hyder, F.; Vanderlick, K; Geerts, N. “Water-Soluble Anisotropic Iron Oxide Nanoparticles: Dextran-Coated Crystalline Nanoplates and Nanoflowers” *Part. Sci. & Technol.* (2013)

2012

36. **Palchoudhury, S.**; Xu, Y.; Rushdie, A.; Holler, R.; Bao, Y. “Controlled Synthesis of Iron Oxide Nanoplates and Nanoflowers” *ChemComm* (2012)

37. **Palchoudhury, S.**; Xu, Y.; Rushdie, A.; Bao, Y. “DNA Interaction of Platinum Attached Iron Oxide Nanoparticles” IEEE Transactions (2012)
38. Xu, Y.; **Palchoudhury, S.**; Yin, Q.; Macher, T.; Bao, Y. “Make Conjugation Simple: A Facile Approach to Integrated Nanostructures” Langmuir. (2012)

2011

39. **Palchoudhury, S.**; An, W.; Xu, Y.; Qin, Y.; Zhang, Z.; Holler, R.; Turner, C. Heath; Chopra, N.; Bao, Y. "Synthesis and Growth Mechanism of Iron Oxide Nanowhiskers" Nano Lett. (2011, impact factor 13). **First paper to report maghemite nanowhiskers.**
40. **Palchoudhury, S.**; Xu, Y.; Goodwin, J.; Bao, Y. “Synthesis of Multiple Platinum Attached Iron Oxide Nanoparticles” J. Mater. Chem. (2011)
41. **Palchoudhury, S.**; Xu, Y.; Goodwin, J.; Bao, Y. “Synthesis of Iron Oxide Nanoworms” J. Appl. Phys. (2011)
42. Xu, Y.; Yin, Q.; **Palchoudhury, S.**; Bao, Y. “Water Soluble Iron Oxide Nanoparticles with High Stability and Selective Surface Functionality” Langmuir. (2011). **Highlight in Nature.**

2010

43. **Palchoudhury, S.**; Xu, Y.; An, Wei; Turner, C. H.; Bao, Y. “Platinum Attachments on Iron Oxide Nanoparticle Surfaces” J. Appl. Phys. (2010)
44. Dozier, D.; **Palchoudhury, S.**; Bao, Y. “Synthesis of Iron Oxide Nanoparticles with Biological Coatings” JOSHUA. (2010)

2009

45. Sikder, J.; Pereira, C.; **Palchoudhury, S.**; Vohra, K.; Basumatary, D.; Pal, P. “ Synthesis and Characterization of Cellulose acetate-polysulfone Blend Microfiltration Membrane for Separation of Microbial Cells from Lactic Acid Fermentation Broth” Desalination (2009)

CONFERENCE PRESENTATIONS

1. **Palchoudhury, S.**; Jones, M.; Al Abri, Z.; Saunders, N.; Designing novel semiconductor materials with Cu-based chalcogenide nanocrystals via a coupled computational and experimental band gap engineering, MRS Annual Conference 2022, Honolulu, Hawaii, submitted
2. **Palchoudhury, S.** HemaX nanofertilizer, AgLaunch Row Crop Challenge, Oct- Dec 2021, (Oral Talk)
3. **Palchoudhury, S.**; Allen, T.; Boutchuen, A.; Denton, O.; Bey, S. “A materials view of a new family of penternary copper chalcogenide semiconductor nanocrystals and thin films” Materials Research Society Virtual Conference, Nov 2020 (Oral Talk)
4. Zimmerman, D.; Boutchuen, A.; **Palchoudhury, S.** “Synthesis and characterization of poly(2-hydroxyethyl methacrylate) hydrogels” National Council of Undergraduate Research Conference, to be presented on Apr 2021 (Oral Talk)
5. Zimmerman, D.; Boutchuen, A.; **Palchoudhury, S.** “Synthesis and characterization of poly(2-hydroxyethyl methacrylate) hydrogels” American Institute of Chemical Engineers Annual Student Conference, Nov 2019 (Poster)
6. Zimmerman, D.; Boutchuen, A.; **Palchoudhury, S.** “Synthesis and characterization of poly(2-hydroxyethyl methacrylate) hydrogels” NanoBio Summit, Sep 2019 (Poster, Won 1st prize)
7. George, O.; Zimmerman, D.; Jur, G.; Foster, Y.; Patel, K.; **Palchoudhury, S.** (faculty advisor) “Effect of different ligands on water-soluble iron oxide nanoparticles” 2019 Technology Symposium, Apr 2019 (Poster, Won 1st prize)
8. Boutchuen, A.; **Palchoudhury, S.** (faculty advisor) “Synthesis and size analysis of DNA conjugated bio-hybrid nanostructures” 2019 Technology Symposium, Apr 2019 (Poster)

9. **Palchoudhury, S.**; Arabshahi, A.; Gharge, U.; Boutchuen, A.; Foster, Y.; Zimmerman, D.; Alresheedi, H. “A new class of integrated chalcogenide nanocrystals and thin films for solar cell applications” 2019 TMS Conference, Mar 2019 (Oral Talk)
10. **Palchoudhury, S.**; Arabshahi, A.; Foster, Y.; Gharge, U.; Boutchuen, A. “Synthesis and size analysis of DNA conjugated bio-hybrid nanostructures” Materials Research Society Fall Conference, Nov 2018 (Poster)
11. George, O.; McMahon, W.; Arabshahi, A.; **Palchoudhury, S.** “Synthesis and transport of Pt-iron oxide nanodrugs” National Council of Undergraduate Research Conference, Apr 2018 (Oral Talk)
12. George, O.; Patel, K.; McMahon, W.; Foster, Y.; Doumitt, C.; **Palchoudhury, S.**; Arabshahi, A. “Synthesis and transport of nanodrugs”, Research Dialogues, Apr 2018 (Oral Talk)
13. Gharge, U.; Albattah, A.; McMahon, W.; Rayl, M.; Davis, E.; Arora, S.; Alp, K.; Flowers, C.; Patel, K.; Miller, J.; **Palchoudhury, S.** “Impact of engineered nanoparticles on seedlings” NanoBio Summit, Nov 2017 (Poster)
14. Gharge, U.; Albattah, A.; Patel, K.; Miller, J.; Conway, E.; Patrick, E.; George, O.; **Palchoudhury, S.** “Impact of engineered nanoparticles on seedlings” ACS SERMACS Nov 2017 (Poster)
15. Albattah, A.; Gharge, U.; **Palchoudhury, S.** “Investigating the effect of engineered nanoparticles on the germination of seeds” Research Dialogues, Apr 2017 (Poster)
16. Patel, K.; Miller, J.; George, O.; Downs, M.; **Palchoudhury, S.** “Synthesis of hybrid Pt-iron oxide nanoparticles via DNA conjugation” Research Dialogues, Apr 2017 (Oral Talk)
17. **Palchoudhury, S.** “Synthesis and characterization of hybrid nanoparticles for biomedical and environmental remediation applications”, International Conference and Exhibition on Materials Science and Engineering, Sep 2016 (Invited talk)
18. Orr, R.; Alkushiban, H.; Alshammari, B.; Downs, M.; **Palchoudhury, S.** “Cost-effective Synthesis of Iron Oxide Nanoparticles Towards Sustainable Nanotechnology” Research Dialog, Apr 2016 (Poster)
19. **Palchoudhury, S. et al.**; “Dextran-iron oxide nanoplates and nanoflowers showing excellent aqueous phase stability”, SERMACS-SWRM, Nov 2015 (Oral talk)
20. **Palchoudhury, S. et al.**; “Self-assembly of protein cages with polymer and nanoparticles”, NanoBio Summit, Oct 2014 (Poster)
21. **Palchoudhury, S.** “Synthesis and characterization of nanostructures for biomedical applications”, Sammilani College, India, Dec 2012 (Invited talk)
22. **Palchoudhury, S. et al.** “Synthesis of iron oxide nanoworms”, 9th International Conference on the Scientific and Clinical Applications of Magnetic Carriers, May 2012 (Poster)
23. **Palchoudhury, S.**; Xu, Y.; Bao, Y. “Synthesis, characterization, and growth mechanism of iron oxide nanoworms”, MINT Fall Review Meeting, Oct 2011 (Poster)
24. **Palchoudhury, S.**; Xu, Y.; Bao, Y. “Synthesis of multiple platinum attached iron oxide nanoparticles”, 140th TMS Conference, Mar 2011 (Oral talk)
25. **Palchoudhury, S.**; Xu, Y.; Bao, Y. “Synthesis of iron oxide nanoworms”, Biomaterials Day, 28th Jan 2011 (Poster)
26. **Palchoudhury, S.**; Xu, Y.; Goodwin, J.; Bao, Y. “Synthesis of multiple platinum attached iron oxide nanoparticles”, 55th MMM Conference, Nov 2010 (Oral talk)
27. **Palchoudhury, S.**; Xu, Y.; Goodwin, J.; Bao, Y. “Synthesis of iron oxide nanoworms”, 55th MMM Conference, Nov 2010 (Poster)
28. **Palchoudhury, S. et al.**; “Platinum attachments on iron oxide nanoparticle surfaces”, 11th Joint MMM-Intermag Conference, Jan 2010 (Oral talk)

SYNERGISTIC ACTIVITIES

- I have established a Nanobiomaterials laboratory in the Chemical and Materials Eng department of UD for research training of undergraduate and graduate researchers, collaborative industry projects, and inter-disciplinary collaborative research projects. A few representative research projects from my group include:

1. Quinary chalcogenide nanocrystals, $\text{Cu}_2\text{ZnAS}_{4-x}\text{Se}_x$ ($A=\text{Al,Ga,In}$) for solar cell applications
 2. Effect of nanoparticle fertilizer on plants
 3. Bio-inspired nanogels for novel drug delivery and hyperthermia
 4. Synthesis of fluorescent nanoparticles for point-of-care diagnostics
- Established successful research collaborations with Drs. Jingsong Huang at Oak Ridge National Laboratories, M. Elliott at the Univ of Alabama, M. Kango-Singh, E. Vasquez, and L. Cao at UD, Katherine Jungjohann and Sergei Ivanov at CINT, Sandia National Lab, Dr. Nirupam Aich at the University of Buffalo, Anton Paar, Hitachi, Cellink 3D Bioprinting Company, Integer LLC., and Archer Daniels Midland.
 - **Research output:** 37 publications, one book, and five book chapters; h-index: 20, Citations ~ 1258
 - Won 1 NSF-REU proposal as Co-PI
 - **CNMS User Proposal, Oak Ridge National Lab**, Award No. CNMS2020-B-00360, 2020: I was awarded this peer-reviewed user grant for my collaboration on multinary chalcogenides with Nanotechnology Theory Institute.
 - **CINT User Proposal Awards, Sandia National Lab:** “Developing a new family of wurtzite $\text{CuZn}_2\text{ASe}_4$ ($A=\text{Al, Ga, In}$) nanocrystals for solar cell application” and “Understanding the effect of engineered nanoparticles in agriculture.” I received the awards to use transmission electron microscopy and other material characterization facilities at Sandia National Lab for analyzing the new nanoscale materials synthesized in my lab at UTC.
 - **Tennessee Higher Education Commission (THEC) Center of Excellence in Applied Computational Science & Engineering (CEACSE) Grant:** I received the THEC CEACSE award (\$100,000) for my interdisciplinary project combining computational and experimental methods to analyze nanoparticle transport, titled “Investigating the flow of nanodrugs through bio-inspired hydrogel channels.”
 - **Research Mentees:** I have mentored 19 undergraduate students and 8 graduate researchers at UTC in total. My mentees have been the recipients of Barry C. Goldwater Scholarship, NSF Graduate Research Fellowship, and Outstanding Graduate Student Awards.
 - **Research Highlights:** My work on engineering a new phase transfer technique to form water-soluble iron oxide nanoparticles has been highlighted in *Nature*, “Chemistry: Iron nanoparticles into blood.” *Nature* 2011, 476, 9. “A new family of wurtzite-phase $\text{Cu}_2\text{ZnAS}_{4-x}$ and CuZn_2AS_4 ($A= \text{Al, Ga, In}$) nanocrystals for solar energy conversion applications”, *Chem Commun* 2016, 52, 217 has featured as the cover art. “ MoS_2 Decorated Carbon Nanofibers as Efficient and Durable Electrocatalyst for Hydrogen Evolution Reaction” has featured as the top cover of the journal *C* 2017, 3(4). My research on iron oxide nanoparticle fertilizers has been selected by the Editor for a Themed Collection in the journal of *RSC Advances*. My research on multinary chalcogenide nanocrystals has featured as a Hot Article Collection in *Nanoscale Advances*.
 - **Editorial:** I served as the lead editor for a Special Issue of the *Journal of Nanomaterials* titled “Advances in smart nanomaterials: environmental perspective”.
 - **Invited Lecture** at the International Conference and Exhibition on Materials Science and Eng, 2016
 - **Proposal submissions:** I have submitted 2 NSF proposals and 3 internal proposals at UD in Fall 2021.

- I have served as the Graduate Co-ordinator of Chemical Engineering and have dedicated continuous efforts in increasing graduate enrollment with highly encouraging results.
- I have served as the faculty advisor for SWE and actively participate in NSBE student chapter workshops. The key focus of my outreach activities is to enhance participation of female students and students from underrepresented groups in STEM fields, particularly chemical engineering. I have won the outstanding service award for my dedicated efforts in organizing hands-on science activities at local schools.
- **Start-up Company:** I founded the start-up specialty company, S&J NanoChemicals Inc. in 2020. Our patented nanofertilizers enhances growth, resilience, and longevity in a wide variety of food and bio-energy crops at a single drop while keeping the environment sustainable. Our company was selected for the AgLaunch Summer Bootcamp, a highly competitive training program for agri-tech businesses. We were selected among the top 10 companies for AgLaunch Row Crop Challenge 2021.

BRIEF HIGHLIGHT OF MY RESEARCH PROJECTS AT DIFFERENT INSTITUTES

- **University of Dayton, Ohio, Aug 2021-present**
Assistant Professor– Chemical and Materials Engineering
 Synthesis of bio-inspired hybrid nanoparticles for energy, environmental, and drug delivery applications, nanomaterials for emerging agri-tech applications, and computational approaches to design sustainable semiconductor materials.
- **University of Tennessee at Chattanooga, Tennessee, Aug 2015-Jul 2021**
Assistant Professor and Visiting Assistant Professor – Chemical Engineering
 Synthesis of hybrid nanoparticles for antibacterial and drug delivery applications, investigating transport of nanodrugs, environmental effect of engineered nanoparticles, synthesis of new chalcogenide nanocrystals and thin films for device applications.
- **The University of Alabama, Tuscaloosa, Alabama, Feb 2014-Jun 2015**
Postdoctoral Associate – Center for Materials and Information Technology
 Synthesis and material characterization of hierarchical structures based on semiconductor particles and virus procapsids for sustainable energy applications.
- **University of South Carolina, Columbia, South Carolina, June 2013-Feb 2014**
Postdoctoral Associate – Arnold School of Public Health
 Synthesis of new polymer-coated magnetic particles for BP oil spill clean-up.
- **Yale University, New Haven, Connecticut, June 2012-May 2013**
Postdoctoral Associate – Chemical and Environmental Engineering Department
 My research goal was to synthesize polymer and lipid encapsulated nanomaterials conjugated to giant unilamellar vesicles for MRI applications in collaboration with Yale Medical School.
- **The University of Alabama, Tuscaloosa, Alabama, August 2008 – May 2012**
Research Assistant (Ph.D.) – Chemical and Biological Engineering Department
 The goal of my Ph.D. research was to develop a bifunctional Pt-decorated iron oxide nanoparticle system for the first time. The Pt component served as the chemotherapeutic agent while the iron oxide acted as the support material and imaging agent. DNA interaction of this new Pt-iron oxide nanoparticle was also studied as a proof of the concept.
- **National Institute of Technology, Durgapur, India, May 2004 – May 2008**
Research Assistant (undergraduate) – Chemical Engineering Department
Modeling Production of Lactic Acid in Membrane Based Process.

The work modeled an economic production of lactic acid from sugarcane juice and its recovery using microfiltration followed by nanofiltration techniques. The set-up modeled, is a perfect manifestation of process intensification.

Software Development for 2D Structure of Organic Compounds through IUPAC

The software is accurate in predicting structure of acyclic organic molecules from their IUPAC names. It can serve as an inter-disciplinary study guide for students.

- **Indian Oil Corp. Ltd., Haldia, India, May 2007 – June 2007, Undergraduate Trainee**
The training provided an overview of the distillation columns, cooling towers, and the water treatment facilities used by one of the top Indian oil refinery.