

# Dibyendu Mukherjee

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## EDUCATION

- Ph. D. (Mechanical Engineering)** May 2001 - August 2005  
University of Minnesota at Twin Cities, Minneapolis
- M.S. (Mechanical Engineering)** August 1999 - March 2001  
University at Buffalo, The State University of New York (SUNY)
- B.E. (Mechanical Engineering)** June 1993 - June 1997  
The M. S. University of Baroda, Vadodara, India

## PROFESSIONAL EXPERIENCE

- Associate Prof. of Practice** January 2024 - Present  
Department of Chemical, Environmental & Materials Engineering (CEME),  
University of Miami, Florida
- Research Asst. Professor** August 2019 - December 2023  
Department of Chemical & Biomolecular Engineering (CBE),  
University of Tennessee, Knoxville
- Assistant Professor** January 2012 - July 2019  
Department of Mechanical, Aerospace & Biomedical Engineering (MABE),  
University of Tennessee, Knoxville
- Gibson Post-Doctoral Fellow** August 2007 - December 2011  
Department of Chemical & Biomolecular Engineering (CBE),  
University of Tennessee, Knoxville
- Post-Doctoral Research Associate** August 2005 - August 2007  
Environmental Sciences Division,  
Oak Ridge National Laboratory (ORNL), Oak Ridge

## HONORS & AWARDS

- FY 2021 Defense University Research Instrumentation Program (DURIP) award from Air Force Office of Scientific Research (AFOSR), U.S. Department of Defense (**2021**)
- Honorarium for invited speakership at the Inorganic Chemistry Department in University of Duisburg- Essen, Germany (**2017**)
- Student poster award (**Awardee:** Sheng Hu; **PI:** Dibyendu Mukherjee) at MRS Fall Meeting & Exhibit (**2016**)
- Nomination for best poster award (**Nominee:** Sheng Hu; **PI:** Dibyendu Mukherjee) at MRS Spring Meeting (**2014**)
- Carbon nanomaterials graduate student award (**Awardee:** Mahshid Mokhtarnejad; **co-PI:** Dibyendu Mukherjee) at AIChE Annual Meeting (**2022**)

## RESEARCH INTERESTS

### Nano-manufacturing, and nano-bio materials for energy, energetics and environment

- Scalable nano-manufacturing processes.
- Laser Ablation Synthesis in Solution (LASiS) for composite/intermetallic and metastable nanomaterials.
- Machine-learning driven materials processing and characterizations.
- Multi-functional nanomaterials for energetic, catalytic and supercapacitor/battery applications.
- Laser Induced Breakdown Spectroscopy (LIBS).
- Monte-Carlo and phenomenological models for nanoparticle formation, growth and evolution study.
- Photosystem I (PS I) based bio-hybrid photo-electrochemical conversions, and quantum biology.
- Nanotoxicology.

## RESEARCH GRANTS UNDER CONTRACT

Till date, ~\$ 2.3M of total grant money from federal (NSF, DOE, DOD) and industrial funding

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- Agency:** Air Force Office of Scientific Research (AFOSR)  
**Title:** Composite energetic nanomaterials with tunable activities via laser ablation synthesis in solution  
**Total funding awarded:** \$ 870,000 (PI Award: \$ 870,000)  
**Award period:** September, 2019 – September 29, 2023
- Agency:** AFOSR - Supplemental Support for Research Trainees (SSRT)  
**Title:** Synthesis-structure-functionality study for metastable energetic nanocomposites synthesized via LASiS  
**Total funding awarded:** \$ 110,087 (PI Award: \$ 110,087)  
**Award period:** September 15, 2022 – September 29, 2023
- Agency:** US Office of Naval Research (ONR)  
**Title:** Tailoring metastable metal/ceramic interfaces in composite energetic nanomaterials via mechanistic understanding of the chemical dynamics of laser ablation synthesis in solution.  
**Total funding awarded:** \$ 482,000 (PI Award: \$ 482,000)  
**Award period:** May 01, 2021 - April 30, 2024
- Agency:** AFOSR - Defense University Research Instrumentation Program (DURIP)  
**Title:** Programmable LASiS (Pro-LASiS): Large-scale machine learning driven nano-manufacturing of composite energetic nanomaterials (ENMs) with tunable interfacial activities  
**Total funding awarded:** \$ 435,000 (PI Award: \$ 435,000)  
**Award period:** April 27, 2021 - April 26, 2024
- Agency:** NSF - IUCRC (Industry-University Cooperative Research Centers Program)  
**Title:** Center for Composite and Hybrid Materials Interfacing (CHMI) (University partners: Georgia Tech, Oakland University, and the University of Tennessee/Knoxville (UTK))  
**Total center funding awarded:** \$ 700,000 (Tentative Co-PI Award on 1 project: \$ 50,000 – 100,000)  
**Submission Date:** July 01, 2021 - June 30, 2026

## STUDENT ADVISING

Advised 3 post-doctoral researchers, graduated 6 PhD students (Lead PI for 3; co-PI for 3), and mentored more than 10 undergraduate research interns till date

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### Current Students/ Post-docs:

Total Number of Current Graduate Students: 3  
    *Lead PI for the number of graduate students:* 2 (from CBE Department)  
    *Co-PI for the number of graduate students:* 1 (from CBE Department)  
Number of Current undergraduate researchers: 2

### Previous Students/ Post-docs

Number of PhDs Graduated: 6  
    *Number of PhDs individually advised:* 3 (2 from MABE; 1 from CBE)  
    *Number of PhDs co-advised:* 3 (from CBE)  
Number of post-docs mentored: 3

### List of Graduate Students Advised:

Name	Degree	Year	Dept.	Post-graduation Employment
<b>Major Advisor:</b>				
Sheng Hu	PhD	2015	CBE	Sr. Scientist, Corbus Pharmaceuticals, PA
Seyyed Ali Davari	PhD	2018	MABE	Data Scientist, California Air Resources Board, CA
Ravi Pamu	PhD	2020	MABE	Process Engineer, Intel Inc., NM
<b>Co-Advisor:</b>				
S. Hanieh Niroomand	PhD	2016	CBE	Senior Scientist, Eastman Chemical Co., TN
Tyler H. Bennett	PhD	2019	CBE	Post-doc, Oak Ridge National Lab, TN
Erick L. Ribeiro	PhD	2020	CBE	Post-doc, MSE Dept., University of Tennessee, TN

## TEACHING ACTIVITIES & SERVICES

Average instructor rating ~4.4 (out of 5) in teaching thermodynamics and senior lab courses

### Undergraduate Courses:

#### - Current

- **Engineering Analysis of Chemical, Env. & Materials Systems (CET 200):** Fall 2024 in CEME

#### - Past

- **Thermodynamics (ME 331):** Taught 9 semesters; Average instructor rating ~4.30
- **Chemical Engineering Thermodynamics (CBE 250):** Taught 5 semesters; Average instructor rating ~4.63
- **Senior Mechanical Engineering Lab (ME 449):** Taught 10 semesters; Average instructor rating ~4.00

### Graduate Courses:

- **Graduate Seminar Series (ME 595):** Every fall for 6 semesters for graduate student orientations. Course included introduction to academic/mentoring policies, lab safety, and research presentations from the department.

Course	Semester	Credit Hrs.	Enrollment	Avg. Rating*	Course	Semester	Credit Hrs.	Enrollment	Avg. Rating*
CBE 250	Sum. 2019	4	11	4.75	ME 449	Spr. 2013	3	12	1.60
	Sum. 2020 (Online)	4	19	N.A.#		Fall 2013	3	11	2.20
	Spr. 2021	4	45	4.5		Spr. 2014	3	12	4.60
	Sum. 2021	4	7	N.A.#		Fall 2014	3	11	4.50
	Sum. 2022	4	8	N.A.#		Spr. 2015	3	13	5.00
ME 331	Spr. 2014	3	75	3.93		Fall 2015	3	14	3.75
	Spr. 2015	3	77	4.57		Spr. 2016	3	14	4.00
	Spr. 2016	3	74	4.14		Spr. 2017	3	15	4.89
	Fall 2016	3	94	3.98		Spr. 2018	3	16	4.25
	Spr. 2017	3	67	4.07		Spr. 2019	3	16	5.00
	Fall 2017	3	84	4.16	ME 595	Fall 2013	1	23	N.A.#
	Spr. 2018	3	75	4.35		Fall 2014	1	23	N.A.#
	Fall 2018	3	72	4.79		Fall 2015	1	18	3.44
	Spr. 2019	3	62	4.74		Fall 2016	1	37	3.83
						Fall 2017	1	25	4.00
				Fall 2018	1	30	4.30		

\*Based on instructor effectiveness/contributions criteria.

#Statistically insufficient student responses.

## PROFESSIONAL SERVICES

- Ad-hoc reviewer for Advanced Materials; JACS; Journal of Physical Chemistry; ACS Catalysis; ACS Applied Electronic Materials; Nanoscale Advances; ChemElectroChem; Journal of Aerosol Science; Analytical Chemistry, Langmuir, Biochemistry, Journal of Analytical Atomic Spectrometry, Electrochemical & Solid-State Letters, Physical Chemistry Chemical Physics, Aerosol Science & Technology; Colloids & Surfaces B; Tellus; Talanta; Journal of Materials Chemistry A; AIChE Journal; Particuology; Chemical Engineering Journal; Chemical Engineering Science; Environmental Progress & Sustainable Energy, Spectrochimica Acta B; Journal of Applied Physics; Small Methods; Adv. Powder Technology; Composites B; Langmuir.
- Member of **American Association for Advancement of Science (AAAS)**, **American Society of Mechanical Engineers (ASME)**, **American Chemical Society (ACS)**, **Materials Research Society (MRS)**, **American Society for Engineering Education (ASEE)**.
- On-site technical reviewer on the **2016 NSF panel for Nanomanufacturing program**.
- International reviewer for **China-Israel Cooperative Scientific Research**, Ministry of Science, Technology & Space, Jerusalem, Israel.
- International reviewer for German Research Foundation (**Deutsche Forschungsgemeinschaft**).
- Invited as an expert participant for **2022 US Army Research Lab (ARL) Mid-Term Tech Forecasting Workshop** on "Disruptive Energetics: Projected Scientific Breakthroughs in 2027-2032."
- Session chair for "Novel Materials for Li-Ion Technologies" at **MRS Spring Meeting**, May 9 2022, Honolulu, HI.

## JOURNAL PUBLICATIONS (<sup>‡</sup> = Corresponding Authors)

**43 published articles** (Avg. Impact Factor: ~5.0-5.5; Total Citations: 1654; h-index: 23 as per Google Scholar), **3 book chapters**, **2 US patents**, **1 US patent appl.**, **2 Invention Disclosures.**

1. E. M. Davis, E. L. Ribeiro, S. Kamali, J. Wen, C. Johnson, J. Johnson<sup>‡</sup>, B. Khomami, D. Mukherjee<sup>‡</sup>, (2024) "Fe-carbide/Fe-oxide-based nanocomposites synthesized as magnetic nanomaterials via laser ablation synthesis in solution (LASiS)." **Applied Surface Science**, **658**, 159682. (Impact Factor: 6.7) <https://doi.org/10.1016/j.apsusc.2024.159682>
2. M. Mokhtarnejad, E. L. Ribeiro, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2023) "Green Alternative for Rational Synthesis of Non-precious Bi-metallic Hybrid Nanocomposites as Oxygen Reduction Electrocatalysts." **ACS Applied Nanomaterials**, **6** (14), 13698. (Impact Factor: 5.9) <https://doi.org/10.1021/acsnm.3c02703>
3. E. M. Davis, G. Duscher, J. Wen, D. Mukherjee<sup>‡</sup>, (2023) "Laser-induced trapping of metastable amorphous-AIO<sub>x</sub>/C (2.5 < x ≤ 3.5) nanocomposites." **ACS Applied Nanomaterials**, **6** (13), 10977 (Impact Factor: 5.9) <https://doi.org/10.1021/acsnm.3c00473>
4. E. M. Davis, J. L. Gottfried, G. Duscher, D. Mukherjee<sup>‡</sup>, (2022) "Laser-induced trapping of metastable nanocomposites as high-performance energetic additives." **Journal of DoD Research & Engineering**, **5** (4) 67. [LIMITED DISTRIBUTION MATERIAL]
5. S. A. Davari<sup>‡</sup>, D. Mukherjee<sup>‡</sup>, (2022) "Deep Learning Models for Data-driven Laser Induced Breakdown Spectroscopy (LIBS) Analysis of Interstitial Oxygen Impurities in Czochralski-Si Crystals." **Applied Spectroscopy**, **76** (6), 667. (Impact Factor: 3.6) <https://doi.org/10.1177/00037028221085640>
6. M. Mokhtarnejad, E. L. Ribeiro, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2022) "3D printed interdigitated supercapacitor using reduced graphene oxide-MnO<sub>x</sub>/Mn<sub>3</sub>O<sub>4</sub> based electrodes." **RSC Adv.**, **12**, 17321. (Impact Factor: 4) <https://doi.org/10.1039/D2RA02009B>
7. R. Pamu, B. Khomami<sup>‡</sup>, D. Mukherjee<sup>‡</sup>, (2022) "Anomalous Observations of Carotenoid and Blind Chlorophyll Activations in Photosystem I under Synthetic Membrane Confinements." **Biochimica et Biophysica Acta (BBA) – Biomembranes**, **1864** (8), 183930. (Impact Factor: 4.0) <https://doi.org/10.1016/j.bbamem.2022.183930>
8. R. Pamu, S. A. Davari, D. Darbar, E. C. Self, J. Nanda<sup>‡</sup>, D. Mukherjee<sup>‡</sup>, (2021) "Calibration-Free Quantitative Analysis of Lithium-Ion Battery (LiB) Electrode Materials Using Laser-Induced Breakdown Spectroscopy (LIBS)" **ACS Applied Energy Materials**, **4** (7), 7259. (Impact Factor: 6.0) <https://doi.org/10.1021/acsaem.1c01386>
9. E. L. Ribeiro, E. M. Davis, M. Mokhtarnejad, S. Hu, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2021) "MOF-derived PtCo/Co<sub>3</sub>O<sub>4</sub> nanocomposites in carbonaceous matrices as high-performance ORR electrocatalysts synthesized via laser ablation techniques." **Catalysis Science & Technology**, **11**, 3002. (Impact Factor: 5.7) **Selected for front cover.** <https://doi.org/10.1039/D0CY02099K>
10. R. Pamu, B. J. Lawrie, B. Khomami<sup>‡</sup>, D. Mukherjee<sup>‡</sup>, (2021) "Broadband Plasmonic Photocurrent Enhancements from Photosystem I Assembled with Tailored Arrays of Au and Ag Nano Discs." **ACS Applied Nanomaterials**, **4** (2), 1209. (Impact Factor: 5.1) <https://doi.org/10.1021/acsnm.0c02709>.
11. T. H. Bennett, R. Pamu, G. Yang, D. Mukherjee<sup>‡</sup>, Bamin Khomami<sup>‡</sup>, (2020) "A new platform for development of photosystem I based thin films with superior photocurrent: TCNQ charge transfer salts derived from ZIF-8." **Nanoscale Advances**, **2**, 5171. (Impact Factor: 4.38) **Featured on front cover.** <https://doi.org/10.1039/D0NA00220H>.
12. M-L. Seol, I. Nam, E. L. Ribeiro, R. Segel, D. Lee, T. Palma, H. Wu, D. Mukherjee, B. Khomami, C. Hill, J-W. Han<sup>‡</sup>, M. Meyyappan, (2020) "All-Printed In-Plane Supercapacitors by Sequential Additive Manufacturing Process." **ACS Applied Energy Materials**, **3** (5), 4965. (Impact Factor: 6.0). <https://doi.org/10.1021/acsaem.0c00510>.
13. M. P. Aranha<sup>‡</sup>, D. Mukherjee, L. Petridis<sup>‡</sup>, B. Khomami, (2020) "An atomistic molecular dynamics study of titanium dioxide adhesion to lipid bilayers." **Langmuir**, **36** (4), 1043. (Impact Factor: 3.9). <https://doi.org/10.1021/acs.langmuir.9b03075>.
14. E. L. Ribeiro, S. A. Davari, S. Hu, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2019) "Laser-induced synthesis of ZIF-67: A facile approach for the fabrication of crystalline MOFs with tailored size and geometry." **Materials Chemistry Frontiers**, **3**, 1302. (Impact Factor: 6.5) **Featured on front cover.** <https://doi.org/10.1039/C8QM00671G>.
15. S. A. Davari, J. L. Gottfried, C. Liu, E. L. Ribeiro, G. Duscher, D. Mukherjee<sup>‡</sup>, (2019) "Graphitic coated Al nanoparticles manufactured as superior energetic materials via laser ablation synthesis in organic solvents." **Applied Surface Science**, **473**, 156. (Impact Factor: 6.7). <https://doi.org/10.1016/j.apsusc.2018.11.238>.



16. T. H. Bennett, M. D. Vaughn, S. A. Davari, K. Park, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2019) "Jolly Green MOF: Confinement and Photoactivation of Photosystem I in the Metal Organic Framework ZIF-8." *Nanoscale Adv.*, **1**, 94. (Impact Factor: 4.38) *Inaugural front cover.* <https://doi.org/10.1039/C8NA00093J>.
17. S. A. Davari, P. A. Taylor, R. W. Standley, D. Mukherjee<sup>‡</sup>, (2019) "Detection of interstitial oxygen contents in Czochralski grown silicon crystals using internal calibration in laser-induced breakdown spectroscopy (LIBS)." *Talanta*, **193**, 192. (Impact Factor: 5.34). <https://doi.org/10.1016/j.talanta.2018.09.078>.
18. H. Niroomand, R. Pamu, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2018) "Tuning the photocurrent generations from photosystem I assembled in tailored biotic–abiotic interfaces." *MRS Comm.*, **1**, 1. (Impact Factor: 2.60). <https://doi.org/10.1557/mrc.2018.83>.
19. R. Pamu, V. P. Sandireddy, R. Kalyanaraman, B. Khomami<sup>‡</sup>, D. Mukherjee<sup>‡</sup>, (2018) "Plasmon-Enhanced Photocurrent from Photosystem I Assembled on Ag Nanopyramids." *Journal of Physical Chemistry Letters*, **9** (5), 970. (Impact Factor: 6.50). <https://doi.org/10.1021/acs.jpcllett.7b03255>.
20. H. Niroomand, R. Pamu, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2018) "Microenvironment alterations enhance photocurrents from photosystem I confined in supported lipid bilayers." *Journal of Materials Chemistry A* **6**, 12281. (Impact Factor: 12.73) *Featured on front cover.* <https://doi.org/10.1039/C8TA00898A>.
21. S. A. Davari, D. Mukherjee<sup>‡</sup>, (2018) "Homogeneous nucleation of metal nanoparticles: A kinetic Monte Carlo model to study the vapor phase synthesis of Al nanoparticles." *AIChE Journal*, **64**, 18. (Impact Factor: 4.0). <https://doi.org/10.1002/aic.15887>.
22. S. A. Davari, S. Masjedi, J. Patel, Z. Ferdous, D. Mukherjee<sup>‡</sup>, (2017) "In-vitro early detection of calcium in aortic valvular interstitial cells undergoing osteogenic differentiation using Laser-Induced Breakdown Spectroscopy (LIBS)." *Journal of Biophotonics*, **11**, e201600288. (Impact Factor: 3.77) *Featured on back cover.* <https://doi.org/10.1002/jbio.201600288>.
23. S. Hu, E. L. Ribeiro, S. A. Davari, M. Tian, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2017) "Hybrid nanocomposites of nanostructured Co<sub>3</sub>O<sub>4</sub> interfaced with reduced/nitrogen-doped graphene oxides for selective improvements in electrocatalytic and/or supercapacitive properties." *RSC Adv.*, **7** (53), 33166. (Impact Factor: 4.0). <https://doi.org/10.1039/C7RA05494G>.
24. H. Niroomand, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2017) "Tuning the photoexcitation response of cyanobacterial Photosystem I via reconstitution into Proteoliposomes." *Scientific Reports*, **7**, 2492. (Impact Factor: 4.38). <https://doi.org/10.1038/s41598-017-02746-5>.
25. S. A. Davari, S. Hu, R. Pamu, D. Mukherjee<sup>‡</sup>, (2017) "Calibration-free quantitative analysis of thin-film oxide layers in semiconductors using Laser Induced Breakdown Spectroscopy (LIBS)." *Journal of Analytical Atomic Spectrometry*, **32** (7), 1378. (Impact Factor: 4.02). <https://doi.org/10.1039/C7JA00083A>.
26. S. Hu, K. Cheng, E. L. Ribeiro, K. Park, B. Khomami<sup>‡</sup>, D. Mukherjee<sup>‡</sup>, (2017) "A facile route for the rapid synthesis of tailored ternary nanoalloys as superior oxygen reduction reaction electrocatalysts." *Catalysis Science & Technology*, **7**, 2074. (Impact Factor: 5.70) <https://doi.org/10.1039/C7CY00073A>.
27. S. A. Davari, S. Hu, E. L. Ribeiro, D. Mukherjee<sup>‡</sup>, (2017) "Rapid elemental composition analysis of intermetallic ternary nanoalloys using calibration-free quantitative Laser Induced Breakdown Spectroscopy (LIBS)." *MRS Advances*, **7** (53), 33166. (Impact Factor: Pending). <https://doi.org/10.1557/adv.2017.303>.
28. S. A. Davari, S. Hu, D. Mukherjee<sup>‡</sup>, (2017) "Calibration-free quantitative analysis of elemental ratios in intermetallic nanoalloys and nanocomposites using Laser Induced Breakdown Spectroscopy (LIBS)." *Talanta*, **164**, 330. (Impact Factor: 5.34). <https://doi.org/10.1016/j.talanta.2016.11.031>.
29. H. Niroomand, G. A. Venkatesan, S. A. Sarles, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2016) "Lipid-detergent phase transitions during detergent mediated liposome solubilization." *Journal of Membrane Biology*, **249**, 523. (Impact Factor: 1.84). <https://doi.org/10.1007/s00232-016-9894-1>.
30. T. H. Bennett, H. Niroomand, R. Pamu, I. Ivanov, D. Mukherjee<sup>‡</sup>, B. Khomami<sup>‡</sup>, (2016) "Elucidating the role of Methyl Viologen as scavenger of photoactivated electrons from Photosystem I under aerobic and anaerobic conditions." *Physical Chemistry Chemical Physics*, **18**, 8512. (Impact Factor: 3.67). <https://doi.org/10.1039/C6CP00049E>.
31. S. Hu, M. Tian, E. L. Ribeiro, G. Duscher, D. Mukherjee<sup>‡</sup>, (2016) "Tandem Laser Ablation Synthesis in Solution-Galvanic Replacement Reaction (LASiS-GRR) for the production of PtCo nanoalloys as oxygen reduction electrocatalysts." *Journal of Power Sources*, **306**, 413. (Impact Factor: 9.13) <https://doi.org/10.1016/j.jpowsour.2015.11.078>.

32. S. Hu, G. Goenaga, C. Melton, T. A. Zawodzinski, D. Mukherjee<sup>‡</sup>, (2016) "PtCo/CoOx nanocomposites: Bifunctional electrocatalysts for oxygen reduction and evolution reactions synthesized via tandem laser ablation synthesis in solution-galvanic replacement reactions." *Applied Catalysis B*, **182**, 286. (Impact Factor: 19.5). <https://doi.org/10.1016/j.apcatb.2015.09.035>
33. S. Hu, C. Melton, D. Mukherjee<sup>‡</sup>, (2014) "A facile route for the synthesis of nanostructured oxides and hydroxides of cobalt using laser ablation synthesis in solution (LASIS)." *Physical Chemistry Chemical Physics*, **16**, 24034. (Impact Factor: 3.67). <https://doi.org/10.1039/C4CP03018D>
34. D. Mukherjee<sup>‡</sup>, M. Wang, B. Khomami, (2012) "Impact of particle morphology on surface oxidation of nanoparticles: A Kinetic Monte Carlo based study." *AIChE Journal*, **58(11)**, 3341. (Impact Factor: 4.00). <https://doi.org/10.1002/aic.13740>
35. D. Mukherjee, M. Vaughn, B. Khomami<sup>‡</sup>, B. D. Bruce, (2011) "Modulation of cyanobacterial Photosystem I deposition properties on alkanethiolate Au substrate by various experimental conditions." *Colloids and Surfaces B: Biointerfaces*, **88**, 181. (Impact Factor: 5.27). <https://doi.org/10.1016/j.colsurfb.2011.06.029>
36. D. Mukherjee, M. May, B. Khomami<sup>‡</sup>, (2011) "Detergent-protein interactions in aqueous buffer suspensions of Photosystem I (PS I)." *Journal of Colloids and Interface Science*, **358(2)**, 477. (Impact Factor: 8.13). <https://doi.org/10.1016/j.jcis.2011.03.070>
37. D. Mukherjee, M. May, M. Vaughn, B. D. Bruce, B. Khomami<sup>‡</sup>, (2010) "Controlling the morphological assembly of Photosystem I deposited on thiol activated Au substrates." *Langmuir*, **26(20)**, 16048. (Impact Factor: 3.9). <https://doi.org/10.1021/la102832x>
38. D. Mukherjee, M-D. Cheng<sup>‡</sup>, (2008) "Characterization of Carbon-Containing Aerosolized Drugs using Laser-Induced Breakdown Spectroscopy." *Applied Spectroscopy*, **62(5)**, 554 (Impact Factor: 2.39) **Featured on front cover.** <https://doi.org/10.1366%2F000370208784344451>
39. D. Mukherjee, M-D. Cheng<sup>‡</sup>, (2007) "Quantitative analysis of carbonaceous aerosols using Laser-Induced Breakdown Spectroscopy: A study on mass loading induced plasma matrix effects." *Journal of Analytical Atomic Spectrometry*, **23**, 119. (Impact Factor: 4.02). <https://doi.org/10.1039/B713436N>
40. D. Mukherjee, A. Prakash, M. R. Zachariah<sup>‡</sup>, (2006) "The implementation of a discrete nodal model to probe the effect of size-dependent surface tension on nanoparticle formation and growth." *Journal of Aerosol Science*, **37**, 1388. (Impact Factor: 3.43). <https://doi.org/10.1016/j.jaerosci.2006.01.008>
41. D. Mukherjee, A. Rai, M. R. Zachariah<sup>‡</sup>, (2006) "Quantitative laser-induced breakdown spectroscopy for aerosols using internal calibration standards: Application to the oxidative coating of aluminum nanoparticles." *Journal of Aerosol Science*, **37**, 667. (Impact Factor: 3.43). <https://doi.org/10.1016/j.jaerosci.2005.05.005>
42. K. Park, D. Lee, A. Rai, D. Mukherjee, M. R. Zachariah<sup>‡</sup>, (2004) "Size resolved kinetics measurements of aluminum nanoparticle oxidation by single particle mass spectrometry." *Journal of Physical Chemistry B*, **109**, 7290. (Impact Factor: 3.00). <https://doi.org/10.1021/jp048041v>
43. D. Mukherjee, C. G. Sonwane, M. R. Zachariah<sup>‡</sup>, (2003) "Kinetic Monte-Carlo simulation of the effect of coalescence energy release on the size and shape evolution of nanoparticles grown as an aerosol." *Journal of Chemical Physics*, **119**, 3391. (Impact Factor: 3.49). <https://doi.org/10.1063/1.1580098>

#### PATENTS:

- E. Davis, D. Mukherjee<sup>‡</sup>, (2023) "Metastable metal/intermetallic, ceramic and carbon derived nanocomposites as additives for composite joining adhesives with engineered multi-functional properties," **Patent Application Submitted with UTRF** (Disclosure Number: UTRF PD 23103)
- D. Mukherjee<sup>‡</sup>, S. Hu, (2022) "Compositions, systems and methods for producing nanoalloys and/or nanocomposites using tandem laser ablation synthesis in solution-galvanic replacement reaction," **U.S. Patent App. 17/479,956** (Submitted: April 14, 2022).
- D. Mukherjee<sup>‡</sup>, S. Hu, (2021) "Compositions, systems and methods for producing nanoalloys and/or nanocomposites using tandem laser ablation synthesis in solution-galvanic replacement reaction," **U.S. Div. Pat. No. US 11,127,956 B2** (Issued: Sept. 21, 2021).
- D. Mukherjee<sup>‡</sup>, S. Hu, (2019) "Compositions, systems and methods for producing nanoalloys and/or nanocomposites using tandem laser ablation synthesis in solution-galvanic replacement reaction," **U.S. Patent No. US 10,326,146 B2** (Issued: Jun. 18, 2019).

- D. Mukherjee<sup>‡</sup>, S. A Davari, P. A. Taylor, R. W. Standley, (2016) “Novel method for rapid and reliable detection of dissolved oxygen in heavily doped Silicon crystals using Laser Induced Breakdown Spectroscopy (LIBS),” **Invention Disclosure Submitted with UTRF**

#### BOOKS & BOOK CHAPTERS:

- D. Mukherjee (2023) “New frontiers for heterostructured nanocomposites with interfacial functionalities synthesized via laser ablation synthesis in solution (LASiS)” in the book entitled “**Emerging Materials and Environment**,” Manoj K. Shukla, Elizabeth Ferguson, Jerzy Leszczynski (Eds.) **Springer Int. Publishing, USA**, pp. 157 - 199.
- D. Mukherjee, S. A. Davari, (2017) “Computational modeling of fate, transport and evolution of energetic metal nanoparticles grown via aerosol route” in the book entitled “**Energetic Materials: Cradle to Grave**” ed. by Dr. Manoj Shukla, Environmental Laboratory, US Army Engineer Research and Development Center (ERDC), **Springer Int. Publishing, Cham, USA**, pp. 271 - 341.
- S. Hu, D. Mukherjee, (2017) “Colloidal Synthesis of Advanced Functional Nanostructured Composites and Alloys via Laser Ablation Based Techniques,” in the book entitled “**Multifunctional Nanocomposites for Energy & Environmental Applications**” ed. by Zhanhu Guo, et al., **Wiley, USA**, pp. 135 - 172.

#### CONFERENCES & SYMPOSIUMS: (\* = Presenter)

**More than 30 international/national conference presentations and 13 invited talks at international/national venues, and DOE & DOD-based national laboratories.**

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#### INVITED TALKS:

- Dibyendu Mukherjee\*, “Laser Ablation Synthesis in Solution (LASiS): A new paradigm for non-equilibrium synthesis of composite and metastable energetic nanomaterials,” **Hopkins Extreme Materials Institute (HEMI) Seminar Series, Johns Hopkins University**, Jan. 27, 2023, Baltimore, MD, USA.
- Dibyendu Mukherjee\*, Erick L. Ribeiro, Mahshid Mokhtarnejad, Bamin Khomami, “MOF-derived PtCo/Co<sub>3</sub>O<sub>4</sub> nanocomposites in carbonaceous matrices as high-performance ORR electrocatalysts synthesized via laser ablation techniques,” **VI Int. Conf. Catalysis & Chem. Engg.**, Feb. 22-24, 2022, San Francisco, CA, USA.
- Dibyendu Mukherjee\*, “New frontiers for nano/biomaterials in energy, energetic and environmental studies,” **Materials Sci. & Engg. Fall 2020 Colloquium, University of California, Riverside**, Nov. 4, 2020.
- Elijah Davis, Dibyendu Mukherjee\*, “Designing Composite and Metastable Energetic Nanomaterials with Tunable Interfacial Activities via Laser Ablation Synthesis in Solution,” **Computational Chemistry/ Modeling Meeting, US Army Engineer Research & Development Center (ERDC)**, Sept. 24, 2019, Vicksburg MS.
- Dibyendu Mukherjee\*, “Structurally designed metal/ceramic nanoparticles with tailored interfacial activities manufactured as superior energetic materials via laser ablation synthesis in solution,” Eglin Air Force Base, **Air Force Research Laboratory (AFRL)**, Dec. 4, 2018, Eglin FL.
- Dibyendu Mukherjee\*, Seyyed Ali Davari “Kinetic Monte Carlo models to study nucleation and evolution of energetic metal nanoparticles grown via aerosol route,” **1<sup>st</sup> Symposium on Nonequilibrium Multiphase Systems, Washington University in St. Louis**, Dec. 7-8, 2018, Saint Louis, MO, USA.
- Dibyendu Mukherjee\*, “Composite nanomaterials and nanoalloys with engineered interfacial functionalities manufactured via Laser Ablation Synthesis in Solution (LASiS)-based techniques,” **5<sup>th</sup> International Conference on Advanced Nanoparticle Generation & Excitation by Lasers in Liquids (ANGEL 2018)**, June 4-7, 2018, Lyon, France.
- Dibyendu Mukherjee\*, “Composite nanomaterials and nanoalloys with engineered interfacial functionalities manufactured via Laser Ablation Synthesis in Solution (LASiS)-based techniques,” **Center for Nanointegration, University of Duisburg-Essen (Germany)**, Oct. 9-11, 2017, Duisburg, Germany.
- Dibyendu Mukherjee\*, “Kinetic Monte Carlo models to study nucleation and evolution of energetic metal nanoparticles grown via aerosol route,” **Computational Chemistry/Modeling Meeting, US Army Engineer Research & Development Center (ERDC)**, Sept. 12, 2017, Vicksburg, MS.
- Dibyendu Mukherjee\*, “Tandem Laser Ablation Synthesis in Solution-Galvanic Replacement Reactions (LASiS-GRR): A facile route for the synthesis of nanocomposites and nanoalloys with engineered functionality,” Aberdeen Proving Ground, **U.S. Army Research Lab.**, May 12, 2016, Aberdeen, MD.

- Dibyendu Mukherjee\*, "Integrating nano-biomaterials for future bio-hybrid solar fuel conversions," **MSE Spring Colloquium Series, Boston University**, April 8, 2016, Boston, MA.
- Dibyendu Mukherjee\*, "Systematic Assembly and Characterization of Photosystem I (PS I): Towards Bio-hybrid Photovoltaic Device," **MRS Fall Meeting**, Dec. 1, 2014, Boston, MA, USA.
- Dibyendu Mukherjee\*, "Characterization of Surface Assembled Photosystem I (PSI): Towards Future Bio-hybrid Photovoltaic Devices," **2<sup>nd</sup> Photovoltaic Workshop, Center for Nanophase Materials Sciences (CNMS), Oak Ridge National Laboratory (ORNL)**, Sept. 13, 2012, Oak Ridge, TN, USA.

#### CONFERENCE & SYMPOSIUM PRESENTATIONS:

- Elijah Davis, Gerd Duscher, Jianguo Wen, Dibyendu Mukherjee\*, "Laser-Induced Trapping of Metastable Amorphous-AlOx/C ( $2.5 < x \leq 3.5$ ) Nanocomposites," **ACS Fall Meeting**, Aug. 13-17, 2023, San Francisco, CA.
- Elijah Davis, Seyyed A. Davari, Gerd Duscher, Dibyendu Mukherjee\*, "Reactive Laser Ablation Synthesis in Solution (r-LASiS): A facile route for one-pot synthesis of Al/C-based composite energetic nanomaterials (ENMs) with tailored interfacial structures," **TechConnect World Innovation Conference & Expo**, June 21, 2023, National Harbor, MD.
- Dibyendu Mukherjee\*, "Reactive Laser Ablation Synthesis in Solution (r-LASiS): A new paradigm for synthesizing functional composite nanomaterials," **Center for Aerosol Science & Technology (CAST): 1<sup>st</sup> Workshop on Aerosol Sci. & Tech., University of Miami**, Jan. 18, 2023, Miami, FL.
- Ravi Pamu, Seyyed A. Davari, Devendrasinh Darbar, Ethan C. Self, Jagjit Nanda, Dibyendu Mukherjee\*, "Calibration-Free Quantitative Analysis of Lithium-ion Battery (LiB) Electrode Materials using Laser-Induced Breakdown Spectroscopy (LIBS)," **MRS Spring Meeting**, May 8-13, 2022, Honolulu, HI.
- Dibyendu Mukherjee\*, Erick L. Ribeiro, Bamin Khomami, "MOF-Derived PtCo/Co<sub>3</sub>O<sub>4</sub> nanocomposites in Carbonaceous Matrices as High-Performance ORR Electrocatalysts Synthesized Via laser Ablation Techniques," **AIChE Annual Meeting (In-Person)**, Nov. 5-11, 2021, Boston, MA.
- Ravi Pamu, Benjamin Lawrie, Bamin Khomami, Dibyendu Mukherjee\*, "Tuning Photocurrent Responses from Photosystem I Interfaced with Tailored Plasmonic Gold and Silver Nanopatterns," **AIChE Annual Meeting (Virtual)**, Nov. 15-19, 2021.
- Dibyendu Mukherjee\*, Seyyed A. Davari, Jennifer L. Gottfried, Gerd Duscher, "Colloidal Synthesis of Al/C-Based Composite Energetic Nanoparticles with Tunable Interfacial Activities via Laser Ablation Synthesis in Solution," **2020 Virtual MRS Spring/Fall Meeting (Online)**, Nov. 27-Dec. 4, 2020.
- Dibyendu Mukherjee, "Designing Composite Energetic Nanomaterials with Tunable Interfacial Activities Via Laser Ablation Synthesis in Solution," **AIChE Annual Meeting**, Nov. 10-15, 2019, Orlando, FL.
- Dibyendu Mukherjee, "Synthesis of composite energetic nanomaterials with tunable interfacial activities via laser ablation synthesis in solution," **U.S. Army Research Office (ARO): Molecular Structure & Dynamics Program Review**, June 25 2019, Durham, NC.
- Dibyendu Mukherjee\*, Patrick A. Taylor, Robert W. Standley, Ali Davari, "Detection of Dissolved Oxygen in Heavily Doped Silicon Crystals Using Laser Induced Breakdown Spectroscopy (LIBS)," **SciX Conference**, Oct. 21-26, 2018, Atlanta, GA.
- Dibyendu Mukherjee\*, Seyyed Ali Davar, Patrick A. Taylor, Robert W. Standley, "Quantitative detection of interstitial oxygen in Czochralski-grown Si crystals via unique matrix-assisted calibration in laser-induced breakdown spectroscopy (LIBS)," **MRS Spring Meeting**, April 2-6, 2018, Phoenix, AZ.
- Dibyendu Mukherjee\*, Hanieh Niroomand, Ramki Kalyanaraman, Bamin Khomami, "Microenvironment alterations affect photocurrent responses from Photosystem I (PSI) confined in biomimetic solid-supported lipid bilayers," **MRS Spring Meeting**, April 2-6, 2018, Phoenix, AZ.
- Dibyendu Mukherjee\*, Seyyed Ali Davari, Bamin Khomami, "Kinetic Monte Carlo models to study nucleation and evolution of metal/metal oxide nanoparticles grown via aerosol route," **ACS National Meeting & Expo (Division of Environmental Chemistry)**, March 21, 2018, New Orleans, LA.
- Dibyendu Mukherjee\*, Hanieh Niroomand, Ramki Kalyanaraman, Bamin Khomami, "Tuning the photoresponse and photocurrent generations from Photosystem (PSI) assembled in tailored biotic-abiotic interfaces," **MRS Fall Meeting**, Nov 26-Dec. 1, 2017, Boston, MA.
- D. Mukherjee\* "High-energy laser-based synthesis and spectrochemical characterization of intermetallic nanoparticles manufactured as efficient electrocatalysts," **ASME-IMECE**, Nov. 8, 2017, Tampa, FL.



- Dibyendu Mukherjee\*, "Photocurrent generations from Photosystem I assembled on nanostructured surfaces," **MRS Fall Meeting**, Nov 29, 2016, Boston, MA.
- Dibyendu Mukherjee\*, "PtCo/CoOx Nanocomposites & PtCo Nanoalloys as electrocatalysts for Oxygen Reduction and Evolution Reactions synthesized via Tandem Laser Ablation Synthesis in Solution-Galvanic Replacement (Tandem LASiS-GRR)", **MRS Fall Meeting**, Nov 30, 2015, Boston, MA.
- Dibyendu Mukherjee\*, "PtCo/CoOx Nanocomposites/Nanoalloys as electrocatalysts for Oxygen Reduction and Evolution Reactions synthesized via Tandem Laser Ablation Synthesis in Solution-Galvanic Replacement (LASiS-GRR)", **ASME Power and Energy**, July 2, 2015, San Diego, CA.
- D. Mukherjee\* and B. Khomami, "Characterization of Surface Assembled Photosystem I (PSI): Towards Future Bio-hybrid Photovoltaic Devices", **Gordon Research Conference**, July 8, 2012, Davidson, NC.
- Dibyendu Mukherjee\*, Iliia Ivanov, and Bamin Khomami, "Electrochemical Investigation into the Photoactivated Electronic Activities of Photosystem I (PS I) Immobilized on Self-Assembled Monolayer/Gold Substrates", **MRS Spring Meeting**, April 9-13, 2012, San Francisco, CA.
- Dibyendu Mukherjee\*, and Bamin Khomami, "Systematic Assembly of Photosystem I on Chemically Tailored SAM/ Au Substrates for Future Bio-hybrid Device Fabrication", **MRS Spring Meeting**, April 25-29, 2011, San Francisco, CA.
- Dibyendu Mukherjee\* and Bamin Khomami. "Characterizations of Photosystem I assembly on SAM/ Au substrates: Towards bio-hybrid photovoltaic devices", **APS March Meeting**, March 21-25, 2011, Dallas, TX.
- Dibyendu Mukherjee\*, Barry D. Bruce, and Bamin Khomami, "Systematic assembly of Photosystem I on thiol activated SAM/ Au substrates for future bio-hybrid photovoltaic devices", **AIChE Annual Meeting**, Nov. 7-12, 2010, Salt Lake City, UT.
- Dibyendu Mukherjee\*, Matthew Wang, and Bamin Khomami, "Impact of Fractal-like Morphology on Surface Oxidation of Al Nanoparticles Synthesized via Aerosol Route: A Kinetic Monte Carlo study," **AAAR 29<sup>th</sup> Annual Meeting**, Oct. 25-29, 2010, Portland, OR.
- Dibyendu Mukherjee\*, Barry D. Bruce, and Bamin Khomami. "Attachment dynamics of Photosystem I on SAM substrates for photovoltaic applications", **APS March Meeting**, March 15-17, 2010, Portland, OR.
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- Dibyendu Mukherjee\*, Anand Prakash, and Michael R. Zachariah, "Implementation of a Discrete Nodal Model to Probe the Effect of Size-dependent Surface Tension on Nanoparticle Formation and Growth", **7<sup>th</sup> International Aerosol Conference**, Sept. 10-15, 2006, St. Paul, MN.
- Dibyendu Mukherjee\*, and Michael R. Zachariah, "Quantitative Laser-Induced Breakdown Spectroscopy for Aerosols via Internal Calibration: Application to the Oxidative Coating of Aluminum Nanoparticles", **7<sup>th</sup> International Aerosol Conference**, Sept. 10-15, 2006, St. Paul, MN.
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- D. Mukherjee\*, C. G. Sonwane and M. R. Zachariah, "Ensemble Kinetic Monte Carlo Simulation: Effect of coalescence energy release on size and shape evolution of nanoparticles", **AAAR 23<sup>rd</sup> Annual Conference**, Oct. 4-8, 2004, Atlanta, GA.

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