Trevor B. Demille

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Education

- University of Notre Dame**,** South Bend, IN
  Ph.D. of Aerospace and Mechanical Engineering
  July 2017 – Present
  Advisor: Dr. Svetlana Neretina
  Primary research topics: *Nanofabrication and Plasmonic Effects of Anisotropy in Periodic Arrays of Substrate-Immobilized Noble Metal Nanostructures*
- University of Massachusetts Amherst**,** Amherst, MA
  Bachelor of Science in Physics
  Graduated May 2017
  Double Major in *Physics & Astronomy*
- University of Massachusetts Dartmouth, Dartmouth, MA
  No degree - transferred May 2014
  Major in *Astrophysics*

Experience and Work History

- Nanomaterial Fabrication Lab (July 2017 – Present)
  Graduate Researcher - South Bend, IN
- ND Nano, Center for Nanoscience and Technology (September 2019 – Present)
  Graduate Student and Postdoc Leadership Council (GSPLC) – South Bend, IN
- Teaching Assistant (Univ. Notre Dame) **(**September 2017 – Present)
  Courses: *Thermodynamics, Photovoltaic Cell Design, Design Methodology*
- Goldner Biophysics Research Lab (July 2014 – May 2017)
  Undergraduate Researcher - Amherst, MA

Areas of Expertise

- Engineering and nanofabrication of metallic nanostructures, deep understanding of plasmonic and nanophotonic phenomena, proficiency in Python and MATLAB for mathematical modeling, as well as Windows Suite software experience.
- Strong communication and presentation skills, team leadership, self-motivation, and positive collaboration.
- Laboratory Techniques including Nanoimprint Lithography (NIL), SAMCO RIE, Plasmatherm 790 RIE, Gatan model 681 high resolution ion beam coater, Oerlikon Leybold 8-pocket electron-beam, dual thermal evaporation system, Lindberg Blue M Quartz Tube Furnace, class 100 clean room procedures, powder x-ray diffraction (XRD) Bruker D8 Advance Davinci Diffractometer, single crystal XRD Bruker Apex II, JASCO UV-vis spectrometer, transmission electron microscopy (TEM) JEOL 2011, and Transient Absorption Spectroscopy.

Publications

1. T. B. Demille, B. Brown, R. A. Hughes, S. Neretina, Substrate-Immobilization of Periodic Arrays of Au Nanostars via DMF, HEPES, and Ascorbic Acid Driven Syntheses, **2019** (*preparation for submission)*
2. S. D. Golze, R. A. Hughes, S. Rouvimov, R. D. Neal, T. B. Demille, S. Neretina, Plasmon-Mediated Synthesis of Periodic Arrays of Gold Nanoplates using Substrate-Immobilized Seeds Lined with Planar Defects, *Nano Lett.* **2019**, 19, 8, 5653-5660.
3. T. B. Demille, R. A. Hughes, S. Neretina, Periodic Arrays of Dewetted Silver Nanostructures on Sapphire and Quartz: Effect of Substrate Truncation on the Localized Surface Plasmon Resonance and Near-Field Enhancement, *J. Phys. Chem. C* **2019**, 123, 19879−19886.
4. A. S. Preston, R. A. Hughes, T. B. Demille, V. M. Rey Davila, S. Neretina, Dewetted Nanostructures of Gold, Silver, Copper, and Palladium with Enhanced Faceting, *Acta Materialia* **2019**, 165, 15-25
5. E. Menumerov, R. A. Hughes, S. D. Golze, R. D. Neal, T. B. Demille, J. C. Campanaro, K. C. Kotesky, S. Rouvimov, S. Neretina. Identifying the True Catalyst in the Reduction of 4-Nitrophenol: A Case Study Showing the Effect of Leaching and Oxidative Etching Using Ag Catalysts, *ACS Catal.* **2018**, 8, 8879-8888
6. T. B. Demille, R. A. Hughes, A. S. Preston, R. Adelung, Y. K. Mishra, S. Neretina, Light-Mediated Growth of Noble Metal Nanostructures (Au, Ag, Cu, Pt, Pd, Ru, Ir, Rh) From Micro- and Nanoscale ZnO Tetrapodal Backbones, *Front. Chem.* **2018,** 6, 411
7. A. S. Preston, R. A. Hughes, T. B. Demille, S. Neretina. Copper Template Design for the Synthesis of Bimetallic Copper-Rhodium Nanoshells through Galvanic Replacement. *Part. Part. Syst. Charact.* **2018**, 35, 1700420.

Presentations

1. T. B. Demille, R. A. Hughes, S. Neretina, Investigating the Role of Ag^{+} in Colloidal and Substrate-Immobilized Au Nanostar Syntheses, Notre Dame Electron Microscopy Club (NDEMC), University of Notre Dame, IN., November 13th, 2019 (upcoming).
2. S. Neretina, A. S. Preston, R. A. Hughes, T. B. Demille, Dewetted Nanostructures of Gold, Silver, Copper and Platinum with Enhanced Faceting, 6th Nano Today Conference, Lisbon, Portugal, June 16-20, 2019.
3. T. B. Demille, S. Neretina, Simulating Plasmonic and Near-Field Phenomena with DDSCAT, Mechanics & Applied Science Seminars, University of Notre Dame, IN., September 28, 2018.
4. T. B. Demille, S. Neretina, Light-Mediated Growth of Noble Metal Nanostructures on ZnO Tetrapods, ND Energy Research Symposium, University of Notre Dame, IN., April 18, 2018.
5. A. S. Preston, R. A. Hughes, T. B. Demille, S. Neretina, Copper Template Design for the Synthesis of Bimetallic Copper-Rhodium Nanoshells Through Galvanic Replacement, Graduate Student Seminar, University of Notre Dame, IN., February 16, 2018.
6. T. B. Demille, K. Ramos, L. Goldner, R. Pajela, S. Velpula, On The pH of Attoliter-Volume Droplets of Water, Biophysics Research Slam, University of Massachusetts Amherst, MA., December 19, 2016.
7. T. B. Demille, K. Ramos, L. Goldner, R. Pajela, S. Velpula, Studies of pH in Attoliter-Volume Droplets of Water, APS Spring Meeting, Wheaton College, Norton, MA., April 1-2, 2016.
8. K. Ramos, S. Velpula, T. B. Demille, R. Pajela, L. Goldner, On The pH of Attoliter-Volume Droplets of Water, APS March Meeting, Baltimore, MD, March 14-18, 2016

Awards and Fellowships

1. Received First-Year Graduate Fellowship, Aerospace and Mechanical Engineering Dept., University of Notre Dame, August 2017 - May 2018
2. Received Remick Graduate Fellowship, Aerospace and Mechanical Engineering Dept., University of Notre Dame, July 2018 - May 2021
3. Received 1st Place Poster Award at The 6th Annual Midwest Imaging and Microanalysis Workshop (MWIMW), University of Notre Dame, May 6th 2019 – Poster Title: *Fabrication, Morphology, and Plasmonics of Au Nanostars*