

Sean Michael Collins

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Research Goals

Synthesis and chemical characterization of new materials for renewable energy technologies.

Education

B.S. Chemistry, B.M., Piano performance

University of Michigan (Ann Arbor, MI), exp. 04/2012. GPA: 3.98/4.00.

International Baccalaureate (IB) Diploma, High School Diploma, Certificate of Merit

Richard Montgomery High School (Rockville, MD), 06/2007. GPA: 4.00/4.00.

Work Experience

09/09 – Present: Undergraduate research assistant, Maldonado and Bartlett Research Groups

- Characterized nanostructured semiconductor and battery materials by electron microscopy
- Developed synthesis of ZnGeP₂ nanowire films

06/10 – 08/10: Summer Undergraduate Research Fellowship, National Institute of Standards and Technology (NIST), Surface and Microanalysis Science Division (SMSD), Microanalysis Research Group

- Designed and applied individual particle characterization sequence of light, electron, and ion (FIB) microscopies for light-absorbing carbonaceous urban atmospheric particle samples
- Developed FIB-SEM micromanipulator lift-out technique to TEM for particle cross-sections
- Completed 3D reconstruction of mixed-phase atmospheric particle by FIB tomography

06/09 – 08/09: Physical Science Trainee (Student Temporary Employment Program), NIST, SMSD, Microanalysis Research Group

- Characterized individual atmospheric particles by electron microscopy and spectroscopy

06/08 – 09/08: Communications Intern, National Stonewall Democrats (NSD)

- Coordinated educational and fundraising events in Washington, D.C., NSD 2008 Convention, and at the 2008 Democratic National Committee Convention (DNCC)
- Managed NSD participation in U.S. Congressional hearings

Leadership Experience

09/09 – 05/11 Director, 2011 Midwest Bisexual Lesbian Gay Transgender Ally College Conference (MBLGTACC) at the University of Michigan

- Led team of 50 students in three year student-run effort

- Supervised program and \$150,000 budget for conference of 2,000 students

09/08 – 04/10 Member, Advisory Board to the Vice President for Student Affairs, U.-M.

Honors and Awards

2011-2012 Barry M. Goldwater Scholar
2011-2012 Microscopy Society of America Undergraduate Research Scholarship
2011 Honors Summer Fellow, University of Michigan
2011 Smeaton Memorial Award, Department of Chemistry, University of Michigan
2011 Nominee to Astronaut Scholarship Program, University of Michigan
2009- 2011 James B. Angell Scholar, University of Michigan
2009 - Present Phi Kappa Phi member
2009 University Honors, University of Michigan
2009, 2008 Air Force Association of Graduates Dependent Scholarship

Publications

Carim, A.I.; Collins, S.M.; Foley, J. M.; Maldonado, S. “Benchtop Electrochemical Liquid-Liquid-Solid Growth of Nanostructured Crystalline Germanium.” *J. Am. Chem. Soc.* **2011**, *133*, 13292-13295.

Wen, W.; Carim, A.I.; Collins, S.M.; Price, M.J.; Peczonczyk, S.L.; Maldonado, S. “Structural and Photoelectrochemical Properties of GaP Nanowires Annealed in NH₃.” Submitted.

Liddle, B.; Collins, S.M.; Bartlett, B. M. “A new one-pot hydrothermal synthesis and electrochemical characterization of Li_{1+x}Mn_{2-x}O_{4+δ} spinel structured compounds.” *Energy and Environmental Science*, **2010**, *3*, 1339 – 1346.

Hagedorn, K.; Collins, S. M.; and Maldonado, S. “Preparation and Photoelectrochemical Activity of Macroporous p-GaP(100).” *J. Electrochem. Soc.*, **2010**, *157*, 11, D588-D592.

Hagedorn, K.; Forgacs, C.; Collins, S.M.; Maldonado, S. “Design Considerations For Nanowire Heterojunctions in Solar Energy Conversion/Storage Applications.” *J. Phys. Chem. C*, **2010**, *14*, 12010-12017.

Presentations

Collins, S.M.; Carim, A.I.; Maldonado, S. “Synthesis and Characterization of ZnGeP₂ Nanowires.” Plenary Session Oral Presentation, University of Notre Dame 2011 Undergraduate Research Symposium, August 5, 2011.

Collins, S.M. “Characterizing the Compositional-Structural Properties of Mixed-Phase Light-Absorbing Carbonaceous Atmospheric Particles: Implications for Climate Change Modeling.” Oral Presentation, NIST SURF Colloquium, August 5, 2010.

Language Skills

Fluent in German (in-country 1989 – 1998), thorough knowledge of Spanish (5 years of study)