



Danielle Lee Proffit

Graduate Institution: Northwestern University

Graduate Discipline: Materials Science and Engineering

Hometown: Charlotte, NC

Relevant SC Research: Basic Energy Sciences

Research Interest:

Synthesis and characterization of functional oxide materials, with specific interest in those related to energy applications (ionic conductors, transparent conducting oxides, thermoelectric materials, multiferroic materials, etc); the application, science, and process control of thin film deposition techniques; electrical properties of materials; x-ray scattering techniques

About Me:

Graduate school has been an enjoyable experience so far. My experience started at the University of Wisconsin-Madison where I earned a Masters degree in Materials Science under Professor Chang-Beom Eom studying the growth of the conducting oxide CaRuO_3 by pulsed laser deposition. I am very excited to see my results influence the current efforts to understand the role of octahedral tilting in controlling properties of perovskite thin films. In 2009, I began work towards a PhD under Professor Thomas O. Mason at Northwestern University. Dr. Jeffrey Eastman at Argonne National Laboratory co-advises my project on the enhancement of ionic conductivity using epitaxial growth. Specifically, I grow $\delta\text{-Bi}_2\text{O}_3$ by chemical vapor deposition and sputtering in the Materials Science Division at Argonne and study its structure and electrical properties at the Department of Energy User Facilities on Argonne's campus. My project may take one of many directions,

but it has the potential to contribute to an understanding of the fundamental properties of $\delta\text{-Bi}_2\text{O}_3$, including the existence and nature of an order-disorder transition with temperature, the role of structure in controlling ionic transport, and the potential for controlling properties through epitaxy. In ancillary roles, this project has also contributed to the development of advanced x-ray techniques, such as x-ray reflection interface microscopy and coherent diffraction imaging, and may also contribute to the expansion of surfactant-mediated growth to oxide thin film processes.

I attended North Carolina State University as an undergrad and participated in a variety of activities. Academically, I earned minors in Music Performance (Viola) and French in addition to my major in Materials Science and Engineering. As a Park Scholar, I also was trained in leadership and teamwork, an experience I value tremendously. During my first summer of college, I studied abroad in France. The following summers I took advantage of internships, working for Caterpillar, Micron, and Intel.

My current graduate student lifestyle is unusual since I work at and live near Argonne. When I worked at Northwestern and UW-Madison, I was involved in music and recruiting. At Argonne, I have transitioned to an interest in gardening and joined the Garden Club that runs the gardening program at Argonne. This program is one of the green initiatives

recently established at Argonne and lets us use Argonne land for gardening. In addition, I have recently re-discovered my love of tennis and hope to get back to a respectable playing level one day.

From a professional point of view, I am a member of several professional societies and regularly attend Materials Research Society Meetings to share my research and network. In the future, I hope to get a research position in industry or at a national laboratory. As an engineer, I enjoy solving tough problems, but also like to see the potential impact on technology and society. My problem of choice is energy, so I look forward to the rest of my adventure as a graduate student.



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