



Danielle Nicole Chirdon

Graduate Institution: Carnegie Mellon University

Graduate Discipline: Inorganic and organic materials chemistry

Hometown: Pittsburgh, PA

Relevant SC Research: Basic Energy Sciences

Research Interest:

I believe that one of the greatest gifts we can give to future generations is to safeguard the beauty and diversity of our planet by finding renewable energy technologies capable of competing with traditional energy production. Thus, my research interests center around materials for solar energy systems. In particular, I am interested in bulk heterojunction solar cells and their electron acceptor materials. I want to develop a new type of acceptor which matches the excellent electron transport in fullerene while also offering greater compatibility with novel donors. Through the development of an acceptor, I hope to identify chemical features critical for electron transport and I hope to learn about electron transfer at the donor-acceptor interface. Beyond bulk heterojunction cells, I am also interested in dye sensitized cells and development of new dyes. I want to know how well chemical tuning of a dye translates to enhanced charge separation and light conversion in a solar cell. Lastly, I have a general interest in photo-excited states and the use of spectroscopy to study their properties as well as their potential for performing useful processes.

About Me:

I have just finished my first year of chemistry graduate studies at Carnegie Mellon University where I research inorganic and organic materials for solar cells in Dr. Stefan Bernhard's group. The Carnegie Mellon campus is across the street from the University of Pittsburgh where I earned my Bachelor of Science in chemistry, and it is also not far from the National Energy Technology Lab (NETL) where my passion for energy research began. As an undergraduate, I spent two summers at NETL using infrared spectroscopy to study the interactions of CO₂ with possible carbon capture and sequestration materials. This was my first research experience, so it taught me valuable lab skills. Much more than that though, it also introduced me to the staggering problems related to future energy generation. I began to understand the inefficiencies of current production methods, the magnitude of CO₂ emissions from power plants, and the various types of pollution like oil sludge which result from fossil fuels. As I realized the impact of these problems not only on the Earth that supports our own lives but on the world that we will leave to future generations, my work at NETL

felt so much less like work and more like a wonderful opportunity to find solutions.

During my time at NETL, I was also greatly inspired by the mentoring and encouragement which I received from Dr. Angela Goodman. I became interested in helping others discover their potential in science, and I found great opportunities to do this in my undergraduate chemistry department at the University of Pittsburgh. I volunteered at the chemistry Olympics for high school students and I also volunteered with a science program for underprivileged students. In addition, I was a chemistry tutor with the ACS student affiliates and a co-editor of the department's newsletter.

As a graduate student, I hope to continue outreach efforts. Also, I know that I will continue to conduct research driven by the hope of contributing towards new energy technologies. Looking beyond graduate school, I want to make energy research a life-long focus either at a National Lab or a university.

Outside of chemistry, I am a big fan of the Pittsburgh Penguins and the Pittsburgh ballet theater. I enjoy spending time with my wonderful family and losing to my lab mates at Foosball.



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