



Matthew Russell Rosenberger

Graduate Institution: University of Illinois - Urbana -Champaign

Graduate Discipline: Mechanical Engineering

Hometown: Urbana, IL

Relevant SC Research: Basic Energy Sciences

Research Interest:

Broadly speaking, my primary research interest is micrometer/nanometer-scale energy transport. Within this area, I have experience with the design and fabrication of bimaterial microcantilevers for heat sensing applications. I am collaborating on a project to measure near-field radiation with bimaterial microcantilevers. Also, my master's thesis focused on optimization of bimaterial microcantilevers as infrared radiation sensors.

I am also interested in semiconductor heat transfer physics. In particular, I am interested in using scanning joule expansion microscopy to analyze heat transfer and inverse-piezoelectricity in GaN high electron mobility transistors operating at high power densities. Understanding heat transfer and the inverse-piezoelectric effect in these devices should elucidate the failure mechanisms and provide guidance for future device design.

Another area of interest is the modification of material properties by micro-structuring and nano-structuring.

About Me:

I received a bachelor's degree in mechanical engineering from the University of Illinois at Urbana-Champaign in August 2010. During my bachelor's degree, I had internships with Motorola, General Electric Aviation, and Ford. Upon graduating, I chose to continue my education in the master's program at the University of Illinois.

My master's research objective was to optimize bimaterial microcantilevers for heat flow sensing applications. This project afforded me many opportunities. In particular, I learned the basics of microfabrication. Despite many long nights in the cleanroom, this experience has been enjoyable and it is invaluable as I move forward in my research career because I am now more aware of the practical considerations of device fabrication. Perhaps my favorite part of research has been working with collaborators. I sincerely enjoy exchanging knowledge and experiences with other scientists, especially those who are in different fields.

I completed my Master's degree in

mechanical engineering in May 2012 and in August 2012, I will take the PhD qualifying examination. I recently started a new research project that aims to analyze the thermal expansion and inverse-piezoelectric expansion of GaN high electron mobility transistors. I am excited about this project because GaN is a promising material for future high power electronics.

After graduate school, I would initially like to do heat transfer research in a national laboratory or in industry. My long-term goal is to obtain a university faculty position.

Throughout my education, I have tried to keep a healthy balance between school/research and other activities. During my undergrad, I was actively involved in Greek Intersvarsity and during grad school I have been involved in Campus Crusade for Christ. I also love playing a variety of sports and games.



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