Andrew McAllister

Curriculum Vitae

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McAllisterSci

Interests

I develop and apply computational methods to study materials used in LEDs. Something like an LED bulb is still very expensive compared to bulbs like incandescents and compact-fluorescents. I am trying to reduce that cost using supercomputers. My methods can predict what experimentalists do in the lab. These predictions let me aid experimentalists when they are investigating new materials for devices. If a new material doesn't have the right properties, I can find out before a lot of time and money has to go into making it in real life. With my calculations, I hope to find new materials that can be realized in the lab that will lead to more efficient and cheaper LEDs.

I also am focused on communicating science, both to technical and lay-audiences. This is just as important as doing good science. If no one understands what I am trying to do, I won't be able to get the support I need to do research. To gain experience with this, I have been involved with various K-12 and adult public engagement events. I have taught technical writing to other graduate students. And I have sought out specific training to improve my skills, like the RELATE workshop series at U of M and the ComSciCon Workshop in Chicago.

Education

2012–Present **PhD in Applied Physics**, *University of Michigan*, Ann Arbor, MI.

2008–2012 **B.S. in Physics**, *Rensselaer Polytechnic Institute*, Troy, NY.
Dual major in mathematics

Work Experience

2012-Present **Graduate Student Researcher**, *University of Michigan*, Ann Arbor, MI.

June-August 2013 **Computational Chemistry and Materials Science Fellow**, *Lawrence Livermore National Laboratory*, Livermore, CA.

2011-2012 **Undergraduate Research Assistant**, *Rensselaer Polytechnic Institute*, Troy, NY.

Awards

2014 National Science Foundation Graduate Research Fellowship Program

2012 Nadia Trinkala Service Award, RPI Physics Department

2011 Pi Mu Epsilon, Mathematics Honor Society

2010 Rensselaer Polytechnic Institute Founder's Award of Excellence

2008 Boy Scouts of America, Eagle Scout

Public Engagement

2017 Nerd Nite Ann Arbor Talk

- LED Light Bulbs: Why Do They Cost and Arm and a Leg?

2016 Researchers Expanding Lay-Audience Teaching and Engagement Workshops

- Communication Fundamentals, resulted in producing a YouTube video
- Advanced Oral Communication

2013-Present American Society for Engineering Education

- President: 2014-2015

2008-2012 Society of Physics Students

- President: 2009-2011

Teaching Experience

At the University of Michigan:

April 2015 Flow in Technical Writing Workshop

October 2014 Introduction to Mathematica Workshop

April 2014 Introduction to LaTeX Workshop

At Rensselaer Polytechnic Institute:

Spring 2012 Teaching Assistant, Physics 4100 - Introductory Quantum Mechanics

Fall 2011 Teaching Assistant, Physics 2961 - Modern Physics

Fall 2011 Grader, Math 4400 - Ordinary Differential Equations

Spring 2011 Teaching Assistant, Physics 1200 - Introductory Electromagnetism

Fall 2010 Teaching Assistant, Physics 1200 - Introductory Electromagnetism

Publications

1. Kyeongwoon Chung, **Andrew McAllister**, David Bilby, Bong-Gi Kim, Min Sang Kwon, Emmanouil Kioupakis, Jinsang Kim, Designing interchain and intrachain properties of conjugated polymers for latent optical information encoding, *Chemical Science* **6**, 6980-6985 (2015) doi:10.1039/c5sc02403j
2. **Andrew McAllister**, Daniel Åberg, André Schleife, and Emmanouil Kioupakis, Auger recombination in sodium-iodide scintillators from first principles, *Applied Physics Letters* **106**, 141901 (2015) doi:10.1063/1.4914500
3. Daniel Recht, David Hutchinson, Thomas Cruson, Anthony DiFranzo, **Andrew McAllister**, Aurore J. Said, Jeffrey M. Warrender, Peter D. Persans, and Michael J. Aziz, Contactless Microwave Measurements of Photoconductivity in Silicon Hyperdoped with Chalcogens, *Applied Physics Express* **5**, 041301 (2012) doi:10.1143/apex.5041301

Presentations

Contributed

1. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis, Radiative and Auger Recombination in InN, International Conference on Nitride Semiconductors, 2017, Strasbourg, France
2. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis, Radiative and Auger Recombination of Degenerate Carriers in InN American Physical Society March Meeting, 2017, New Orleans, LA
3. **Andrew McAllister**, Emmanouil Kioupakis, Auger recombination in InN from first principles, American Physical Society March Meeting, 2016, Baltimore, MD
4. **Andrew McAllister**, Emmanouil Kioupakis, Daniel Åberg, Andreé Schleife, Auger recombination in scintillator materials from first principles, American Physical Society March Meeting, 2015, San Antonio, TX
5. **Andrew McAllister**, Predictive modelling of quantum processes for optoelectronic devices, Physics Graduate Student Symposium, 2014, Ann Arbor, MI
6. **Andrew McAllister**, Emmanouil Kioupakis, Daniel Åberg, Andreé Schleife, Auger recombination in sodium iodide, American Physical Society March Meeting, 2014, Denver, CO
7. **Andrew McAllister**, Computational Modeling of Auger Recombination, Computational Chemistry and Materials Science Summer Institute, Livermore, CA, Lawrence Livermore National Laboratory

Poster

1. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis Auger Recombination in Indium Nitride from First-Principles, Electronic Materials Conference, 2017, South Bend, IN
2. **Andrew McAllister**, Daniel Åberg, Emmanouil Kioupakis, André Schleife, Babak Sadigh, Computational modelling of Auger recombination in scintillators, Computational Chemistry and Materials Science Summer Institute, 2013, Livermore, CA

High-performance Computing Awards

2017 Electronic and optical properties of novel photovoltaic and thermoelectric materials from first-principles, National Energy Research Scientific Computing Center (1,800,000 hours). PI: Emmanouil Kioupakis *Note: Award and project was same as 2016, not a copy and paste error.*

2016 Electronic and optical properties of novel photovoltaic and thermoelectric materials from first-principles, National Energy Research Scientific Computing Center (1,800,000 hours). PI: Emmanouil Kioupakis

2015 Electronic and optical properties of novel photovoltaic and thermoelectric materials from first-principles, National Energy Research Scientific Computing Center (4,000,000 hours). PI: Emmanouil Kioupakis

Mentoring

2014 Lunch and Lab with a Grad Mentoring Program

Professional Memberships

American Physical Society

Materials Research Society

American Society for Engineering Education

American Association for the Advancement of Science

Computer skills

Fortran, Python, C++, Matlab, Mathematica, Shell and LaTeX. Further details and proficiencies available on request.