

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
- 2013-2016 American Society for Engineering Education
 - President: 2014-2015
- 2008-2012 Society of Physics Students
 - President: 2009-2011

Writing and Editing

- 2017 Wrote a [press release](#) about lab's research that was picked up by the DOE, NERSC, EurekaAlert! and Semiconductor Today.
- 2016-Present Content Editor and Writer for Michigan Science Writers.
 - [How Gecko Feet Will Make Your Next Move Easier](#)
- 2017-Present Senior Editor for project by the Applied Physics Student Council. Project involves Applied Physics PhD students interviewing each other and learning how to explain their research to a broader audience in writing.
 - [Example article](#)

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, Christina Jones, Emmanouil Kioupakis, Auger Recombination From First-principles in Group-III Nitride Alloys, American Physical Society March Meeting 2018, Los Angeles, CA
2. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis, Auger Recombination in Group-III Nitrides from First Principles, Materials Research Society Fall Meeting, 2017, Boston, MA
3. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis, Radiative and Auger Recombination in InN, International Conference on Nitride Semiconductors, 2017, Strasbourg, France
4. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis, Radiative and Auger Recombination of Degenerate Carriers in InN American Physical Society March Meeting, 2017, New Orleans, LA
5. **Andrew McAllister**, Emmanouil Kioupakis, Auger recombination in InN from first principles, American Physical Society March Meeting, 2016, Baltimore, MD
6. **Andrew McAllister**, Emmanouil Kioupakis, Daniel Åberg, André Schleife, Auger recombination in scintillator materials from first principles, American Physical Society March Meeting, 2015, San Antonio, TX
7. **Andrew McAllister**, Predictive modeling of quantum processes for optoelectronic devices, Physics Graduate Student Symposium, 2014, Ann Arbor, MI
8. **Andrew McAllister**, Emmanouil Kioupakis, Daniel Åberg, André Schleife, Auger recombination in sodium iodide, American Physical Society March Meeting, 2014, Denver, CO
9. **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 modeling of Auger recombination in scintillators, Computational Chemistry and Materials Science Summer Institute, 2013, Livermore, CA

High-performance Computing Awards

- 2018 Electronic and optical properties of novel photovoltaic and thermoelectric materials from first-principles, National Energy Research Scientific Computing Center (5,000,000 hours). PI: Emmanouil Kioupakis
- 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 the same as 2016*
- 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

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, Git and \LaTeX .
VASP, QuantumEspresso, Wannier90, BerkeleyGW
Further details and proficiencies available on request.