

# Andrew McAllister

## Curriculum Vitae

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McAllisterSci



## Interests

I develop and apply computational methods to study materials used in LEDs. LED bulbs are still very expensive compared to bulbs like incandescents and compact-fluorescents. I am trying to reduce that cost using supercomputers. My methods can predict properties that these materials have before an experimentalists has to go through the expensive and time consuming process of making the material in the lab. That time and money can be saved by my calculations, leading to faster discovery of materials that have desirable properties. 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. I have written and edited with Michigan Science Writers. And I have sought out specific training to improve my skills, like the RELATE workshop series at the University of Michigan and the ComSciCon Workshop in Chicago.

## Education

- 2012–Present **PhD in Applied Physics**, *University of Michigan*, Ann Arbor, MI.  
Advisor: Emmanouil Kioupakis  
Expected Graduation: Summer 2018
- 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

- 2018 **Skype a Scientist**.  
More information on my blog, [here](#).

- 2017 **Nerd Nite Ann Arbor Talk.**  
LED Light Bulbs: [Why Do They Cost an Arm and a Leg?](#)
- 2016 **Researchers Expanding Lay-Audience Teaching and Engagement (RELATE) Workshops.**
  - Communication Fundamentals Produced a [YouTube video](#) highlighting my research.
  - 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

- 2018 **Using LEDs to Tell Plants What We Want From Them.**  
Worked on as part of "Friends of Joe's Big Idea" Program, submitted for publication
- 2017 **Press Release for Research Group.**  
Picked up by the DOE, NERSC, EurekaAlert! and Semiconductor Today
- 2017-Present **Senior Editor, *Students of Applied Physics Project, Applied Physics Student Council.***  
I develop and edit articles that PhD students write about each other's research. [Example article](#)
- 2016-Present **Content Editor and Writer for Michigan Science Writers.**  
[How Gecko Feet Will Make Your Next Move Easier](#)

## 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

## Other Education Experiences

- Winter 2018 **Public Policy 650 - Introduction to Science and Technology Policy Analysis,**  
*University of Michigan.*
- August 2017 **ComSciCon Chicago,** *Chicago, IL.*
- Fall 2017 **Engineering 580 - Teaching Engineering,** *University of Michigan.*

## Professional Memberships

American Association for the Advancement of Science  
 American Physical Society  
 American Society for Engineering Education  
 Materials Research Society

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## Publications

1. **Andrew McAllister**, Dylan Bayerl, Emmanouil Kioupakis, Auger and radiative recombination in indium nitride, *In preparation*
2. 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](https://doi.org/10.1039/c5sc02403j)
3. **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](https://doi.org/10.1063/1.4914500)
4. 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](https://doi.org/10.1143/apex.5041301)

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## 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

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## 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

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## Computer Skills

Programming: Fortran, Python, C++, Matlab, Shell, Git

High Performance Computing Codes: VASP, QuantumEspresso, Wannier90, BerkeleyGW

Other Software: L<sup>A</sup>T<sub>E</sub>X, Microsoft Office, Basic Knowledge of Adobe Illustrator and Adobe InDesign

Further details and proficiencies available on request.