Kraig J. Andrews

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Education

- **Wayne State University** **Detroit, MI**
  Ph.D. Physics *2014 – Present*

  Thesis Title: "Quantum Transport Properties and Scattering Mecahnisms in Transistion Metal Dichalcogenides"
- **Wayne State University** **Detroit, MI**
  M.Sc. Physics *2014 – 2017*
- **Michigan State University** **East Lansing, MI**
  B.Sc. Physics *2010 – 2014*
- **Michigan State University** **East Lansing, MI**
  B.Sc. Astrophysics *2010 – 2014*

Research Experience

- **Nano Fabrication and Electron Transport Laboratory** **Wayne State University, Detroit, MI**
  Graduate Research Assistant (Advisor: Dr. Zhixian Zhou) *2015 – Present*
  - Fabricate field-effect transistors using two-dimensional semiconductors to invesitgate their intrinsic transport properties.
  - Develop novel techniques for making low-resistance Ohmic contacts to a wide variety of two-dimensional semiconductors.
- **National Institute of Materials Science (NIMS)** **Tsukuba, Ibaraki Prefecture, Japan**
  International Center for Materials Nanoarcitectonics (MANA)
  Visiting Graduate Researcher (Advisor: Dr. Kazuhito Tsukagoshi) *2017*
  - Investigate methods for surface modification of two-dimensional semiconductors for the use of creating a new low-resistance Ohmic contact strategy.
- **Interational Course on Computational Physics** **Delft, The Netherlands and East Lansing, MI**
  Undergraduate Research Assistant (Advisors: Dr. Jos Thijssen, Dr. Phil Duxbury) *2014*
  - A Joint collaboration with Technische Universiteit Delft and Michigan State University involving the development of computational models of various physical systems to model interactions of materials and optimize employed techniques.
- **Jenoptik Laser Technologies** **Brighton, MI**
  Summer Intern *2013*
  - Contributed in development of a user interface for laser welding machine that allows user manipulation of robotic end-arm tooling.
  - Incorporated microcontroller program via interfaced electronic devices and several developed algorithms to analyze physical data and feedback in real-time.
- **Michigan State University** **East Lansing, MI**
  Undergraduate Research Assistant (Advisor: Dr. Edward Brown) *2012 – 2014*
  - Research of neutron star evolution using various modeling tools and techniques.

Peer Review Publications

1. "*High Performance WSe_2 Phototransistors with 2D/2D Ohmic Contacts.*" Tianjiao Wang, **Kraig Andrews**, Arthur Bowman, Tu Hong, Michael Koehler, Jiaqiang Yan, David Mandrus, Zhixian Zhou, and Ya-Qiong Xu. *Nano Letters, (18)*5:2766-2771. 2018.

Presentations

1. "*Palladium Diselenide as a New Two-Dimensional Electronic Material Beyond Silicon.*" **Kraig Andrews**, Arthur Bowman, Upendra Rijal, Amanda Haglund, David Mandrus, and Zhixian Zhou. Society of Vacuum Coaters TechCon, Orlando, FL. May 2018.

2. "*Improved On-Off in Ratio Black Phosphorus Field-Effect Transistors with True Ohmic Contacts.*" **Kraig Andrews**, Arthur Bowman, Upendra Rijal, Michael Koehler, David Mandrus, and Zhixian Zhou. APS March Meeting, Los Angeles, CA. March 2018.

3. "*High Mobility Palladium Diselenide Field-Effect Transistors Using Heaving $n-$Doped Graphene Contacts.*" Arthur Bowman, **Kraig Andrews**, Upendra Rijal, Amanda Haglund, David Mandrus, and Zhixian Zhou. APS March Meeting, Los Angeles, CA. March 2018.

4. "*Measuring the Barrier Height at Transition Metal Dichalcogenide Heterojunctions.*" Upendra Rijal, Arthur Bowman, **Kraig Andrews**, Michael Koehler, David Mandrus, and Zhixian Zhou. APS March Meeting, Los Angeles, CA. March 2018.

5. "*High-Performance Top-Gated WSe_2 Transistors with Two-Dimensional Ohmic Contacts.*" **Kraig Andrews**, Upendra Rijal, Arthur Bowman, Hsun-Jen Chuang, Sagar Paduel, Michael Koehler, David Mandrus, and Zhixian Zhou. 41^{st} Annual Symposium American Vacuum Society- Michigan Chapter, Ann Arbor, MI. May 2017.

6. "*Substrate Dependence of Hall and Field-Effect Mobilities in Few-Layer MoS_2 Field-Effect Transistors.*" Bhim Chamlagain, Perera Meeghage, Hsun-Jen Chuang, Arthur Bowman, Upendra Rijal, **Kraig Andrews**, Joseph Klesko, Charles Winter, and Zhixian Zhou. APS March Meeting, Boston, MA, March 2016.

Awards and Honors

Frank Knoller Endowed Fellowship in Physics	2019
Society of Vacuum Coaters (SVC) Student Sponsorship Award	2018
Wayne State Physics and Astronomy Department Travel Award	2017
Associated Students of Michigan State University (ASMSU) Research Travel Grant	2014

Professional Memberships

Society of Vacuum Coaters	2018
American Physical Society	2017 – Present
Sigma Pi Sigma, Physics Honor Society	2013

Volunteer and Outreach Experience

Teaching Experience

Laboratory Instructor, General Physics I, Wayne State University	Summer 2018
Teaching Assistant, General Physics II, Wayne State University	Summer 2018
Teaching Assistant, General Physics I, Wayne State University	Winter 2018
Teaching Assistant, General Physics II, Wayne State University	Autumn 2017
Teaching Assistant, General Physics II, Wayne State University	Winter 2017
Teaching Assistant, General Physics II, Wayne State University	Autumn 2016
Teaching Assistant, General Physics I, Wayne State University	Summer 2016
Teaching Assistant, General Physics I, Wayne State University	Autumn 2015
Teaching Assistant, General Physics Lab I, Wayne State University	Summer 2015
Laboratory Instructor, Conceptual Physics Lab I, Wayne State University	Winter 2015

Laboratory Instructor, Descriptive Astronomy Lab I, Wayne State University	Autumn 2014
Teaching Assistant, Introductory Physics II, Michigan State University	Winter 2014
Laboratory Instructor, Planets and Telescopes, Michigan State University	Winter 2013
Teaching Assistant, Introductory Physics I, Michigan State University	Autumn 2013
Teaching Assistant, Introductory Physics II, Michigan State University	Winter 2012

Core Technical Skills

Nanofabrication: Atomic force microscopy (AFM), Electron beam lithography, Photolithography, Scanning electron microscopy (SEM), General clean room abilities (> 1000 hours), Physical vapor deposition (PVD), Plasma etching, Reactive ion etching (RIE)

Languages & Software: C++, Fortran, Java, JavaScript, LaTeX, Python, shell script, Microsoft Office, Matlab, Mathematica

Operating Systems: OS X, Linux OS, Microsoft Windows