KYLE HERSHEY

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SUMMARY OF QUALIFICATIONS

- Graduation with a Ph. D in Materials Science & Engineering in Summer 2018
- Extensive experience in the fabrication and characterization of thin films, with emphasis on Organic Light-Emitting Diodes (OLEDs)
- Specific expertise in characterization of dynamic processes of electronic species within OLEDs in the transient, steady-state and operational lifetime regimes
- Primary hardware and software designer for multiple permanent lab equipment setups
- Strong leader with long history of experience

EDUCATION

University of Minnesota Expected Summer 2018
Ph.D. in Materials Science & Engineering
Profesor Russell J. Holmes Research Group
Dow Chemical Company University Partnership Program Scholar
GPA: 3.545

Coe College June 2013
B.A.s in Phyisics, Mathematics, and Computer Science
GPA: 3.927

RESEARCH EXPERIENCE

University of Minnesota, Materials Science & Engineering July 2013-Present
Graduate Student *Minneapolis, MN*

- *Transient and Operational Lifetime Dynamics of Organic Light Emitting Devices (OLEDs)*
- PI: Prof. Russell J. Holmes
- Explored methods of enhancing device efficiency and lifetime through an improved understanding of dynamic processes and novel experimental techniques
- Fabrication and characterization of OLEDs at transient, steady-state, and lifetime timescales
- Actively collaborated with the Dow Chemical Company as an industrial sponsor in order to provide methods of understanding device and chemical behavior of materials of interest
- Theoretical, hardware and software development for novel OLED lifetime testing setup, as well as multiplexing to eight simultaneous devices.
- Created perminant hardware setups for transient photoluminescence and electroluminescence studies
- Model development for fitting experimental data of transient and steady-state electroluminescence
- Software development and hardware automation for device testing and analysis
- Database setup for storing test data and data analysis
- Maintain active code repository for testing and analysis software using Github, featureing over 13,000 lines of code
- Extensive use of software connection to testing equipment including source-measure units, spectrometers, and custom microprocessor board based electronics

Northwestern University, Materials Science/Chemistry June 2012 - August 2012
REU Student *Evanston, IL*

- *Field Enhancement Due to Plasmonic Nanostructures*
- PI: Prof. George Schatz, Chemistry
- Mentor: Montacer Dridi, Graduate student, Chemistry
- Computational simulation of electromagnetic field enhancement near the surface of gold cylindrical dimers
- Finite-difference time domain method simulation (FDTD) with periodic boundary conditions
- Cluster computing on Northwestern's high performance computing system - *Quest*

Rockwell Collins, Inc., Advanced Technology Center June 2011-August 2011
Summer Intern *Cedar Rapids, IA*

- *Microelectroncs die attach process development*
- Mentor: Guy Smith, Sr. Mechanical Engineer, Rockwell Collins, Inc.
- Developed and characterized methodology for attaching microelectronics using various techniques for low stand-off applications
- Composed internal documentation on No Clean microelectronics die attachment and Transient Liquid Phase bonding

Coe College June 2010-August 2010
REU Student *Cedar Rapids, IA*

- PI: Prof. James Cottingham, Coe College, Physics
- Examined the effects of the vibrations in the pipe walls of free-reed wind instruments
- Materials measurements of density and Young's modulus of bamboo pipes
- Theoretical modeling of vibraional modes with Matlab and Mathematica

LEADERSHIP EXPERIENCE

Holmes Group Purchasing Officer 2016-Present
University of Minnesota

- Served as group purchasing officer, responsible for handling all purchases less than $500
- Regular interaction with the Accounting Office to process transactions
- Weekly transaction accounting and justification

Treasurer (2011), Vice President (2012) 2009-2013
Coe College Physics Club

- Assisted in organization of *Playground of Science*, an annual outreach event for over 1,000 elementary school students, engaging them with science demos. Ran the demos for a theramin and sparking steel wool.
- Organized weekly Ice Cream Social for on campus outreach
- Represented Phyics Club at annual student activities committee budget meeting. Physics Club had the largest budget of any student group, with an annual budget over $ 4,000.
- Defended Physics Club at special budgetary meetings which succeeded in funding over 30 students to attend the 2012 Sigma Pi Sigma Quadrennial Congress, the largest group Coe College has ever sent.

President, Society of Physics Students 2012-2013
Coe College Chapter

- Represented the chapter at the 2012 Sigma Pi Sigma Quadrennial Congress
- Helped organize events in coordination with Physics Club

Mentor of Undergraduate and High School Research Students 2016-present
University of Minnesota

- Primary contact for Undergraduate student working on developing new technique for solution lifetime measurements
- Oversaw two high school students in creating organic lasers for a summer research experience project
- Taught advanced research topics at basic level to enable understanding of lab work

Senior Patrol Leader, Boy Scouts of America 2006
Troop 46 Glendale, AZ

- Organized and led weekly troop meetings focusing on important life skills ranging from First Aid to wilderness skills to finance
- Organized monthy camping trips for scouts and parents
- Maintained order in a group of 30 children

TEACHING EXPERIENCE

Teaching Assistant, Senior Design 2017
University of Minnesota

- Oversaw over 30 students working in groups with industrial partners designing solutions to commercially relevant problems
- Assisted in idea generation, design specification, techical calculations and financial analysis
- Evaluated biweekly presentation and written reports of projects
- Responsible for assisting students and grading

Supervisor, Coe College Math Help Room 2012-2013
Coe College

- Math Help Room is a nightly open office hour for assisting students of any class offerend in the math department. Five senior students are chosen to supervise once per week.
- Held weekly open tutoring sessions, averaging over 5 students per hour
- Assisted students with math topics ranging from algebra, to calculus, to real and complex analysis

Tutor, Academic Achievement Program 2010-2013
Coe College

- Tutored multiple students in Physics, Math, and Computer Science
- Individual weekly tutoring sessions for at least two students per semester

TECHNICAL STRENGTHS

Analytical Techniques	Ellipsometry, Electronic Device Characterization, UV/Visible Spectrometry, Transient exciton lifetime measurements (electrically and optically pumped), OLED lifetime characterization, Scanning Electron Microscopy (SEM), Optical Microscopy, Optical Field Modeling, Transfer Matrix Formalism, Finite Difference Time Domain (FDTD) Modeling, Transient Liquid Phase (TLP) bonding, AuSn eutectic bonding, solder bumping, Ball Grid Array (BGA) attachment, cross sectional die analysis
Lab Equipment	Thermal evaporation vacuum chamber, glovebox, spin coater, UV ozone, sonicator, pulse generator, Impedence spectrometer, frequency generator, optical microscope, SEM, ellipsometer, oscilloscope, FFT audio spectrometer, source meter, spectrometer, arduino, Pulsed and CW lasers, Class 10000 clean room, chip bonder, wire bonding, stud bumping, plating baths
Software	Matlab, Mathematica, Anaconda, Autodesk Inventor, AutoCAD, Solidworks, OriginLabs, ChemDraw, Powershell, Microsoft Office Suite, Github, KiCAD, LaTeX, Linux(Ubuntu, Debian, Red Hat, Arch) Vim, SSH, SCP, VNC, Bash
Programming	Python, C, C++, C#, Objective C, Matlab, Tk graphics, National Instrument VISA command library, HTML, PHP, MongoDB, SQLite, SQL, Plotly, Matplotlib

HONORS

- Eagle Scout (2008)
- Dean's List, Coe College (2009-2013)
- Member of Sigma Pi Sigma Physics Honors Society (Inducted 2013)
- Member of Phi Beta Kappa (Inducted 2013)
- Member of the Materials Research Society (Inducted 2016)
- University of Minnesota College of Science and Engineering Fellowship (2013-2014)

PUBLICATIONS AND PRESENTATIONS

Journal Publications

- **KW Hershey**, G Qian, RJ Holmes. *Decoupling Degradation in Exciton Formation and Recombination During Lifetime Testing of Organic Light-Emitting Devices.* Applied Physics Letters. *Submitted*
- F Xu, **KW Hershey**, RH Holmes, TR Hoye. *Blue-Emitting Arylalkynyl Naphthalene Derivatives via a Hexadehydro-Diels-Alder Cascade Reaction* . Journal of the American Chemical Society 138 (39), 12739-12742
- **KW Hershey**, RJ Holmes. *Unified Analysis of Transient and Steady-State Electrophosphorescence Using Exciton and Polaron Dynamics Modeling* . Journal of Applied Physics 120 (19), 195501
- **KW Hershey**, JP Cottingham. *Matierial Properties of Pipes of Reeds From the Southeast Asian Khaen* . Journal of the Acoustics Society of America, 129 (4) 2520

Oral Presentations

- **KW Hershey**, RJ Holmes.*Decoupling Degradation Mechanisms During Lifetime Testing of Organic Light-Emitting Devices*, UMN IPrime. Talk. Minneapolis, MN. June 2017
- **KW Hershey**, RJ Holmes.*Modeling Exciton and Polaron Dynamics to Analyze OLED Behavior*, UMN IPrime. Talk. Minneapolis, MN. June 2016
- **KW Hershey**, RJ Holmes.*Modeling Exciton and Polaron Dynamics to Analyze OLED Behavior*, MRS Spring Conference. Talk. Phoenix, AZ. April 2016
- **KW Hershey**, JP Cottingham. *Material Properties of Pipes and Reeds from the Southeast Asian Khaen*, Acoustical Society of America National Meeting. Talk. Seattle, WA. May 2011

Poster Presentations

- **KW Hershey**, RJ Holmes.*Decoupling Degradation Mechanisms During Lifetime Testing of Organic Light-Emitting Devices*, UMN IPrime. Poster. Minneapolis, MN. June 2017
- **KW Hershey**, RJ Holmes.*Connecting Transient and Steady-State Dynamics in Organic Light Emitting Devices*, UMN IPrime. Poster. Minneapolis, MN. June 2016
- **KW Hershey**, RJ Holmes.*Transient Analysis of Organic Light-emitting Devices*, UMN IPrime. Poster. Minneapolis, MN. May 2015
- **KW Hershey**, JP Cottingham.*Material Properties of Pipes and Reeds from the Southeast Asian Khaen*, Sigma Pi Sigma Quadrennial Physics Congress. Poster. Orlando, FL. 2012.