KYLE W. HERSHEY

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SUMMARY OF QUALIFICATIONS

- Ph.D in Materials Science & Engineering (Expected Summer 2018)
- Extensive experience in the fabrication and characterization of thin films via solution and vapor deposition methods
- Testing and analysis of Organic Light-Emitting Devices (OLEDs), along with failure analysis
- Specific expertise in characterization of kinetic processes of electronic species within OLEDs in the transient, steady-state and operational lifetime regimes
- Primary hardware and software designer for multiple permanent laboratory equipment apparatuses
- Experience implementing software control of testing equipment along with database design for data management
- Strong leader with experience in mentoring and financial management

EDUCATION

University of Minnesota — Expected Summer 2018
Ph.D. in Materials Science & Engineering — GPA: 3.545
Transient and Operational Lifetime Dynamics of Organic Light Emitting Devices (OLEDs)
Holmes Research Group

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

RESEARCH EXPERIENCE

University of Minnesota, Materials Science & Engineering — July 2013 - Present
Graduate Student, Prof. Russell J Holmes — *Minneapolis, MN*

Unified Transient and Steady-State Dynamics
- Explored methods of enhancing device efficiency through an improved understanding of dynamic processes
- Model development for fitting experimental data of transient and steady-state electroluminescence
- Fabrication and characterization of OLEDs at transient, steady-state, and lifetime timescales

Decoupling Exciton Formation and Recombination Degradation
- Actively collaborated with the Dow Chemical Company as an industrial sponsor in order to provide methods of understanding device and chemical degradation of materials of interest
- Theoretical and experimental development for novel OLED lifetime testing method
- Enhanced understanding of degradation pathways of OLEDs

Hardware and Software Design and Implementation
- Created permanent hardware setups for transient photoluminescence and electroluminescence studies as well as novel lifetime apparatus
- Multiplexed prototype lifetime setup to eight simultaneous devices
- Software development and hardware automation for device testing and analysis
- Database setup for test data storage and analysis
- Maintain code repository for testing and analysis software using Github, featuring 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, Prof. George Schatz, Chemistry — *Evanston, IL*

- *Field Enhancement Due to Plasmonic Nanostructures*
- Finite-difference time domain (FDTD) simulation of electromagnetic field enhancement around gold dimers
- 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*

- *Microelectronics die attach process development*
- Developed methodology for attaching microelectronics using various techniques for low stand-off applications
- Composed internal documentation on microelectronics die attachment and Transient Liquid Phase bonding

Coe College June 2010 - August 2010
REU Student, Prof. James Cottingham, Coe College, Physics *Cedar Rapids, IA*

· 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 and simulation of vibrational modes

TECHNICAL STRENGTHS

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
Equipment	Thermal evaporation vacuum chamber, glovebox, spin coater, UV ozone, sonicator, pulse generator, impedance spectrometer, frequency generator, optical microscope, SEM, ellipsometer, oscilloscope, FFT audio spectrometer, probe station, cryogenic probe station, 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

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

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

· Primary contact for undergraduate student 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

Executive Board Member 2011 - 2013
Physics Club: *Treasurer (2011), Vice President (2012)* ***Soc. of Physics Students:*** *President (2012-2013)*

· Assisted in organization of *Playground of Science*, an annual outreach event for 1,000+ elementary school students
· Defended Physics Club at annual student activities committee budget meeting and special budgetary meetings which succeeded in funding 30+ students to attend the 2012 Sigma Pi Sigma Quadrennial Congress
· Represented the Society of Physics Students chapter at the 2012 Sigma Pi Sigma Quadrennial Congress

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

· Organized and led weekly troop meetings and monthly campouts for a troop of 30+ boys aged 12-16

TEACHING EXPERIENCE

Teaching Assistant, Senior Design 2017
University of Minnesota

· Oversaw 30+ students working in groups with industrial partners designing solutions to commercially relevant problems
· Assisted in idea generation, design specification, technical calculations and financial analysis
· Evaluated biweekly presentation and written reports of projects

Teaching Assistant, Materials Performance 2015
University of Minnesota

- Ran two laboratory sections every week, seeing 30 students
- Oversaw laboratory experiments for thermal and mechanical characterization, including thermal stress, creep, fatigue and stress-strain testing

HONORS

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

PUBLICATIONS AND PRESENTATIONS

Journal Publications

- J Suddard-Bangsund, **KW Hershey**, RJ Holmes. *Origin of Lifetime Enhancement in Organic Light Emitting Devices.* Applied Physics Letters. *In Preparation*
- **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 Exciton Formation and Recombination Losses in Organic Light-Emitting Devices During Lifetime Testing*, Optical Society of America - Solid State Lighting Meeting. Boulder, CO. November 2017
- **KW Hershey**, RJ Holmes.*Decoupling Degradation Mechanisms During Lifetime Testing of Organic Light-Emitting Devices*, UMN IPrime. Minneapolis, MN. June 2017
- **KW Hershey**, RJ Holmes.*Modeling Exciton and Polaron Dynamics to Analyze OLED Behavior*, UMN IPrime. Minneapolis, MN. June 2016
- **KW Hershey**, RJ Holmes.*Modeling Exciton and Polaron Dynamics to Analyze OLED Behavior*, MRS Spring Conference. 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. 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.