

Contact

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About

I am an optical and electronic materials scientist with eight years of laboratory experience in photovoltaics and LEDs. I develop software and hardware which enable new measurement techniques and improved data analysis.

Skills

Techniques - Ellipsometry, atomic force microscopy, X-ray diffraction, electronic device characterization, UV-Vis spectrometry, transient fluorescence, optical microscopy, physical vapor deposition
Equipment - lock-in amplifier, pulse generator, oscilloscope, source measure unit, spectrometer, pulsed and CW lasers, Arduino, cryostat
Programming - Python, MATLAB, LabView, GUI development, National Instruments VISA, Git, MongoDB, Image Processing, Optical modeling

John Bangsund

Optical and Electronic Materials Scientist

Education

University of Minnesota

Ph.D. Materials Science | GPA: 3.9 | Expected May 2020

National Science Foundation Graduate Research Fellowship (2015-2020)

Michigan State University

B.S. in Materials Science & Engineering | GPA: 4.0 | May 2015

Concentration in Polymer Science, B.A. in Humanities, Minor in Spanish

Goldwater Scholarship (2014), Alumni Distinguished Scholarship (2011-2015)

Work Experience

Graduate Research Fellow

University of Minnesota | Advised by Prof. Russell Holmes | Nov. 2015 - Present

- Collaborated with DuPont to characterize OLED degradation and understand stability differences between proprietary host materials
- Developed techniques based on optical probes to quantify the pathways of OLED degradation, such as changes in quantum yield and excited state kinetics
- Designed hardware and software for automation of device lifetime testing
- Helped build and maintain database for test data storage and analysis
- Implemented image analysis techniques to study crystallization and pattern formation in organic thin films

Ellipsometry Technician

UMN Characterization Facility | Minneapolis, MN | Oct. 2016 - Present

- Trained over 40 new users in theory and the principles of operation
- Maintained instrument and assisted industry partners in sample analysis
- Gave workshop presentations and demos to industry partners

Undergraduate Research Assistant

Michigan State University | Advised by Prof. Richard Lunt | Aug. 2012 - July 2015

Initiated and led a project on near-infrared absorbers for organic photovoltaics which resulted in a licensed patent and three journal publications

Leadership and Outreach

Research Mentor

University of Minnesota and Michigan State University | 2014 - Present

Closely mentored and managed one graduate student, four undergraduates, and two high school students, leading to contributions in four publications

Science Fair Mentor

Minnesota Academy of Science, Bdote Middle School | Fall 2018

Mentored four middle school students developing science fair projects

Student Chapter President

Engineers Without Borders, MSU Student Chapter | Sep. 2014 - May 2015

- Managed chapter of 40 members, supervising local and international volunteering projects
- Coordinated design, fundraising, report writing, and planning for two international projects
- Spanish translator on two trips, helping to construct 14 composting latrines

Journal Publications

- 8 **JS Bangsund**, *et al.* Assessing Bimolecular Quenching During Operation of Organic Light-Emitting Devices. In prep.
- 7 **JS Bangsund**, *et al.* Spontaneous Formation of Aligned, Periodic Patterns During Crystallization of Organic Semiconductor Thin Films. *Nature Materials* (2019). DOI: 10.1038/s41563-019-0379-3
- 6 **JS Bangsund**, *et al.* Improved Stability in Organic Light-Emitting Devices by Mixing Ambipolar and Wide Energy Gap Hosts. *Journal of the Society for Information Display* (2019). DOI: 10.1002/jsid.761
- 5 **JS Bangsund**, *et al.* Origin of Lifetime Enhancement in Mixed Emissive Layer Organic Light-Emitting Devices. *ACS Applied Materials and Interfaces* (2018). DOI: 10.1021/acsami.7b16643
- 4 KW Hershey, **JS Bangsund**, *et al.* Decoupling Degradation in Exciton Formation and Recombination During Lifetime Testing of Organic Light-Emitting Devices. *Applied Physics Letters* (2017). DOI: 10.1063/1.4993618
- 3 CJ Traverse, M Young, **JS Bangsund**, *et al.* Anions for Near-Infrared Selective Organic Salt Photovoltaics. *Scientific Reports* (2017). DOI: 10.1038/s41598-017-16539-3
- 2 M Young, **JS Bangsund**, *et al.* Organic Heptamethine Salts for Photovoltaics and Detectors with Near-Infrared Photoreponse up to 1600 nm. *Advanced Optical Materials* (2016). DOI: 10.1002/adom.201600102
- 1 **JS Bangsund**, *et al.* Organic Salts as a Route to Energy Level Control in Low Bandgap, High Open-Circuit Voltage Organic and Transparent Solar Cells that Approach the Excitonic Voltage Limit. *Adv. En. Mat.* (2016). DOI: 10.1002/aenm.201501659

Conference Presentations

- 4 **JS Bangsund**, *et al.* Spontaneous Formation of Aligned, Periodic Patterns During Crystallization of Organic Semiconductor Thin Films. Poster Presentation. Materials Research Society Fall Meeting, Boston, MA. 11/2018.
- 3 **JS Bangsund**, *et al.* Quantifying Multiple Active Degradation Mechanisms in Mixed Host Organic Light-Emitting Devices. Oral Presentation. Materials Research Society Spring Meeting, Phoenix, AZ. 4/2018.
- 2 **JS Bangsund**, *et al.* Understanding Improved Lifetime in Mixed Emissive Layer Organic Light-Emitting Devices. Oral Presentation. Optical Society of America Solid-State Lighting Meeting, Boulder, CO. 11/2017.
- 1 **JS Bangsund**, *et al.* Energy Level Control in Organic Salts for Efficient, Deep Near-Infrared Organic and Transparent Photovoltaics. Oral Presentation. Materials Research Society Spring Meeting, Phoenix, AZ. 3/2016.

Patents

RR Lunt, **JS Bangsund**, M Young, and CJ Traverse. *ORGANIC SALTS FOR HIGH VOLTAGE ORGANIC AND TRANSPARENT SOLAR CELLS*. PCT/US2016/026169. April, 2016. *Licensed by Ubiquitous Energy*.

Interests

Woodworking, gardening, bouldering, backpacking, biking, saxophone, jazz, and creative writing