

Matthew Schuette White

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The
UNIVERSITY
of **VERMONT**

Professional Experience

September 2015 – Present

Assistant Professor, University of Vermont, Department of Physics, Burlington, VT.

Research focused on the electrical and optical characterization of next generation semiconductor materials and thin-film device design with built-in optical resonant structures.

www.uvm.edu

February 2011 – June 2015

Assistant Professor, Johannes Kepler University Department of Physical Chemistry, Linz, Austria

Responsible for lecturing and guiding student lab practical courses, as well as mentoring undergraduates, graduate students, and post-docs. My group currently consists of two post-docs and a co-advised PhD student with temporary visitors on a regular basis. Head of Device Fabrication and Characterization Lab, and Laser Lab. Research on transient electrical characterization of organic semiconductors and devices including CELIV and nonlinear impedance analysis, ultra-thin, light-weight, and flexible/stretchable solar cells and OLEDs, microstructured organic solar cells, paper substrates for organic devices, and oxide-based hybrid materials.

www.lios.at

September 2009 - December 2010

Post-doctoral Research Assistant, Linz Institute for Organic Solar Cells, Linz, Austria

Characterized organic semiconductor materials using transient methods. Used Charge Extraction with Linearly Increasing Voltage (CELIV) to determine charge carrier mobility as a function of device temperature to quantify the Meyer-Neldl behavior of the materials. Constructed small-molecule IR-activated OLEDs. Investigated the causes of anomalous low frequency diode impedance signals.

www.lios.at

2004 - 2009

Graduate Research Assistant, National Renewable Energy Laboratory, Golden, CO

Fabrication and characterization of organic photovoltaic devices under the direction of David Ginley. The specific area of research was interface engineering for efficient charge transfer and separation in hybrid oxide-polymer devices.

http://www.nrel.gov/pv/advanced_concepts.html

2002-2003

Undergraduate Research Assistant, Center for Nuclear Physics and Astrophysics, University of Washington, Seattle, WA

Worked with the Eöt-Wash group under Eric Adelberger and Blayne Heckel. Constructed and characterized magnetic torsion pendulums to test for spin-coupled forces.

<http://www.npl.washington.edu/eotwash/>

Education

2003-2009

PhD University of Colorado, Boulder, CO

Title of thesis: *Effects of charge carrier concentration in hybrid conjugated polymer/oxide photovoltaic devices*

Department of Physics

Area of concentration: Hybrid and organic photovoltaic device physics

1999-2003

B.S. University of Washington, Seattle WA

Double Major in Mathematics and Physics

Departmental Honors in Physics

University Honors Program

Languages spoken

English: Fluent, native language

Spanish: Very proficient. Lived in Spain 1991-1994 with additional 10 semesters of middle-school, high-school, and university level courses.

German: Proficient. Two semesters of courses plus conversational practice living in Austria 2009-Present.

Italian: Conversational

Awards and Grants

(¥149,985,000 ≈ \$1,365,000) 2014

ANGEL, JSPS Brain Circulation Program. 2.5-year travel, materials, and equipment grant to promote the exchange of researchers to and from Yamagata University (YU) Faculty of Engineering in Yonezawa, Japan. Funded by the Japan Society for the Promotion of Science. The project is transferrable, so I will be able to use some of the funds to host Japanese assistant professors and send my own students and postdocs to YU during the 2015-2017 time frame. Co-author and scientific coordinator at JKU.

(€158,700) 2013

3D Solar, "e!Mission.at" Emerging Technologies for Climate and Energy. 2-year academic/industrial collaborative research project with Joanneum Research in Weiz, Austria. Project funded by the FFG, provides 100% support for salary of 1 post-doctoral researcher, materials, and travel. Co-author and co-PI/Institutional director at JKU.

(€5,272) 2013

Sustainable Energy Travel Grant WTZ. Funding provided by the ÖAD supports travel to and from the Czech Academy of Science to form a collaborative research effort between LIOS and the Institute of MacroMolecular Chemistry headed by J. Stejskal. Principal author and co-PI at JKU.

(€226,890) 2012

OLAE+ Transnational Project "DUC3PV". 2-year project involving 3 universities and 2 industrial entities in Germany (Technical University Chemnitz, Altana), Austria (Isovoltaic, JKU/LIOS), and Poland (Polish Academy of Sciences). Support for 1 post-doctoral researcher, 1 PhD student, materials, and travel. Co-author and technical director at partner institute (JKU/LIOS).

(€1,180) 2010

ORGANISOLAR ESF Short Visit Grant (Ref. #3623) Funding for travel to Universitat Jaume I in Castellon de la Plana, Spain.

2002-2003

Gregory Lynn Andersen Scholarship Full tuition scholarship offered through the physics department at the University of Washington for academic excellence.

Editorial Board

Scientific Reports (Starting Oct 2014)

Reviewing

Journal Review

Advanced Materials
Advanced Energy Materials
Applied Physics A
Journal of Applied Physics
Journal of Luminescence
Journal of Physical Chemistry
Nano Letters
Nature Communications

Organic Electronics
Physics Letters A
Scientific Reports

Grant Review

Israel Science Foundation
U.S. DOE-BES
KAUST CRG

Experimental Skills

Material Characterization

Photoluminescence
UV-Vis absorption spectroscopy
Four-point probe
Profilometry
X-ray diffraction
Electrostatic voltmeter/Kelvin probe
Atomic force microscopy

Device and Film Fabrication

Pulsed laser deposition
Photolithography
Thermal evaporation
Nanoparticle synthesis
Spin coating
Blade coating

Device Characterization

IV and EQE
Electroluminescence
Nonlinear impedance spectroscopy
CELIV and photo-CELIV
Transient photovoltage
Capacitance-voltage

Software and Programming

IGOR Pro
MATLAB
Mathematica
C++
Labview
LaTeX
Corel Draw

Collaborators

Tsukasa Yoshida

Yamagata University
Yonezawa, Japan

Siegfried Bauer

Johannes Kepler University
Linz, Austria

Takao Someya

Tsuyoshi Sekitani
University of Tokyo
Tokyo, Japan

Mehmet Sarikaya

University of Washington

Alan Aspuru-Guzik

Martin Blood-Forsythe
Harvard University
Cambridge, MA

János Volk

Hungarian Academy of Sciences
Budapest, Hungary

Daniel Gryko

Polish Academy of Science
Warsaw, Poland

Arved Hübler

Tino Zillger

Chemnitz University of Technology
Chemnitz, Germany

Andrew Sutherland

Olga Efremova
Aston University
Birmingham, UK

Bernard Lamprecht

Joanneum Research
Weiz, Austria

Jaroslav Stejskal

Jiri Pflieger

Czech Academy of Science
Institute for Macromolecular Chemistry
Prague, Czech Republic

Teaching and mentoring

Courses

Physics 1110, General Physics 1 (Calculus Based) CU Boulder, TA, Fall 2003, Spring 2004, 4 recitation sections each semester, roughly 25 students per section.

Computational tools for experimental scientists JKU, Summer 2011, 2012, 2013, 2014, Lecture course of my own design, 6 to 12 students per semester

Organic opto-electronics lecture and practical JKU, Winter 2011, 2012, 2013, 2014, Half lecture, half lab practical course of my own design, 6 to 12 students per semester.

Physics 128, Waves & Quanta University of Vermont, Fall 2015, Half lecture, half lab on modern physics. 15 students.

Post-docs

Christoph Ulbricht, Post-doctoral researcher, 3D Solar microstructured PV, 2014-present

Lucia Leonat, Post-doctoral researcher, Disposable ultracheap printed paper photovoltaics. 2013-present

PhD students

Safae Aazou, PhD student from Chouaïb Doukkali University in Morocco. I supervised her 6 month research visit to Linz through the African Network for Solar Energy (ANSOLE) ANEX program in 2012, resulting in 2 publications.

Olena Kozlova, PhD student in Marie Curie Research Training Network (ESTABLIS), co-supervisor Siegfried Bauer, 2012-present

Masters/Diploma students

Stefan Kraner, Master of Science, *Measurement of charge carrier mobility and charge carrier concentration of organic photovoltaic diodes under in situ light soaking conditions and varying temperatures*, July 2011

Stefanie Schlager, Diplom Ingenieurin, *Diodes with organic Schottky junctions*, October 2011

High-school summer research students

Matthias Stummer, Talente – Praktika für Schülerinnen und Schüler, August 2013

Conferences Presentations

Invited Presentations

FUTURMAT2, September 2012, Brindisi, Italy, *Ultra-thin, -light, and -flexible organic solar cells*

International Symposium on Advanced Materials and Electronics, March 2013, Tokyo, Japan, *Ultrathin organic opto-electronics*.

Society for Information Display Mid-Europe Chapter Spring Meeting, April 7, 2014, *Ultrathin Organic Optoelectronics*

University of Michigan, MSE Special Seminar, August 12, 2014, *Substrates, Contacts, and Semiconductors for Organic and Hybrid Photovoltaics*

MRS Fall 2014 Symposium P, *ZnO and CuSCN nanostructures for hybrid solar cells* (will be in December 2014)

Contributed Presentations

Over 20 oral presentations, and several poster presentations at international conferences, including Materials Research Society, European Materials Research Society, SPIE Optics and Photonics, Electrochemical Society, and many others.

Outreach Activities

Photovoltaic Research Dialog, Chamber of Commerce Vienna, Austria, Oct 19th 2011
African Network for Solar Energy, student project coordinator for Safae Aazou, 2012
NaNSA Career Q&A Seminar, University of Washington, April 9th, 2013
Nanotechnologie Schulwoche, high school students attend lab experiments in nanotechnology, Feb 10-14, 2014
i-Front Career Q&A Seminar, Yamagata University, March 17th, 2014
ESTABLIS Marie Curie International Training Network Workshop, Sept. 9th, 10th, 2014

Publications

Highlights

- **M. S. White**, D. C. Olson, S. E. Shaheen, N. Kopidakis, and D. S. Ginley, “Inverted bulk-heterojunction organic photovoltaic device using a solution-derived ZnO underlayer,” *Appl. Phys. Lett.*, vol. 89, no. 14, p. 143517, 2006.
- M. Kaltenbrunner, **M. S. White**, E. D. Glowacki, T. Sekitani, T. Someya, N. S. Sariciftci, and S. Bauer, “Ultrathin and lightweight organic solar cells with high flexibility,” *Nat Commun*, vol. 3, p. 770, 2012.
- **M. S. White**, M. Kaltenbrunner, E. D. Glowacki, K. Gutnichenko, G. Kettlgruber, I. Graz, S. Aazou, C. Ulbricht, D. A. Egbe, and M. C. Miron, “Ultrathin, highly flexible and stretchable PLEDs,” *Nature Photon*, vol. 7, no. 10, pp. 811–816, 2013.
- E. D. Glowacki, M. Irimia-Vladu, M. Kaltenbrunner, J. Gasiorowski, **M. S. White**, U. Monkowius, G. Romanazzi, G. P. Suranna, P. Mastroilli, T. Sekitani, S. Bauer, T. Someya, L. Torsi, and N. S. Sariciftci, “Hydrogen-Bonded Semiconducting Pigments for Air-Stable Field-Effect Transistors,” *Adv. Mater.*, vol. 25, no. 11, pp. 1563–1569, 2013.
- L. Leonat, **M. S. White**, E. D. Glowacki, M. C. Scharber, T. Zillger, J. Rühling, A. Hübler, and N. S. Sariciftci, “4% Efficient Polymer Solar Cells on Paper Substrates,” *J Phys Chem C*, vol. 118, no. 30, pp. 16813–16817, 2014.

All publications

* indicates over 100 citations

26. 1. C. Enengl, S. Enengl, M. Havlicek, P. Stadler, E. D. Glowacki, M. C. Scharber, **M. S. White**, K. Hingerl, E. Ehrenfreund, H. Neugebauer, and N. S. Sariciftci, “The Role of Heteroatoms Leading to Hydrogen Bonds in View of Extended Chemical Stability of Organic Semiconductors,” *Adv. Funct. Mater.* 2015 DOI: 10.1002/adfm.201503241
25. 1. M. Kaltenbrunner, G. Adam, E. D. Glowacki, M. Drack, R. Schwödiauer, L. Leonat, D. H. Apaydin, H. Groiss, M. C. Scharber, **M. S. White**, N. S. Sariciftci, and S. Bauer, “Flexible high power-per-weight perovskite solar cells with chromium oxide-metal contacts for improved stability in air,” *Nat Mater*, vol. 14, pp. 1032-1039, 2015.
24. E. D. Glowacki, H. Coskun, M. A. Blood-Forsythe, U. Monkowius, L. Leonat, M. Grzybowski, D. Gryko, **M. S. White**, A. Aspuru-Guzik, and N. S. Sariciftci, “Hydrogen-Bonded Diketopyrrolopyrrole (DPP) Pigments as Organic Semiconductors,” *Organic Electronics*, vol. 15, no. 12, pp. 3521-3528, 2014.
23. O. A. Efremova, K. A. Brylev, O. Kozlova, **M. S. White**, M. A. Shestopalov, N. Kitamura, Y. V. Mironov, S. Bauer, and A. J. Sutherland, “Polymerisable octahedral rhenium cluster complexes as precursors for photo/ electroluminescent polymers,” *J. Mater. Chem. C*, vol. 2, pp. 8630–8638, 2014.
22. E. Portenkirchner, D. Apaydin, G. Aufischer, M. Havlicek, **M. S. White**, M. C. Scharber, and N. S. Sariciftci, “Photoinduced Energy Transfer from Poly(N-vinylcarbazole) to Tricarbonylchloro-(2,2'-bipyridyl)rhenium(I),” *ChemPhysChem*, p. Preprint, 2014.

21. G. Adam, T. Yohannes, **M. S. White**, A. Montaigne, C. Ulbricht, E. Birckner, S. Rathgeber, C. Kästner, H. Hoppe, N. S. Sariciftci, and D. A. M. Egbe, "Effect of Varying Thiophene Units on Charge-Transport and Photovoltaic Properties of Poly(phenylene ethynylene)-alt-poly(phenylene vinylene) Polymers," *Macromol. Chem. Phys.*, vol. 215, no. 15, pp. 1473–1484, 2014.
20. K. Ichinose, T. Mizuno, **M. S. White**, and T. Yoshida, "Control of Nanostructure and Crystallographic Orientation in Electrodeposited ZnO Thin Films via Structure Directing Agents," *J Electrochem Soc*, vol. 161, no. 5, pp. D195–D201, 2014.
19. Y. Ogawa, **M. S. White**, L. Sun, M. C. Scharber, N. S. Sariciftci, and T. Yoshida, "Substrate-Oriented Nanorod Scaffolds in Polymer-Fullerene Bulk Heterojunction Solar Cells," *ChemPhysChem*, vol. 15, no. 6, pp. 1070–1075, 2014.
18. T. Iwamoto, Y. Ogawa, L. Sun, **M. S. White**, E. D. Glowacki, M. C. Scharber, N. S. Sariciftci, K. Manseki, T. Sugiura, and T. Yoshida, "Electrochemical Self-Assembly of Nanostructured CuSCN/Rhodamine B Hybrid Thin Film and Its Dye-Sensitized Photocathodic Properties," *J Phys Chem C*, vol. 118, no. 30, pp. 16581–16590, 2014.
17. Y. Udum, P. Denk, G. Adam, D. H. Apaydin, A. Nevosad, C. Teichert, **M. S. White**, N. S. Sariciftci, and M. C. Scharber, "Inverted bulk-heterojunction solar cell with cross-linked hole-blocking layer," *Organic Electronics*, vol. 15, no. 5, pp. 997–1001, 2014.
16. L. Leonat, **M. S. White**, E. D. Glowacki, M. C. Scharber, T. Zillger, J. Rühling, A. Hübler, and N. S. Sariciftci, "4% Efficient Polymer Solar Cells on Paper Substrates," *J Phys Chem C*, vol. 118, no. 30, pp. 16813–16817, 2014.
15. E. D. Glowacki, M. Irimia-Vladu, M. Kaltenbrunner, J. Gasiorowski, **M. S. White**, U. Monkowius, G. Romanazzi, G. P. Suranna, P. Mastrolilli, T. Sekitani, S. Bauer, T. Someya, L. Torsi, and N. S. Sariciftci, "Hydrogen-Bonded Semiconducting Pigments for Air-Stable Field-Effect Transistors," *Adv. Mater.*, vol. 25, no. 11, pp. 1563–1569, 2013.
- 14.* **M. S. White**, M. Kaltenbrunner, E. D. Glowacki, K. Gutnichenko, G. Kettlgruber, I. Graz, S. Aazou, C. Ulbricht, D. A. Egbe, and M. C. Miron, "Ultrathin, highly flexible and stretchable PLEDs," *Nature Photon*, vol. 7, no. 10, pp. 811–816, 2013.
13. S. Aazou, A. Ibral, **M. S. White**, M. Kaltenbrunner, E. D. Glowacki, D. A. Egbe, N. S. Sariciftci, and E. M. Assaid, "Organic Bulk Heterojunction Solar Cells Based on P3HT and Anthracene-Containing PPE-PPV: Fabrication, Characterization and Modeling," *Journal of Optoelectronics and Advanced Materials*, vol. 13, no. 5, pp. 395–404, 2013.
12. M. Kaltenbrunner, **M. S. White**, T. Sekitani, N. S. Sariciftci, S. Bauer, and T. Someya, "Breakthroughs in Photonics 2012: Large-Area Ultrathin Photonics," *IEEE Photonics J.*, vol. 5, no. 2, pp. 0700805–0700805, 2013.
- 11.* M. Kaltenbrunner, **M. S. White**, E. D. Glowacki, T. Sekitani, T. Someya, N. S. Sariciftci, and S. Bauer, "Ultrathin and lightweight organic solar cells with high flexibility," *Nat Commun*, vol. 3, p. 770, 2012.
10. **M. S. White**, D. C. Olson, N. Kopidakis, A. M. Nardes, D. S. Ginley, and J. J. Berry, "Control of charge separation by electric field manipulation in polymer-oxide hybrid organic photovoltaic bilayer devices," presented at the Physica Status Solidi a-Applications and Materials Science, vol. 207, no. 5, pp. 1257–1265, 2010.
- 9.* M. T. Lloyd, D. C. Olson, P. Lu, E. Fang, D. L. Moore, **M. S. White**, M. O. Reese, D. S. Ginley, and J. W. P. Hsu, "Impact of contact evolution on the shelf life of organic solar cells," *J. Mater. Chem.*, vol. 19, no. 41, pp. 7638–7642, 2009.
- 8.* M. O. Reese, **M. S. White**, G. Rumbles, D. S. Ginley, and S. E. Shaheen, "Optimal negative electrodes for poly(3-hexylthiophene): [6,6]-phenyl C61-butyric acid methyl ester bulk heterojunction photovoltaic devices," *Appl. Phys. Lett.*, vol. 92, no. 5, p. 053307, 2008.

- 7.* D. C. Olson, Y.-J. Lee, **M. S. White**, N. Kopidakis, S. E. Shaheen, D. S. Ginley, J. A. Voigt, and J. W. P. Hsu, "Effect of ZnO processing on the photovoltage of ZnO/poly(3-hexylthiophene) solar cells," *J Phys Chem C*, vol. 112, no. 26, pp. 9544–9547, 2008.
6. C. G. Allen, D. S. Ginley, D. C. Olson, D. T. Gillaspie, **M. S. White**, R. T. Collins, T. E. Furtak, and D. J. Baker, "Oxidexyltriethoxysilane Surface Modification of Zinc Oxide," *MRS Proceedings*, vol. Spring, p. 6, 2008.
- 5.* M. O. Reese, A. J. Morfa, **M. S. White**, N. Kopidakis, S. E. Shaheen, G. Rumbles, and D. S. Ginley, "Pathways for the degradation of organic photovoltaic P3HT:PCBM based devices," *Solar Energy Materials and Solar Cells*, vol. 92, no. 7, pp. 746–752, 2008.
- 4.* D. C. Olson, Y.-J. Lee, **M. S. White**, N. Kopidakis, S. E. Shaheen, D. S. Ginley, J. A. Voigt, and J. W. P. Hsu, "Effect of polymer processing on the performance of poly(3-hexylthiophene)/ZnO nanorod photovoltaic devices," *J Phys Chem C*, vol. 111, no. 44, pp. 16640–16645, 2007.
- 3.* D. C. Olson, S. E. Shaheen, **M. S. White**, W. J. Mitchell, M. F. A. M. Van Hest, R. T. Collins, and D. S. Ginley, "Band-Offset Engineering for Enhanced Open-Circuit Voltage in Polymer–Oxide Hybrid Solar Cells," *Adv. Funct. Mater.*, vol. 17, no. 2, pp. 264–269, 2007.
2. S. E. Shaheen, **M. S. White**, D. C. Olson, N. Kopidakis, and D. S. Ginley, "Inverted bulk-heterojunction plastic solar cells," *SPIE Newsroom*, vol. 24, 2007.
- 1.* **M. S. White**, D. C. Olson, S. E. Shaheen, N. Kopidakis, and D. S. Ginley, "Inverted bulk-heterojunction organic photovoltaic device using a solution-derived ZnO underlayer," *Appl. Phys. Lett.*, vol. 89, no. 14, p. 143517, 2006.

Book Chapters

2. **M. S. White** and N. S. Sariciftci, "Nanostructured organic bulk heterojunction solar cells," in *Nanotechnology. Volume 7: Light and Energy*, John Wiley and Sons, ed. K. Kalyanasundaram and M. Graetzel, 2014
1. **M. S. White** and N. S. Sariciftci, "Semiconducting polymer based bulk heterojunction solar cells," in *Polymers for energy storage and conversion*, John Wiley and Sons, ed. Vikas Mittal, 2013.

Bibliometrics

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Source	Thomson Reuters	Google Scholar
Times cited	1553	2101
h-index	10	12
Most cited	411	603

