

ERIC JOHLIN

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CURRENT EMPLOYMENT

University of Western Ontario, Mechanical and Materials Engineering **2018-**
• Assistant Professor

EMPLOYMENT HISTORY

FOM Institute AMOLF, Center for Nanophotonics, Amsterdam, Netherlands **2015-2018**
• Postdoctoral Researcher – Nanoscale Solar Cells, Advised by Dr. Erik Garnett

Massachusetts Institute of Technology, Cambridge, MA, USA **2014-2015**
• Postdoctoral Researcher – Research Laboratory of Electronics, Advised by Prof. Jeffrey Grossman

EDUCATIONAL HISTORY

Massachusetts Institute of Technology, Cambridge, MA, USA (GPA - 4.8/5.0) **2009-2014**
• Ph.D. in Mechanical Engineering and Computation
- Dissertation – “Understanding and Improving Hole Transport in Hydrogenated Amorphous Silicon”
- Major Program – Nanoscale Fabrication and Measurement
- Minor Program – Simulation and Computation
• M.S. in Mechanical Engineering
- Thesis – “Origins and Implications of Intrinsic Stress in Hydrogenated Amorphous Silicon Thin Films”

California Institute of Technology, Pasadena, CA, USA (GPA - 3.5/4.0) **2005-2009**
• B.S. in Mechanical Engineering with High Honors

JOURNAL PUBLICATIONS

- G Adhyaksa, [E Johlin](#), EC Garnett. “Nanoscale back contact perovskite solar cell design for improved tandem efficiency” *Nano Letters* **17**, 5206 (2017).
- Featured in *Nature Energy* **2**, 832 (2017).
- M de Goede, [E Johlin](#), B Sciacca, F Boughorbel, EC Garnett. “3D multi-energy deconvolution electron microscopy.” *Nanoscale* **9**, 684 (2017)
- [E Johlin](#), J Solari, SA Mann, J Wang, TS Shimizu, EC Garnett. “Super-resolution imaging of light–matter interactions near single semiconductor nanowires.” *Nature Communications* **7**, 13950 (2016)

- E. Johlin, A Al-Obeidi, G Nogay, M Stuckelberger, T Buonassisi, JC Grossman. “Nanohole Structuring for Improved Performance of Hydrogenated Amorphous Silicon Photovoltaics.” *ACS Applied Materials & Interfaces* **8**, 15169 (2016)
- RVK Chavali, E. Johlin, JL Gray, T Buonassisi, MA Alam. “A Framework for Process-to-Module Modeling of a-Si/c-Si (HIT) Heterojunction Solar Cells to Investigate the Cell-to-Module Efficiency Gap.” *IEEE Journal of Photovoltaics* **6**, 875 (2016)
- JP Mailoa, CD Bailie, E. Johlin, ET Hoke, AJ Akey, WH Nguyen, MD McGehee, T Buonassisi. “A 2-terminal perovskite/silicon multijunction solar cell enabled by a silicon tunnel junction.” *Applied Physics Letters* **106**, 121105 (2015)
- DA Strubbe, E. Johlin, TR Kirkpatrick, T Buonassisi, JC Grossman. “Stress effects on the Raman spectrum of an amorphous material: Theory and experiment on a-Si:H.” *Physical Review B* **92**, 241202 (2015)
- E. Johlin, CB Simmons, T Buonassisi, JC Grossman. “Hole-mobility-limiting atomic structures in hydrogenated amorphous silicon.” *Physical Review B* **90**, 104103 (2014)
- T Mueller, E. Johlin, JC Grossman. “Origins of hole traps in hydrogenated nanocrystalline and amorphous silicon revealed through machine learning.” *Physical Review B* **89**, 115202 (2014)
- R Raghunathan, E. Johlin, JC Grossman. “Grain Boundary Engineering for Improved Thin Silicon Photovoltaics.” *Nano Letters* **14**, 4943 (2014)
- E. Johlin, LK Wagner, T Buonassisi, JC Grossman. “Origins of structural hole traps in hydrogenated amorphous silicon.” *Physical Review Letters* **110**, 146805 (2013)
- E. Johlin, N Tabet, S Castro-Galnares, A Abdallah, MI Bertoni, T Asafa, JC Grossman, S Said, T Buonassisi. “Structural origins of intrinsic stress in amorphous silicon thin films.” *Physical Review B* **85**, 075202 (2012)

PATENTS

- JP Mailoa, CD Bailie, E. Johlin, MD McGehee, T Buonassisi. “2-TERMINAL METAL HALIDE SEMICONDUCTOR/C-SILICON MULTIJUNCTION SOLAR CELL WITH TUNNEL JUNCTION” US Patent 20,160,163,904 (2016)

SELECTED ORAL PRESENTATIONS

- “Imaging & Optimizing Nanophotonic Interactions.” *University of Western Ontario, Invited Colloquium*, London, Ontario, 25 September 2017
- “Imaging and Optimization of Nanophotonic Interactions.” *DIFFER Invited Colloquium*, Eindhoven, Netherlands, 23 May 2017
- “3D nanostructure imaging via multi-energy deconvolution SEM.” *ACS National Meeting*, San Francisco, CA, 6 April 2017

- “Super-Resolution Imaging of Light-Matter Interactions in Single Nanowires.” *NanoCity Conference*, Amsterdam, The Netherlands, 21 June 2016
- “Super-Resolution Measurements of Silicon Nanowires.” *Fall MRS Meeting*, Boston, MA, 1 December 2015
- “Efficiency Improvements through Nanohole Structuring of Amorphous Silicon Photovoltaic Devices.” *EMRS Spring Meeting*, Lille, France, 15 May 2015
- “Nanohole Structuring of Hydrogenated Amorphous Silicon for Photovoltaic Applications.” *Spring MRS Meeting*, San Francisco, CA, 25 April 2014
- “Influence of Structural Phenomena on Time-of-flight Hole Mobility in Hydrogenated Amorphous Silicon Thin Films.” *Fall MRS Meeting*, Boston, MA, 28 November 2012
- “Stress-Based Mitigation of Strong Hole Traps in Hydrogenated Amorphous Silicon.” *Spring MRS Meeting*, San Francisco, CA, 10 April 2012
- “Stress Engineering in Amorphous Silicon Thin Films.” *37th IEEE-PVSC*, Seattle, WA, 20 June 2011
- “Statistical Diagnosis and Mitigation of Structural Hole Traps in Hydrogenated Amorphous Silicon.” *Spring MRS Meeting*, San Francisco, CA, 27 April 2011
- “Density Functional Theory Calculations of the Role of Defects in Amorphous Silicon Solar Cells.” *APS March Meeting*, Portland, OR, 15 March 2010

PRE-GRADUATE RESEARCH EXPERIENCE

Undergraduate Research - California Institute of Technology, Pasadena, CA **2008-2009**
Advised by Dr. Kenneth A. Pickar (Visiting Professor of Mechanical Engineering, Caltech)

- Design, Optimization, and Validation of a Novel Solar Water Distillation Device

Undergraduate Research - NASA Jet Propulsion Laboratory, Pasadena, CA **2007, 2008**
Advised by Dr. Dan Goebel (Senior Research Scientist, NASA JPL)

- Plasma Characterization and Analysis of High Frequency Oscillations in the Xenon Ion Propulsion System’s Neutralizer Cathode

TEACHING EXPERIENCE

Teaching Assistant - *Massachusetts Institute of Technology*, Cambridge, MA **2009-2010**

- 2.626 – Fundamentals of Photovoltaics. Instructor: Prof. Tonio Buonassisi
 Assisted Professor Buonassisi with class operation and lab sessions, graded quizzes, homework assignments and tests, and held office hours to assist students with the course material.

Teaching Assistant - *California Institute of Technology*, Pasadena, CA

2008-2009

- ME 96 – Mechanical Engineering Laboratory. Instructor: Dr. David Boyd

Taught and assisted students with laboratory experiments, graded laboratory reports and homework assignments. Maintained lab equipment and helped refine experiment procedures, requirements and grading.

TECHNICAL EXPERIENCE

Fabrication

- Chemical deposition (PECVD, ALD, LPCVD)
- Physical deposition (thermal & e-beam evaporation, sputtering)
- Etching (RIE, DRIE, ozone/plasma)
- Lithography (photo-, interference, soft/PDMS, e-beam, two-photon)
- Wet bench processing, thermal and laser annealing

Characterization

- Optical ([micro]Raman spectroscopy, UV-Vis absorption/reflection/transmission spectroscopy, FTIR transmission spectroscopy, spectroscopic ellipsometry, curvature-stress measurement)
- Microscopy (SEM, STEM, AFM, profilometry, super-resolution)
- Electronic (Time-of-Flight mobility, solar simulator J-V measurements, Suns- V_{OC} , 4 point probe)
- General laser/optical bench work

Technical Software

- Lumerical (FDTD), SIESTA (DFT), Igor, Solidworks, Autodesk AutoCAD & Inventor, LabVIEW, Grace, Inkscape/Illustrator

Programming Languages

- Julia, Perl, Mathematica, MATLAB, C, Basic, TeX

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