

Rachel C. Kurchin

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EDUCATION

- 2019 **Massachusetts Institute of Technology** *Cambridge, MA, USA*
Ph.D., Materials Science and Engineering, GPA 4.6/5.0
- 2014 **University of Cambridge** *Cambridgeshire, UK*
MPhil, Materials Science & Metallurgy (research-based)
- 2013 **Yale University** *New Haven, CT, USA*
B.S., Physics (Intensive), with distinction (magna cum laude, GPA 3.9/4.0)

RECENT RESEARCH POSITIONS

- 2019 – pres. **Carnegie Mellon University** *Depts. of Mechanical Engineering, Materials Science and Engineering*
MFI ('19-'20), MolSSI ('21) Postdoctoral Fellow with Venkat Viswanathan and Jay Whitacre
- 2014 – 2019 **Massachusetts Institute of Technology** *Dept. of Mechanical Engineering*
Ph.D. student with Tonio Buonassisi (committee: V. Stevanović, J. Grossman, B. Yildiz)
- 2016 – 2017 **National Renewable Energy Laboratory** *Solar Energy Research Facility*
Summer Visiting Graduate Student with Vladan Stevanović

RECENT FELLOWSHIPS AND AWARDS

- 2020 **MolSSI Software Fellowship** *Molecular Sciences Software Institute*
Rising Star in Computational and Data Sciences *Oden Institute at UT Austin*
- 2019 **MFI Postdoctoral Fellowship** *CMU Manufacturing Futures Initiative*
CCE Symposium Poster Prize *MIT Center for Computational Engineering*
- 2018 **Materials Day Best Poster Award** *MIT Materials Research Laboratory*
- 2017 **Blue Waters Graduate Fellowship** *National Center for Supercomputing Applications*
- 2016 **Total Energy Fellowship** *MIT Energy Initiative*
Second Place, de Florez Award Competition *MIT Dept. of Mechanical Engineering*

RECENT PUBLICATIONS ([Google Scholar](#))

- 2020 [15] **R. Kurchin**, V. Viswanathan. “Marcus-Hush-Chidsey kinetics at electrode-electrolyte interfaces.” *The Journal of Chemical Physics* 153, 134706 (2020)
- [14] **R. C. Kurchin**, J. R. Poindexter, V. Vahanissi, et al. “How much physics is in a current-voltage curve? Inferring defect properties from photovoltaic device measurements.” *IEEE Journal of Photovoltaics* 10, 1532–1537 (2020)
- 2019 [13] **R. C. Kurchin**, G. Romano, T. Buonassisi. “Bayesim: a tool for adaptive grid model fitting with Bayesian inference.” *Computer Physics Communications* 239, 161–165 (2019)
- 2018 [12] **R. C. Kurchin**, P. Gorai, T. Buonassisi, V. Stevanović. “Structural and chemical features giving rise to defect tolerance of binary semiconductors.” *Chemistry of Materials* 30, 5583–5592 (2018)

- [11] J. Correa-Baena, L. Nienhaus, **R. C. Kurchin**, et al. “A-site cation in inorganic $\text{A}_3\text{Sb}_2\text{I}_9$ perovskite influences structural dimensionality, exciton binding energy, and solar cell performance.” *Chemistry of Materials* 30, 3734–3742 (2018)
- 2017 [10] S. S. Shin, J. Correa-Baena, **R. C. Kurchin**, et al. “Solvent-engineering method to deposit compact bismuth-based thin films: mechanism and application to photovoltaics.” *Chemistry of Materials* 30, 336–343 (2017)
- [09] R. Brandt, **R. C. Kurchin**, V. Steinmann, et al. “Rapid semiconductor device characterization through Bayesian parameter estimation.” *Joule* 1, 843–856 (2017)
- [08] R. Hoyer, L. C. Lee, **R. C. Kurchin**, et al. “Strongly enhanced photovoltaic performance and defect physics of air-stable bismuth oxyiodide (BiOI).” *Advanced Materials* 29, (2017)
- [07] R. E. Brandt, J. Poindexter, P. Gorai, **R. Kurchin**, et al. “Searching for “defect-tolerant” photovoltaic materials: combined theoretical and experimental screening.” *Chemistry of Materials* 29, 4667–4674 (2017)
- [06] J. R. Poindexter, R. Hoyer, L. Nienhaus, **R. C. Kurchin**, et al. “High tolerance to iron contamination in lead halide perovskite solar cells.” *ACS Nano* 11, 7101–7109 (2017)

RECENT TALKS

- 2021 *Do Me a Solid: Materials Modeling to Fight Climate Change*
Carnegie Mellon Department of Civil and Environmental Engineering
Introducing Chemellia: Machine Learning, with Atoms
JuliaCon
Building a Chemistry and Materials Science Ecosystem in Julia
JuliaCon
- 2020 *High-fidelity Accelerated Design of High-performance Electrochemical Systems*
Materials Science & Technology Conference 2020
Graph Convolutional Networks for Atomic Structures
Cambridge Machine Learning Discussion Group
Marcus-Hush-Chidsey Kinetics at Solid Surfaces
Battery Modeling Webinar Series
Accelerating Energy Materials Discovery with Computation
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)
Accelerating Energy Materials Discovery with Computation
University of Illinois Urbana-Champaign Electrical & Computer Engineering Department
- 2019 *Bayesim Workshop*
Helmholtz Institute for Renewable Energy Erlangen Nuremberg
- 2018 *Semiconductor Parameter Extraction (and more!) with Bayesian Inference*
MIT Society of Industrial and Applied Mathematics
Computational Screening for Defect-Tolerant Semiconductors
Gordon Research Seminar on Defects in Semiconductors
Structural and Chemical Features Contributing to Defect Tolerance of Binary Semiconductors
Blue Waters Research Symposium
- 2017 *Toward Quantitative Metrics to Screen for Defect Tolerance in Novel Semiconducting Materials*
Materials Research Society Fall Meeting and Exhibit