



Austin Sendek

- Adjunct Professor, Materials Science and Engineering
- Hourly Speaker, Stanford Center for Professional Development

Bio

BIO

Austin Sendek is Adjunct Professor of Materials Science & Engineering at Stanford University. His research and teaching focuses broadly on harnessing the power of machine learning and A.I. to accelerate the design and discovery of new materials for decarbonizing the global economy. He serves as an advisor and collaborator on several initiatives at Stanford, spanning from fundamental materials science research to technology entrepreneurship mentoring. He is also the Founder and Chief Executive Officer of Aionics, Inc., a technology company dedicated to designing high performance batteries with A.I. and high performance compute (HPC)-based quantum mechanical simulation. He was included on the 2019 list of Forbes 30 Under 30 in Energy, and served as a Guest Lecturer in Mechanical Engineering at Columbia University in 2019 and 2020. He holds a B.S. in Applied Physics from UC Davis and a Ph.D. in Applied Physics from Stanford University.

Upcoming courses:

FALL 2023: Materials Science and Engineering 331: Computational materials science at the atomic scale. Introduction to computational materials science methods at the atomistic level, with an emphasis on quantum methods. A brief history of computational approaches is presented, with deep dives into the most impactful methods: density functional theory, tight-binding, empirical potentials, and machine learning-based property prediction. Computation of optical, electronic, phonon properties. Bulk materials, interfaces, nanostructures. Molecular dynamics. Prerequisites - undergraduate quantum mechanics. Experience writing code is preferred but not required.

Select publications:

AD Sendek, B Ransom, ED Cubuk, LA Pellouchoud, J Nanda, EJ Reed. Machine learning modeling for accelerated battery materials design in the small data regime. ACS Energy Materials 12, 2200553 (2022).

AD Sendek, Q Yang, ED Cubuk, KAN Duerloo, Y Cui, EJ Reed. Holistic computational structure screening of more than 12000 candidates for solid lithium-ion conductor materials. Energy & Environmental Science 10 (1), 306-320 (2017).

AD Sendek, ED Cubuk, ER Antoniuk, G Cheon, Y Cui, EJ Reed. Machine learning-assisted discovery of solid Li-ion conducting materials. Chemistry of Materials 31 (2), 342-352 (2018).

AD Sendek, G Cheon, M Pasta, EJ Reed. Quantifying the search for solid Li-ion electrolyte materials by anion: a data-driven perspective. *The Journal of Physical Chemistry C* 124 (15), 8067-8079 (2020).

AD Sendek, ER Antoniuk, ED Cubuk, B Ransom, BE Francisco, J Buettner-Garrett, Y Cui, EJ Reed. Combining Superionic Conduction and Favorable Decomposition Products in the Crystalline Lithium–Boron–Sulfur System: A New Mechanism for Stabilizing Solid Li-Ion Electrolytes. *ACS Applied Materials & Interfaces* 12 (34), 37957-37966 (2020).

J Xie, AD Sendek, ED Cubuk, X Zhang, Z Lu, Y Gong, T Wu, F Shi, W Liu, EJ Reed, Y Cui. Atomic Layer Deposition of Stable LiAlF₄ Lithium Ion Conductive Interfacial Layer for Stable Cathode Cycling. *ACS Nano* 11 (7), 7019-7027 (2017).

B Ransom, N Zhao, AD Sendek, ED Cubuk, W Chueh, EJ Reed. Two low-expansion Li-ion cathode materials with promising multi-property performance. *MRS Bulletin* (2021).

ED Cubuk, AD Sendek, EJ Reed. Screening billions of candidates for solid lithium-ion conductors: A transfer learning approach for small data. *The Journal of Chemical Physics* 150 (21), 214701 (2019).