
EDUCATION

- **Carnegie Mellon University** (Aug 2015 – present), Pittsburgh, PA
Ph.D. candidate in Mechanical Engineering advised by Venkat Viswanathan; GPA: 4.0/4.0
- **Indian Institute of Technology (IIT) Delhi** (Aug 2011 – May 2015), New Delhi, India
Bachelor of Technology (B.Tech.) in Mechanical Engineering; GPA: 9.4/10.0
Thesis: *Droplet Formation in a T-junction Microfluidic Device using Electrical Actuation*, under the supervision of Prof. Amit Gupta and Prof. Supreet S. Bahga

RESEARCH INTERESTS

Materials Theory encompassing the tools and methods from computational materials science and theoretical condensed matter physics (e.g. density functional theory, molecular dynamics, phase field modeling) with applications to energy; Machine Learning in Materials Science

JOURNAL PUBLICATIONS

6. **Z. Ahmad**, T. Xie, C. Maheshwari, J. C. Grossman, V. Viswanathan, *Machine Learning Enabled Computational Screening of Inorganic Solid Electrolytes for Suppression of Dendrite Formation in Lithium Metal Anodes*, ACS Cent. Sci. 4, 996 (2018).
Featured in Research Interfaces and TechXplore
5. **Z. Ahmad**, V. Viswanathan, *Role of anisotropy in determining stability of electrodeposition at solid-solid interfaces*, Phys. Rev. Materials 1, 055403 (2017)
4. **Z. Ahmad**, V. Viswanathan, *Stability of electrodeposition at solid-solid interfaces and implications for metal anodes*, Phys. Rev. Lett. 119, 056401 (2017)
3. L. Klosterman, **Z. Ahmad**, V. Viswanathan, C. J. Bettinger, *Synthesis and Measurement of Cohesive Mechanics in Polydopamine Nanomembranes*, Adv. Mater. Interfaces 4, 170041 (2017)
2. C. Xu, **Z. Ahmad**, A. Aryanfar, V. Viswanathan, J. R. Greer, *Enhanced strength and temperature dependence of mechanical properties of Li at small length scales and its implications for Li metal anodes*, Proc. Natl. Acad. Sci. USA. 114, 57 (2017).
Featured in TechXplore, Kavli Foundation news, and Green Car Congress news.
1. **Z. Ahmad**, V. Viswanathan, *Quantification of uncertainty in first-principles predicted mechanical properties of solids: Application to solid ion conductors*, Phys. Rev. B 94, 064105 (2016).

PATENTS

1. *Lithium metal electrodes and batteries thereof*
Y.-M. Chiang, V. Viswanathan, L. Li, V. Pande, D. Krishnamurthy, **Z. Ahmad**, W. H. Woodford
US Patent Application number 15/480,235 (2017)

PRESENTATIONS

Multi-author talks have the presenting author in bold

9. *Solid electrolytes for stable electrodeposition in Li metal anode based batteries*
Z. Ahmad, V. Viswanathan
American Physical Society March Meeting 2018
8. *Development of solid ion conductors for stable electrodeposition at electrolyte-Li metal anode interfaces*
Z. Ahmad, V. Viswanathan
Batteries Gordon Research Conference 2018

7. *Data Science on Inorganic Crystals*
Z. Ahmad, V. Viswanathan
 4th Annual Electrochemical Energy Symposium 2018, Carnegie Mellon University
6. *Machine Learning-Driven Prediction of Electrodeposition Stability of Inorganic Solid Electrolytes with Li-Metal Anode*
Z Ahmad, C. Maheshwari, V. Viswanathan
 Materials Research Society Fall Meeting 2017
5. *Robust Uncertainty Quantification Framework in Computational Electrochemical Functional Materials Design*
 Z. Ahmad, G. Houchins, D. Krishnamurthy, V. Sumaria, O. Vinogradova, **V.Viswanathan**
 Materials Research Society Fall Meeting 2017
4. *Design Principles for Solid Electrolytes to Enable Lithium Metal Anode*
Z. Ahmad, V. Viswanathan
 3rd Annual Electrochemical Energy Symposium 2017, Carnegie Mellon University
3. *New Approach of Dendrite Suppression Using Solid Electrolyte to Enable Li Metal Anodes*
Z. Ahmad, V. Viswanathan
 Electrochemical Society Fall Meeting 2017
2. *Challenges in enabling metal anodes: Tuning mechanical properties at the electrode-electrolyte interface*
Z. Ahmad, V. Viswanathan
 2nd Annual Electrochemical Energy Symposium 2016, Carnegie Mellon University Simulators Meeting 2016, Carnegie Mellon University
1. *Droplet Formation in a T-Junction Microfluidic Device in the Presence of an Electric Field*
 Z. Ahmad, **R. Singh**, S. S. Bahga, A. Gupta
 ASME International Conference On Nanochannels, Microchannels, And Minichannels 2015-48388 (2015).

AWARDS & FELLOWSHIPS

- 2019 **American Physical Society Energy Research Workshop** Travel Award
- 2018 **Bushnell Fellowship in Engineering** by Carnegie Mellon College of Engineering
- 2017 **Best Poster Award at Science 2017** by Pittsburgh Quantum Institute
- 2016 **Phillips and Huang Fellowship in Energy**
- 2015 **Best Poster Award** at 1st Annual Electrochemical Energy Symposium, Carnegie Mellon University
- 2015 **Institute Silver Medal** at IIT Delhi, awarded for graduating at the top of the class
- 2015 **Nayyar Perwez Shahabuddin Medal** at IIT Delhi, awarded for best research record and potential
- 2015 **Institute Semester Merit Prize** (six times) at IIT Delhi
- 2014 **IIT Delhi Alumni Association Scholarship** (twice) at IIT Delhi
- 2014 **Jagdishwar & Maya Jaluria Scholarship** (twice) at IIT Delhi
- 2013 **S.C. Mehrotra's Award** at IIT Delhi
- 2011 **Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship** by Govt. of India

TEACHING

Teaching Assistant, Spring 2018 for 24-231 undergraduate Fluid Mechanics

GRADUATE COURSEWORK

Quantum Mechanics, Solid State Physics, Statistical Thermodynamics, Molecular Simulation of Materials (Molecular Dynamics and Monte Carlo), Principles and Applications of Molecular Simulation (Density Functional Theory), Electrochemical Energy Systems, Artificial Intelligence and Machine Learning, Continuum Mechanics

SCHOOLS/WORKSHOPS ATTENDED

- International Summer School on Computational Quantum Materials, University of Sherbrooke, Quebec, Canada (May 27 - June 8, 2018)
- SUNCAT Summer Institute: Fundamentals and Applications of Heterogeneous Catalysis, Stanford University (Aug 14 - 18, 2017)

PROGRAMMING SKILLS

Python, C, C++, Matlab, Mathematica

First-principles codes: Quantum espresso, VASP, GPAW, Wien2K, TRIQS, Abinit, DFT+eDMFT

PROFESSIONAL SERVICE & MEMBERSHIPS

- Referee for Physical Review and Physical Review Letters
- Graduate Student Representative for Mechanical Engineering in Carnegie Mellon Graduate Student Assembly (GSA)
- Student member of American Physical Society (APS), Electrochemical Society (ECS), Materials Research Society (MRS), Pittsburgh Quantum Institute (PQI).