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Education

University of Massachusetts	Chemistry	B.S., 2004
Northeastern University	Chemistry	Ph.D., 2010

Professional Experience

2010-present	Postdoctoral Research Associate, Center for Nanophase Material Sciences, ORNL
2006-2009	Research Assistant, Northeastern University, Boston, MA
2004-2006	Teaching Assistant, Chemistry, Northeastern University, Boston, MA
2003-2004	Teaching Assistant, Chemistry, University of Massachusetts, N. Dartmouth, MA

Professional and Synergistic Activities

2001-present	Member: American Chemical Society
2003-present	Electrochemical Society

Honors and Awards

2009	Chemistry Graduate Leadership Award (NU)
2004	Brian A. Rose Award (UMASS Dartmouth)
2003	American Chemical Society Analytical Division Award

Publications (Over 25 articles in refereed journals, book chapters and conference proceedings)

Research Synopsis

- Ion dynamics of Li ion battery materials.*
We use Electrochemical Strain Microscopy (ESM) to map ion dynamics in Li ion battery cathode, anode and electrolyte materials on the nanoscale.
- Characterization and development of Li air battery materials.*
Force and strain based AFM methods are adapted to perform nanoscale electrochemical techniques (CV, CA, EIS) to study Li-air battery electrolytes in situ, with nanometer resolution.
- Electrochemical capacitors.*
In situ AFM based methods are employed to study strain effects in electrochemical capacitors to investigate failure and enhance activity of carbonaceous double-layer capacitors.
- Electrocatalysis of Solid Acid Fuel Cell Materials.*
Pd-Pt catalysts supported on CsH_2PO_4 electrolyte under development for SAFCs are being investigated by ESM and X-ray Absorption Spectroscopy.

5. *Origin of ferroelectricity in BaTiO₃:*

BE-PFM methods are employed to investigate the origins of ferroelectricity in BTO and analogous materials.

Patents

1. Jesse, S.; Kumar, A.; **Arruda, T.**; Kalinin, S., Method for local probing of irreversible electrochemical reactions and bias- and temperature- induced transformations, US Patent disclosure filed, **2011**.
2. Patrissi, C. J., Bessette, R. R., Carreiro, L. G., Kim, Y. K., **Arruda, T. M.**, Deschenes, C. M., Method for Increasing Fiber Density in Electrostatic Flocking, U. S. Patent 7,354,626, **2008**.