

Mark E. Arsenault

Department of Mechanical Engineering and Applied Mechanics

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<http://www.seas.upenn.edu/~marsenau/index.html>

SUMMARY

Excellent software, teaching, and communication skills. Experience working in teams of international researchers. State-of-the-art knowledge of nanotechnology instrumentation.

EDUCATION

- **University of Pennsylvania** – School of Engineering and Applied Science; Philadelphia, PA (2003-present)
 - Doctor of Philosophy in Mechanical Engineering – May, 2009
 - **Advisors:** Dr. Haim H. Bau and Dr. Yale E. Goldman
- **Worcester Polytechnic Institute;** Worcester, MA (2001-2003)
 - Bachelor of Science – May, 2003
 - **Honors:** Graduated with Highest Distinction, 2nd Prize Overall – Senior Design Project
 - Undergraduate Research Assistant – Semi-solid Aluminum Processing.
 - **Advisor:** Dr. Diran Apelian **Major:** Mechanical Engineering
- **United States Air Force Academy;** Colorado Springs, CO (1999-2000)
 - **Honors:** Dean's List all 3 semesters **Major:** Mechanical Engineering

RESEARCH AND TEACHING EXPERIENCE

- **Research Assistant** – Department of Mechanical Engineering, **University of Pennsylvania** (2003-present)
 - Worked on projects primarily involving single-molecule biophysics and electrokinetics.
 - Designed and constructed equipment to study bio-filament polymerization (article submitted).
 - Devised a novel method to study single-molecule mechanics (article published).
 - Wrote original algorithms for quantitative data analysis and image processing.
- **Summer Academy in Applied Science and Technology (SAAST) – Nanotechnology** (Summer 2005)
 - Co-developed the curriculum for the debut offering of this full-time, 3-week course at UPENN.
 - Instructed 25 high school students in nanotechnology-related topics.
 - Guided the students in performing technical labs and in using research equipment.
- **Teaching Assistant** (4 semesters) – Department of Mechanical Engineering, **University of Pennsylvania**
 - Instructed classes of 50 students in Design of Thermal/Fluid Systems and Engineering Mechanics.
 - Taught weekly, hour-long recitations.
 - Guided students in laboratories designed to teach fundamental engineering topics.

SELECTED HONORS / AWARDS

- GAAN Fellow – (2006-2008)
- Best Poster in MEAM Frontiers in M. E. – (2008)
- Best Poster in SEAS Graduate Symposium – (2005)
- Clayton Family Scholarship – (2002)
- NSF Fellow, IGERT Program – (2003-2006)
- Pi Tau Sigma Mech. Eng. Honor Society – (2003)

EXPERIMENTAL TECHNIQUES / SKILLS

- Total Internal Reflection (TIR) Microscopy
- Bright Field and Fluorescent Microscopy
- Micro/Nanofabrication
- Optical Trapping
- Protein Purification
- MatLab, Mathcad, Mathematica, COMSOL
- Multiphysics (finite elements), LabView, ImageJ, AutoCAD
- Image Processing
- Conversational French

PROFESSIONAL AFFILIATIONS/ACTIVITIES

- American Society of Mechanical Engineers (ASME)
- Engineers Without Borders – USA
- Biophysical Society
- Treasurer – Mech. Eng. Grad. Assoc. (2006/2007)

EXTRACURRICULAR ACTIVITIES / SERVICE

- Rock Climbing
- Woodworking
- Eagle Scout
- Black Belt/Instructor – Kenpo Karate

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PEER-REVIEWED PUBLICATIONS

Arsenault, M. E., Purohit, P. K., Goldman, Y. E., & Bau, H. H. 2008. The Effect of Ionic Strength on the Persistence Length of Actin Filaments. (in preparation)

Arsenault, M. E., Goldman, Y. E., & Bau, H. H. 2008. A novel method for investigating the azimuthal rotation of myosin motors utilizing dielectrophoresis and optical tweezers. (submitted)

Hategan, A., **Arsenault, M. E.**, Travaglia, M., Safer, D., Shuman, H. Single molecule approach for the study of myosin polymerization (submitted)

Purohit, P. K., **Arsenault, M. E.**, Goldman, Y. E., & Bau, H. H. 2008. The mechanics of short rod-like molecules in tension. *Int. J. Non-Linear Mech.* doi: [10.1016/j.ijnonlinmec.2008.05.009](https://doi.org/10.1016/j.ijnonlinmec.2008.05.009)

Arsenault, M. E., Zhao, H., Purohit, P. K., Goldman, Y. E., & Bau, H. H. 2007. Confinement and Manipulation of Actin Filaments by Electric Fields. *Biophys. J.* 93:L42-L44.

SELECTED PRESENTATIONS

Zhao, H., **Arsenault, M. E.**, and Bau, H. H., The Polarization of an Elongated Cylindrical Particle Suspended in an Electrolyte Solution and Subjected to an AC Electric Field. The 8th International Electrokinetics Conference (ELKIN 2008). Santa Fe, NM, 22 May, 2008.

Bau, H. H., **Arsenault, M. E.**, Zhao, H., Purohit, P. K., Goldman, Y. E., A Technique for Estimating the Surface Conductivity of Single Molecules. American Physical Society-DFD Meeting. 18 November, 2007.

Arsenault, M. E., Purohit, P. K., Goldman, Y. E., Bau, H. H. The effect of electric field on the apparent tension of actin filaments. Poster #B491. Biophysical Society Meeting. 4 March, 2007.

Arsenault, M. E., Purohit, P. K., Goldman, Y. E., Bau, H. H. A novel method for positioning and studying actin filaments (using electric fields). Biophysical Society Meeting – Motility Subgroup Symposium. 3 March, 2007.

Invited Talk

Arsenault, M. E., Purohit, P. K., Goldman, Y. E., Bau, H. H. Electric Tweezers vs. Actin: Title Bout. NSF Soft Matter MRSEC Chalk Talk. 26 January, 2007. **Invited Talk**

Hategan, A., **Arsenault, M. E.**, Travaglia, M., Safer, D., Shuman, H. Single molecule approach for the study of myosin polymerization. Poster #B514. Biophysical Society Meeting. 22 February, 2006.
