

# MAJID MINARY

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Department of Mechanical Engineering  
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## EDUCATION

**University of Illinois at Urbana-Champaign, Urbana-IL** Sep. 2006-Sep. 2010  
Department of Mechanical Science and Engineering  
PhD, Mechanical Engineering  
**Dissertation:** "Scanning Probe Microscopy of Biomaterials and Nanoscale Biomechanics"

**University of Virginia, Charlottesville, VA** Sep. 2003- Sep. 2005  
Department of Mechanical and Aerospace Engineering  
M.S., Mechanical Engineering  
**Thesis:** "Mechanical Characterization of the Knee Ligaments: Viscoelastic, Viscoplastic Flow, and Failure Properties"

**Sharif University of Technology, Tehran, Iran** Sep. 1999-Sep. 2003  
Department of Mechanical Engineering  
B.S., Mechanical Engineering  
**Thesis:** "Inter-laminar Stress Analysis at the Boundary Layer of a Cylindrical Composite Shell"

## PROFESSIONAL EXPERIENCE

**Assistant Professor, The University of Texas at Dallas** Aug. 2012- Now  
Richardson, TX  
Erik Jonsson School of Engineering and Computer Science  
Department of Mechanical Engineering

**Post Doctoral Fellow, Northwestern University** Oct. 2010-Aug. 2012  
Evanston, IL  
Department of Mechanical Engineering

**Graduate Research Assistant, University of Illinois at Urbana-Champaign** 2006-2010  
Urbana, IL  
College of Engineering  
Department of Mechanical Science and Engineering

**Graduate Research Assistant, University of Virginia** 2003-2005  
Charlottesville, VA  
Department of Mechanical and Aerospace Engineering

Majid Minary

## FIELDS OF INTEREST

- Nanobiomechanics
- Scanning Probe microscopy
- bioinspired and biomimetic nanomaterials
- nanomechanics of living cells and biological systems
- nanomanufacturing and microfabrication

## TEACHING EXPERIENCE

### University of Illinois at Urbana-Champaign

- Teaching Assistant-Introduction to Solid Mechanics Fall 2007
- Teaching Assistant-Continuum Mechanics-Graduate-level Course Spring 2006
- Lab Instructor- Engineering Materials Laboratory Fall 2006

### University of Virginia

- Teaching Assistant-Linear Algebra Spring 2005

### Sharif University of Technology

- Instructor, Statics Spring 2003

## HONORS AND AWARDS

- Best student paper award, finalist, Society of Engineering Science 2010.
- NSF travel award, Society of Engineering Science 2010.
- Graduate Research Assistantship, Nano-CEMMS, University of Illinois, 2009-2010.
- Mavis Memorial Fund Scholarship Award-College of Engineering, University of Illinois, 2008.
- NSF Summer Short Course on Cellular Mechanics, Summer 2007.
- Listed as Teachers Ranked as Excellent by Students, University of Illinois, Fall 2006.
- Ranked 41 in Nation among 300,000 Participants in University Entrance Examination, Iran 1999.

## SCHOLARLY ACTIVITIES

### Journal peer-reviewer:

2010-Present

- Applied Physics Letters
- Journal of Applied Physics
- Experimental Mechanics
- Journal of Nanoscience and Nanotechnology
- Journal of the Mechanical Behavior of Biomedical Materials
- Journal of Biological Physics
- Acta Biomaterialia

### imechanica discussion leader:

imechanica journal club, month of October 2011, Topic: "AFM in Nano-biomechanics"  
over total of ~5000 reads. (<http://imechanica.org/node/11185>)

## PUBLICATIONS

### Book Chapter

16. **Majid Minary** and M.-F. Yu, "Nanomechanical and Electromechanical Characterization of One-dimensional Piezoelectric Nanomaterials", in *Piezoelectric Nanomaterials for Biomedical Applications*, Springer (2012). **[Invited]**

### Refereed Journal Publications

15. **Majid Minary**, Arash Tajik, Ning Wang, and Min-Feng Yu, "Intrinsically High-Q Dynamic AFM Imaging in Liquid with a Significantly Extended Needle Tip", *Nanotechnology*, 23,235704 (2012).  
**Featured in: NSF.gov, Materials Today, Phys.org, Nanotechnology Now.**
14. **Majid Minary**, Rodrigo Bernal, Irma Kuljanishvili, Victor Parpoil, and Horacio Espinosa, "Individual GaN Nanowires Exhibit Strong Piezoelectricity in 3D", *NANO Letters* 12, 970 (2012).  
**Highlighted in: Science Daily, Bio-Medicine.org, Materials Today, Physorg, Semi Conductor today, Energy Harvesting Research, Nanowerk, EurekAlert, Science Newslines, Science CoDex, i-micronews, Labmate online, Nanotechnology Now, Azom, Laser Focus World, brightsurf, Compound Semiconductor, EE times Asia, and LabSpaces.**
13. Horacio Espinosa, Rodrigo Bernal, and **Majid Minary**, "A Review of Mechanical and Electromechanical Properties of Piezoelectric Nanowires" *Advanced Materials* (2012).  
\*equal contribution  
**Invited Article for Special Issue on Piezotronics- Edited by Prof. Zhong Lin Wang**
12. **Majid Minary**, Rodrigo Bernal, and Horacio Espinosa, "Strong Piezoelectricity in Individual GaN Nanowires", *MRS Communications*, DOI: 10.1557/mrc.2011.14 (2011).
11. Jie Hu, Kyungsuk Yum, Arash Tajik, **Majid Minary**, Jaehooh Bang and Min-Feng Yu, "Diffusion Limited Current in Very High Aspect Ratio Pt Needle Electrodes", *Applied Physics Letters* 99, 053113 (2011).
10. **Majid Minary** and Min-Feng Yu, "Shear Piezoelectricity in Bone at the Nanoscale", *Applied Physics Letters* 97, 153127 (2010)  
**- Selected for: Virtual Journal of Nanoscale Science and Technology 22, 2010**
9. **Majid Minary** and Min-Feng Yu, "Nanomechanical Heterogeneity in the Gap and Overlap Regions of Type I Collagen Fibrils with Implications for Bone Heterogeneity", *Biomacromolecules* 10, 2565 (2009).
8. **Majid Minary** and Min-Feng Yu, "Uncovering Nanoscale Electromechanical Heterogeneity in the Subfibrillar Structure of Collagen Fibrils Responsible for the Piezoelectricity of Bone", *ACS Nano* 3, 1859 (2009).  
**- Featured in Editorial in NANO "Boning Up on Collagen's Piezoelectricity" ACS Nano, 28 July 2009, <http://pubs.acs.org>.**

7. **Majid Minary** and Min-Feng Yu, "Nanoscale Characterization of Isolated Individual Collagen Type I Fibrils: Polarization and Piezoelectricity", Nanotechnology 20, 085706 (2009).

- **Featured: Collagen fibrils receive smart material status**” [Nanotechweb.org](http://nanotechweb.org), 4 March 2009, <http://nanotechweb.org/cws/article/lab/38085>

- **Featured in Editorial: “Nanodevices come to life”**, Nanotechnology 22, 090201 (2011)

- **Featured in Editorial: “High performance under pressure”**, Nanotechnology 22, 460201 (2011)

6. **Majid Minary**, and Min-Feng Yu, “Reversible Radial Deformation up to the Complete Flattening of Carbon Nanotubes in Nanoindentation”, Journal of Applied Physics 103, 073516 (2008).

**Selected for: Virtual Journal of Nanoscale Science and Technology, 17, 2008**

5. **Majid Minary**, and Min-Feng Yu, “An Improved *in situ* Measurement of Offset Phase Shift towards Quantitative Damping-Measurement with AFM”, Ultramicroscopy, 108, 821 (2008).
4. M. Fesanghary, M. Mahdavi, **Majid Minary**, Y. Alizadeh “Hybridizing Harmony Search Algorithm with Sequential Quadratic Programming for Engineering Optimization Problems”, Computer Methods in Applied Mechanics and Engineering 197, 3080 (2008).
3. JAW van Dommelen, **Majid Minary**, B. J. Ivarsson, et al., “Pedestrian Injuries: Viscoelastic Properties of Human Knee Ligaments at High Loading Rates” Traffic Injury Prevention 6, 278 (2005).
2. JAW van Dommelen, **Majid Minary**, B. J. Ivarsson, et al., “Nonlinear Viscoelastic Behavior of Human Knee Ligaments Subjected to Complex Loading Histories”, Annals of Biomedical Engineering 34, 1008 (2006).
1. JAW van Dommelen, B.J. Ivarsson, **Majid Minary**, et al. “Characterization of the Rate-Dependent Mechanical Properties and Failure of Human Knee Ligaments, SAE Transactions, 114, 80 (2006).

## Abstracts

5. **Majid Minary**, and Min-Feng Yu, “Nano-Mechanical and -Electromechanical Heterogeneity in Single Collagen Fibrils” Biophysical Society-Biophysical Journal 98, 759a (2010).
4. **Majid Minary**, and Min-Feng Yu, “Collagen Fibrils: Multifunctional Nanoscale Components in Bone Structure”, Society of Engineering Science, 47<sup>th</sup> Annual Technical Meeting, IA, p27-28 (2010).
3. **Majid Minary**, and Min-Feng Yu, “Shear Piezoelectricity in Individual 100-nm Diameter Collagen Type I Fibrils”, Society of Engineering Science, 45<sup>th</sup> Annual Technical Meeting, IL, p250 (2008).
2. **Majid Minary**, and Min-Feng Yu, “Reversible Elasticity and Structural Damping of Individual Multi-walled Carbon Nanotubes in Radial Direction”, Society of Engineering Science, 45<sup>th</sup> Annual Technical Meeting, IL, p380 (2008).
1. **Majid Minary**, and Min-Feng Yu, “Individual Collagen Fibrils with 100 nm-diameter Behave as Shear Piezoelectric Materials”, Symposium: Mechanics of Biological and Biomedical Materials, MRS Fall 2008.

## PATENT

- Min-Feng Yu and **Majid Minary**, "Ultra-low damping imaging mode related to scanning probe microscopy in liquid", US Patent Application (2011)