

# Ravikumar Varadarajan

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## **EDUCATION**

- |   |              |
|---|--------------|
| <b>Ph.D. Mechanical Engineering</b><br><i>Case Western Reserve University, Cleveland, Ohio</i><br>GPA 3.83 / 4                  | January 2007 |
| <b>M.S. Mechanical Engineering</b><br><i>University of Illinois at Chicago, Chicago, Illinois</i><br>GPA 5 / 5                  | May 2003     |
| <b>B.E. Mechanical Engineering</b><br><i>University of Madras, Chennai, India</i><br>GPA 79 / 100, First class with distinction | May 1999     |

## **RESEARCH INTERESTS**

- Mechanical characterization of metallic, polymeric and composite materials and other advanced materials
- Design and characterization of biomedical materials and biomedical devices
- Finite element analysis

## **RESEARCH EXPERIENCE**

- 1. Research Associate, Case Western Reserve University** 2007 - Present
  - Study of mechanical behavior of Bulk Metallic Glasses (BMG)
  - Mechanical characterization of composite fine cables used in biomedical devices
- 2. Graduate Research Assistant, Case Western Reserve University** 2003 – 2006
  - Fracture resistance of ultra high molecular weight polyethylene (UHMWPE).
  - Environmental effects on static and cyclic fracture resistance of UHMWPE
  - Development of fracture testing methodologies for ductile polymers
- 3. Graduate Research Assistant, University of Illinois at Chicago** 2001 - 2002
  - Parametric finite element model of human lumbar spine developed using ProEngineer and ANSYS.
  - Combined effects of osteoporosis, disc degeneration and interbody fusion in human lumbar spine.

## **INDUSTRIAL EXPERIENCE**

**Design Engineer, Mirza International Pvt. Ltd, Kanpur, India** May 1999 – April 2001

### Responsibilities:

- Design and development of leather processing and shoe manufacturing machines according to customer requirements.
- Design and development of jigs and fixtures
- Conceptual models development using 3D CAD and engineering drawing as per standards

### Projects (Selected)

- Design and development of thermo-fusible press for shoe uppers.
- Redesign of an automatic leather dyeing drum and chemical mixing tank.

## **TEACHING EXPERIENCE**

**Graduate Teaching Assistant**, Case Western Reserve University      Aug 2003 – Dec 2004  
**Courses:** (i) Computational methods in Mechanical Engineering, (ii) Dynamics, (iii) Relation of materials to design

**Graduate Teaching Assistant**, University of Illinois at Chicago      Aug 2002 – Dec 2002  
**Course:** Biomechanics

## **RELEVANT GRADUATE COURSE WORK**

- Experimental stress analysis
- Computer aided design
- Finite element method
- Solid mechanics
- Fracture of materials
- Fatigue of materials
- Polymer Engineering
- Computational biomechanics

## **TECHNICAL SKILLS**

- Monotonic, static and cyclic fracture and multi-axial testing using materials testing machines.
- Material testing software development using Labview
- Design of jigs and fixtures
- Solid modeling using Solidworks, ProEngineer, AutoCAD
- Finite element analysis using Ansys and Abaqus

## **SOFTWARE SKILLS**

Microsoft Office, C, C++, Visual Basic, Matlab, Labview  
AutoCAD, Solidworks, ProEngineer, Ansys, Abaqus, Gambit

## **AWARDS**

- Student travel achievement recognition award, Society for Biomaterials Annual meeting, Pittsburgh, 2006.
- Case Prime Fellowship, Case Western Reserve University, Cleveland, 2003-2006.
- Academic proficiency award, Crescent Engineering College, India, 1997, 1998, 1999.

## **PUBLICATIONS**

**Conference presentations: Total (12)**

**Journal Papers:**

1. Varadarajan R, Rimnac CM, "Compliance calibration for fracture testing of ultra high molecular weight polyethylene", *Biomaterials*, 27(27), 4693-4697, 2006.
2. Lewandowski JJ, Varadarajan R, Smith B, Tuma C, Shazly M, Vatamanu LO, "Tension and fatigue behavior of 316LVM 1x7 multi-strand cables used as implantable electrodes", *Journal of Materials Science and Engineering A* (Accepted for publication).
3. Varadarajan R, Dapp EK, Rimnac CM, "Static fracture resistance of UHMWPE using single specimen normalization method." (Submitted to *Polymer Testing*).
4. Caris J, Varadarajan R, Lewandowski JJ, "Effect of heat treatment on the fracture behavior of CuSnNi alloys for electrical spring applications." (Under Preparation).
5. Hassan Hala, Varadarajan R, Lewandowski JJ, "Effect of loading rate and temperature on the fracture resistance of zirconium based bulk metallic glass." (Under preparation).

**Journal article reviewer:** Metallurgical Transactions