

Vaibhav Mathur

1001,westford St, Apt#23, Lowell, MA-01851 USA
Phone: 978-495-1257 E-mail: vaibhavdeniro@gmail.com
Webpage: <http://www.linkedin.com/in/mathurmems>

Education:

PhD (Applied Physics)

University of Massachusetts, Lowell

Expected graduation

May 2010

Master of Science (Applied Physics)

University of Massachusetts, Lowell

Dec. 2006

Bachelor of Engineering (Mechanical)

Bangalore Institute of Technology, India

Aug. 2003

Key Skills:

Lithography

FEM analysis using COMSOL Multiphysics

SEM Imaging

Nanoindentation

LAB View automation

FIB micromachining

Silicon/III-V material fabrication

Wafer fusion technology

Optical test bench setups

Thin film sputtering and e-beam deposition

Research Experience:

Research Associate: Photonics Center, UMass, Lowell

Sept. 2005 – Present

- Designed and fabricated two novel GaAs based **Optical MEMS** devices. (PhD Thesis in final stages)
 - First device based on an optical actuation mechanism for addressing large array MEMS spring plate mirrors via cascaded wafer fused photo detectors.
 - A second device fabricated with applications in vibration sensing based on the optical misalignment of **GaAs/AlGaAs** waveguide micro cantilevers.
 - Completely automated an optical test bench setup for measuring PIN photo response and interferometry for MEMS mirror characterization.
 - Detailed optical and structural **FEM studies** conducted for the above using the **COMSOL Multiphysics package**.
 - Developed **wafer bonding** technology on the GaP/GaAs material system for applications in **PIN photodiode** fabrication and **QPM** (Quasi Phase Matching)
 - Worked extensively in class 100 cleanrooms at the **Center for Nanoscale Studies (CNS)** Harvard University, and the University of Massachusetts, Lowell
 - Also, designed and maintained the official university lab website
<http://www.uml.edu/centers/photonics/default.html>

Junior Research fellow: Laser Lab, Indian Institute of Science, Bangalore, India **Jun 03-Aug 04**

- Designed and setup an optical tweezing setup for use as a micro-manipulation tool.
- Experimental techniques for optical trap calibrations and manipulation studies on micro spheres and DNA investigated.

Grants and proposal writing:

- Grant proposal for the optical-MEMS initiative at the UMass, Lowell to the National Science Foundation (NSF) (*In preparation*)
- Successfully authored and acquired a seed fund for the MEMS vibration sensor project through CFCI (Committee of Federated Centers and Institutes) University of Massachusetts.
- Wrote several white papers and quarterly reports to the United States Air Force Research Labs on the MEMS micro mirror project research for wave front aberration correction.

Publications & Conference Presentations

- “A novel all optically driven MEMS deformable mirror device” ***Journal paper in preparation.***
- “Design and optimization of an all optically driven Phase Correction MEMS device using FEA” in proceedings of the **International COMSOL Multiphysics Users Conference, Boston, 2009**
- “All optically driven MEMS deformable mirrors via direct cascading with wafer bonded GaAs/GaP PIN photo detectors” V.Mathur et al presented at the **IEEE Photonics society, Optical MEMS and Nanophotonics conference, Florida 2009**
- “Development of a wafer fusion process for producing patterned GaP templates” K. Termkoa, V. Mathur et. al. In proceedings of **APS March 2009 meeting.**
- “FEM simulation of a micro-cantilever optical-MEMS sensor”- V. Mathur, J.Li and W.D. Goodhue. In proceedings of the **International Comsol Users Conference , Boston 2006**
- “Direct measurement of the oscillation frequency in an optical-tweezer trap using parametric excitation” J.Joycutty, V.Mathur, V.Venkataraman, V.Natarajan **Phy. Rev. Lett. Vol. 95, Issue 19,(2005)**

Internships:

- *Carbone of America, Boonton, NJ* **Summer’ 05**
Received hands on training in manufacturing workshop, wrote ISO standard procedures for processes involved in carbon brush technology.
- *Design center, Ingersoll-Rand India Pvt. Ltd.* **Feb 03’- Jun 03’**
Analyzed and proposed design changes for a Paver machine frame using 3D FEM analysis using ANSYS (Structural module)
- *BOSCH R&D Center, Bangalore, India* **May ’02 – Oct ’02**
Conducted a detailed FEM analysis of a Negative Temperature Coefficient (NTC) thermistor using ANSYS (Thermal module)

Professional references:

- 1) Dr. Bill Goodhue http://www.uml.edu/college/arts_sciences/Physics/Faculty/William_D._Goodhue.html
- 2) Dr. Dan Wasserman http://www.uml.edu/college/arts_sciences/Physics/Faculty/Dan_Wasserman.html
- 3) Dr. Joel Therrien <http://faculty.uml.edu/jtherrien/>
- 4) Dr. James Sherwood <http://m-5.uml.edu/sherwood/>