

NITIN UPPAL

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Objective

A full time position in a challenging and multi-disciplinary environment involving analytical modeling and mechanical design.

Skills Summary:

- Experience in using analytical methods and fundamental physics to solve complex multi disciplinary and multi physics problems.
- Strong Finite Element Analysis background, Structural, Thermomechanical, Multiphysics and Nonlinear FEA analysis using ANSYS, familiar with APDL scripting.
- Experience in mathematical modeling and numerical analysis using MATLAB.
- Strong data analysis skills, design of experiments using SPSS, SAS and Minitab.
- 3D solid modeling using Pro/Engineer, Solid Works (Beginner), CAM, Pro Manufacturing, AutoCAD.
- Understanding of six sigma principles: DFSS and DMAIC methodologies.
- Experience with High Performance Computing in UNIX environment.
- Material characterization using Scanning Electron Microscopy (Hitachi –S3000N), Optical Microscopy, FT-IR (Nicolet 6700), MTS Tensile and Compression testing.
- Experience with optical component alignment, Femtosecond Laser System troubleshooting and diagnostic, Oscilloscopes and Optical grade material polishing, Sputter deposition.
- Experience with G-codes, CNC milling, lathe, drilling and general machine shop activities.

Work Experience

Research Assistant, BioMEMS lab, The University of Texas at Arlington (January 2004 – Present)

- Femtosecond laser induced Two Photon Polymerization (2PP) 3D lithography for micro/nano structuring.
- Mathematical modeling of the fabrication process involving transport phenomena at microscale.
- Ablation characteristics and process parameter evaluation of common engineering metals, ceramics, smart-materials and polymers for Femtosecond Laser Micromachining.
- Modeling ultrashort laser pulses interaction with metals, dielectrics and polymers.
- Thermal analysis of laser induced melting and ablation of transparent materials for bonding.
- Molding microcomponents using Hot Embossing Microreplication system.
- Statistical analysis and Design of Experiments (DOE) approach for process parameter sensitivity analysis.
- Problem diagnostics and maintenance of Femtosecond Laser System.
- Design and CNC fabrication of experimental setups.

Graduate Teaching Assistant, University of Texas at Arlington (January 2005 – Present)

- Lab instructor for the Measurement Lab, measurements techniques involved in Thermodynamics, Fluid Dynamics, Design, Heat Transfer, Dynamic System Modeling.
- Upgrading the existing experimental setups with digital interfaces.

Engineer Trainee, Amtek Auto Ltd., New Delhi, India (June 2002 – July 2003)

- Undertaking new product development activities for high volume production of automobile engine components.
- Interfacing with finance, engineering and production team and monitoring the project development.
- Vendor development for Jigs, Fixtures and Tools.

- In-house fixtures fabrication using CNC machines.

Summer Intern, Amtek Siccardi India Ltd., India (May 2001 – August 2001)

- Involved in the design and manufacturing processes for automobile engine components.
- Involved with Quality Assurance Team on FMEA analysis and proposing preventive measures.

Education:

PhD in Mechanical Engineering, University of Texas at Arlington, Present (July 2008) **GPA: 4.0/4.0**
Dissertation topic: Mathematical modeling and resolution prediction of Two Photon Polymerization for 3D micro/nano lithography.

MS in Mechanical Engineering, University of Texas at Arlington, May 2005 **GPA: 3.9/4.0**
Thesis topic: Femtosecond Laser Micromachining of engineering materials: Process parameter study and microrapid prototyping.

BS in Mechanical Engineering, Maharishi Dayanand University, India May 2002 **74.7% (Honors)**

Projects:

Finite Elements Method

- Electrothermal analysis of thermal microactuators/grippers using ANSYS.
- Analysis of radical diffusion on *voxel* formation in photopolymerization.
- Nonlinear structural and modal analysis of polymerized micro-beam.
- Transient Thermomechanical induced stresses and moisture diffusion analysis of an electronic package.

Heat and Mass Transfer/ HVAC

- Thermal analysis and induced temperature gradients in a photosensitive resin on ultrashort pulsed laser irradiation.
- Calculation of cooling and heating load of an office space.

Design of Experiments

- Sensitivity and process parameter influence analysis of polymerization resolution using a mixed factor complete factorial design.
- A design of experiments approach on ice cream branding and image study.
- Influence of laser process parameters on micro-channel dimensions.

Statistical and Regression Analysis

- Regression model of the PMMA bonding strength on hot embossing process parameters.
- A regression approach to study the mandatory attendance policy in improvement of student's performance in calculus course.
- Descriptive statistical analysis to uncover the cause of Nosocomial Infections in the hospitals across USA.

Robotics and Classical Controls

- Dynamic and Kinematic analysis of GMF 110R manipulator.
- Real world application of compound transformation for Robotically Automated Surface Finishing Cell consisting of a GMF S-400 Robot, CMM and several work pieces.
- Dynamic analysis of inverted pendulum system.

Awards:

- Recipient of Newport-Spectra Physics excellence in research award at SPIE Photonics West Conference, 2008.
- Recipient of STEM Doctoral Research Fellowship, UTA, 2007.
- Recipient of University Scholar Award, April 19th 2007 (Formal reorganization of the top one percent of the student body who exemplify academic excellence).

- Recipient of Graduate Dean's Fellowship towards Masters and Doctorate program at University of Texas at Arlington.
- Recipient of Mechanical Engineering Jack R. Woolf service award, February 24th 2005.

Professional Membership:

- Student member of SPIE- The International Society for Optical Engineering.
- Student member of "Phi Kappa Phi" Honors Society, UTA chapter.
- Student member of "Tau Beta Pi" The National Engineering Honors Society, UTA chapter.

Publications:

Journal Papers:

- Nitin Uppal and Panos S. Shiakolas, "Process sensitivity analysis and resolution prediction for the two-photon polymerization of micro/nano structures", Journal of Manufacturing Science and Engineering, 2008. (In review)
- Nitin Uppal and Panos S. Shiakolas, "Fabrication of high aspect ratio microstructures by two-photon polymerization using off-focus self-trapped ultrashort pulses", Journal of Microelectromechanical Systems, 2008. (In review).
- Nitin Uppal and Panos S. Shiakolas, "Modeling of temperature dependent diffusion and polymerization kinetics and their effect on single pulse two photon polymerization dynamics", Journal of Micro/Nanolithography, MEMS and MOEMS, 2008. (Revised).
- Nitin Uppal and Panos S. Shiakolas, "Micromachining characteristics of NiTi based shape memory alloy using femtosecond laser", Journal of Manufacturing Science and Engineering, vol. 130, 2008.
- Nitin Uppal, Panos S. Shiakolas, and Shashank Priya, "Micromachining of PZT using Ultrafast Femtosecond Laser", Ferroelectrics Letters Section, vol. 32, n 3-4, pages 67-77, 2005.

Peer Reviewed Conference:

- Nitin Uppal, Panos S. Shiakolas, and Mohsin Rizwan, "Three dimensional waveguide fabrication in PMMA using femtosecond laser micromachining system", Proceedings of SPIE-The International Society of Optical Engineering, Micromachining and Microfabrication Process Technology XII, Vol. 6882, 2008.
- Nitin Uppal and Panos S. Shiakolas, "Experiments and characterization of two photon polymerization using 1-kHz femtosecond laser system", Proceedings of SPIE-The International Society of Optical Engineering, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics, Vol. 6883, 2008.
- Nitin Uppal and Panos S. Shiakolas, "An Ablation Parameter Study and Micromachining of NiTi Based Shape Memory Alloy Using a Femtosecond Laser", ASME International Mechanical Engineering Congress and Exposition, 2007.
- Nitin Uppal, Panos S. Shiakolas, and Sunil Belligundu, "Femtosecond Laser Micromachining as a Rapid Prototyping Environment- System Development and Initial Results", ASME International Mechanical Engineering Congress and Exposition, 2006.
- Nitin Uppal, Sunil Belligundu, and Panayiotis Shiakolas, "Femtosecond Laser Micromachining: System Development, Ablation Studies and Microcomponent Manufacturing", VII International Conference on Micro Electro Mechanical Systems, El Paso – Juarez region, 2005.
- Sunil Belligundu, Panayiotis Shiakolas, and Nitin Uppal, "Rapid Prototyping of Polymer Microdevices utilizing Femtosecond Laser for mold making and Hot Embossing", VII International Conference on Micro Electro Mechanical Systems, El Paso – Juarez region, 2005.

References:

Available on Request