SCIENTIFIC ENGINEER

SUMMARY:

Research Scientist with a PHD in Engineering Physics with numerous Publications, and Patents. Extensive R&D experience. Expertise includes working with nano and measurement technologies.
Created a novel nanofabrication process for designing an optical waveguide, this technique solved complex problems involving optical birefringence and in plane geometrical stress.

RESEARCH INTERESTS:

Semiconductors, sputtering, plasma, Device fabrication, Magnetic data storage, MEMS, Solar, Novel Photonics devices, Optics, nanophotonics, On-chip photonic integration, Microelectronics, PVD, Nanotechnology, Lasers, Packaging or Related fields, optical test equipment, fiber optic communication, DRIE, RIE, Electrical engineering, CMOS, Thin films, Thick films, Manufacturing.

TECHNICAL SKILLS:

Software skills: Mathematica, FOTRAN, CADENCE(mask design), RSoft (photonic modeling software), C, MS-Excel, ANSYS (MEMS modeling), Supreme (CMOS modeling).

WORK EXPERIENCE:

Summit Technology Services, Inc., Research Scientist on contract to Corning.
Physical measurement scientist (April 2008-current)
Project I: Development of an online metrology system: Worked on this project as the project leader and investigated various technologies best suiting the needs. Interacted with stakeholders and vendors through review meetings and evaluated various technologies by getting systematic measurements on various samples. Established a timeline and coordinated with various engineers and scientists in achieving the milestones.

Project II: Green Laser project for the micro projector application: Worked on this project as a failure mode analysis engineer. This worked involved investigating laser modules with laser sources, piezoelectric elements, and frequency doubling crystals. Identified root causes behind the deviation from optimal performance of the laser modules.

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MEASUREMENT TECHNOLOGIES:

Development of measurement technologies
Experimental setup for on-chip optical waveguide filter characterization: Developed an optical bench setup for the characterization of on-chip photonic crystals. The on-chip device was fabricated by me using focused ion beam system. This is an endfire coupling setup and needed

alignment of several optical components, some of these are: stage with x, y, z controls, a digital polarizer controller (Agilent 11896A), a 50% non-polarizing beam-splitter, a 10 × microscope objective, a rotating Glan-Thompson polarizer, a photodetector (Ophir PD300-IR), and tunable laser sources, recording camera (Hamamatsu) equipped with beam profile analyzer software (Spiricon LBA-710PC) in a computer.

Design of experiment for the measurement of piezoelectric response of microcantilever beams: Developed an optical interferometer based measurement setup for the characterization of the piezoelectric micro cantilever beams. The cantilever beam was fabricated by me using MEMS technologies. This setup involved an optical interferometer, DC power sources, 8 pin chip socket, breadboard, and wire bonding.

Metrology Techniques:
Six years of experience with various metrology techniques. Recently was appointed as metrology lab instructor at the electron-optics facility at Michigan Technological University. Instructed graduate students in various metrology techniques using, FESEM, SEM, AFM. Experience includes working with X-Ray diffraction for other characterization studies.

Documentation and invention disclosure:
Over 6+ years experience in documenting data systematically by conducting smart experiments. Have published 3 journal papers and am currently working 4 important papers. Recently applied for one patent along with my advisor and fellow graduate students. Also in the process of applying for patent on novel optical waveguide configuration.

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PROFESSIONAL PROFILE:

Physics Department, Michigan Technological University, Houghton, MI 49931, USA
Graduate Research Assistant (Aug 2003- Jan 2008)

Project I: Fabrication and testing an array of freestanding piezoelectric microcantilever actuators (For WIMS-ERC, University of Michigan) (Implemented using: MEMS techniques for applications in micro-chemisensors (UV-Photolithography, RF Sputtering, and DRIE).

Responsibilities:

Developed a novel piezoelectric film fabrication process through CMP technique. Prepared and implemented standard operating procedures (SOP). Collected vast amount of data, and characterized the experimental process for reproducibility, and yield enhancement. Experience with leading small groups of junior graduate students and implemented various aspects of the projects by appropriately assigning tasks to individuals and reporting to advisor through documents and PowerPoint presentations.

Project II: On-chip optical waveguide filter (FIB, FESEM, AFM, DRIE, UV-Photolithography, RF Sputtering)

Responsibilities:

Designed, developed and fabricated a novel optical waveguide filtering device. Acquired data by conducting systematic experiments, analyzed and created process flows. Interacted with research advisor and other group members to coordinate various aspects of the projects. Developed the device designs, demonstrated and enhanced the yield production through systematic experiments.

Project III: Computational modeling of piezo-actuators and optical waveguides in piezoelectric crystals (Ansys, R-Soft, SRIM, FORTRAN).

Project IV: Proposed and fabricated a novel free standing optical waveguide bridge structure for on-chip integrated devices

Material Science and Engineering Department, Michigan Technological University, Houghton, MI, USA
Graduate Teaching Assistant (Aug 2007- Dec 2007)

Instructing Scanning Electron Microscope (SEM) laboratories to a group of 30 graduate and senior undergraduate students using JEOL 6400 SEM.

Physics Department, Michigan Technological University, Houghton, MI, USA
Graduate Teaching Assistant (Jan 2002 - May 2002)

Taught introductory physics recitation class to a group of 30 students.

Graduate Teaching Assistant (Aug 2000 - Dec 2001)

Instructed and organized introductory physics laboratories to 100 students per week.

Team Asia Greaves Semiconductor limited, Hyderabad, India
Engineering Intern Summer 1999

Underwent Training on semiconductor transistor fabrication processes. Taught basic semiconductor physics to undergraduate interns.

School of Physics, University of Hyderabad, India
Graduate Research Assistant
Modeling the interaction of ions with semiconductors (FORTRAN, Mathematica)

Research Instrumentation Skills:
Expertise:

Scanning Electron Microscopy (SEM)	X-Ray Diffraction	Micropolishing(CMP)	Focused Ion Beam (FIB)
Dry Etching Systems (DRIE)	End-Fire Coupling	Metricon Prism Coupler	RF- Sputtering
Rapid Thermal Annealing (RTA)	Photolithography Process	Wafer Dicing Tools	Micromanipulator
Atomic Force Microscopy (AFM)	Optical Interferometer	Profilometer	Evaporator

Patent:
Xiayoue Huang, Miguel Levy, Ziyou Zhou, Raghav Vanga, "Optical waveguide polarization memory device based on magnetization locking" (US patent pending)
Accomplishments/Honors. Helped Advisor with writing proposals, obtained $152,231 from UES, $75k/annum WIMS-NSF(MTU). Instrumental in proposing and translating conceptual photonic crystal filters into commercially viable. On-chip devices. Awarded second place during 2005-06 graduate student poster session, MTU, Houghton, MI. Secured 1st place in All India common entrance exam for admission to the Master's program at the University of Hyderabad, India, June-2000. Graduate student representative from Physics Department, at the Graduate Student Council (GSC): Fall 2003-Present. Activities: Organizing and inviting speakers at campus, contributing suggestions towards campus improvement, organizing academic poster sessions. Member of GSC softball team, Fall 2000-Fall 2007 (winners 2004, 2007)

Responsibilities:
Mentored junior graduate and undergraduate students in their research projects. Help research staff characterize and troubleshoot tools such as chemically assisted ion beam system (CAIBE), FIB, EVG photolithography system. Placed orders for supplies, laboratory necessities and procured laboratory parts, established contacts. Conducted experimental demonstrations for high school Teachers/Students in basic Physics/Material Science.

Sample Publications/Conference Presentations:
M. Levy, Raghav Vanga, H. K. Park, K. S. Moon, Y. K. Hong, "Single-crystal relaxor ferroelectric piezoactuators with interdigitated electrodes," IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control 51, 1593-1599, Dec. 2004.

Ziyou Zhou, Xiaoyue Huang, Raghav Vanga, "Tunable Photonic Crystals Based on Ferro-electric Ferro-magnetic Materials by Focusion Beam Milling", Submitted to Chinese Optics Letters, July, 2007.

Raghav Vanga, Miguel Levy, "Piezoelectric Based High Efficiency Gas-Drive Micro Valves and Pumps", Wireless Integrated Microsystems, summer and Fall IAB/NSF meetings. May-2003 to Oct-2007 (Poster)

Raghav Vanga, Miguel Levy, Ziyou Zhou, Xiaoyue Huang, "Tunable beam routing optical waveguide filters in relaxor ferroelectrics" (To be submitted).

Raghav Vanga, Miguel Levy, Xiaoyue Huang, Ziyou Zhou, "Fabrication and characterization of novel substrate-less optical waveguides using focused ion beam technology" (To be submitted).

Raghav Vanga, Miguel Levy, Ziyou Zhou, Xiaoyue Huang, "A MEMS based single-sided piezoelectric microactuator" (To be submitted).

Raghav Vanga, Miguel Levy, Xiaoyue Huang, Ziyou Zhou, "Optimization and characterization of crystal ion sliced relaxor single crystal films" (To be submitted).

EDUCATION:

Doctor of Philosophy (Ph. D – Engineering Physics) Jan 2008
GPA:3.6/4.0
Thesis: Relaxor piezoelectric thin film actuators, waveguides, and photonic crystals: fabrication and characterization.

Michigan Technological University (MTU), Houghton, MI
Master of Philosophy (M.Phil – Solid state physics) Aug 1998-Jan 2000 GPA: 4.0/4.0
Thesis: Charged Particle Interaction with Solids–Energy Loss & Dechanneling Properties

University of Hyderabad, Hyderabad, India
Master of Science (M.S - Semiconductor physics) May 1996- May 1998 GPA: 4.0/4.0
University College of Science, O.U, Hyderabad, India

Bachelor of Science (B.S - Mathematics, Physics, Chemistry) Aug 1993-May 1996 GPA: 3.7/4.0
Government City College, O.U, Hyderabad, India