

ARNAB CHOUDHURY

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SUMMARY OF QUALIFICATIONS

- 5+ years of experience in MEMS research (design, fabrication and testing)
- 5+ years of experience in CMOS and MEMS fabrication techniques
- 4+ years of experience in device and material testing and characterization
- 2+ years of experience with microscale energy generation systems (fuel cells and thermoelectric power generation)
- Worked on projects in fuel cells, chemical and electrical sensors, pressure sensors, piezoresistive system design, microfluidic system design and thermoelectric power generation
- Participated in writing grant proposals. Contributed to project reports to NSF, DOE, DARPA and other sponsors
- Strong analytical and communication skills

EDUCATION

Georgia Institute of Technology, Atlanta, GA

Jan., 2004- Sep., 2007 (Expected)

Ph.D. in Mechanical Engineering (GPA: 3.73/4.0)

Thesis: A piezoresistive microcantilever array for chemical and biochemical sensing

- Investigation of effect of design parameters on device sensitivity and detection limit
- Thermomechanical modeling and characterization of piezoresistive microcantilevers
- Low-noise measurement of piezoresistance during stress-based chemical measurement
- Key improvements in material design, temperature control and prevention of non-specific interaction with analyte

Minor: Biological and chemical sensors (GPA: 4.0/4.0)

Georgia Institute of Technology, Atlanta, GA

Aug., 2001- Dec., 2003

M.S. in Mechanical Engineering (GPA: 3.57/4.0)

Thesis: Process development for a silicon carbide micro four-point probe

- Investigation and characterization of amorphous silicon carbide and development of fabrication processes
- Integration of stereolithographic structures with MEMS devices with high alignment accuracy

Indian Institute of Technology, Kharagpur, India

Aug., 1997- May, 2001

B. Tech. (Honors) in Manufacturing Science and Engineering (GPA: 8.55/10)

Thesis: Development of layered manufacturing system using fused deposition modeling by electrochemical discharge

[Best Thesis Award]

EXPERIENCE

Georgia Institute of Technology, Atlanta, GA

Aug., 2001 - Present

Graduate Research Assistant (List of projects)

1. Development of a silicon carbide micro four-point probe
2. Integration of stereolithographic components with MEMS-based devices
3. Design and fabrication of pumping mechanism for a methanol-based fuel cell (MBFC)
4. Thermal management for a methanol-based fuel cell (MBFC)
5. Thermomechanical design of a hydrogen-based fuel cell
6. Fabrication of a pressure sensor for measurement of retinal pressure
7. Design and fabrication of thermoelectric power generation system

Oak Ridge National Laboratories, Oak Ridge, TN

May - Aug., 2004

Summer Intern

Project: Design and fabrication of a piezoresistive microcantilever array

Godrej & Boyce Manufacturing Company, Mumbai, India

May - July, 2000

Summer Intern

Project: Modification of a cellular assembly system and improvement in material handling, balance of assembly line, reduction of work hazards, etc.

SKILLS

Microfabrication: Common microfabrication techniques

Instrumentation: SEM, AFM, CNC machining, stereolithography, nanoindentation, Instron universal testing machine, four-point probe testing, lapping machine and Woollam ellipsometric system

Computer/Modeling: C, MATLAB, ANSYS, Fluent, COMSOL ProEngineer, AutoCad, Autodesk Inventor, LabView

Linguistic: English (fluent), Hindi (fluent), Bengali (fluent) and German (basic)

PATENTS/ INVENTION DISCLOSURES

1. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Method of manufacture of piezoresistive cantilever sensor array for stress-based measurement", Provisional patent, GTID 3687, October, 2006.
2. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Method for noise reduction and temperature control of piezoresistive cantilever sensor arrays", Provisional patent, GTID 3754, June, 2006.
3. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Nanothermal mechanical cantilever biosensors", Invention disclosure, GTID 4067, December, 2006.
4. **A. Choudhury**, P. J. Hesketh and Mark Allendorf, "Metal organic framework coating of strain sensitive microcantilevers for chemical sensing", Invention disclosure, GTID 4196, May, 2007.
5. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Piezoresistive-thermal microcantilever array for chemical and biochemical sensing", Provisional Patent, GTID 4068, June, 2007.

PUBLICATIONS/PRESENTATIONS

Selected Conference Presentations

1. R. Luharuka, **A. Choudhury**, CF Wu, W. Morlock, P. Hesketh, "Constant pressure fluid dispensing unit for microfluidic applications", 203rd Meeting of the ECS, Paris, France, Apr 27-May 2, 2003
2. S. Rajaraman, H.-S. Noh, **A. Choudhury**, J. Street, P. J. Hesketh, and D. S. Gottfried, "Stereolithography-based dielectrophoretic microchannels for enrichment of bio-particles," in 204th Meeting of the ECS, San Antonio, TX, 2003.
3. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Design and fabrication of a piezoresistive microcantilever array," in 208th Meeting of the ECS, Los Angeles, CA, 2005.
4. E. R. Shediak, C. Bauer, B. Simmons, R. Strumpf, **A. Choudhury**, P. J. Hesketh, and M. Allendorf, "Growth of metal organic frameworks on microcantilever substrate materials," in 210th Meeting of the ECS, Cancun, Mexico 2006.

Selected Conference Papers

1. **A. Choudhury**, A. Sengupta, P. K. Mishra, and A. Ghosh, "Development of system of layered manufacturing using FDM-ECD," in Advanced Manufacturing Systems, Proceedings of 5th Japan-India Joint Seminar, 2001.
2. **A. Choudhury** and P. J. Hesketh, "A novel method of stereolithographic alignment for MEMS structures," in Nanotech 2003, San Francisco, CA, 2003, p. 542.
3. **A. Choudhury** and P. J. Hesketh, "Development of a silicon carbide micro four-point probe," in IMECE, Anaheim, CA, 2004, pp. 55-62.
4. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Low-noise chemical detection with a piezoresistive microcantilever array," in 210th Meeting of the ECS, Cancun, Mexico, 2006, pp. 473-482.
5. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Thermal characterization and temperature control of piezoresistive microcantilevers," in IEEE Sensors, Daegu, Korea, 2006, 1223 – 1226.
6. **A. Choudhury**, P. J. Hesketh, Z. Hu, and T. G. Thundat, "Single and double sided chemical sensing with piezoresistive microcantilevers," in MicroTAS 2007 Paris, Oct. 2007.

Journal Papers

1. **A. Choudhury**, P. J. Hesketh, T. G. Thundat, and Z. Hu, "A piezoresistive microcantilever array for surface stress measurement: curvature model and fabrication," Submitted to *Journal of Micromechanics and Microengineering*.
2. **A. Choudhury**, P. J. Hesketh, T. G. Thundat, and Z. Hu, "Design issues in surface-stress based chemical sensing with piezoresistive microcantilever arrays," in preparation.

Invited Talk

1. P. J. Hesketh, **A. Choudhury**, R. Luharuka, Z. Hu, T. G. Thundat, and M. D. Allendorf, "Microfabricated cantilever arrays and miniature bistable rotary gate valves for chemical sensing," in ICMAT 2007, Singapore, 2007.

RELEVANT COURSEWORK (CATEGORIZED BASED ON AREA OF INTEREST)

Microscale Mechanical and Thermal Design

Introduction to MEMS
Design and fabrication of MEMS devices
Microscale heat transfer and thermophysics
Microsystems packaging
Introduction to Mechatronics
Mechanical Design and Analysis
Introduction to finite elements
Principles of continuum mechanics
Engineering design

Data Analysis

Chemometrics
Statistical modeling and design of experiments

Electronic Device Theory

Introduction to microelectronic theory
Theory of electronic devices

Chemistry

Chemical sensors
Scanning probe microscopy

Biomedical Engineering

Tissue engineering
Cell engineering