

BIKRAM BHATIA

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EDUCATION

University of Illinois at Urbana-Champaign

Ph.D. in Mechanical Science and Engineering, August 2014 (expected graduation)

Thesis title: “Pyroelectric Energy Conversion using Nanometer-Scale Oxide Thin Films”

Thesis advisor: Prof. William P. King

Certificate in Business for Non-Business Graduate Students, College of Business, 2013

M.S. in Mechanical Science and Engineering, 2010

Thesis title: “Simulation of Implantation and Diffusion Processes for Electrothermal Microcantilevers”

Thesis advisor: Prof. William P. King

Indian Institute of Technology Guwahati

B.Tech. in Mechanical Engineering, IIT Guwahati, India, 2008

Thesis title: “Study of Two-Phase Flow Instabilities in Microchannels”

Thesis advisor: Prof. Manmohan Pandey

ACADEMIC EXPERIENCE

Prof. William P. King Research Group, University of Illinois, Urbana, IL (2008 – Present)

- Investigated energy conversion in nanometer-thick pyroelectric films
- Developed a 2 ω method for pyroelectric characterization of thin films
- Performed high temperature Piezoresponse Force Microscopy on ferroelectric thin films
- Designed, fabricated and characterized doped silicon micro-heater platforms and cantilevers
- Simulated dopant implantation and diffusion processes for Electro-Thermal Microcantilever design
- Led discussion for ME 420 – Intermediate Heat Transfer as a substitute for Prof. William P. King

Prof. Rusi Taleyarkhan Research Group, Purdue University, IN (Summer 2007)

- Performed multiphysics modeling and experiments to study the effect of scattering centers on the pressure distribution in the high-powered resonant acoustic chamber, as part of the Summer Undergraduate Research Fellowship (SURF) Program

IIT Guwahati, India (2004 – 2008)

- Examined two-phase flow in microchannels using a non-linear lumped parameter dynamic model for the undergraduate thesis project
- Performed two-dimensional Computational Fluid Dynamics (CFD) modeling

JOURNAL PUBLICATIONS

1. **B. Bhatia**, A. Damodaran, H. Cho, L.W. Martin, and W.P. King, "High-Frequency Thermal-Electrical Cycles for Pyroelectric Energy Conversion," (in preparation).
2. **B. Bhatia**, H. Cho, J. Karthik, J. Choi, D.G. Cahill, L.W. Martin, and W.P. King, "High Power Density Pyroelectric Energy Conversion from BaTiO₃ films," (submitted).
3. W.P. King, **B. Bhatia**, J.R. Felts, H.J. Kim, B. Kwon, B. Lee, S. Somnath, and M. Rosenberger, "Heated Atomic Force Microscope Cantilevers and their Applications," Annual Review of Heat Transfer 12, 287-326, 2013.
4. **B. Bhatia**, J. Karthik, T. Tong, D.G. Cahill, L.W. Martin, and W.P. King, "Pyroelectric Current Measurements on PbZr_{0.2}Ti_{0.8}O₃ Epitaxial Layers," Journal of Applied Physics 112, 104106, 2012.
5. **B. Bhatia**, J. Karthik, D.G. Cahill, L.W. Martin, and W.P. King, "High-Temperature Piezoresponse Force Microscopy," Applied Physics Letters 99, 173103, 2011.
6. P.C. Fletcher, **B. Bhatia**, Y. Wu, M.A. Shannon, and W.P. King, "Electro-Thermal Atomic Force Microscope Cantilever with Integrated Heater and NPN Back-to-Back Diodes," Journal of Microelectromechanical Systems 20, 644-653, 2011.

CONFERENCE PRESENTATIONS

1. **B. Bhatia**, H. Cho, J. Karthik, J. Choi, D.G. Cahill, L.W. Martin, and W.P. King, "Energy Conversion from BaTiO₃ Thin Films using the Pyroelectric Ericsson Cycle," ISHMT-ASME Heat and Mass Transfer Conference, IIT Kharagpur, India, 2013. (**P K Sarma Award for Best Poster**)
2. **B. Bhatia**, H. Cho, J. Karthik, J. Choi, D.G. Cahill, L.W. Martin, and W.P. King, "High Power Density Pyroelectric Energy Conversion using a MEMS Platform," MRS Fall Meeting, Boston, MA, 2013.
3. **B. Bhatia**, J. Karthik, T. Tong, D.G. Cahill, L.W. Martin, and W.P. King, "Pyroelectric Measurements on PbZr_{0.2}Ti_{0.8}O₃ Epitaxial Layers," MRS Fall Meeting, Boston, MA, 2012.
4. **B. Bhatia**, J. Karthik, D.G. Cahill, L.W. Martin, and W.P. King, "Measuring Pyroelectric Coefficient of a Thin Film using a 2 ω Method," ASME IMECE, Houston, TX, 2012.
5. **B. Bhatia**, J. Karthik, D.G. Cahill, L.W. Martin, and W.P. King, "High-Temperature Piezoresponse Force Microscopy," MRS Fall Meeting, Boston, MA, 2011.
6. **B. Bhatia**, J. Karthik, D.G. Cahill, L.W. Martin, and W.P. King, "Temperature dependent Characterization of Ferroelectric Thin Films using Piezoresponse Force Microscopy," NATAS Annual Conference, Des Moines, IA, 2011.
7. K. Chikmagalur, **B. Bhatia**, and M. Pandey, "Two-phase flow instabilities in flow boiling in microchannels," IC-ICAME, IISc, Bangalore, India, 2008.
8. **B. Bhatia**, R. Assudani, and M.K. Das, "Accurate solution of L-shaped lid-driven cavity at high Reynolds number," IC-ICAME, IISc, Bangalore, India, 2008.