

Curriculum Vitae of

IKRAMUDDIN AHMED

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EDUCATION

- Ph.D.** The University of Texas at Austin, **1997** (Dissertation Title: *Spectral Simulation of Thermocapillary Convection*; Supervisor: *Kenneth S. Ball.*)
- M.S.** The University of Texas at Austin, **1993** (Thesis Title: *Sublimation Cooling of a Hypersonic Blunt Body*; Supervisors: Kenneth S. Ball and Dennis E. Wilson.)
- B.S.** Bangladesh University of Engineering and Technology, Dhaka, **1988**

ACADEMIC APPOINTMENTS

- 2007 - *present* Associate Professor, Mechanical Engineering, Wichita State University
- 2000 - 2007 Assistant Professor, Mechanical Engineering, Wichita State University
- 1997 - 2000 Visiting Assistant Professor and Postdoctoral Fellow, Department of Mechanical Engineering and the Institute of Materials Science, The University of Connecticut

OTHER APPOINTMENTS

- 1989 - 1990 Assistant Engineer, Reactor Operations and Maintenance Unit (TRIGA Mark III), Bangladesh Atomic Energy Research Establishment, Savar, Dhaka.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Member, American Society of Mechanical Engineers
Member, American Society for Engineering Education

ACADEMIC AWARDS AND NOMINATIONS

- 2000 - *present* Nominated multiple times by students for the CTRE Academy for Effective Teaching Award, WSU
- 1995 College of Engineering Award for *Excellence in Teaching while pursuing a Graduate Degree*, UT Austin

Service to Professional Community

a. Review Work

For proposals submitted to the National Science Foundation: CAREER (2011).

For manuscripts submitted to technical journals (2000-*present*):

Journal of Heat Transfer

Journal of Fluids Engineering

Heat and Mass Transfer (Warme- und Stoffübertragung)

Journal of Thermal Spray Technology

For manuscripts submitted to professional conferences (2000-*present*):

National Heat Transfer Conferences

Fluids Engineering Summer Meetings

International Mechanical Engineering Congress and Exposition (IMECE)

b. Chairing of Conference Sessions

2012 ASME IMECE, Session 7-28-10, Houston, TX, November 2012.

2004 National Heat Transfer/Fluids Engineering Conference, Charlotte, NC, July 15-22.

2002 ASME IMECE, New Orleans, La, November 17-22.

Service to Wichita State University and Local Community

WSU Chapter of AAUP, Vice-President (2013 - present)

WSU General Education Committee, College of Engineering Representative, 2008-present.

ME Graduate Coordinator (Masters and PhD), 2005 - 2010.

Advisor, WSU Student Section of the American Society of Mechanical Engineers, 2002 - *present*

Faculty Advisor, WSU Bangladesh Student Association, 2004 - *present*

Guest Lecturer, LAS 300G: Global Issues (Course Coordinator: Dr. Dorothy K. Billings, Anthropology), "Globalization and the Engineering Profession," Spring 2004; Fall 2005.

Host-Organizer, 2002 ASME Regional Student Conference (Region VII), April 4-6, Wichita

Judge, LEGO-MIND Competitions, 2002; 2003; *Wallace Scholar Invitational*, 2004

Judge, USD 259 Debates, Fall 2005

Committees

(University) Faculty Senate, ME Representative, 2014 – present.

(University) General Education Committee, CoE Representative, 2008-*present*.

(University) Graduate Awards Committee, CoE Representative, 2003 - 2010

(University) Faculty Senate Library Committee, CoE Representative, 2002 - 2010

(University) Doctoral Subcouncil, 2005 - 2010

(University Libraries) Engineering Librarian Search Committee (Fall, 2006)

(College) CoE ABET Committee, 2002 - 2004
(College) Graduate Committee, 2005 – 2010

(Department) Curriculum Committee 2002-2004; 2014 – present.
(Department) Lab Coordinating Committee (2003)
(Department) ABET Committee (2002-2004)
(Department) KBOR Program Review Report (2002 - 2003)
(Department) Graduate Committee

Peer Reviewed Publications

a. Archival Articles Published

W.S. Khan, R. Asmatulu, **I. Ahmed**, T. S. Ravigururajan, “Thermal Conductivities of Electrospun PAN and PVP Nanocomposite Fibers Incorporated with MWCNTs and NiZn Ferrite Nanoparticles,” *International Journal of Thermal Sciences*, 2013 (*in press*).

I. Ahmed and T. L. Bergman, "Optimization of Plasma Spray Processing Parameters for Deposition of Nanostructured coatings," *Journal of Fluids Engineering*, Vol. 128(2), pp. 394-401, 2006.

I. Ahmed and T. L. Bergman, “An Engineering Model for Solid-Liquid Phase Change within Sprayed Ceramic Coatings of Non-Uniform Thickness,” *Numerical Heat Transfer, Part A: Applications*, Vol. 41(2), pp. 113-129, 2002.

I. Ahmed and T. L. Bergman, “Simulation of Thermal Plasma Spraying of Partially Molten Ceramics: Effect of Carrier Gas on Particle Deposition and Phase Change Phenomena,” *Journal of Heat Transfer*, Vol. 123(1), pp. 188-196, 2001.

I. Ahmed and T. L. Bergman, “Three-Dimensional Simulation of Thermal Plasma Spraying of Partially Molten Ceramic Agglomerates,” *Journal of Thermal Spray Technology*, Vol. 9(2), pp. 214-224, 2000.

I. Ahmed and T. L. Bergman, “Thermal Modeling of Plasma Spray Deposition of Nanostructured Ceramics,” *Journal of Thermal Spray Technology*, Vol. 8(2), pp. 315–322, 1999.

I. Ahmed and K. S. Ball, “Spectral Simulation of Thermocapillary Convection with Deformable Free Surface using Boundary-Fitted Coordinates,” *Numerical Heat Transfer, Part B: Fundamentals*, Vol. 32(2), pp. 127-149, 1997.

b. Conference Proceedings (* indicates graduate students under Dr. Ahmed’s supervision)

Ziaul Haqu*, **I. Ahmed**, George Talia, and Ramazan Asmatulu, “Fatigue Characterization of Plasma Spray Coated Composites,” 2010 ASME International Mechanical Engineering Congress & Engineering Exposition, Denver, CO.

U. V. Diccar*, S. Vyawahare*, **I. Ahmed**, and G. E. Talia, “Protective Coatings for Polymer Composites,” 2006 ASME International Mechanical Engineering Congress & Engineering Exposition, November 5-10, Chicago, IL.

I. Ahmed and I. Sabirov*, “Inverse Calculation of Flame Impingement Heat Transfer, 2006 ASME Joint US-European Fluids Engineering Summer Meeting, July 17-20, Miami, FL
L. Vargas*, **I. Ahmed**, and D. N. Koert, “**High Rayleigh Number Flows in a Cubical Enclosure**,” 2005 National Heat Conference (Joint ASME/AIChE), San Francisco, Ca, June 17-22.

H. Raikoty*, **I. Ahmed**, and G. E. Talia, High Speed Friction Stir Welding: Computational and Numerical Studies,” 2005 National Heat Conference (Joint ASME/AIChE), San Francisco, Ca, July 17-22.

I. Ahmed, I. Sabirov*, and A. Pokharel*, “Inverse calculation of Plasma Jet Impingement Heat Transfer,” 2004 National Heat Transfer/Fluids Engineering Conference, Charlotte, NC, July 12-17.

I. Ahmed and T. L. Bergman, “Optimization of Spray Processing Parameters for Nanostructured Coatings,” 2002 International Mechanical Engineering Congress and Exposition, New Orleans, La, November 17-22.

I. Ahmed and T. L. Bergman, “CFD Simulation of Thermal Spraying of Partially Molten Ceramics: Carrier Gas and Loading Effects on Particle Deposition and Phase Change,” presented at the ASME International Mechanical Engineering Congress & Exposition (IMECE 2000), Orlando, Florida, November 5–10, 2000.

I. Ahmed and T. L. Bergman, “Computational Simulation of Thermal Plasma Spraying of Ceramics: Effects of Carrier Gas and Particle Loading,” presented at the 2nd United Engineering Foundation Conference on Thermal Spray Processing of Nanoscale Materials, Quebec City, Aug. 15–20, 1999.

I. Ahmed and K. S. Ball, “Spectral Simulation of Thermocapillary Convection,” Proc. 31st National Heat Transfer Conference, Volume 5 (HTD-Vol. 327), R. L. Mahajan et al. (eds.), pp. 113–120, ASME, New York, 1996.

Invited Presentations

“Nanostructured Thermal Barrier Coatings,” ASME Wichita Section (Seminar offered as part of the Region VII members’ professional development activities), 2003

MASTER’S THESES SUPERVISED

“A Life Cycle Analysis of the Solar Updraft Tower,” James Zongker, 2013.

“High Rayleigh Number Flows in a Cubical Enclosure,” Balaraju Bende, 2010.

“Fatigue Behavior of Plasma Spray Coatings for Polymer Matrix Composite Materials,” Ziaul Haqu, 2008.

“Plasma Spray Coatings for Polymer Composites: Electrical and Mechanical Characterization,” Unmesh Diccar, 2006

“Protective Thermal Spray Coatings for Polymer Matrix Composites: SEM Analysis”, Siddharth Vyawahare, 2006.

“Heat Transfer Calculations for Plasma Jet Impingement,” Arjun Pokharel, Fall 2005

“High Rayleigh Number Flows in Rectangular Cavities,” Lucas Vargas (co-supervised with Prof. David N. Koert), Fall 2004

“Thermal and Mechanical Analysis of High Speed Friction Stir Welding using Finite Element Analysis,” Harsha Raikoty (co-supervised with Prof. George E. Talia), Summer 2005

“Simulation of Channel Flows in the Slip Regime using Computational Fluid Dynamics,” Syed S. Abbas, Summer 2004

“CFD Simulation of an Atmospheric Plasma Jet with Chemistry,” M. Moshir R. Chowdhury, Mechanical Engineering, Summer 2003

REGULAR COURSES TAUGHT AT WICHITA STATE UNIVERSITY

ME 398 Thermodynamics I; **ME 502** Thermodynamics II; **ME 521** Fluid Mechanics; **ME 522** Heat Transfer; **ME 682** Engineering Applications of Computational Fluid Dynamics and Heat Transfer; **ME 801** Boundary Layer Theory; **ME 802** Turbulence; **ME 856** Computational Fluid Dynamics.

NEW COURSES AND LABORATORY MATERIAL DEVELOPED

ME 682: Engineering Applications of Computational Fluid Dynamics and Heat Transfer. This is a new course developed (from ME 650P and ME 750P, both offered multiple times) with the aim of introducing ME seniors and graduate freshmen to CFD&HT. The objective is to prepare them for the industry using computer simulation and analysis as a thermal/fluids design tool. Here students are introduced to the detailed mathematical foundations of CFD&HT analysis, with a special emphasis on the derivation of the partial differential equations describing conservation of mass, momentum, and energy; the concepts of discretization based on Taylor series expansion; the finite volume method favored by the heat transfer community; stability and convergence issues; as well as with a basic introduction to turbulence modeling. A major term project is focused on open-ended design problems.

ME 750F: Sustainability and Energy (experimental Spring Semester course being offered for the fifth time in as many years, as of 2013): This course is being developed in collaboration with Distinguished Professor Emeritus William Wentz. Offered as an elective and open to any engineering student that has completed Thermodynamics I and Engineering Economics. A survey of alternative technologies in a world that is increasingly becoming energy intensive with a carbon footprint that is no longer sustainable. Topics include: Greenhouse Gas Emission from Conventional Power Generation and Transportation; Wind Turbines (mechanics; blade design; resource/site evaluation); Solar Energy (thermal as well as photovoltaic); Bio-Fuels (ethanol; bio-diesel); Fuel Cells; pros and cons of Nuclear Energy; Energy Storage and the Smart Grid; Conservation and Efficiency in residential, industrial, and agricultural practices; Life Cycle Inventory/Analysis of engineered products; Air Quality and Tropospheric Ozone; Accelerated Anthropogenic Climate Change; Environmental Philosophy.

ME 750A: Selected Topics in Fluid Mechanics. This course has been taught once (Spring 2005) and is being developed in anticipation of the Kansas Bioscience Initiative and the related research activities at WSU. A significant part of the course is devoted to preparing the students' mathematical foundation (Tensor Algebra; Navier-Stokes equations; Dimensional Analysis and Scaling) necessary for understanding of non-Newtonian fluid dynamics, since most of the biologically important fluids (such as blood) exhibit such behavior. Simplified analyses for fluid-structure interaction, as found in pulsatile flows in arteries, for example, were presented as well. Since no single textbook covers all the relevant topics well, lecture materials were prepared using four different textbooks.

Lab Manual for CFD software: Dr. Ahmed acts as the Point of Contact between WSU and Fluent, Inc., the owner of the CFD code FLUENT and the meshing code GAMBIT. This entails answering any FLUENT/GAMBIT related questions from users on WSU campus, and acting as a liaison in case further assistance from FLUENT specialists are needed. Because of the two courses that extensively use these codes, Dr. Ahmed has also developed short manuals so that students completely unfamiliar with these codes can get started. These manuals are updated with student feedback every year as the computer-labs are upgraded with new operating systems as well as with new versions of the code.

PROFESSIONAL DEVELOPMENT ACTIVITIES IN TEACHING/INSTRUCTION

Workshop on Patent Disclosure and Patent Filing, The Office of Research Administration, 2012.

Designing and preparing objectives and outcomes based curriculum, College of Engineering, 2011

Analysis of students' perception of teaching effectiveness, College of Engineering, 2008.

What is My Ethical IQ? Workshop on Engineering Ethics, College of Engineering, 2007.

Workshop for New Engineering Faculty (SUCCEED/NSF), Tempe, Az, March 16-17, 2003

Essential Teaching Seminar (ASME), Tulsa, Ok, May 15-18, 2003

RESEARCH GRANTS AWARDED

a. as PI

Equipment Grant: WSU Foundation (Reviewed by WSU CoE Peers): A Thermal Spray Booth for Developing Protective Coatings for Polymer Composites in Aerospace and Biomedical Applications, \$130,000, 2007 (pending release by CoE Dean, as of Spring 2013).

Thermal Spray Coatings for Aviation Composites: Phase II, Aircraft Design and Manufacturing Research Consortium, \$50,000 01/06 12/06.

Thermal Spray Coatings for Aviation Composites, Aircraft Design and Manufacturing Research Consortium, \$50,000 01/05 12/05.

Modeling and Analyses of Solution Precursor Plasma Spray Processes, US Navy, \$30,000, 01/04 12/04.

b. as CoPI

Expansion of Hardware for the High Performance Computing Center, WSU (with Prof. David Alexander as PI), National Science Foundation/EPSCoR (Grant No. EIA-0216178, \$190,000), 2002.

c. Other Research Awards

ARCS: Modeling and Simulation of Materials and Processes at Micro- and Nanoscales, Office of Research Administration, WSU, Summer 2003, \$4,000.

URCA: Computer Simulation of Microfluidic Devices, Office of Research Administration, WSU, Summer 2002, \$5,000.

Work In Progress

Simulation and modeling of the interaction between the atmospheric boundary layer and wind turbines in urban terrains using the open source CFD code OpenFOAM.

Simulation and modeling of a fluidized bed for medical waste incineration using OpenFOAM.

Tutorials for using OpenFOAM in an undergraduate introductory course in CFD&HT.