

Kishwar Hossain, Ph.D.

SUMMARY OF QUALIFICATIONS

More than 8 years of experience as a research assistant in the field of aerospace engineering, including 3 years as a structural analyst. Highly skilled computational scientist with experience in numerical modeling of fluid flow, combustion and structural phenomena. Presented at various industry conferences, including the Aerospace Sciences Meeting and Exhibit. Possess exceptional written and oral communication skills, and ability to facilitate strong interpersonal relationships.

PROFESSIONAL EXPERIENCE

Center for Simulation of Advanced Rockets, UNIVERSITY OF ILLINOIS, Urbana, IL **2005-2008**
Combustion Research Assistant

Member of the Combustion and Energetic Materials Research group

- Conducted a study on the stability, and extinction characteristics of diffusion flames supported by a spinning methane burner. It was found that non-uniform flames, namely flame holes and spirals appear at near extinction conditions.
- Investigated the relevance of these unsteady flames to turbulence modeling.
- Developed a three-dimensional finite-difference code to solve the unsteady energy equations in cylindrical coordinates. Wrote the code using FORTRAN 90 and parallelized it using MPI. Post-processed the data using MATLAB.

Caterpillar Inc., Enterprise Works, UNIVERSITY OF ILLINOIS, Champaign, IL **2003-2006**
Structural Analyst Research Assistant

Conducted structural analysis of earth moving vehicles using finite element methods through an assistantship with Caterpillar Inc. (CAT).

- Removed unnecessary components from Pro/E geometry received from design group.
- Created finite element models of complex geometry using IDEAS and HYPERMESH and applied necessary constraints and loads.
- Conducted linear static analysis using ABAQUS or NASTRAN for different components of Caterpillar machines for validation of simulations with test results and for identifying weak design vulnerabilities.
- Conducted non-linear static analysis to identify structural weaknesses in designs during the development of new machines.
- Conducted bolted joint analysis, contact analysis and some hydraulic analysis.
- Conducted modal analysis to identify critical frequencies in newly developed machines.
- Conducted fatigue analysis and made recommendations for improving designs to make components more robust.
- Presented results to clients.

Illinois Aerospace Institute, Champaign, IL **2000-2003**
Instructor, Illinois Aerospace Institute Summer Camp

- Instructor for aerodynamics sessions.
- Instructor for glider building workshops.

Department of Aerospace Engineering, UNIVERSITY OF ILLINOIS, Urbana, IL

Aircraft Icing Research Assistant

2000-2003

Member of the Smart Icing Systems group, SIS, a multidisciplinary group dedicated to the development of a semi-autonomous icing protection system for small aircraft.

- Developed numerical algorithms to enhance the envelope protection systems of aircrafts impaired under icing conditions and implemented the algorithms in a flight simulator using C.
- Developed a neural network in MATLAB to characterize icing effects as a function of aerodynamic coefficients.

Teaching Assistant

8/2000-12//2000

Instructor for AAE 260, (currently AE 433), the undergraduate fluid dynamics lab course.

- Instructed on experimental procedures for subsonic and supersonic wind tunnel experiments.

Department of Mechanical Engineering, LAFAYETTE COLLEGE, Easton, PA

1998-2000

Viscoelastic Material Property Research Assistant

Conducted research on the behavior of viscoelastic materials under tensile loads.

- Developed a diagnostic setup to study thermoforming using thermocouples in conjunction with the labview diagnostic interface.
- Designed and manufactured a pseudo fluidized bed for coating prepregs with microparticles.

EDUCATION AND AFFILIATIONS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN, Urbana-Champaign, IL

Ph.D. in Aerospace Engineering

- Dissertation: "Three-dimensional Numerical Study of Flames Supported by a Rotating Burner"

Master of Science in Aeronautical and Astronautical Engineering

- Thesis: "Open Loop Longitudinal Envelope Protection in Icing Encounters"

LAFAYETTE COLLEGE, Easton, PA

Bachelor of Science in Mechanical Engineering with Honors, minor in Mathematics, Excel Scholar

Member, American Institute of Aeronautics and Astronautics, Combustion Institute and Sigma Gamma Tau Honorary Aeronautical Engineering Society.

PUBLICATIONS

JOURNALS

- Hossain K., Jackson T., Buckmaster J., Numerical Simulations of Flame Patterns Supported by a Spinning Burner, Proceedings of the Combustion Institute, 32, 1, 2009.
- Wang, X., Hossain K., Jackson T., The Three-dimensional Numerical Simulation of Aluminized Composite Solid Propellant Combustion, Combustion Theory and Modeling, 11, 4, 2007.
- Hummel, S. Hossain K., Hayes G., Biaxial Stress Relaxation of High Impact Polystyrene (HIPS) Above the Glass Transition Temperature, Polymer Engineering and Science, 41, 3, 2001.

CONFERENCES

- Hossain K., Jackson T., Buckmaster J., Three-dimensional Simulations of Flames Supported by a Spinning Porous Plug Burner, AIAA 2008-1047, 2008.
- Hossain K., Jackson T., Buckmaster J., Edge Flames and Other Structural Complexities Supported by a Spinning Burner, 5th US Combustion Meeting, 2007.
- Hossain K., Sharma V., Bragg M., Voulgaris P., Envelope Protection and Control Adaptation in Icing Encounters, AIAA 2003-0025, 2003.

- Merret J., Hossain K., Bragg M., Envelope Protection and Atmospheric Disturbances in Icing Encounter, AIAA 2002-0814, 2002.

COMPUTER SKILLS

C/C++, FORTRAN, MPI, OPENMP, MATLAB, Mathematica, PRO/E, SIMULINK, LABVIEW, ABAQUS, NASTRAN, IDEAS, HyperMesh, Microsoft Office, LATEX.