**Bryan W. Weber**

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(412) 443-6447 (412) 968-5884

**Education**

**Case Western Reserve University,** Cleveland, OH

Bachelor of Science, Aerospace Engineering

Graduated *cum laude*, May 2009

Cumulative GPA: 3.73

Received the Fred H. Vose Prize, awarded to the senior in Mechanical and Aerospace Engineering showing the most promise for future leadership

**University of Connecticut,** Storrs, CT

Master of Science, Mechanical Engineering

Planned Graduation: May 2010

**Professional Experience**

**Master’s Thesis (Planned Completion: May 2010)**

**Combustion Laboratory,** University of Connecticut, Storrs, CT

* Autoignition Analysis of Butanol Isomers at Elevated Pressure using a Rapid Compression Machine
  + Developed LabView instrument to control data sampling from the rapid compression machine
  + Designed and constructed an electrical circuit and mechanical system to control diaphragm puncture timing on a sampling apparatus for the rapid compression machine
  + Operating the rapid compression machine to measure the autoignition delay associated with the four isomers of butanol
  + Operating the gas chromatograph, mass spectrometer, and flame ionization detector to determine the kinetic pathways of butanol ignition
  + Simulating ignition delay and kinetic results of experiments using CHEMKIN software

**Senior Project, 2008-2009**

**Combustion Diagnostics Laboratory**, Case Western Reserve University, Cleveland, OH

* Analysis of Heavy Hydrocarbon Fuels using Gas Chromatography with Mass Spectrometry
  + Work partially supported by Summer Undergraduate Research in Energy Sciences grant from Case Western Reserve University, 2008
  + Participated in the 2009 Symposium and Poster Session, sponsored by the Support of Undergraduate Research and Creative Endeavors Office
  + Characterized the composition of unburned conventional and synthetic jet fuels (Jet-A, JP-8, and S-8)

**Mechanical Engineering Laboratory 2, 2007-2008**

**Combustion Diagnostics Laboratory**, Case Western Reserve University, Cleveland, OH

* An Investigation of Hydrocarbon Flames using Probe Sampling and Gas Chromatography with Mass Spectrometry
  + Constructed gas sampling probe and control system
  + Tested sampling probe on flat, premixed methane flames

**Summer Internship, 2007**

**Combustion Diagnostics Laboratory**, Case Western Reserve University, Cleveland, OH

* Catalytic Hydrogen Ignition Project funded by NIST
  + Designed, constructed, and calibrated a flow control system for hydrogen, nitrogen, and oxygen
  + Designed and constructed a customized translation stage for hydrogen-air burner
  + Constructed a customized exhaust hood for hydrogen-air burner

**Leadership Experience**

**Ultimate Frisbee Club**, Case Western Reserve University, Cleveland, OH

***President****,* 2008; ***Treasurer****,* 2007-2008; ***Secretary and Webmaster***, 2006-2007; ***Member***, 2005-2009

* Assisted in organizing and conducting North Coast Ultimate Frisbee tournaments for 22 teams from MI, PA, NY, and OH; 2006-2008
* Coordinated club activities with the Case Western Reserve University Athletic Department and Facilities Department
* Won Sports Club of the Year, 2007
* Coordinated week-long team trip to Jekyll Island, GA for High Tide Tournament, 2009

**Additional Skills**

**Computer**

Windows XP, SolidWorks, Microsoft Word, Excel, and PowerPoint, MatLab, LabView, CHEMKIN 4.1.1

**Additional Related Coursework**

**Aerospace Design:** Semester-long course to design an atmospheric miner for Neptune. Mission profile called for mining mission in the atmosphere of Neptune followed by launch to orbit, transfer of payload to another craft, and re-entry into the atmosphere for more mining missions. Design included nuclear-thermal propulsion system, cryogenic cooling and storage system, aerodynamics of the craft, and entry heating analysis. Participated as the propulsion system primary designer on a team of 3 people.

**Combustion:** Graduate Level. Chemical kinetics, thermodynamics, and governing conservation equations of chemically reacting flows. Laminar premixed and diffusion flames, ignition, extinction, flame stabilization, detonation, and droplet and particle combustion were covered.

**Advanced Fluid Dynamics 1** **and 2:** Graduate Level.General equations for conservation of mass, momentum, and energy; and solutions for incompressible Newtonian viscous fluids were presented and analyzed. Kinematics and dynamics of inviscid and incompressible flow including free streamline theory were studied using vector, complex variable, and numerical techniques. Low and high Reynolds number approximations and boundary layer theory. Matching techniques and similarity solutions. Elements of gas dynamics including quasi-one-dimensional flow, shock waves, supersonic expansion, and linearized theory. Non-Newtonian fluids.

**Flight and Orbital Mechanics:** Aircraft performance, range and endurance, stability and control, take-off and landing, and simple maneuvers. Also included elements of celestial mechanics, orbit transfer, orbit decay due to drag, and lift-off and entry.

**Aerophysics:** Graduate Level. Physical and chemical topics in modern fluid mechanics, plasma dynamics, and combustion sciences, including quantum mechanical analysis of atomic and molecular structure, statistical thermodynamic calculations, chemical and physical equilibrium, reaction kinetics, and adiabatic flame temperature of complex reacting systems and transport phenomena.

**Propulsion:** Performance criteria of engines and air-breathing engine cycle analysis. Rocket flight performance and staging. Introduction to thermochemistry and combustion.

**Aero and Gas Dynamics:** Review of conservation equations and potential flow. Subsonic and supersonic airfoil theory, finite wings, isentropic one-dimensional flow, normal and oblique shock waves, and Prandtl-Meyer expansion waves.

**Aerostructures:** Mechanics of thin-walled aerospace structures including load analysis and shear flow due to shear and twisting loads in open and closed cross-sections. Introduction to structural vibrations and finite element methods. Included application of ALGOR FEA software to various related structures. As part of a team of 5, constructed and successfully test-flew a micro-air vehicle from molded carbon fiber.

**Mechanical Manufacturing:** Focus on graphics and manufacturing processes. Included manual and computer-aided drafting and design, primary and secondary engineering processes, engineering materials, and a hands-on lab applying knowledge obtained in lectures.

**Design of Fluid and Thermal Elements:** Project-based class presenting practical design problems integrating fluid mechanics, thermodynamics and heat transfer. A series of 6 projects were completed in teams of 3 over the semester.

**Engineering Design:** Semester-long project to design and build a small-scale hover craft in teams of 5.

**Fluid and Thermal Engineering 2:** Heat engines and refrigeration, chemical equilibrium, developing flow, boundary layer theory, hydrodynamic lubrication, heat transfer, and heat exchangers.