**Bryan W. Weber**

*Campus Address* bww3@case.edu *Permanent Address*

47D Mt. Vernon Drive 399 Wickford Drive

Vernon, Connecticut 06066 Pittsburgh, Pennsylvania 15238

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

**Education**

**Case Western Reserve University,** Cleveland, Ohio

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, Connecticut

Master of Science, Mechanical Engineering

Planned Graduation: May 2010

**Employment and Coursework**

**Summer Internship, 2007**

**Combustion Diagnostics Laboratory**, CWRU, Cleveland, Ohio

* 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

**Mechanical Engineering Laboratory 2**

**Combustion Diagnostics Laboratory**, CWRU, Cleveland, Ohio

* 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

**Senior Project**

**Combustion Diagnostics Laboratory**, CWRU, Cleveland, Ohio

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

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

**Combustion Laboratory,** UConn, Storrs, Connecticut

* 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 (RCM)
  + Designed and constructed an electrical circuit and mechanical system to control diaphragm puncture timing on a sampling apparatus for the RCM
  + Operating the RCM 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

**Leadership Experience**

**Ultimate Frisbee Club**, CWRU, Cleveland, Ohio

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

* Assisted in organizing and conducting North Coast Ultimate Frisbee tournament for 22 teams from Michigan, Pennsylvania, New York and Ohio, October 2006, 2007 and 2008
* Coordinated club activities with the CWRU Athletic Department and Facilities Department
* Won Sports Club of the Year, April 2007
* Managed team budget with more than $10,000 in annual revenue and expenses
* Coordinated week-long team trip to Jekyll Island, Georgia for High Tide Tournament in March 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 three 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, 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:** Lecture included topics such as 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. Introduction to the physical and chemical topics of importance in modern fluid mechanics, plasma dynamics and combustion sciences. The course included 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. Class constructed Micro-Air Vehicles in teams of 5. MAVs were constructed from molded carbon fiber and successfully test-flown.

**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. Projects were completed in teams of three. A series of 6 projects were completed over the semester.

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

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