Francis ["Mac"] M. Haas **fhaas@princeton.edu**

EDUCATION

Ph.D. Mechanical and Aerospace Engineering, Princeton University, anticipated 2011
Concentration: Combustion and Energy Science
Advisor: Frederick L. Dryer, Ph.D.

MS Mechanical Engineering and Mechanics, Drexel University, 2006
Concentration: Thermal & Fluid Sciences
Thesis: "Plausibility Analysis of Branching Radical Reclamation from HO_2 in Plasma-Stimulated Ignition below the Autoignition Temperature Threshold"
Advisor: Alexander Fridman, Ph.D, D.Sc.

BS Chemical Engineering, Drexel University, 2006

BS Environmental Engineering, Drexel University, 2006

Exchange Student, Middle East Technical University (Ankara, Turkey), Fall Semester 2003

PROFESSIONAL EXPERIENCE

2/2004 – 9/2004 **Plant Engineer, Ecoprotech Ltd. (Istanbul, Turkey)**

- Commissioned gasification plant and operated gasifier during testing
- Designed and implemented tests for gasifier fuels and fuel preparation methods
- Redesigned existing equipment to improve safety and performance
- Created procedures for assessment of air pollution control equipment
- Created and maintained plant drawings in AutoCad

9/2002 – 3/2003 **Contact Engineer, ExxonMobil Chemical Company (Baytown, TX)**
Active in the day-to-day operations of a propylene concentration unit:

- Interpreted air pollution control regulations and updated equipment clearing procedures to reflect tighter environmental standards
- Modeled propylene/propane distillation unit to investigate energy integration alternatives
- Evaluated malfunctioning control valve; recommended and pursued repairs
- Calculated emissions release for a reportable incident
  - Submitted report to US EPA and Texas Commission on Environ. Quality (TCEQ)
  - Created procedure for future reportable incident calculations applicable to all Baytown Chemical Plant facilities; issued as a worksheet to plant engineers.

9/2001 – 3/2002 **Air Quality Engineer, ExxonMobil Research and Engineering (Fairfax, VA)**

- Conducted dispersion modeling for new source permitting
- Evaluated new combinations of storage tank emissions controls for effectiveness and economic attractiveness. Issued R&D report to ExxonMobil US Refining.
- Self-taught Visual Basic to program an environmental progress indicators management application

RECENT ACTIVITIES

2006 – Present **Advisor, Princeton Chapter, Engineers without Borders**

2004 – 2006 **Engineering Advisor, Philadelphia Fry-o-Diesel LLC:**
Designed a trap (sewer) grease pretreatment system for a biofuel pilot plant (for Drexel senior design course), and transferred design to Fry-o-Diesel for construction. Won EPA funding for continued research into the physical and chemical properties of trap grease (EPA P^3 program). Co-advised two additional senior design groups with related biodiesel production projects. Advised Fry-o-Diesel on permitting issues, plant design, and bench-scale testing.

SELECTED AWARDS AND HONORS

Gordon Y.S. Wu Fellow in Engineering, Princeton University, 2006
National Science Foundation Graduate Research Fellow, 2005
Vanguard Scholar, National Action Council for Minorities in Engineering (NACME), 2000-2006
Eagle Scout, 2000

RESEARCH ACTIVITIES: REPORTS, PRESENTATIONS and POSTERS

Haas, F. M., Chaos, M., Dryer, F.L. "Oxidation of PRF-Ethanol Blends: Kinetic Modeling at Low and Intermediate Temperatures," ACS Symposium on Computational Methods and Modeling in Fuel Chemistry, New Orleans, LA (April 6-10, 2008).

Haas, F. M., Cairncross, R. A. "Renewable Energy: Biodiesel, Solar, and Other Options." Presentation, Engineers without Borders Mid-Atlantic Professionals Regional Conference, Glassboro, NJ (October 14, 2006).

Haas, F. M. "Plausibility Analysis of Branching Radical Reclamation from HO_2 in Plasma-Stimulated Ignition below the Autoignition Temperature Threshold." Masters Thesis, Drexel University (2006).

Haas, F., Fridman, A., Gutsol, A. "Investigation of Plasma-Stimulated Ignition below the Ignition Threshold." Poster, 2006 Gordon Research Conference on Plasma Processing Science, Mt. Holyoke College, S. Hadley, MA (July 16-21, 2006).

Chapman, J.M., Crawford, D. I., Nguyen, V.-A., Powell, P. D., **Haas, F. M.**, Letterle, K. D., Doan, T., Cairncross, R. A., and Cernansky, N. P. "Design of a Trap Grease Upgrader for BioFuel Processing – Phase 1." Final Report and Poster, US EPA P^3 Program Funding Agreement SU832486010 (2006).

Haas, F. M. Panelist on Alternative Energy. Sierra Club (Southeastern PA Chapter) Earth Day Picnic and Energy Fest, Media, PA (April 22, 2006).