

Michael Seibert, Ph.D.

Assistant Professor of Mechanical Engineering, Franciscan University of Steubenville
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EDUCATION

- Ph.D., 2016, Mechanical Engineering
The Catholic University of America, Washington, DC
Dissertation Topic: “Dual Firing of Hydrogen and Heavy Hydrocarbon Fuels”
Advisor: Dr. Sen Nieh, Professor and Chair, Mechanical Engineering
- M.S., 2006, Mechanical Engineering
Villanova University, Villanova, PA
- B.S. Summa Cum Laude, 2005, Mechanical Engineering
Villanova University, Villanova, PA

EXPERTISE

Both Experimental and Computational Fluid Dynamics (CFD) in:
Thermal-fluids, Heat Transfer, Combustion, Pollution Reduction, Power Generation

EXPERIENCE

Assistant Professor of Mechanical Engineering, Franciscan University of Steubenville, 2023-present

Research Mechanical Engineer U.S. Army DEVCOM C5ISR Center/CERDEC, Aberdeen Proving Ground, MD, 2014-present

- Performed computational research (ANSYS FLUENT) in thermal conductivity enhancement of phase change materials (PCM) using aluminum fins (Manuscript in preparation for submission)
- Used oil and emissions analysis to evaluate the long term performance of spark ignition engines which had been modified to operate on military jet fuel
- Developed the concept of Thermochemical Cooling by using endothermic reactions in fuel to increase heat absorption and reduce system size and weight
- Provided computational fluid dynamics support for division programs including thermal management of wireless power receivers and exhaust plume modeling.
- Numerically and experimentally evaluated the burner and emitter assembly for a thermo-photovoltaic (TPV) power source. Recommended changes to improve temperature distribution.
- Conducted experimental and numerical research in hydrogen enriched combustion of jet fuel for external combustion applications (Ph.D. research).
- Technical point of contact for external research and development, includes proposal evaluation, advising, and evaluating contract deliverables

Mechanical Engineer, U.S. Army RDECOM CERDEC, Aberdeen Proving Ground, MD (2011-2014) and Fort Belvoir, VA (2006-2011)

- Studied the flow and thermal behavior of pin fin heat exchangers with tip clearances, showing improvements in Nusselt number and the transition to unsteady flow

- Numerically modeled (ANSYS CFX) refrigerant leaks in military and civilian vehicles to assess the exposure risk of novel refrigerants in mobile air conditioning systems.
- Developed a transient thermal model to assess an army airborne sensor system operating in both hot and cold climates

PROPOSALS/FUNDING

C5ISR Center In-Lab Independent Research (ILIR) is a competitive program for funding internal research. I proposed and served as the principal investigator for the following projects

- Michael Seibert, Terry DuBois, Sen Nieh, “Hydrogen Enhanced Combustion of Logistics Fuels,” 2011-2014, Annual Funding \$77K, \$95K, \$95K, \$60K
- Michael Seibert, Richard Scenna, Terry DuBois, “Thermo-chemical Cooling of Directed Energy Weapons,” 2018-2020, Annual Funding \$120K/year
- Michael Seibert, Richard Scenna, Terry DuBois, “Optimizing High Flux Phase Change Material Heat Exchangers Using Fin Theory,” 2021-2023, Fiscal Years 2021-22 funded at \$120K/year

PATENT APPLICATION

Seibert, M., Scenna, R., DuBois, T., “Fuel Endothermic Reaction to Cool a Load” Submitted March 29, 2021, Application Number 17/215,498

PUBLICATIONS

Richard Scenna, **Michael Seibert**, Michael Abraham, Terry DuBois, "Thermo-chemical Cooling for Large Thermal Load Applications," *The International Journal of Hydrogen Energy*, 48 (2023) 16223-16231

Michael Seibert, Richard Scenna, Terry DuBois (2022). Plate Fin Optimization in High Flux Phase Change Material Heat Exchangers Using Fin Theory. Manuscript in preparation

Michael Seibert and Sen Nieh, “Comparison of hydrogen and hydrogen-rich reformatte enrichment of JP-8 in an open flame,” *Fuel*, 210 (2017) 91-97

Michael Seibert and Sen Nieh, “Measurements of Hydrogen-Enriched Combustion of JP-8 in Open Flame,” *ASME Journal of Energy Resources Technology* 139(1) (2017) 012205

Michael Seibert and Sen Nieh, "Control of an Air Siphon Nozzle Using Hydrogen and Gases Other Than Air," *The International Journal of Hydrogen Energy*, 41 (2016) 683-689

Michael Seibert, Neal Blackwell, Danesh Tafti, 2014, “Effect of Pin Tip Dual Clearance on Flow and Heat Transfer at Low Reynolds Numbers”, *ASME Journal of Heat Transfer* 136 (7) 071901

Michael Seibert, Sen Nieh, “Simulation of dual firing of hydrogen-rich reformatte and JP-8 surrogate in a swirling combustor”, *International Journal of Hydrogen Energy* 38 (2013) 5911-5917

PRESENTATIONS

Michael Seibert, Terry DuBois, Richard Scenna, “1 kW Generator Endurance Testing with Oil Analysis,” Proceedings of the 49th Power Sources Conference, Jacksonville, FL, June 2020 (Abstract accepted for paper presentation and publication)

Michael Seibert, Richard Scenna, Terry DuBois, “Thermo-Chemical Cooling of High Power Electronics,” Proceedings of the 49th Power Sources Conference, Jacksonville, FL, June 2020 (Abstract accepted for paper presentation and publication)

Michael Seibert, Terry DuBois, Richard Scenna, Tony Thampan, “Testing Spark Ignition Engines Converted to Operate on JP-8,” Proceedings of the ASME 2018 Power and Energy Conference, Lake Buena Vista, FL, June 2018

Michael Seibert, Terry DuBois, Richard Scenna, Tony Thampan, “Testing Spark Ignition Engines Converted to Operate on JP-8,” Proceedings of the 48th Power Sources Conference, Denver, CO, June 2018

Michael Seibert, Sen Nieh, “Measurements of hydrogen enriched combustion of jet fuel in open flame,” Proceedings of the ASME 2016 Power and Energy Conference, Charlotte, NC, June 2016

Michael Seibert, Sen Nieh, “Comparing hydrogen and hydrogen-rich reformatte enrichment of JP-8 in an open flame,” Proceedings of the 47th Power Sources Conference, Orlando, FL, June 2016

Michael Seibert, Sen Nieh, Terry DuBois, “Dual fining of hydrogen and JP-8 for external combustion based power sources,” Proceedings of the 46th Power Sources Conference, Orlando, FL, June 2014, Paper 13.1

Michael Seibert, Sen Nieh, “Simulation of Dual Firing of Hydrogen and JP-8 in a Swirling Combustor”, Proceedings of the 45th Power Sources Conference, Las Vegas, NV, June 2012, pp. 339-342

Richard Scenna, **Michael Seibert**, Terry DuBois, “Oil Analysis for Prognostic Diagnostics Applications,” Proceedings of the 48th Power Sources Conference, Denver, CO, June 2018

William Rowley, Eric Conrad, **Michael Seibert**, Tony Thampan, “Army Applications of Laser Power Beaming,” Proceedings of the 48th Power Sources Conference, Denver, CO, June 2018

Tony Thampan, Terry DuBois, Richard Scenna, and **Michael Seibert**, “Evaluation of spark-ignition engines converted for operation on heavy distillate fuels,” Proceedings of the 47th Power Sources Conference, Orlando, FL, June 2016

GRADUATE COURSEWORK

The Catholic University of America

Mathematical Analysis, Introduction to Nanotechnology, Applied Energy Systems, Design and Optimization of Thermal Systems, Design of Power and Propulsion Systems, Conduction and Radiation, Intermediate Thermodynamics, Air Pollution and Control, Combustion and Waste Management, Special Topics: Advanced Combustion and Multiphase Flow

Villanova University

Conduction Heat Transfer, Computational Fluid Dynamics, Finite Element Analysis, Acoustics

TEACHING/GRADING ASSISTANT

Fluid Mechanics-Spring 2005

Statics-Fall 2005

Finite Element Analysis-Spring 2006

Thermodynamics-Spring 2006

HONORS

Hennessey Scholarship, Catholic University of America, 2015

MEMBERSHIPS

American Society of Mechanical Engineers 2012-present

Interagency Power Generation Group-Mechanical Working Group

Villanovans for Life (pro-life) 2001-2006

Vice President 2003, President 2004

COMMUNITY SERVICE

- Instructor/Tutor Middle School Science, Catholic Schoolhouse (Homeschool Co-op), Joppa, MD (2018-1019)
- Soccer Coach, Under 10 Girls, Bel Air, MD Football Club (2017-18, 2021-22)
- Hawk Trail Guide (Boys age 7-8), Trail Life Troop 518, Perry Hall, MD (2018-2020)
- Catechist-Middle School, St Ignatius-Hickory, MD, (2013-2020)