

## CURRICULUM VITAE

**Michael Helwig**

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### **FORMAL EDUCATION:**

D.Sc., Engineering Management, School of Engineering and Applied Science, George Washington University, 2006.

*Dissertation entailed developing 29 large-scale mixed-integer optimization models*

M.S., Operations Research, Naval Postgraduate School, 1991

*Thesis: "Optimal Allocation of Air-to-Air Missiles for the U.S. Navy in the 1990s"*

B.S., Liberal Arts and Science, University of Illinois, 1982

### **Other Education:**

Numerous schools and/or training associated with the Navy including flight schools (strike lead, navigation, communications, weapons, tactics, threat evaluation, specialized air reconnaissance); seamanship; survival; programming, planning and budgeting; leadership; management; etc.

Joint Professional Military Education Phase I via the Air Force

### **EMPLOYMENT HISTORY:**

2014 -- current. Lecturer, Iowa State University

2007 -- 2015. Senior Engineer, National Renewable Energy Laboratory, Golden, CO.

2004 -- 2007. Research Analyst, Institute for Defense Analyses, Washington, D.C.

1984 -- 2004. Naval officer, United States Navy.

### **PROFESSIONAL ACCOMPLISHMENTS/DUTIES:**

**Lecturer, Iowa State University, Industrial and Manufacturing Systems Engineering Department**

#### **Courses taught:**

- IE 148 (Information Engineering)
- IE 305 (Engineering Economic Analysis)
- IE 563 (Engineering and Systems Management)
- IE 570 (Systems Engineering and Project Management)
- IE 441 (Industrial Engineering Design)

- IE 242X (Supplemental Statistics)
- STAT 305 (Engineering Statistics)

**Service:**

- Iowa State University representative to the Association of Naval Reserve Officer Training Corps (NROTC) Colleges and Universities
- Large course assessment coordinator (IE 305)
- Director of Graduate Education (Engineering Management and Systems Engineering)

**Project leader/senior engineer, NREL, 2007 -- 2015.** Project lead for a variety of high visibility demanding tasks involving technical analyses, time constraints and budget management. Various tasks supported during this timeframe follow.

- **Department of Defense energy efficiencies in a deployed environment.** Technical Lead for multi-year, multi-entity effort identifying optimal energy strategies for the military while in a deployed, overseas location.
- **California Plug-In Electric Vehicle Infrastructure Plan.** Co-author and analyst of the "California Plug-in Electric Vehicle Infrastructure Assessment" for the state of California.
- **Department of Defense installation energy assessment.** Optimization lead and sole optimization expert for developing large-scale mixed integer model to determine installation's optimal mix of conventional and renewable energy.
- **Air Force energy assessment.** Represented Department of Energy as part of an Air Force energy assessment team visit to Afghanistan and Qatar in 2010.
- **Federal vehicle fleet Task Lead.** Charged with supporting Department of Energy efficiency efforts for the 600,000 vehicle federal fleet.
- **Strategic energy analyses.** Task lead in providing strategic market and policy renewable energy advice to the Department of Defense for six renewable energy technologies.
- **Vehicle fleet optimization.** Lead engineer and task lead in developing and refining optimization tool for Federal agencies to minimize greenhouse gas emissions and petroleum use for their vehicle fleets.

**Research Analyst, Institute for Defense Analyses (IDA), 2004 -- 2007.** Senior analyst on a 10-person team supporting the Secretary of Defense by developing/using a model used to forecast the contingency costs of the military Services for operations in

Afghanistan and Iraq. Results of this model were used as a basis for supporting or denying Operation Iraqi Freedom and Operation Enduring Freedom funding requests. Was the primary analyst charged with initially reviewing over \$30 billion of the Armed Service's funding requests for the Global War on Terror for 2007. Task involved extensive discussions and independent analyses of all four Service submissions, ensuring that funding requests were justified or eliminated.

**Naval Officer, 1984 -- 2004.** Career Naval officer with tours including the following:

- **Commanding Officer, Albuquerque, New Mexico Reserve Center.**
- **Multiple Lead Analyst Positions, Washington, D.C.**
- **Operational tours.** Two F-14 squadron assignments accumulating 1,000 flight hours, and one tour as Assistant Navigator directing aircraft carrier movements. Three 6-month deployments to the Persian Gulf.
- **Mathematics instructor, U.S. Naval Academy.**

**Awards.** Selected awards follow.

- **National Renewable Energy Lab Team Staff award, 2011.** Developed the optimization work that illustrated the large-scale efficiencies that were possible for federal vehicle fleets, and the opportunities for dramatic increases in greenhouse gas reduction and petroleum reduction, at no costs to federal agencies.
- **Department of Energy Federal Energy Management Program's Energy Champion award, 2010.** Details follow below.



Dr. Helwig (left) and Dr. Barnett's Energy Champion Award Poster

*Energy Champion Award Citation:* International Twenty-First Century Citizenship is being shaped by leaders like Dr. John Barnett and Dr. Michael Helwig of the U.S. Department of Energy's National Renewable Energy Laboratory, who traveled with Defense Department teams to military bases in Afghanistan and the Arabian Peninsula to assess the provision of energy and water to expeditionary forces. Recommendations to reduce battlefield reliance on imported fossil fuel and water include energy efficiency best practices; solar water heating; solar PV electricity; smart micro-grid projects; onsite water wells, and improved vehicle fleet management. Implementation can potentially reduce convoy needs by as much as 50 percent, saving American taxpayers millions of dollars each month and further protecting the safety and security of American troops deployed overseas.

- **National Renewable Energy Lab Director's Award, 2008.** For task work supporting the Department of Energy's federal vehicle efficiency efforts.
- **Navy awards, 1984 -- 2004.** Twelve separate personal decorations; 6 unit awards.

**Informal Presentations.** Much written material was produced and delivered informally – often for senior DoD personnel. Examples follow.

- Deputy Chief of Naval Operations, Dec 2012. Navy "Net Zero" opportunities.
- Deputy Assistant Secretary of the Army, Oct 2012. Army installation efficiency opportunities.
- Army Science Board, 2011. Inefficiencies in the operational environment.
- Vice Chief of Staff of the Air Force, Jan 2010. Outbrief of Afghanistan visit.

**Publications/Presentations.** Selected examples follow.

- Jenner, A., Helwig, M., & Rufer, A. (2018). Lecture capture and learner engagement strategies for industrial engineering distance education: results of a pilot program. *Production*, 28, e20170078. <https://doi.org/10.1590/0103-6513.20170078>.
- “Lecture Capture and Learner Engagement Strategies for Industrial Engineering Education: Results of a Pilot Program.” Presented at the International Joint Conference, Valencia, Spain. Alicia Jenner, Michael Helwig and Arlette Rufer abstract authors; Helwig and Rufer presenters. July 2017.
- Sly, D; Helwig, M and Hu, G (2017). “Improving the Efficiency of Large Manufacturing Assembly Plants,” *Procedia Manufacturing*. Volume 11.
- "California Statewide Plug-In Electric Vehicle Infrastructure Assessment," National Renewable Energy Laboratory Technical Report, May 2014.
- "Targeting Net Zero Energy at Marine Corps Air Station Miramar: Assessment and Recommendations," National Renewable Energy Laboratory Technical Report, December 2010.
- "Improving Energy Efficiency in a Deployed Environment," Air Force Energy Assessment Team report, 29 March, 2010
- Helwig, M. (2009). "Reducing Federal Petroleum Use: Mandates and Strategies," FEMP FOCUS Winter 2009, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. January.

- Helwig, M and Deason, J. (2007). "The Energy Policy Act of 1992 and Executive Order 13149: Proposed compliance strategies and process improvements for federal agencies," *Energy Policy*. May.
- Helwig, M. (1991). "Optimal Allocation of Air-to-Air Missiles for the U.S. Navy in the 1990s," Naval Postgraduate School master's degree thesis -- classification SECRET