Kevin L. Davies
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Education

Georgia Institute of Technology — Atlanta, GA
PhD in Mechanical Engineering — May 2014

Purdue University — West Lafayette, IN
MS in Interdisciplinary Engineering — August 2004

Carnegie Mellon University — Pittsburgh, PA
BS in Electrical and Computer Engineering, with University Honors — May 2001

Experience

Hawaii Natural Energy Institute (HNEI) — Honolulu, HI
Assistant Researcher — January 2014–present

- Led a team of 2 engineers, 2 postdocs, and 10 students to develop an advanced grid power monitor system—including board-level circuit design, wireless comms, database, and web front end
- Initiated and led the acquisition of real-time grid simulation and hardware-in-the-loop (HiL) equipment for rapid prototyping of distributed energy resources and associated devices
- Created production cost models and custom scripts to evaluate and optimize the mix of solar, wind, and battery energy storage to achieve high penetrations of renewable energy on Oahu and Molokai
- Led 5 proposals to support renewable energy in Hawaii (>$5M total), involving the collaboration of eleven independent companies and laboratories
- Developed electrochemical models of carbon monoxide poisoning in proton exchange membrane fuel cells (PEMFCs)
- Taught 2 undergraduate Electrical Engineering project courses

Georgia Institute of Technology — Atlanta, GA
Graduate Research and Teaching Assistant — August 2007–August 2013

- Developed a dynamic, physics-based framework for modeling advective and diffusive transport in fluid mechanics, heat transfer, and electrochemistry using differential algebraic equations (DAEs)
- Evaluated the framework by implementing a library of PEMFC models in an equation-based, object-oriented (EOO) modeling language (Modelica)
- Led undergraduate students in related research and the lab of *Creative Decisions and Design* course
- Lectured and supported graduate students in *Modeling and Simulation in Design* course

Hawaii Natural Energy Institute (HNEI) — Honolulu, HI
Assistant Specialist — June 2005–July 2007

- Developed Simulink models of hybrid electric vehicles (HEVs) under various drive cycles to characterize the conditions imposed on PEMFC systems
- Performed trade-off studies of fuel cell (FC) system and H_2/O_2 storage options for unmanned underwater vehicles (UUVs) and reported recommendations to the Office of Naval Research

Ford Motor Company — Dearborn, MI
Product Development Engineer — August 2001–May 2005

- Tested the FC system of the Ford Focus fuel cell electric vehicle (FCEV) and analyzed Controller Area Network (CAN) data to evaluate its performance and validate control algorithms
- Created hardware and LabVIEW software to emulate a FC system for an HiL test that confirmed the stability of the FCEV's high voltage bus

- Designed and programmed the engine state control algorithm for the Ford Escape HEV
- Supported the installation of a solid oxide fuel cell (SOFC) and related equipment at Ford's Dearborn Assembly Plant for the Fumes-to-Fuel project to harvest paint emissions for energy
- Produced the powertrain assembly guide and resolved launch issues for the 2005 Ford Escape

DaimlerChrysler Auburn Hills, MI
Vehicle Engineering Intern May 2000–August 2000

- Tested and modeled the heating, ventilation, and air conditioning system in order to save battery charge and extend a battery electric minivan's driving range
- Designed, built, and programmed a microcontroller-based diagnostic tool for quality assurance

Microelectromechanical Systems (MEMS) Laboratory Carnegie Mellon University
Research Assistant January 1999–May 2001

- Designed analog and digital PCB to demonstrate MEMS accelerometers
- Developed circuits for the lab curriculum of the *Fundamentals of Electrical Engineering* course

Achievements

- 2 provisional patents on grid power monitoring 2017–2018; utility patent expected 2018
- Robert G. Shackelford Graduate Fellowship, Georgia Tech Research Institute, 2008–2012
- Georgia Institute of Technology President's Fellowship, 2007–2011
- Honorable Mention, Dr. Bernard S. Baker Student Award for Fuel Cell Research, Fuel Cell Seminar & Exposition, 2009
- Co-inventor of US Patent #7197382, "Method and System for Determining Engine State of a Hybrid Electric Vehicle," 2007
- First Place, Motorola Software Solutions Competition, Carnegie Mellon University, 2001
- Dean's List for the Carnegie Institute of Technology, 1998–2001

Computer Skills

- **Programs:** PLEXOS, HOMER, Dymola, Simulink, ControlDesk, CANalyzer, LabVIEW, Mathematica, Engineering Equation Solver (EES), ModelCenter, Origin, Visio, MPLAB, Quartus, Django, and Git
- **Languages:** Modelica, MATLAB, Python, Bash, VBA, C++, C, Verilog, and assembly
- **Communication protocols:** SPI, UART, I^2C, Modbus, SunSpec, and CAN

Outreach and Hobbies

- Make-A-Wish volunteer and wish granter, 2014–2015
- President of Makiki Apartments owner's association in Honolulu, 2014–2015
- Endurance athlete with 4 Ironman and 12 marathon finishes (6 Boston-qualifying), 2000–present
- Open-source software developer—including 3 standalone libraries, functions for the Modelica Standard Library, and a Sankey module for the matplotlib data visualization package, 2011–2014
- Lead organizer for a student/community energy and water conservation event in a low-income neighborhood of Atlanta, 2008
- Engineering mentor for the Hawaii Underwater Robotics Challenge, 2006
- Engineering mentor for a national-qualifying FIRST robotics team, 2004–2005
- Founding president of Carnegie Mellon University's chapter of Habitat for Humanity, 2000–2001
- Men's Captain of the Carnegie Mellon University Rowing Club, 1998