David M. Reed
Curriculum Vitae

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Education

2011–2016 **Ph.D. in Electrical Engineering: Systems**, *University of Michigan*, Ann Arbor, MI.
Dissertation: *Identification and Adaptive Control for High-performance AC Drive Systems*
Committee: Jing Sun (co-advisor), Heath Hofmann (co-advisor), Jessy Grizzle, and Ilya Kolmanovsky

2007–2009 **M.S. in Electrical Engineering**, *The Pennsylvania State University*, University Park, PA.
Thesis: *Direct Field-Oriented Control of an Induction Machine using an Adaptive Rotor Resistance Estimator*
Committee: Heath Hofmann (advisor) and Jeffrey Schiano

2003–2007 **B.S. in Electrical Engineering**, *The Pennsylvania State University*, University Park, PA.

Professional Experience

Industry

2019–present **Senior Professional Staff I**, Johns Hopkins University Applied Physics Lab, Laurel, MD.
- Isolation DC/DC converter lead for Europa Clipper thermal pump electronics
- Modeling and control research for Stirling engine radioactive power supplies
- Design of Hardware-In-the-Loop (HIL) simulator for Stirling engine radioactive power supply
- Granted Secret-level security clearance

2017–2019 **Motor Control Engineer**, Mercedes-Benz Research and Development North America, Redford, MI.
- AC motor drive diagnostics and control algorithm development for EV and HEV applications
- Electric motor control software adaptation and development for Mercedes-AMG Project One supercar
- Preparation of group training presentation on optimal control of PMSMs
- Agile production software development via model-based design using Matlab/Simulink
- Validation of production software using Hardware-In-the-Loop (HIL) and dyno testing
- Research and development of sensorless and FPGA-based control algorithms for AC machines
- Invention disclosure of algorithm for sensorless AC motor drive functional safety
- Training on automotive functional safety standard ISO 26262

2009–2011 **Associate Staff**, MIT Lincoln Laboratory, Lexington, MA.
- Auxiliary controller unit engineer for airborne sensor platform
- Designed controller and selected hardware used to automate an air-sampling system for shipping container screening
- Aided in the design and analysis of an electrical power supply for a satellite payload
- Used LabVIEW to automate validation of satellite flight hardware
- Granted security clearances from the Department of Defense

2007–2008 **Engineering Intern**, Bechtel Bettis, Inc., West Mifflin, PA.
- Redesigned a digital pulse-width modulation circuit for a 6 MW motor drive to increase resolution
- Used Synopsys Saber to model and simulate a 200 kW bi-directional DC/DC converter
- Held security clearances from the Department of Energy

Academia: Research

2016–2017 **Postdoctoral Research Fellow**, University of Michigan, Ann Arbor, MI.
Supervisors: Ilya Kolmanovsky and Anouck Girard
- Development of model-free optimization (i.e., extremum seeking) algorithms for problems subject to constraints and parametric dependencies with application to automotive diesel engine calibration
- Development of static VGT diesel engine maps (models) from experimental Design of Experiments (DoE) data using Gaussian Process Regression (i.e., Kriging)
- Aided in the supervision of Ph.D. students working on integrated Model-Predictive Control (MPC) of a gas turbine engine and electrical power system for aircraft
- Aided in the supervision of a Ph.D. student working on Linear Parameter Varying (LPV) modeling and control of gasoline and diesel engines
- Preparation of reports and presentations

2011–2015 **Graduate Student Research Assistant**, University of Michigan, Ann Arbor, MI.
- Research activities related to the development of advanced adaptive control methodologies for electric machinery and drive systems with experimental validation
- Helped lead in the design and construction of a test-bed for advanced electric drives with hybrid energy storage (battery, ultracapacitors, and flywheel) for the Michigan Power and Energy Lab (MPEL)
- Led the design, construction, and testing of a 16 kWh Li-ION battery system for the MPEL test-bed
- Mentoring of several undergraduate students

Academia: Teaching

Winter 2015 **Graduate Student Instructor**, University of Michigan, Ann Arbor, MI.
Course: Linear Systems Theory (first-year graduate course)
- Responsible for teaching the weekly discussion
- Assisted in writing and grading exams problems
- Substitute lectured on several occasions
- Led final exam review session

2007–2009 **Teaching Assistant**, The Pennsylvania State University, University Park, PA.
Courses: Power Electronics, Electric Machinery and Drives, and Introduction to Electronic Design
- Electric Drives, (Spring '09): Substitute lectured class, taught lab, and grading
- Power Electronics and Energy Conversion (Fall '07 and Fall '08): Grading
- Introduction to Electronic Design (Spring '08): Taught weekly lab, grading

2006–2007 **Teaching Intern**, The Pennsylvania State University, University Park, PA.
Course: Introduction to Electronic Design
- Guest lectured class once a week whenever possible
- Helped to write and grade midterm exam problems
- Held office hours to answer student's questions
- Received training on teaching methods (Learning Styles, Meyers-Briggs, etc.)

Publications

In Print or Accepted

[1] A. Hasanzadeh, **D. M. Reed**, and H. F. Hofmann, "Rotor resistance estimation for induction machines using carrier signal injection with minimized torque ripple," *IEEE Transactions on Energy Conversion*, vol. 34, pp. 942–951, June 2019.

[2] F. A. P. Delgado, **D. M. Reed**, H. F. Hofmann, and J. Sun, "Simultaneous identification and torque control of surface-mount permanent magnet synchronous machines with inverter current and voltage constraints," in *2018 IEEE Conference on Control Technology and Applications (CCTA)*, pp. 1185–1190, Aug 2018.

[3] J. Seok, **D. M. Reed**, I. V. Kolmanovsky, and A. R. Girard, "Coordinated model predictive control of aircraft gas turbine engine with simplified electrical system model," in *2018 Annual American Control Conference (ACC)*, pp. 1460–1466, 2018.

[4] J. Hou, **D. M. Reed**, H. F. Hofmann, and J. Sun, "A low-voltage test-bed for development and validation of control strategies for electric propulsion systems with hybrid energy storage," *Naval Engineers Journal*, vol. 130, no. 1, pp. 135–143, 2018.

[5] **D. M. Reed**, J. Sun, and H. F. Hofmann, "Simultaneous identification and adaptive torque control of permanent magnet synchronous machines," *IEEE Transactions on Control Systems Technology*, vol. 25, pp. 1372–1383, July 2017.

[6] **D. M. Reed**, H. F. Hofmann, and J. Sun, "Offline identification of induction machine parameters with core loss estimation using the stator current locus," *IEEE Transactions on Energy Conversion*, vol. 31, pp. 1549–1558, December 2016.

[7] **D. M. Reed**, J. Sun, and H. F. Hofmann, "A receding horizon approach to simultaneous identification and torque control of permanent magnet synchronous machines," in *2016 American Control Conference (ACC)*, July 2016.

[8] J. Hou, **D. M. Reed**, H. Hofmann, and J. Sun, "A low-voltage test-bed for electric ship propulsion systems with hybrid energy storage," in *ASNE AMTS*, May 2016.

[9] **D. M. Reed**, J. Sun, and H. F. Hofmann, "Simultaneous identification and torque regulation of permanent magnet synchronous machines via adaptive excitation decoupling," in *2015 American Control Conference (ACC)*, pp. 3224–3229, July 2015.

[10] **D. M. Reed**, K. Zhou, H. F. Hofmann, and J. Sun, "A stator current locus approach to induction machine parameter estimation," in *Transportation Electrification Asia-Pacific (ITEC Asia-Pacific), 2014 IEEE Conference and Expo*, pp. 1–6, Aug 2014.

[11] **D. M. Reed**, J. Sun, and H. F. Hofmann, "A robust adaptive controller for surface-mount permanent magnet synchronous machines," in *2014 American Control Conference*, pp. 5236–5241, June 2014.

[12] J. Hou, **D. M. Reed**, K. Zhou, H. Hofmann, and J. Sun, "Modeling and test-bed development for an electric drive system with hybrid energy storage," in *ASNE EMTS*, May 2014.

[13] **D. M. Reed** and H. F. Hofmann, "Direct field-oriented control of an induction machine using an adaptive rotor resistance estimator," in *2010 IEEE Energy Conversion Congress and Exposition*, pp. 1158–1165, Sept 2010.

Awards

2009	Pontano Family Scholarship in Electrical Engineering
2009	Joseph R. and Janice M. Monkowski Graduate Fellowship in Electrical Engineering
2009	James R. and Barbara R. Palmer Fellowship in Electrical Engineering
2014,2015	Best Presentation in Session at the American Control Conference
2014,2015	U-M Rackham Travel Grant

Technical Presentations

2010 **Energy Conversion Conference and Exposition**, *Atlanta, GA.*

2013 **Naval Engineering Education Center Summer Symposium**, *Ann Arbor, MI.*

2013 **NAVSEA**, *Philadelphia, PA.*

2013 **U-M Engineering Graduate Symposium (Poster)**, *Ann Arbor, MI.*

2014 **American Control Conference**, *Portland, OR.*
   **Best Presentation in Session Award*

2014 **U-M Engineering Graduate Symposium (Poster)**, *Ann Arbor, MI.*

2015 **American Control Conference**, *Chicago, IL.*
   **Best Presentation in Session Award*

2016 **Advanced Machinery Technology Symposium**, *Philadelphia, PA.*

2016 **American Control Conference**, *Boston, MA.*

2017 **General Motors**, *Milford, MI.*

2017 **Southwest Research Institute**, *Ann Arbor, MI.*

2017 **Mercedes-Benz Research and Development North America**, *Redford, MI.*

2018 **Ford Motor Company**, *Dearborn, MI.*

2019 **Traxen, Inc.**, *Plymouth, MI.*

2019 **Johns Hopkins University Applied Physics Lab**, *Laurel, MD.*

Professional Service

- **Reviewer for the following journals:**
  - IEEE Transactions on Control Systems Technology
  - IEEE Transactions on Energy Conversion
  - IEEE Access
  - International Journal of Adaptive Control and Signal Processing
  - ASME Journal of Dynamic Systems, Measurement and Control
  - AIAA Journal of Guidance, Control, and Dynamics
  - Simulation Modelling Practice and Theory
  - Journal of Vibration and Control
  - Engineering Optimization
  - International Journal of Numerical Modelling: Electronic Networks, Devices and Fields
  - MDPI Energies
- **Reviewer for the following conferences:**
  - IEEE American Control Conference (ACC) - 2017, 2016
  - IEEE Conference on Decision and Control (CDC) - 2020, 2018
  - IEEE Conference on Control Technology and Applications (CCTA) - 2019
  - EUCA European Control Conference (ECC) - 2020
  - IEEE Indian Control Conference (ICC) - 2015
  - IEEE Multi-Conference on Systems and Control (MSC) - 2016
- **Session Judge for 2018 and 2017 UofM Engineering Graduate Symposiums**
- **Session Chair for 2016 American Control Conference**
- **Session Chair for 2014 UofM Engineering Graduate Symposium**

Summary of Skills

Computer

Computing & Simulation	MATLAB & Simulink, Simscape Power Systems (formerly SimPowerSystems), Simulink HDL Coder, Mathematica, Maple, GT Power, LTspice, Synopsys Saber, NI Multisim, LabVIEW, Microwave Office, Tortoise SVN, dSpace TargetLink, Polarion ALM, Vector CAN tools (CANape, CAN db++, AUTOSAR Explorer, etc.)
Office Tools	MS Office (Word, Excel, PowerPoint, Visio, Project), LATEX
Rapid Prototyping	dSpace ds1104, dSpace MicroAutoBox II, dSpace MicroLabBox, Simulink Real-Time, Speedgoat, NI PXI Platform
Platforms	Windows, Mac OSx, Linux (Ubuntu)
Languages	MATLAB (expert), PYTHON (novice), BASIC (intermediate), C++ (intermediate), SQL (novice)

Hardware

Use of electrical test equipment (oscilloscopes, multimeters, power analyzers, etc.), soldering, basic PCB layout, cable construction and best practices

Other

Strong public speaking and technical writing skills, as well as project management and mentoring experience

Professional and Honor Society Memberships

Member, IEEE

IEEE Control Systems Society

Associate Member, SAE (Inactive)

Tau Beta Pi

Eta Kappa Nu

Last Updated

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