

Kody Merlin Powell

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Summary

- Third-year PhD student seeking faculty or post-doctoral research positions in a chemical or mechanical engineering department (starting Fall 2013)
- Research focus in energy systems, specifically optimization of systems with energy storage

Peer-Reviewed Journal Articles and Conference Publications

Kody M. Powell, Wesley J. Cole, and Thomas F. Edgar – “Comparison of continuous and mixed integer nonlinear programming techniques for static and dynamic optimal chiller loading” – In Preparation

Kody M. Powell and Thomas F. Edgar – “An adaptive grid model for thermocline thermal energy storage systems” – In Preparation

Kody M. Powell, John D. Hedengren, and Thomas F. Edgar – “Dynamic optimization of a solar thermal energy storage system over a 24 hour period using weather forecasts” – Submitted to 2012 American Institute of Chemical Engineers Annual Meeting

Wesley J. Cole, Kody M. Powell, and Thomas Edgar – “Optimization and Control of Thermal Energy Storage Systems” – Submitted to *Reviews in Chemical Engineering* in November 2011

Kody M. Powell and Thomas F. Edgar – “Modeling and control of a solar thermal power plant with thermal energy storage” – Submitted to *Chemical Engineering Science* in Feb 2011, accepted for publication

Kody M. Powell and Thomas F. Edgar – “Control of a large-scale thermal energy storage system” – American Control Conference – June 2011

Current Research/Educational Activity

- Participating in Pecan Street Project, a multi-disciplinary DOE-funded smart grid demonstration project to test and model emerging energy technologies and consumer behavior (www.pecanstreet.org)
- Working with Hal C. Weaver Power Plant, a 140 MW combined heat and power facility, to optimize power plant performance for the University of Texas at Austin
- Developed a novel technique for modeling stratified thermal energy storage tanks and solving optimal control problems – submission for publication expected early 2012
- Developed a dynamic real-time optimization strategy for solar thermal power plants incorporating solar radiation forecasts and dynamic power pricing
- Developing models using weather forecast data to predict electric, cooling, and heat loads for use in dynamic optimization of energy systems
- Assisting in research and development of a control and optimization software package that solves nonlinear differential algebraic equations (www.apmonitor.com)
- As lab instructor, developed new curriculum for undergraduate students studying distillation

Education

University of Texas at Austin– Austin, Texas – August 2009-Present – Completion Summer 2013

Ph. D. in Chemical Engineering • Current GPA: 3.98/4.0

- National Science Foundation Graduate Fellowship
- Cockrell School of Engineering Fellowship

University of Utah– Salt Lake City, Utah – Graduated Summer 2009

B.S. in Chemical Engineering • GPA: 3.95/4.0

- Magna Cum Laude

- Oblad Silver Medal for Excellence in Chemical Engineering
- University of Utah American Institute of Chemical Engineers Outstanding Senior Award
- Presidential Scholarship Recipient
- Senior Student Advisory Committee Representative

Work Experience

ExxonMobil Chemical Company – Baytown, Texas

- **Advanced Process Control Engineering Intern** (May 2011 to August 2011) Worked for central engineering group responsible for advanced control and optimization for the entire company
 - Developed and solved dozens of nonlinear control and dynamic optimization problems to use for benchmarking various software packages
 - Developed a nonlinear model predictive controller for a polypropylene chemical reactor to control product viscosity
 - Developed and coded a program for solving control and optimization problems represented by differential algebraic equations using both simultaneous and sequential solution methods

Reference: Bill Morrison (Supervisor) – bill.g.morrison@exxonmobil.com

Fairchild Semiconductor – West Jordan, Utah

- **Process Engineering Co-op** (June 2006 to July 2009) Worked in process engineering for diffusion, chemical vapor deposition, physical vapor deposition, and back-metal processes
 - Led a project that reduced standard deviation of chemical vapor deposition process by 25%
 - Key participant in process improvement project saving \$300K/year in chemical usage and scrapped product
 - Developed an accurate mathematical model describing relation between wafer surface area and chemical reaction kinetics for chemical vapor deposition process
 - Conducted dozens of designed experiments and developed testing methods

Reference: Jim Murphy (Supervisor) – jim.murphy@fairchildsemi.com

ZARS Pharmaceutical – Salt Lake City, Utah

- **Process and Manufacturing Engineering Co-op** (January 2006 to June 2006) Performing lab work and developing test methods for pharmaceutical products
 - Developed standard test method to determine peel force and drying time for topical anesthetic cream
 - Performed designed experiments for new process development
 - Involved in product manufacturing for clinical trials
 - Performed engineering study eliminating need for standard test
 - Developed standard test method to determine moisture content for various pharmaceutical materials

Reference: Mike Wessman (Supervisor) – mikewessman@gmail.com

Additional References

Thomas F. Edgar, PhD (Research Advisor) – Department of Chemical Engineering – The University of Texas at Austin – edgar@mail.utexas.edu

John D. Hedengren, PhD (Former Work Supervisor at ExxonMobil and Research Collaborator) – Department of Chemical Engineering – Brigham Young University – john.hedengren@byu.edu

JoAnn S. Lighty (Department Chair) – Department of Chemical Engineering – The University of Utah – jlighty@utah.edu