WESLEY COLE

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EDUCATION

University of Texas - Austin Austin, TX 2010-current

Ph.D. Chemical Engineering (2014)

- Advisor: Dr. Thomas Edgar
- Dissertation Topic: Dynamic modeling, optimization, & control of integrated energy systems in a smart grid environment
- 3.98 GPA

Brigham Young University

Provo, UT

2004-2010

B.S. Chemical Engineering

• 3.94 GPA, magna cum laude

TECHNICAL EXPERIENCE

University of Texas Austin, TX 2010-current

Graduate Research/Teaching Assistant

- Perform modeling and optimization of integrated energy systems (e.g., gas turbines, commercial buildings, thermal storage, solar PV, etc.) that are tied to the smart grid
- Developed model predictive control for a novel chiller system with thermal storage
- TA Courses: Optimization, Unit Operations, Energy Technology & Policy

National Renewable Energy Laboratory

Golden, CO

Summer 2012

Research Assistant in the OpenStudio Design Team

- Implemented multivariate sampling methods into the OpenStudio building energy modeling software
- Developed multivariate sampling, sensitivity analysis, and uncertainty quantification test suites for OpenStudio

Idaho National Laboratory

Idaho Falls, ID

Summer 2010

Research Assistant

- Performed field-scale studies investigating high-moisture biomass storage for commercial biorefineries
- \bullet Developed new protocols for high-moisture biomass storage, reducing biomass storage losses by more than 20%
- Designed and oversaw the construction of an adiabatic storage vessel, allowing field-scale tests to be performed at the lab-scale for a fraction of the cost

Dept. of Chemical Engineering, BYU

Provo, UT

2008-2010

Research Assistant to Dr. Thomas Fletcher

- Developed a model for predicting flame characteristics for small-scale wildland fires
- Designed and constructed a flat-flame burner apparatus for performing leaf-scale combustion experiments
- Supervised six-person research team

ADDITIONAL EXPERIENCE

Idaho Supreme Court Boise, ID Summer 2007

2005-2007

Building Services Employee

- Given responsibility for all in-house publishing and printing
- Performed maintenance and custodial duties

Church of Jesus Christ of Latter-day Saints New York, NY

Volunteer Representative

- Developed and conducted presentations for individuals and groups
- Supervised 15 other volunteers
- Planned and facilitated weekly training meetings
- · Learned to speak, read, and write Spanish

PEER-REVIEWED CONFERENCE & JOURNAL PAPERS

- [13] J. D. Rhodes, **W. J. Cole**, C. R. Upshaw, T. F. Edgar, and M. E. Webber, "Clustering analysis of residential electricity use data," *Energy*, 2013, under review.
- [12] K. M. Powell, A. Sriprasad, **W. J. Cole**, and T. F. Edgar, "Heating, cooling, and electrical load forecasting for a large-scale district energy system with combined heat and power," *Energy*, 2013, under review.
- [11] **W. J. Cole**, K. M. Powell, E. T. Hale, and T. F. Edgar, "Reduced-order residential home modeling for model predictive control," *Energy and Buildings*, 2013, under review.
- [10] K. M. Powell, **W. J. Cole**, U. F. Ekarika, and T. F. Edgar, "Dynamic optimization of a campus cooling system with thermal storage," in *Proceedings of the 2013 European Control Conference*, Zurich, Switzerland, 2013.
- [9] **W. J. Cole**, E. T. Hale, and T. F. Edgar, "Building energy model reduction for model predictive control using OpenStudio," in *Proceedings of the 2013 American Control Conference*, Washington, D.C., 2013.
- [8] J. D. Rhodes, C. R. Upshaw, C. M. Meehan, D. A. Walling, P. A. Navratil, A. L. Beck, C. B. Harris, K. Nagasawa, R. L. Fares, **W. J. Cole**, H. Kumar, R. D. Duncan, C. L. Holcomb, T. F. Edgar, A. Kwasinski, and M. E. Webber, "Experimental and Data Collection Methods for a Large-Scale Smart Grid Deployment," *Environmental Research Letters*, 2013, under review.
- [7] **W. J. Cole**, J. D. Rhodes, K. M. Powell, and T. F. Edgar, "Turbine inlet cooling with thermal energy storage," *International Journal of Energy Research*, in press 2013.
- [6] K. M. Powell, **W. J. Cole**, U. F. Ekarika, and T. F. Edgar, "Optimal chiller loading in a district cooling system with thermal energy storage," *Energy*, vol. 50, pp. 445-453, 2013.
- [5] E. T. Hale, B. Ball, R. Elmore, E. Bonnema, S. Horowitz, and **W. J. Cole**, "A Suite of Analysis Test Problems for Energy-Efficient Building Design, Part II: Sensitivity Analysis and Uncertainty Quantification," National Renewable Energy Laboratory, Golden, Colorado, Technical Report, 2013.
- [4] E. T. Hale, E. Bonnema, **W. J. Cole**, B. Ball, and S. Horowitz, "A Suite of Analysis Test Problems for Energy-Efficient Building Design, Part I: Multivariate Sampling," National Renewable Energy Laboratory, Golden, Colorado, Technical Report, 2013.
- [3] **W. J. Cole**, T. F. Edgar, and A. Novoselac, "Use of model predictive control to enhance the flexibility of thermal energy storage cooling systems," in *Proceedings of the 2012 American Control Conference*, Montreal, Canada, 2012, pp. 2788–2793. *Best Paper in Session
- [2] **W. J. Cole**, K. M. Powell, and T. F. Edgar, "Optimization and advanced control of thermal energy storage systems," *Reviews in Chemical Engineering*, vol. 28, no. 2–3, pp. 81–99, 2012.
- [1] **W. J. Cole**, M. H. Dennis, T. H. Fletcher, and D. R. Weise, "The effects of wind on the flame characteristics of individual leaves," *International Journal of Wildland Fire*, vol. 20, no. 5, pp. 657–667, 2011.

CONFERENCE ABSTRACTS & PRESENTATIONS

- [11] J. D. Rhodes, **W. J. Cole**, C.R. Upshaw, T. F. Edgar, M. E. Webber "Analysis of Temporal Seasonal Residential Demand Profiles" ASME International Mechanical Engineering Congress & Exposition, San Diego, CA, 2013.
- [10] **W. J. Cole**, J. D. Rhodes, W. Gorman, M. E. Webber, T. F. Edgar, "Community-scale residential air conditioning control for effective grid management" AIChE Annual Meeting, San Francisco, CA, 2013.
- [9] C. R. Touretzky, **W. J. Cole**, A. Novoselac, M. Baldea, T. F. Edgar, "Reduced-order modeling strategies for optimal energy management in buildings" Intelligent Building Operations Workshop, Boulder, CO, 2013.
- [8] A. Sriprasad, **W. J. Cole**, T. F. Edgar, "Managing Economic Uncertainty in a Smart Grid Environment" AIChE Spring Meeting, San Antonio, TX, 2013.
- [7] J. Hedengren, **W. J. Cole**, T. F. Edgar, K. M. Powell, "BPOPT:MINLP Solver for Differential Algebraic Systems with Benchmark Testing" INFORMS Annual Meeting, Phoenix, AZ, 2012.
- [6] **W. J. Cole**, J. D. Rhodes, T. F. Edgar, "Analysis of District Cooling with Combined Heat and Power" TWCCC Fall Meeting, Madison, WI, 2012.
- [5] **W. J. Cole**, A. Novoselac, T. F. Edgar, "Analysis of Thermal Energy Storage Systems for a Smart Energy Environment" TWCCC Spring Meeting, Austin, TX, 2012.
- [4] T. H. Fletcher, **W. J. Cole**, M. H. Dennis, J. Chong, D. R. Weise, "Observations of Burning Bush Behavior as a Function of Wind and Moisture Content" 24th Annual ACERC Conference, Provo, UT, 2010.
- [3] B.T. Andersen, **W. J. Cole**, T. H. Fletcher, D. R. Weise, "Modeling a Burning Bush with and without Wind Using a Semi-empirical Approach" 24th Annual ACERC Conference, Provo, UT, 2010
- [2] **W. J. Cole**, M. H. Dennis, T. H. Fletcher, D. R. Weise, "The Effects of Wind on the Flame Characteristics of Individual Leaves" Western States Section of the Combustion Institute Fall Meeting, Irvine, CA, 2009.
 - *Also given at the 24^{th} Annual ACERC Conference, Provo, UT, 2010.
- [1] **W. J. Cole**, B. M. Pickett, T. H. Fletcher, D. R. Weise, "A Semi-empirical Model of Fire Spread through a Manzanita Shrub" 6th National Meeting of the U.S. Combustion Institute, Ann Arbor, MI, 2009.
 - *Also given at the 23rd Annual ACERC Conference, Provo, UT, 2009.

GRANTS

- [2] National Science Foundation Graduate Research Fellowship Program (GRFP) Fellowship, "Dynamic Modeling and Optimization of Integrated Energy Systems in a Smart Grid Environment," 2012-2015, **W. J. Cole** (PI), \$121,500.
- [1] The University of Texas at Austin Green Fee Program, "Optimization of the Campus Cooling System to Reduce Energy Usage" 2011-2012, K. M. Powell (PI), T. F. Edgar, K. Kuretich, W. J. Cole, R. Thompson, J. Hedengren, K. Kapoor, J. Mojica, A. Sriprasad, J. Kim (co-PI's), \$36,930.

AWARDS & HONORS

- National Science Foundation Graduate Research Fellowship Program (GRFP) Fellowship
- Ford/Herring Endowed Graduate Fellowship in Engineering
- Heritage Scholarship (Full Tuition) and Robert C. Byrd Scholarship (2/3 Tuition)
- Outstanding Undergraduate Research Assistant Award
- Outstanding Sophomore, Junior, and Senior Awards
- 1st Place Process Design Award from BYU Chemical Engineering