

John P. Eason

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Research Interests

Optimization, Energy systems, Process operations, Multi-scale modeling

Education

Ph.D. Carnegie Mellon University, Expected May 2018.
Department of Chemical Engineering. Advisor: Lorenz T. Biegler.

B.S. The University of Tulsa, May 2013.
Department of Chemical Engineering.

Research Experience

Zhejiang University, Advisor: Xi Chen Sep 2017 - Dec 2017
Topic: Surrogate equations of state for optimization of polymerization processes.

Carnegie Mellon University, Advisor: Lorenz T. Biegler Nov 2013 - Present
Topic: Reduced Order Model (ROM)-based optimization for energy systems.

Argonne National Laboratory, Advisor: Jennefer B. Dunn and Michael Wang May 2011 - Aug 2011
Topic: Data collection and analysis for life cycle assessment of emerging fuel technologies.

The University of Tulsa, Advisor: Selen Cremaschi Jun 2010 - May 2013
Topic: Biofuel production, adaptive sampling for machine learning.

Honors and Awards

NSF Graduate Fellow, *NSF GRFP* - 2015 to 2018

Thomas and Adrienne Klopach Graduate Fellowship, *CMU* - 2013

Wilbur L. Nelson Award for Outstanding Academic Achievement in Chemical Engineering, *TU* - 2013

Donald F. and Milfred Topp Othmer National Scholarship Award, *AIChE* - 2011

Harry West Student Paper Award, *AIChE Fuels and Petrochemicals Division* - 2011

Publications

Journal Articles

Eason, J.P. and Biegler, L.T. "Trust region optimization strategies for glass box/black box models." Under Review, 2017.

Wan, W., **Eason, J.P.**, Nicholson, B.L. and Biegler, L.T. "Parallel Cyclic Reduction Decomposition for Dynamic Optimization Problems." *Computers & Chemical Engineering*. Available online 5 October 2017.

Yu, H., **Eason, J.**, Biegler, L.T., and Feng, X. "Process integration and superstructure optimization of Organic Rankine Cycles (ORCs) with heat exchanger network synthesis." *Computers & Chemical Engineering*. Available online 17 May 2017.

Zhu, D., **Eason, J.P.**, and Biegler, L.T. "Energy-efficient CO₂ liquefaction for oxy-combustion power plant with ASU-CPU integration enhanced by cascaded sub-ambient energy utilization and waste heat recovery." *Intl. Journal of Greenhouse Gas Control*. Vol. 61, June 2017, pages 124-137.

Yu, H., **Eason, J.**, Biegler, L.T., and Feng, X. "Simultaneous heat integration and techno-economic optimization of Organic Rankine Cycle (ORC) for multiple waste heat stream recovery." *Energy*. Vol. 119, January 2017, pages 322-333.

Yu, H., Feng, X., Wang, Y., Biegler, L.T., and **Eason, J.** "A systematic method to customize an efficient organic Rankine cycle (ORC) to recover waste heat in refineries." *Applied Energy*. Vol. 179, October 2016, pages 302-315

Eason, J.P., Biegler L.T. "A trust region filter method for glass box/black box optimization." *AIChE Journal*. Vol. 62, September 2016, pages 3124-3136.

Ma, J., **Eason, J.P.**, Dowling, A.W., Biegler, L.T., and Miller, D.C. "Development of a first-principles hybrid boiler model for oxy-combustion power generation system." *Intl. Journal of Greenhouse Gas Control*. Vol. 46, March 2016, pages 136-157.

Eason, J., Cremaschi, S. "Adaptive sequential sampling for surrogate model generation with artificial neural networks." *Computers & Chemical Engineering*. Vol. 68, September 2014, pages 220-232.

Eason, J., Cremaschi, S. "A multi-objective superstructure optimization approach to biofeedstocks-to-biofuels systems design." *Biomass and Bioenergy*. Vol. 63, April 2014, pages 64-75.

Proceedings and technical reports

Eason, J.P., Biegler, L.T. "Reduced model trust region methods for embedding complex simulations in optimization problems." In: Krist V. Gernaey, Jakob K. Huusom and Rafiqul Gani, Editors, *Computer Aided Chemical Engineering*, Elsevier, 2015, Volume 37, Pages 773-778.

Dowling, A.W., **Eason, J.P.**, Ma, J., Miller, D.C., and Biegler, L.T. "Coal oxycombustion power plant optimization using first principles and surrogate boiler models." *Energy Procedia*. Vol 63, 2014, pages 352-361.

Dunn, J., **Eason, J.**, and Wang, M. "Updated Sugarcane and Switchgrass Parameters in the GREET Model." Center for Transportation Research, Argonne National Laboratory. Published online: http://greet.es.anl.gov/publication-updated_sugarcane_switchgrass_params October 2011.

Book Chapters

Dowling, A.W., **Eason, J.P.**, Ma, J., Miller, D.C., and Biegler, L.T. "Equation-Based Design, Integration, and Optimization of Oxycombustion Power Systems." In: Mariano Martin, Editor, *Alternative Energy Sources and Technologies*. Springer International, 2016, pages 119-158.

Presentations

Eason, J.P. and Biegler L.T. "Rigorous Surrogate-Based Optimization Strategies That Integrate Glass Box/Black Box Process Models." 2016 AIChE Annual Meeting, San Francisco, CA. 16 November 2016.

Eason, J.P. and Biegler L.T. "A trust region method for glass box/black box optimization." Invited talk at International Conference on Continuous Optimization, Tokyo, Japan. 8 August 2016

Eason, J.P., and Biegler L.T. "Large-scale optimization with multi-scale models." Poster presented at Workshop on Nonlinear Optimization Algorithms and Industrial Applications, Toronto, ON, Canada. 2 June 2016.

Eason, J.P., Dowling, A.W., Ma, J., Miller, D.C., and Biegler, L.T. "Multi-Scale Optimization Methods for Oxycombustion Power System Design." 2015 AIChE Annual Meeting, Salt Lake City, UT. 11 November 2015.

Eason, J.P. and Biegler L.T. "Trust region methods for optimization with reduced order models embedded in chemical process models." ISMP 2015, Pittsburgh, PA. 16 July 2015.

Eason, J., Dowling, A., Ma, J., Miller, D., and Biegler, L.T. "A Framework for Equation Based Optimization of Coal Oxycombustion Power Plants." 2014 AIChE Annual Meeting, Atlanta, GA. 17 November 2014.

Eason, J., Biegler, L.T. "Embedding Complex Simulations in Flowsheet Optimization Problems: A Reduced Model Trust Region Framework." Poster presented at AIChE 2014 Annual Meeting, Atlanta, GA. 17 November 2014.

Eason, J., Biegler, L.T. "Reduced Order Models for Oxycombustion Boiler Optimization." Presented at Energy Systems Initiative Meeting, Pittsburgh, PA. 9 March 2014.

Eason, J., Cremaschi, S. (2012) "Efficient surrogate model generation." Invited talk for APMonitor Webinar series on modeling and optimization. 13 November 2012.

Eason, J., Cremaschi, S. (2012) "Efficient surrogate model generation with adaptive sequential sampling." Presented to Advances in Optimization session, 2012 AIChE Annual Meeting. 31 October 2012, Pittsburgh, PA.

Eason, J., Cremaschi, S. (2011). "A Multi-Objective Superstructure Optimization Approach to Biofeedstocks-to-Biofuels Systems Design." 2011 AIChE Annual Student Conference, Minneapolis, MN.

Eason, J., Cremaschi, S. (2011) "Estimation of biofuel yields and production route optimization with biofeedstock-to-biofuel superstructure." AIChE Mid-America Conference. 9 April 2011, Fayetteville, AR.

Eason, J., Cremaschi, S. (2010) "A Systematic Comparison of Biofuel Production Routes." 2010 AIChE Annual Student Conference, Salt Lake City, UT.

Dean, C., Lee, D., Hanneman, K., **Eason, J.** and Winters, M. (2010) University of Tulsa Chem-E Car Poster Presentation. AIChE Mid-America Conference, 9 April 2010, Ames, IA.

Eason, J., Wilson, W., Laizure, M., and Seing, S. (2010). University of Tulsa Chem-E Car Poster Presentation. AIChE Annual Student Conference, 5-8 November, 2010, Salt Lake City, UT.

Teaching Experience

2013-2014 Teaching Assistant, Unit Operations (S14) and Chemical Process System Design (F13 and F14).

Advising

M.S. Student - Dehao Zhu (2016)

Thesis topic: Energy-efficient CO₂ liquefaction for oxy-combustion power plant

Affiliations

American Institute of Chemical Engineers (AIChE)

Society for Industrial and Applied Mathematics (SIAM)

Referee Activity

Energy

AIChE Journal

Computers & Chemical Engineering

Industrial & Engineering Chemistry Research

Journal of Global Optimization

Latin American Applied Research

Optimization Methods and Software

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