

JEREMY J. MICHALEK

CURRICULUM VITAE

Mechanical Engineering • Engineering and Public Policy • Carnegie Mellon University
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ACADEMIC APPOINTMENTS

Associate Professor, Carnegie Mellon University
Mechanical Engineering (July 2010 - *present*)
Engineering and Public Policy (July 2011 - *present*)
Engineering and Public Policy, affiliated (July 2010 - June 2011)

Assistant Professor, Carnegie Mellon University
Mechanical Engineering (July 2005 - June 2010)
Engineering and Public Policy, affiliated (June 2007 - June 2010)

Director, Carnegie Mellon Design Decisions Laboratory (July 2005 - *present*)
<http://www.cmu.edu/me/ddl>

Co-Director, Carnegie Mellon Vehicle Electrification Group (Jan 2009 - *present*)
<http://www.cmu.edu/cit/veg>

Postdoctoral Research Fellow (Jan 2005 - June 2005)
Department of Mechanical Engineering
University of Michigan, Ann Arbor, MI

EDUCATION

Ph.D. Mechanical Engineering, University of Michigan, 2005
Dissertation: Preference Coordination in Engineering Design Decision-Making

M.S. Mechanical Engineering, University of Michigan, 2001
Thesis: Interactive Building Layout Optimization

B.S. Mechanical Engineering, Minor in Engineering Design, Carnegie Mellon University, 1999
Honors Research: A Shape Grammar Implementation for the Design of Coffeemakers

RESEARCH INTERESTS

Systems Optimization: Develop fundamental knowledge and new methods for multidisciplinary design and complex systems optimization;
Design for Market Systems: Measure and predict consumer choice and firm behavior in the marketplace to optimize engineering systems for profitability; and
Green Design & Environmental Policy: Understand environmental implications of engineering decisions, and study how economics and policy drive these decisions.

Vehicle Electrification: Study vehicle systems, assess life cycle cost, environmental, and security implications of electrified vehicles, assess relevant policy.

TEACHING INTERESTS

Engineering, economic, and environmental modeling, analysis, and decision-making
Mathematical modeling, numerical methods, and optimization
Innovation and critical thinking in design, defining and working with open-ended problems

PUBLICATIONS

Peer-Reviewed Journal Publications

- [1] **Michalek, J.J.**, M. Chester, P. Jaramillo, C. Samaras, C.S. Shiau, and L. Lave (2011) "Valuation of plug-in vehicle life cycle air emissions and oil displacement benefits" *Proceedings of the National Academy of Sciences*, v108 n40 p16554-16558.
- [2] **Michalek, J.J.**, F.M. Feinberg, P. Ebbes, F. Adigüzel and P.Y. Papalambros (2011) "Enhancing marketing with engineering: optimal product line design for heterogeneous markets," *International Journal of Research in Marketing*, v28 p1-12.
- [3] Shiau, C.-S. and **J.J. Michalek** (2011) "Global optimization of plug-in hybrid vehicle design and allocation to minimize life cycle greenhouse gas emissions," *ASME Journal of Mechanical Design*, v133 n8 p084502 1-6.
- [4] Shiau, C-S, N. Kaushal, C.T. Hendrickson, S. Peterson, J. Whitacre, and **J.J. Michalek** (2010) "Optimal plug-in hybrid electric vehicle design and allocation for minimum life cycle cost, petroleum consumption, and greenhouse gas emissions," *ASME Journal of Mechanical Design, Special Issue on Sustainability*, v132 n9 p091013 1-11.
- [5] Khajavirad, A and **J.J. Michalek** (2009) "A deterministic Lagrangian-based global optimization approach for quasiseparable nonconvex mixed-integer nonlinear programs," *ASME Journal of Mechanical Design*, v131 p051009 1-8
- [6] Khajavirad, A., **J.J. Michalek** and T.W. Simpson (2009) "An efficient decomposed multi-objective genetic algorithm for solving the joint product family selection and design problem with generalized commonality," *Structural and Multidisciplinary Optimization*, v39 p187-201.
- [7] Shiau, C.-S. and **J.J. Michalek** (2009) "Optimal product design under price competition," *ASME Journal of Mechanical Design*, v131 071003 p1-10.
- [8] Shiau, C.-S., **J.J. Michalek**, and C.T. Hendrickson (2009) "A structural analysis of vehicle design responses to corporate average fuel economy policy," *Transportation Research Part A: Policy and Practice*, v43 p814-828.
- [9] Shiau, C.-S., C. Samaras, R. Hauffe and **J.J. Michalek** (2009) "Impact of battery weight and charging patterns on the economic and environmental benefits of plug-in hybrid vehicles," *Energy Policy* v37 p2653-2663.
- [10] Shiau, C.-S. and **J.J. Michalek** (2009) "Should designers worry about market systems?" *ASME Journal of Mechanical Design*, v131 011011 p1-9.

- [11] Khajavirad, A. and **J.J. Michalek** (2008) "A decomposed approach for solving the joint product family selection and design problem with generalized commonality," *ASME Journal of Mechanical Design*, v130 p071101.
- [12] Li, Y., Z. Lu and **J.J. Michalek** (2008) "Diagonal quadratic approximation for parallelization of analytical target cascading." *ASME Journal of Mechanical Design* v130 n5 p051402-1-11.
- [13] **Michalek, J.J.**, O. Ceryan, P.Y. Papalambros, and Y. Koren (2006) "Balancing marketing and manufacturing objectives in product line design," *ASME Journal of Mechanical Design*, v128 n6 p1196-1204.
- [14] **Michalek, J.J.**, F.M. Feinberg and P.Y. Papalambros (2005) "Linking marketing and engineering product design decisions via analytical target cascading," *Journal of Product Innovation Management*, v22 p42-62.
- [15] **Michalek, J.J.** and P.Y. Papalambros (2005) "An efficient weighting update method to achieve acceptable consistency deviation in analytical target cascading," *ASME Journal of Mechanical Design*, v127 p206-214.
- [16] **Michalek, J.J.** and P.Y. Papalambros (2005) "Technical brief: weights, norms, and notation in analytical target cascading," *ASME Journal of Mechanical Design*, v127 p499-501.
- [17] **Michalek, J.J.**, P.Y. Papalambros, and S.J. Skerlos (2004) "A study of fuel efficiency and emission policy impact on optimal vehicle design decisions," *ASME Journal of Mechanical Design*, v126 p1062-1070.
- [18] **Michalek, J.J.**, R. Choudhary and P.Y. Papalambros (2002) "Architectural layout design optimization," *Engineering Optimization*, v34 n5 pp461-484.
- [19] **Michalek, J.J.** and P.Y. Papalambros (2002) "Interactive design optimization of architectural layouts," *Engineering Optimization*, v34 n5 pp485-501.

Full-length Peer-Reviewed Conference Publications

- [20] Yuksel, T. and **J.J. Michalek** (2012) "Development of a simulation model to analyze the effect of thermal management on battery life," Society of Automotive Engineers World Congress, April 24-26, Detroit, MI.
- [21] **Michalek, J.J.**, C.T. Hendrickson and J. Cagan (2011) "Using economic input-output life cycle assessment to guide sustainable design," ASME International Design Engineering Technical Conferences, August 28-31, Washington DC.
- [22] Resende, C., C.G. Heckmann and **J.J. Michalek** (2011) "Robust design for profit maximization under uncertainty of consumer choice model parameters using the delta method," ASME International Design Engineering Technical Conferences, August 28-31, Washington DC.
- [23] Sakti, A., S. Khan, T. Langer, **J.J. Michalek**, and J.F. Whitacre (2011) "Techno-economic analysis of Lithium-ion batteries for personal vehicle electrification," *National Academies Transportation Research Board Annual Meeting*, January 23-27, Washington D.C.
- [24] Traut, E., C.T. Hendrickson, E. Klampfl, Y. Liu and **J.J. Michalek** (2011) "Optimal Design and Allocation of Electrified Vehicles and Dedicated Charging Infrastructure for

- Minimum Greenhouse Gas Emissions," *National Academies Transportation Research Board Annual Meeting*, January 23-27, Washington D.C.
- [25] Shiau, C.-S., S. Peterson and **J.J. Michalek** (2010) "Optimal plug-in hybrid electric vehicle design and allocation for minimum life cycle cost, petroleum consumption and greenhouse gas emissions," *Proceedings of the ASME International Design Engineering Technical Conferences, Advance Vehicle and Tire Technologies Conference*, August 15-18, Montreal, Quebec, Canada.
- [26] Shiau, C.-S. and **J.J. Michalek** (2010) "A mixed-integer nonlinear programming model for deterministic global optimization of plug-in hybrid vehicle design and allocation," *Proceedings of the ASME International Design Engineering Technical Conferences, Design Automation Conference*, August 15-18, Montreal, Quebec, Canada.
- [27] Kaushal, N., C.-S. Shiau and **J.J. Michalek** (2009) "Optimal plug-in hybrid electric vehicle design and allocation for diverse charging patterns," *Proceedings of the International Design Engineering Technical Conferences*, Aug 30 – Sept 2, San Diego, CA, USA.
- [28] Shiau, C.-S., **J.J. Michalek** and C. T. Hendrickson (2009) "A structural analysis of vehicle design responses to corporate average fuel economy standards," *Transportation Research Board Annual Meeting*, Washington D.C.
- [29] Shiau, C.-S., C. Samaras, R. Hauffe and **J.J. Michalek** (2009) "Impact of battery weight and charging patterns on the economic and environmental benefits of plug-in hybrid vehicles," *Transportation Research Board Annual Meeting*, Washington D.C.
- [30] Hauffe, R., C. Samaras and **J.J. Michalek** (2008) "Plug-in hybrid vehicle simulation: How battery weight and charging patterns impact cost, fuel consumption, and CO2 emissions," *Proceedings of the ASME International Design Engineering Technical Conferences*, August 3-6, Brooklyn, NY, USA.
- [31] Khajavirad, A. and **J.J. Michalek** (2008) "A deterministic Lagrangian-based global optimization approach for large scale decomposable problems," *Proceedings of the ASME International Design Engineering Technical Conferences*, August 3-6, Brooklyn, NY, USA.
- [32] McGaughey, A. and **J. J. Michalek** (2008) "Wiki-based learning in the mechanical engineering classroom," *American Society for Engineering Education Annual Conference*, June 22-25, Pittsburgh, PA, USA.
- [33] Shiau, C.-S. and **J.J. Michalek** (2008) "Should designers worry about market systems?" *Proceedings of the ASME International Design Engineering Technical Conferences*, August 3-6, Brooklyn, NY, USA.
- [34] Shiau, C.S. and **J.J. Michalek** (2008) "Optimal product design under price competition," *Proceedings of the ASME International Design Engineering Technical Conferences*, August 3-6, Brooklyn, NY, USA.
- [35] Li, Y., Z. Lu and **J.J. Michalek** (2007) "Diagonal quadratic approximation for parallelization of analytical target cascading," *Proceedings of the 2007 ASME International Design Engineering Technical Conferences*, Sept 4-6, Las Vegas, NV, USA.
- [36] Khajavirad, A. and **J.J. Michalek** (2007) "A single-stage gradient-based approach for solving the joint product family platform selection and design problem using

- decomposition," *Proceedings of the 2007 ASME International Design Engineering Technical Conferences*, Sept 4-6, Las Vegas, NV, USA.
- [37] Khajavirad, A. and **J.J. Michalek** (2007) "An extension of the commonality index for product family optimization," *Proceedings of the 2007 ASME International Design Engineering Technical Conferences*, Sept 4-6, Las Vegas, NV, USA.
- [38] Orsborn, S., S. Swamy, **J. Michalek** and J. Cagan (2007) "Measurement of headlight form preference using choice-based conjoint analysis," *Proceedings of the 2007 ASME International Design Engineering Technical Conferences*, Sept 4-6, Las Vegas, NV, USA.
- [39] Shiau, C.S., I.H. Tseng, D. Heutchy and **J. Michalek** (2007) "Design optimization of a laptop computer using aggregate and mixed logit demand models with consumer survey data." *Proceedings of the 2007 ASME International Design Engineering Conferences*, Sept 4-6, Las Vegas, NV, USA.
- [40] Shiau, C.S. and **J. Michalek** (2007) "A game theoretic approach for finding market equilibria for automotive design under environmental regulation," *Proceedings of the 2007 ASME International Design Engineering Technical Conferences*, Sept 4-6, Las Vegas, NV, USA.
- [41] **Michalek, J.J.** and P.Y. Papalambros (2006) "BB-ATC: Analytical target cascading using branch and bound for mixed integer nonlinear programming," *Proceedings of the 2006 ASME International Design Engineering Technical Conferences*, Sept. 10-13, Philadelphia, PA, USA.
- [42] **Michalek, J.J.**, O. Ceryan, P.Y. Papalambros, and Y. Koren (2005) "Manufacturing investment and allocation in product line design decision-making," *Proceedings of the 2005 ASME International Design Engineering Technical Conferences*, DETC2005-84812, Sept. 26-28, Long Beach, CA, USA. [**Best Paper Award**]
- [43] Choudhary, R. and **J. Michalek** (2005) "Design optimization in computer aided architectural design," *International Conference of the Association for Computer Aided Architectural Design Research In Asia*, April 28-30, 2005, New Delhi, India.
- [44] **Michalek, J.J.**, F.M. Feinberg and P.Y. Papalambros (2004) "An optimal marketing and engineering design model for product development using analytical target cascading," *Proceedings of the 2004 Tools and Methods for Competitive Engineering Conference*, Lausanne, Switzerland, April 12-16, 2004.
- [45] **Michalek, J.J.** and P.Y. Papalambros (2004) "An efficient weighting update method to achieve acceptable consistency deviation in analytical target cascading," *Proceedings of the 2004 ASME Design Engineering Technical Conferences*, DETC2004-57134, Sept. 28 - Oct. 2, Salt Lake City, Utah, USA.
- [46] **Michalek, J.J.**, P.Y. Papalambros and S.J. Skerlos (2003) "A study of emission policy effects on optimal vehicle design decisions," *Proceedings of the ASME Design Engineering Technical Conferences*, DETC2003/DAC-48767, September 2-6, Chicago, IL, USA.

Other Conference Publications

- [47] Shiau, C.-S., **J.J. Michalek** and C.T. Henderson (2009) "A structural analysis of vehicle design responses to corporate average fuel economy policy," *National Academies Transportation Research Board Annual Meeting*, January 2009, Washington, DC, USA.

- [48] Shiau, C.S. and **J.J. Michalek** (2009) "Optimal product design under price competition," *National Academies Transportation Research Board Annual Meeting*, January 2009, Washington DC, USA.
- [49] Shiau, C.-S., R. Hauffe, C. Samaras and **J.J. Michalek** (2009) "Impact of battery weight and charging patterns on the economic and environmental benefits of plug-in hybrid vehicles," *National Academies Transportation Research Board Annual Meeting*, January 2009, Washington DC, USA.
- [50] Khajavirad, A., **J.J. Michalek** and T.W. Simpson (2007) "An efficient decomposed genetic algorithm for joint product family selection and optimization," *Proceedings of the 2007 AIAA Multidisciplinary Design Optimization Specialists Conference*, April 23-26, Honolulu, Hawaii, USA.
- [51] Cooper, A.B., P. Geortopoulos, **J.J. Michalek**, and P.Y. Papalambros (2004) "A simulation-based vehicle design strategy for acquisition and requirements validation," *Proceedings of the 2004 Society of Automotive Engineers World Congress*, March 11-18, Detroit, MI. A shortened version also appeared at the *US-ASMO SMART Conference*, Dearborn, Michigan, Sept. 8-11, 2003.

Books and Book Chapters

- [52] **Michalek, J.J.** (2007) "Designing better products by coordinating marketing research and engineering," in *Modern Marketing Research: Concepts, Methods and Cases*, eds: F. Feinberg, T. Kinnear and J. Taylor.
- [53] Skerlos, S.J., W.R. Morrow, and **J.J. Michalek** (2006) "Sustainable design engineering and science: selected challenges and case studies," chapter 3.10 in *Sustainability Science and Engineering, Volume 1: Defining Principles*, edited by M. Abraham, Elsevier Science.

Dissertations and Theses

- [54] Khajavirad, A. (2011) *Convexification Techniques for Global Optimization of Nonconvex Nonlinear Optimization Problems*, Ph.D. Dissertation, Department of Mechanical Engineering, Carnegie Mellon University, August 2011. Committee: **Jeremy Michalek***, Nick Sahinidis*, Kenji Shimada, John Hooker.
- [55] Shiau, N. (2010) *Design Decision Making for Market Systems and Environmental Policy with Vehicle Design Applications*. Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA. Committee: **Jeremy Michalek***, Chris Hendrickson, Jonathan Cagan, Baohong Sun.
- [56] Li, Y. (2006). *Diagonal Quadratic Approximation for Parallel Computing with Analytical Target Cascading*. Department of Mathematical Sciences. Pittsburgh, Carnegie Mellon University. Committee: **Jeremy Michalek***, Zhaosong Lu*, Lorenz Biegler.
- [57] **Michalek, J.J.**, (2005) *Preference Coordination in Engineering Design Decision-Making*, Ph.D. Dissertation, Department of Mechanical Engineering, University of Michigan. Committee: Panos Papalambros*, Fred Feinberg, Steven Skerlos, Richard Gonzalez.

- [58] **Michalek, J.J.** (2001) *Interactive Layout Design Optimization*, M.S. Thesis, Department of Mechanical Engineering, University of Michigan, Ann Arbor, Michigan, USA, 2001. Committee: Panos Papalambros*, Kazuhiro Saitou.

Other Publications:

- [59] **Michalek, J.J.**, M. Chester, P. Jaramillo, and C. Samaras (2011) *Air Emissions and Oil Displacement Benefits from Plug-in Vehicles*, policy brief, Carnegie Mellon University, September 2011.
- [60] **Michalek, J.J.** and C. Samaras (2009) "Economic, environmental, and security implications of plug-in hybrid electric vehicles," Policy brief provided to members of the House Energy and Commerce Committee, the House Committee on Science and Technology, the Select Committee on Energy Independence and Global Warming, the Congressional Research Service, and members of the U.S. House and Senate.
- [61] **Michalek, J.J.** (2008) "Design for market systems: Integrating social, economic, and physical sciences to engineer product success," *Mechanical Engineering*, v 130, n11, p32-36.

Working Papers:

- [62] Hassan, M.N.A., W.M.Griffin and J.J. Michalek (2012) "Cost and greenhouse gas emissions from biomass-coal cofiring in Malaysia: optimizing decisions under uncertainty," working paper.
- [63] Karabasoglu, O. and J.J. Michalek (2012) "Influence of driving patterns on life cycle benefits of hybrid and plug-in vehicles," in review, *Energy Policy*.
- [64] Karabasoglu, O., B. Yuksel and J.J. Michalek (2012) "Globally optimal co-design and control of electrified vehicles for minimum life cycle cost," working paper.
- [65] Khajavirad, A., J.J. Michalek and N.V. Sahinidis (2012) "Relaxations of factorable functions with convex-transformable intermediates," in review, *Mathematical Programming*.
- [66] Min, J., I. Azevedo, J. Michalek and W. Bruine de Bruin (2012) "Analyzing consumer preferences for lighting technologies using discrete choice analysis," working paper.
- [67] Peterson, S., J.J. Michalek and J. Apt (2012) "Relative cost of reducing U.S. gasoline consumption via increased plug-in vehicle battery size vs. charging infrastructure," working paper.
- [68] Resende, C.B., C.G. Heckmann and J.J. Michalek (2012) "Robust design for profit maximization with aversion to downside risk from parametric uncertainty in consumer choice models," in review, *ASME Journal of Mechanical Design*.
- [69] Sakti, A., J.J. Michalek and J.F. Whitacre (2012) "A validation study of Lithium-ion cell constant C-rate discharge simulation with Battery Design Studio[®]," in review, *Journal of Power Sources*.
- [70] Traut, E., C. Hendrickson, E. Klampfl, Y. Liu and J.J. Michalek (2012) "Optimal design and allocation of electrified vehicles and dedicated charging infrastructure for minimum life cycle greenhouse gas emissions and cost," in review, *Energy Policy*.

- [71] Weis, A., P. Jaramillo and J.J. Michalek (2012) "Controlled plug-in vehicle charging in high wind penetration scenarios," working paper.
- [72] Yuksel, T. and J.J. Michalek (2012) "Evaluation of the effects of thermal management on battery life in plug-in hybrid electric vehicles," in review, *Battery Congress*.

ADVISING

Ph.D. Research

- Shiau, Ching-Shin Norman – *Design Decision Making for Market Systems and Environmental Policy with Vehicle Design Applications*, Ph.D. Mechanical Engineering, 2010.
- Khajavirad, Aida – *Convexification Techniques for Global Optimization of Nonconvex Nonlinear Optimization Problems*, Ph.D. Mechanical Engineering 2011.
- Karabaşoğlu, Orkun – Ph.D. candidate, Mechanical Engineering (2008-pres)
- Traut, Elizabeth – Ph.D. candidate, Mechanical Engineering (2008-pres)
- Resende, Camilo Brandao de – Ph.D. candidate, Mechanical Engineering and Engineering & Public Policy (2009-2010), left program for medical school
- Apurba Sakti – Ph.D. candidate, Engineering & Public Policy (2010-pres), co-advised with Prof. Jay Whitacre
- Christine Grace Heckmann – Ph.D. candidate, Mechanical Engineering (2010-pres)
- Tugce Yuksel – Ph.D. candidate, Mechanical Engineering (2010-pres)
- Allison Weis – Ph.D. student, Engineering and Public Policy (2010-pres)
- Jihoon Min – Ph.D. student, Engineering and Public Policy (2010-pres)
- John Helveston – Ph.D. student, Engineering and Public Policy (2011-pres)

M.S. Research Project-Based Degree

- Li, Yanjing – *Diagonal Quadratic Approximation for Parallel Computing with Analytical Target Cascading*, M.S. Mathematical Sciences, 2006
- Swamy, Surya – *Global Optimization of Mixed-Integer Nonlinear Systems using Decomposition and Lagrangian Branch-and-Cut*, M.S. Mechanical Engineering, 2007
- Kaushal, Nikhil – *Optimal Plug-in Hybrid Electric Vehicle Design and Allocation for Diverse Charging Patterns*, M.S. Mechanical Engineering, 2009
- Krishnakumar, Varun – *Global Design Optimization using Black-Box Optimization Techniques*, M.S., Mechanical Engineering, 2009
- Tsu-Wei Cherng – *Charging Infrastructure for Electric Vehicles*, Mechanical Engineering, (current)
- Li, Guo – *Optimal Design and Control of Plug-in Vehicles*, Mechanical Engineering, (current)
- Pan, Lu – *Impact of Terrain on Life Cycle Implications of Conventional and Electrified Vehicles*, Mechanical Engineering, (current)
- Yoon, Paul – *Plug-in Vehicle Optimization for Real-World Driving*, Mechanical Engineering, (current)

M.S. Independent Research Project

- Hsieh, Sandy – *Review of Vehicle Simulation Software* – M.S. Mechanical Engineering, 2006
- Chen, Esther – *Review of Multiattribute Utility Theory* – M.S. Mechanical Engineering, 2008
- Yuksel, Burak – *Optimal Design and Control of Plug-in Vehicles* – Independent Study, Istanbul Technical University.

Undergraduate Research

- Gitomer, Ali – *Review of Automotive Demand Models* – Visiting student, Northwestern University
- Hamilton, Andrew – *Study of Consumer Preferences for Hybrid Vehicles* – B.S. Mechanical Engineering, 2008
- Hauffe, Richard – *Effects of Battery Weight on Plug-in Hybrid Vehicle Performance* – B.S. Mechanical Engineering, 2008
- Lee, Jonghyun – *Review of Environmental Policy for Vehicle Design* – B.S. Mechanical Engineering, 2008
- Lewis, Anne Marie – *Optimization of Infrastructure for Ethanol Distribution* – B.S. Mechanical Engineering, 2008
- Mikkilineni, Sarat – *Uncertainty in Choice Modeling* – B.S. Mechanical Engineering, 2008
- Khwaja, Osman – *Effects of Terrain on Vehicle Efficiency of Electrified Powertrains*, Independent Study, Princeton University.
- Kimball, Paul – *Control Systems for Electrified Vehicles*, (current)
- Stabile, Rebecca – *Synthetic Drive Cycle Generation and Fuel Economy Estimation*, (current)

Ph.D. Committee Service

- Olson, Jesse – *The Collective Potential: Achieving Organizational Potential by Design*, Ph.D. Mechanical Engineering, Carnegie Mellon University, 2005
- Orsborn, Seth – *Quantifying aesthetic preference through statistics applied to an agent-based shape grammar implementation*, Ph.D. Mechanical Engineering, Carnegie Mellon University, 2007
- Wakeley, Heather – *Alternative Transportation Fuels: Infrastructure Requirements and Environmental Impacts for Ethanol and Hydrogen*, Ph.D. Civil and Environmental Engineering, Carnegie Mellon University, 2007
- Logue, Jennifer – *Characterizing Air Toxics Exposure and Risk in Allegheny County and Evaluating EPA Modeling Tools for Policy Making*, Ph.D. Engineering and Public Policy, Mechanical Engineering, Carnegie Mellon University, 2009
- You, Fengqi – *Mixed Integer Nonlinear Programming Models and Algorithms for Enterprise-Wide Supply Chain Optimization under Uncertainty*, Ph.D. Chemical Engineering, Carnegie Mellon University, 2009.
- Hannah, Lindsay – *Combinatory Adaptive Optimization with Multi-Agent Systems* Ph.D., Mechanical Engineering, Carnegie Mellon University, 2009.
- Hatton, Ross – *Geometric Mechanics of Locomotion and Optimal Coordinate Choice*, Ph.D., Carnegie Mellon University, Mechanical Engineering, 2011.
- Nadadur, Gopal – The Pennsylvania State University Department of Mechanical and Nuclear Engineering (current).
- Peterson, Scott – *Plug-in Hybrid Electric Vehicles: Battery Size Tradeoffs, Emissions, and Grid Support*, Carnegie Mellon University, Engineering and Public Policy (current).
- Venkatesh, Aranya – *An Analysis of Transition Scenarios to Lower Carbon Energy Systems in the Transportation and Electricity Sectors*, Carnegie Mellon University, Civil and Environmental Engineering (current).
- Hassan, Mohd Nor Azman – *Lifecycle Greenhouse Gas Emissions of Energy from Biomass in Malaysia: Implications for Energy Security of the Electricity and Transportation Sectors*, Carnegie Mellon University, Engineering and Public Policy (current).
- Hess, Kacy – *In Situ, Through-Thickness Potential and Current Distribution Measurements in Electrochemical Energy Conversion and Storage Devices*, Carnegie Mellon University, Mechanical Engineering, (current).

TEACHING/RESEARCH INITIATIVES

Design Decisions Wiki (since 2006)

Established a wiki website as a central research and educational resource for sharing information about design and tools to analyze and support decision-making. As of February 2010, the wiki has over 450 articles, 700,000 page views and 350 registered users: <http://ddl.me.cmu.edu/ddwiki>.

TEACHING EXPERIENCE

24-785 Engineering Optimization (2010-pres)

This course introduces students to theory and application of mathematical optimization, with a focus on nonlinear programming. Theoretical topics include necessary and sufficient conditions for optimality, including Karush Kuhn Tucker (KKT) conditions, and numerical methods, including Newton's method, generalized reduced gradient, sequential quadratic programming, and stochastic methods including simulated annealing and genetic algorithms. Model construction and interpretation are explored through study of model boundedness, monotonicity analysis, sensitivity analysis, metamodeling, constraint activity, reformulation, and the use of engineering examples. Additional topics, such as linear and mixed integer programming, nonconvex optimization, and decomposition are introduced for exposure. Matlab is used in lecture and homework assignments for visualization and algorithm development, and students apply theory and methods to a topic of interest in a course project.

24-784 / 24-484 / 19-784 / 19-484 Decision Tools for Engineering Design and Entrepreneurship, Carnegie Mellon University (2008-pres)

Co-instructor: Professor Erica Fuchs

This course provides engineers with a multidisciplinary mathematical foundation for integrated modeling of engineering design and enterprise planning decisions in an uncertain, competitive market. Topics include economics in product design, manufacturing and operations modeling and accounting, consumer choice modeling, survey design, conjoint analysis, decision tree analysis, optimization, game theory, model integration, and professional communication skills. Students apply theory and methods to a team project for a new product or emerging technology of their choice, developing a business plan to defend technical and economic competitiveness.

24-789C Quantitative Methods for Product Design and Development, Carnegie Mellon University (2006)

This course provides a multidisciplinary mathematical foundation for integrated modeling in product design and development. In this course, students learn introductory theory and methods for building and solving optimization models integrating producer, consumer, competitor, regulator, and designer perspectives. Topics include optimization methods with a focus on nonlinear programming, choice modeling, conjoint analysis, game theory, policy analysis, decomposition and model integration. Students apply methods to a team project and engage in independent research to deepen knowledge on a relevant topic of interest.

24-441 / 24-442 Engineering Design II: Conceptualization and Realization, Carnegie Mellon University (2006-pres)

In this course, students gain hands-on, practical experience applying engineering principles, theories, thought processes, and problem-solving approaches to the design and prototyping of a physical product. Students develop skills for working in teams, working with open-ended problems, and making appropriate engineering assumptions. Students are expected to research the topic area, identify opportunities and design criteria, generate creative concepts, synthesize detailed design of the concept, analyze the design on a number of criteria to make improvements, and prototype and communicate the final solution.

ENGR490 Engineering for Community, University of Michigan (2003-2004)

Worked to co-design, develop, and implement a new interdisciplinary engineering course focusing on learning through experience and field work, international and local community development, social and cultural awareness, sustainability, appropriate technology, and communication skills.

Graduate Student Instruction Mentor, University of Michigan (2003-2004)

University of Michigan Center for Research on Learning and Teaching

Trained and assisted graduate student instructors, facilitated student feedback on teaching and provided teaching observations and evaluations.

ME 499/599 Analytical Product Design, University of Michigan (2003, 2004)

Helped to develop and implement a new interdisciplinary course on model-based product development. Gave lectures, provided student support, and developed computer tools for students.

ME 555 Design Optimization, University of Michigan (2003)

Acted as a course aid for the graduate-level course on design optimization. Developed new material and gave lectures and demonstrations.

Rackham-CRLT Seminar on College Teaching, University of Michigan (2003)

Participated in the selective Center for Research on Learning and Teaching Preparing Future Faculty Seminar on College Teaching to sharpen teaching philosophy, learn about the structure of higher education institutions in the United States, and develop teaching skills.

Multicultural Classroom Facilitation Training, University of Michigan (2003)

Participated in a training course emphasizing teaching through dialogue and focusing on issues of multiculturalism, diversity, and social and cultural awareness.

Detroit Area Pre-College Engineering Program, University of Michigan (2002-2003)

Exposed middle-school students from minority and low-income areas to engineering by providing hands-on examples and activities in order to improve accessibility of the field. Position: instructor.

Michigan Mentor Program, University of Michigan (2000-2002)

Worked with two middle school students one-on-one to provide exposure to the engineering disciplines and work with them to explore career possibilities in engineering and beyond.

ME 450 Design and Manufacturing III, University of Michigan (2000-2001)
Assisted in teaching and advising the capstone mechanical engineering design course.
Developed new course material and restructured the syllabus. Initiated and supported interdisciplinary student coursework and project interaction with the University Of Michigan School of Art and Design and the Parsons School of Design. Developed an interactive course web portal to support distance collaboration.

Programming Tutor, Carnegie Mellon University (1997)
Tutored undergraduates in programming the C++ language.

INDUSTRY EXPERIENCE

Research Engineer, Intern
Xerox - The Document Company, Rochester, NY (summer 1999)
Designed and implemented improvements to a distributed embedded digital control system for paper path handling.

Design Engineer, Intern
General Motors, Warren, MI (summer 1998)
Worked with a multidisciplinary team including Engineering, Industrial Design, and Sculpture to design and prototype a future concept vehicle with engineering documentation to show concept feasibility.

Reliability Engineer, Intern
General Motors, Warren, MI (summer 1997)
Developed and implemented a procedure to quantify the reliability of commercial components of machinery and equipment in the assembly plant environment.

Designer
Linear Systems Corporation, Rochester, MI (1994-1996)
Designed automotive tooling. Trained employees in AutoCAD. Developed new CAD tools.

OTHER DESIGN EXPERIENCE

Innovative Product Concept, Development, and Prototype (2001)
Aware | The Shopping Information Manager: Wireless PDA device to help consumers make informed purchasing decisions by providing customized product information on-location and on-demand.
International design team (South Korea, UK, USA, Venezuela)
University of Michigan Global Product Development Course

Innovative Product Concept, Development, and Prototype (1999)
Draperz | The Clothing Coordinator for Teens: A new product for managing laundry by draping clothes instead of hanging or folding them that provides an organizational system allowing users to flip through clothes to coordinate outfits.
Interdisciplinary design team (Engineering, Industrial Design, Industrial Administration)
Carnegie Mellon University Integrated Product Development Course

Innovative Product Concept, Development, and Prototype (1998)

A safety shower chair for people with disabilities: A novel, ergonomic shower chair design that swivels to assist safe transfer into and out of the bathtub and locks in position inside the tub, allowing curtain closure.

Carnegie Mellon University Mechanical Engineering Design Course

ORGANIZATIONAL LEADERSHIP EXPERIENCE

ASME Design Engineering Division, Chair: Publicity and Newsletter Committee (2007-2009)

Member, Center for Product Strategy and Innovation, Carnegie Mellon University (since 2008)

Member, Green Design Institute, Carnegie Mellon University (since 2006)

Director, Design Decisions Laboratory, Carnegie Mellon University (since 2005)

Engineers Without Borders / BLUElab, University of Michigan, Education Chair (2003-2005)

Graduate Student Mentor (2003-2004)

Amnesty International Student Group on Economic and Social Rights (2003-2004)

Public Service Announcement Director, WCBN-FM Ann Arbor (2002-2004)

University of Michigan Graduate Student Symposium, Design and Manufacturing Chair (2001)

Interdisciplinary Antilium Education and Research Collaboration Initiative (2001-2005)

New Foreign Graduate Student Mentor (2000-2002)

New Graduate Student Recruiter (2000)

RESEARCH GRANTS AND AWARDS

Principal investigator:

- [1] Toyota Motor Corporation, "PHEV Research," [co-PI Jay Whitacre], September 2011.
- [2] Ford Motor Company, "Electrified Vehicles in China: Identifying Consumer Preferences and Key Factors that Impact Adoption," Sept 2011 - Aug 2014.
- [3] Toyota Motor Corporation, "Life Cycle Cost and Environmental Assessment of Plug-in Vehicles," [co-PIs Jay Whitacre, Constantine Samaras], August 2010.
- [4] Toyota Motor Corporation, "Systems Analysis of Plug-in Hybrid Electric Vehicles," [co-PIs Jay Whitacre, Constantine Samaras], April 2009.
- [5] National Science Foundation, CAREER Award, "Driving Design: Modeling the Influence of Market Forces and Public Policy on Engineering Design Decision-Making," Aug 2008 - Aug 2013.
- [6] Ford Motor Company, "Engineering and Market Simulation for Optimal Product Planning under Environmental Regulation," Aug 2008 - Aug 2011.
- [7] Carnegie Mellon Institute for Entrepreneurship, Innovation and Technology course development grant for "Quantitative Methods for Product Design and Development," Aug 2007 - July 2012.
- [8] Pennsylvania Infrastructure Technology Alliance, "A Systems Decomposition Approach for Optimization of Product Families to Balance Market and Engineering Needs," Jan - Dec 2007 [Co-PIs Peter Boatwright, Tim Simpson].

- [9] Pennsylvania Infrastructure Technology Alliance, "Hierarchical Design Optimization of Complex Systems," Jan - Dec 2006 [Co-PIs Jon Cagan, Zhaosong Lu].

Co-Principal Investigator

- [10] National Science Foundation, SciSIP Program (2011) "GOALI: Think Globally Act Locally - China and the Future of Energy-Saving Vehicle Technologies," Sept 2011 - Aug 2014 [PI: Erica Fuchs]
- [11] Mellon Foundation award for "Course Instructor Outreach to Carnegie Mellon's Center for Technology Transfer," 2008-2009 [PI: Erica Fuchs].
- [12] National Science Foundation, MUSES Program "Material Use, Infrastructure Change, and Environmental Impacts for Alternative Fuels and Vehicles," Sept 2006 - Aug 2011 [PI: Lester Lave. Co-PIs: Chris Hendrickson, H. Scott Matthews, W. Michael Griffin].
- [13] United States Environmental Protection Agency P3 Award People Prosperity and the Planet Award for project "AWARE: A Step Toward Building a Sustainable Economy by Informing Consumer Purchasing Decisions at the Point of Sale," Sept 2004 - May 2005 [PI: Steven Skerlos, co-investigators W. Ross Morrow, J. Michalek].

Affiliated

- [14] National Science Foundation Graduate Research Fellowship "How Does Energy Policy Affect Vehicle Design?" student: Elizabeth Traut, 2009, June 2009 - May 2012.
- [15] Steinbrenner Institute for Environmental Education and Research "How Does Energy Policy Affect Vehicle Design?" student: Elizabeth Traut, August 2009 - July 2010.

HONORS AND AWARDS

Faculty

- Best Course, awarded by the Carnegie Mellon Mechanical Engineering Class of 2010
American Society of Mechanical Engineers, Design Automation Outstanding Young Investigator Award (2009)
George Tallman Ladd Research Award for outstanding research and professional accomplishments and potential (2008)
Best Use of Technology in the Classroom, awarded by the Carnegie Mellon Mechanical Engineering Class of 2006
American Society of Mechanical Engineers Design Automation Conference Best Paper Award (2005)

Student

- NSF Engineering Research Center for Reconfigurable Manufacturing Systems Ph.D. Student of the Year Award (2005)
Elaine Harden Award for Outstanding Leadership in College, University and Community Activities, (2005) - University of Michigan BLUElab Executive Committee
Martin Luther King Jr. Spirit Award for co-development of new Engineering for Community course (2004) - University of Michigan
Michigan Teaching Fellow (2003) - University of Michigan Horace H. Rackham School of Graduate Studies and the Center for Research on Learning and Teaching
Rackham Interdisciplinary Institute Fellowship (2001-2002)
Devlieg Fellowship and Scholarship (2000)

Engineering Graduate Fellowship (1999)
Mechanical Engineering Graduate Student Council Second Place Award for Research Poster Competition at the Graduate Student Symposium (2003)
Graduated first in the ME class of 1999 at Carnegie Mellon with University Honors
Motorola Second Place Research Award for Sigma Xi Undergraduate Research Symposium (1999)
Carnegie Institute of Technology Third Place Research Award for Sigma Xi Undergraduate Research Symposium (1999)
Bennett Award for Academic Achievement (1999)
Department Research Honors, Carnegie Mellon Mechanical Engineering (1999)
Student Leadership Award, Carnegie Mellon University (1999)

PROFESSIONAL ASSOCIATIONS

ASME: American Society of Mechanical Engineers (since 1997)
INFORMS: Institute for Operations Research and the Management Sciences (since 2005)
TRB: National Academies Transportation Research Board (since 2009)

ACADEMIC SERVICE (since 2005)

Editor:

Concurrent Engineering: Research and Applications, An International Journal (guest editor, Special Issue on Managing Modularity and Commonality in Product and Process Development, 2005-2006)
ASME Design Engineering Division Newsletter Editor (2006-2009)

Reviewer:

AIAA Journal
AMA American Marketing Association Conference
Applied Energy
ASME Journal of Mechanical Design
ASME Design Engineering Technical Conferences
Concurrent Engineering - Research and Applications
Energies
Energy Journal
Energy Policy
Engineering Optimization
Environmental Science and Technology
IEEE Transactions on Automation Science and Engineering
IEEE Spectrum
International Journal of Information Technology and Decision Making
International Journal of Manufacturing Technology and Management
International Journal of Product Development
Journal of Cleaner Production
Marketing Science (INFORMS)
National Science Foundation Panel Reviewer
Research in Engineering Design
Structural and Multidisciplinary Optimization

Sustainable Transportation
Transport Policy

Review Coordinator:

ASME International Design Engineering Technical Conferences, Design Automation
Conference

Conference Session Organizer:

ASME International Design Engineering Technical Conferences
INFORMS Annual Meeting

Conference Session Chair:

ASME Design Engineering Technical Conferences
INFORMS Annual Meeting

Outreach:

Society of Women Engineers High School Day Workshop (2005-2008)
Green Design Apprenticeship, 6 day course for high-school students (2007-present)
U.S. Congress Policy Briefing (2009)
National Petroleum Council study on Future Transportation Fuels, Electricity Subgroup
(2010-2011)

Committee Service:

ASME Design Engineering Division, Chair: Publicity and Newsletter Committee (2007-2009)
ASME Design Automation Committee (since 2005)
Acting co-director, Master in Product Development program, (2008-2009)
Carnegie Mellon Mechanical Engineering Curriculum Assessment Committee (since 2010)
Carnegie Mellon Mechanical Engineering Undergraduate Education Committee (2006-2011)
Carnegie Mellon Mechanical Engineering Library Committee (since 2006)
Carnegie Mellon Mechanical Engineering Seminar Series Committee (2005-2006)
Carnegie Mellon Mechanical Engineering Qualifying Examination Service (2005-present)
Carnegie Mellon Engineering and Public Policy Qualifying Examination Service (2006-
present)

COMPUTER LANGUAGES AND SOFTWARE

C/C++, Java, LISP, HTML, OpenGL/GLUT (Windows, Unix, DOS, MacOS, PalmOS)
Matlab, GAMS, Simulink, Alias Wavefront, AutoCAD, Unigraphics, CAD-AM, Pro Engineer,
Ansys FEA, Working Model, Visual Studio, Excel, PowerPoint, Access, Illustrator,
Pagemaker, Photoshop, Mathtype, Labview, various embedded circuit software

INVITED LECTURES

- [1] *Are Plug-in Vehicles Worth the Cost? Valuing Air Emissions and Oil Displacement Benefits in the U.S.*, Sept 2011, Cambridge University, U.K.
- [2] *Life Cycle Cost, Air Emissions, and Oil Displacement Potential of Plug-in Vehicles*, Ford Motor Company, July 2011, Dearborn, MI.
- [3] *On the Life Cycle Implications of Plug-in Hybrid Electric Vehicles*, University of California Berkeley, Oct 22, 2010, Berkeley, CA.

- [4] *On the Life Cycle Implications of Plug-in Hybrid Electric Vehicles*, Stanford University, Precourt Energy Efficiency Center, Oct 21, 2010, Stanford, CA.
- [5] *Product Design in Strategic Firm Decision-Making*, Stanford Graduate School of Business, Operations, Information and Technology Group, Oct 20, 2010, Stanford, CA.
- [6] *On the Life Cycle Implications of Plug-in Hybrid Electric Vehicles*, University of California Davis, ITS-STEPS Seminar, Oct 19, 2010, Davis, California.
- [7] *Do More Batteries Make a Plug-in Better? Economic and Environmental Analysis of Plug-in Hybrid Electric Vehicles*, Society of Automotive Engineers Government-Industry Meeting, January 28, 2010, Washington DC.
- [8] *Market Forces and Public Policy in Engineering Systems Optimization*, Massachusetts Institute of Technology, Engineering Systems Division, June 12, 2009, Boston, MA.
- [9] *Design for Market Systems: Integrating Social, Economic, and Physical Sciences to Engineer Product Success*, University of Maryland – College Park, Design and Reliability of Systems Division, January 14, 2009.
- [10] *Design for Market Systems: Integrating Social, Economic, and Physical Sciences to Engineer Product Success*, The Pennsylvania State University, Industrial and Manufacturing Engineering, October 16, 2008.
- [11] *Driving Design: Modeling Market Forces and Public Policy in Vehicle Design*, State University of New York at Buffalo, Mechanical and Aerospace Engineering, April 10, 2008.
- [12] *Should Designers Worry about Market Structure?*, The Pennsylvania State University, Engineering Design, April 4, 2008.
- [13] *Modeling Energy Policy and Consumer Choice in Vehicle Design Optimization*, Ford Motor Company, Systems Analytics and Environmental Sciences, July 25, 2007.
- [14] *Realizable Product Line Optimization: Coordinating Product Positioning and Design for Heterogeneous Markets*, Tepper School of Business, Carnegie Mellon University, Feb. 24, 2006.
- [15] *A Model for Studying the Impact of Fuel Economy and Emission Policy on Profit-Driven Vehicle Design Decisions in a Competitive Market*, Green Design Institute, Carnegie Mellon University, Oct. 20, 2005.
- [16] *Preference Coordination in Engineering Design Decision-Making*, Mechanical Engineering, Northwestern University, March 31, 2005.
- [17] *Preference Coordination in Engineering Design Decision-Making*, General Motors Research and Development Seminar, Oct. 27, 2004.
- [18] *Individual, Social and Economic Preference in Engineering Design Decision-Making*, Eindhoven University of Technology, Eindhoven, The Netherlands, April 22, 2004.
- [19] *Automotive Design and Environmental Policy in the US Market*, Delft University of Technology, Delft, The Netherlands, April 21, 2004.
- [20] *Coordination of Preferences Using Hierarchical Optimization of Complex Systems*, Ecole Centrale de Nantes, Nantes, France, April 19, 2004.
- [21] *Automotive Design and Environmental Policy in the US Market*, Technischen Universität Berlin, Berlin, Germany, April 8, 2004.

PROFESSIONAL PRESENTATIONS

- [22] *Are Plug-in Vehicles Worth the Cost? Valuing Air Emissions and Oil Displacement Benefits in the U.S.*, INFORMS Annual Meeting 2011, Charlotte, N.C.
- [23] *Using Economic Input-Output Life Cycle Assessment to Guide Sustainable Design*, INFORMS Annual Meeting, Nov 2011, Charlotte, N.C. (speaker: Traut)
- [24] *Optimal Design and Allocation of Electrified Vehicles and Dedicated Charging Infrastructure for Minimum Greenhouse Gas Emissions*, INFORMS Annual Meeting, Nov 2011, Charlotte, N.C. (speaker: Traut)
- [25] *Minimizing the Integration Costs of Wind Using Curtailment and Electric Vehicle Charging*, U.S. Association for Energy Economics North American Conference, Oct 2011, Washington D.C. (speaker: Weis)
- [26] *Robust Design for Profit Maximization under Uncertainty of Consumer Choice Model Parameters Using the Delta Method*, ASME International Design Engineering Technical Conferences, Aug 2011, Washington D.C. (speaker: Heckmann)
- [27] *Using Economic Input-Output Life Cycle Assessment to Guide Sustainable Design*, ASME International Design Engineering Technical Conferences, Aug 31, 2011, Washington D.C.
- [28] *Are Plug-in Vehicles Worth the Cost?*, ASME International Design Engineering Technical Conferences, Aug 30, 2011, Washington D.C.
- [29] *A Perspective on Rebound Effects and Demand/Supply Equilibrium*, 2011 Climate and Energy Decision Making Workshop, June 2011, Washington D.C.
- [30] *NHTS Survey Day Driving Distance and Estimated Variability to inform Electric Vehicle Range Design*, Using National Household Travel Survey (HNTS) Data for Transportation Decision Making Workshop, June 2011, Washington, D.C. (speaker: Traut)
- [31] *Costs and Benefits of Plug-in Vehicles*, Carnegie Mellon Steinbrenner Media Fellowship, June 2011, Pittsburgh, PA.
- [32] *Optimal Design and Allocation of Electrified Vehicles and Dedicated Charging Infrastructure for Minimum Greenhouse Gas Emissions*, International Society of Industrial Ecology Conference, June 2011, Berkeley, CA. (speaker: Traut)
- [33] *Techno-Economic Analysis of Lithium-Ion Batteries for Personal Vehicle Electrification*, with Apurba Sakti, Technology Management and Policy Conference, May 2011, State College, PA.
- [34] *Optimal Design and Allocation of Electrified Vehicles and Dedicated Charging Infrastructure for Minimum Greenhouse Gas Emissions*, Mascaro Center's Engineering Sustainability Conference 2011, April 2011, Pittsburgh, PA.
- [35] *Techno-Economic Analysis of Lithium-Ion Batteries for Personal Electrification*, with Apurba Sakti. National Academies Transportation Research Board Annual Meeting, January 23-27, 2011, Washington D.C.
- [36] *Optimal Design and Allocation of Electrified Vehicles and Dedicated Charging Infrastructure for Minimum Greenhouse Gas Emissions*, with Elizabeth Traut, National Academies Transportation Research Board Annual Meeting, January 23-27, 2011, Washington D.C.

- [37] *Driving Design: Modeling the Influence of Market Forces and Public Policy on Vehicle Design Decisions*, Civil, Mechanical and Manufacturing Innovation Conference, January 4-7, 2011, Atlanta, GA.
- [38] *Material Use, Infrastructure Change, and Environmental Impacts of Alternative Fuels and Vehicles*, Civil, Mechanical and Manufacturing Innovation Conference, January 4-7, 2011, Atlanta, GA.
- [39] *Are Plug-in Vehicles Worth the Cost?*, INFORMS Annual Meeting, Nov 9, 2010, Austin, TX.
- [40] *A MINLP Model for Global Optimization of Plug-in Vehicle Design and Allocation to Minimize Life Cycle Cost and Greenhouse Gas Emissions*, INFORMS Annual Meeting, Nov 8, 2010, Austin, TX.
- [41] *Why Your Plug-in Hybrid Electric Vehicle with a 40-mile Battery May Only Go 25*, with Orkun Karabasoglu, INFORMS Annual Meeting, Nov 9, 2010, Austin, TX.
- [42] *Optimal Plug-in Hybrid Electric Vehicle Design and Allocation for Minimum Life Cycle Cost, Petroleum Consumption, and Greenhouse Gas Emissions*, ASME International Design Engineering Technical Conferences, Advanced Vehicle and Tire Technology Conference, Aug 2010, Montreal, CA.
- [43] *A MINLP Model for Global Optimization of Plug-in Hybrid Electric Vehicle Design and Allocation to Minimize Life Cycle Greenhouse Gas Emissions*, ASME International Design Engineering Technical Conferences, Design Automation Conference, Aug 2010, Montreal, CA.
- [44] *MINLP Global Optimization of Plug-in Hybrid Vehicle Design and Allocation for Minimum Cost and GHG Emissions*, INFORMS Conference on Energy, Sustainability and Climate Change, Feb 2010, Gainesville, FL, USA.
- [45] *Do More Batteries Make a Plug-in Better? Economic and Environmental Analysis of Plug-in Hybrid Electric Vehicles*, Society of Automotive Engineers Government-Industry Meeting, Jan 2010, Washington D.C., USA.
- [46] *Do More Batteries Make a Plug-in Better? Economic and Environmental Analysis of Plug-in Hybrid Electric Vehicles*, Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting, Oct 11, 2009, San Diego, CA, USA.
- [47] *Optimal Plug-in Hybrid Electric Vehicle Design and Allocation for Diverse Driving Patterns*, ASME Design Engineering Technical Conferences, Sept 1 2009, San Diego, CA, USA.
- [48] *Do More Batteries Make a Plug-in Better? Economic and Environmental Analysis of Plug-in Hybrid Electric Vehicles*, MIT Engineering Systems Symposium, June 17, 2009, Boston, MA, USA.
- [49] *A Structural Analysis of Vehicle Design Responses to Corporate Average Fuel Economy (CAFE) Policy*, poster presentation, MIT Engineering Systems Symposium, June 16, 2009, Boston, MA, USA.
- [50] *Economic, Environmental, and Security Implications of Plug-in Hybrid Electric Vehicles*, Presented to staff members of the House Energy and Commerce Committee, the House Committee on Science and Technology, the Select Committee on Energy Independence and Global Warming, the Congressional Research Service, and offices of U.S. House and Senate members, April 16 and April 20, 2009, Washington D.C., USA.

- [51] *A Structural Analysis of Vehicle Design Responses to CAFE Policy*, National Academies Transportation Research Board Annual Meeting, January 2009, Washington DC, USA.
- [52] *Impact of Battery Weight and Charging Patterns on the Economic and Environmental Benefits of Plug-in Hybrid Vehicles*, National Academies Transportation Research Board Annual Meeting, January 2009, Washington DC, USA.
- [53] *A Structural Analysis of Vehicle Design Responses to CAFE Policy*, Institute for Operations Research and Management Sciences (INFORMS) Annual Meeting, November 2008, Washington, DC, USA.
- [54] *A Deterministic Lagrangian-Based Global Optimization Approach for Decomposable Nonconvex Mixed-Integer Problems*, Institute for Operations Research and Management Sciences (INFORMS) Annual Meeting, November 2008, Washington, DC, USA.
- [55] *Optimal Product Design in a Competitive Market*, Institute for Operations Research and Management Sciences (INFORMS) Annual Meeting, November 2008, Washington, DC, USA.
- [56] *Consumer Heterogeneity and Channel Structures in Optimal Product Design*, Institute for Operations Research and Management Sciences (INFORMS) Annual Meeting, November 2008, Washington, DC, USA.
- [57] *Global Optimization of the Joint Product Family Platform Selection and Design Problem*, Institute for Operations Research and Management Sciences (INFORMS) Annual Meeting, November 2008, Washington, DC, USA.
- [58] *Impact of Battery Weight and Charging Patterns on Plug-in Hybrid Vehicles*, ASME International Design Engineering Technical Conferences, August 2008, New York, NY, USA.
- [59] *Should Designers Worry about Market Systems?*, ASME International Design Engineering Technical Conferences, August 2008, New York, NY, USA.
- [60] *Optimal Product Design under Price Competition*, ASME International Design Engineering Technical Conferences, August 2008, New York, NY, USA.
- [61] *A Deterministic Lagrangian-based Global Optimization Approach for Large-Scale Decomposable Problems*, ASME International Design Engineering Technical Conferences, August 2008, New York, NY, USA.
- [62] *Wiki-Based Learning in the Mechanical Engineering Classroom*, American Society for Engineering Education (ASEE) Annual Conference and Exposition, June 2008, Pittsburgh, PA, USA.
- [63] *Applications of Lagrangian Branch and Cut for Hierarchical Engineering Systems*, Institute For Operations Research and the Management Sciences (INFORMS) Annual Meeting, November 2007, Seattle, WA, USA.
- [64] *A Quantitative Approach to Achieving Optimal Balance between Product Variety and Manufacturability*, Institute For Operations Research and the Management Sciences (INFORMS) Annual Meeting, November 2007, Seattle, WA, USA.
- [65] *Product Line Design Optimization for Heterogeneous Markets*, Institute For Operations Research and the Management Sciences (INFORMS) Annual Meeting, November 2007, Seattle, WA, USA.

- [66] *Diagonal Quadratic Approximation for Parallelization of Analytical Target Cascading*, ASME International Design Engineering Technical Conferences, September 2007, Las Vegas, NV, USA.
- [67] *A Game Theoretic Approach to Finding Market Equilibria for Automotive Design under Environmental Regulation*, ASME International Design Engineering Technical Conferences, September 2007, Las Vegas, NV, USA.
- [68] *Design Optimization of a Laptop Computer using Aggregate and Mixed Logit Demand Models with Consumer Survey Data*, ASME International Design Engineering Technical Conferences, September 2007, Las Vegas, NV, USA.
- [69] *Measurement of Headlight Form Preference using Choice-Based Conjoint Analysis*, ASME International Design Engineering Technical Conferences, September 2007, Las Vegas, NV, USA.
- [70] *An Extension of the Commonality Index for Product Family Optimization*, ASME International Design Engineering Technical Conferences, September 2007, Las Vegas, NV, USA.
- [71] *A Single-Stage Gradient-Based Approach for Solving the Joint Product Family Platform Selection and Design Problem using Decomposition*, ASME International Design Engineering Technical Conferences, September 2007, Las Vegas, NV, USA.
- [72] *A Decomposed Genetic Algorithm for Solving the Joint Product Family Optimization Problem*, AIAA Multidisciplinary Design Optimization Specialists Conference, April, Honolulu, Hawaii, USA.
- [73] *Balancing Marketability and Manufacturability in Product Line Design Optimization*, Institute For Operations Research and the Management Sciences (INFORMS) Annual Conference, November 2006, Pittsburgh, PA.
- [74] *The Impact of Environmental Policy on Profit-Driven Vehicle Design Optimization*, Institute For Operations Research and the Management Sciences (INFORMS) Annual Conference, November 2006, Pittsburgh, PA.
- [75] *Analytical Target Cascading using Branch and Bound for Mixed Integer Nonlinear Programming*, ASME International Design Engineering Technical Conferences, September 2006, Philadelphia, PA, USA.
- [76] *Balancing Marketing and Manufacturing Objectives in Product Line Design*, ASME International Design Engineering Technical Conferences, September 2005, Long Beach, CA, USA.
- [77] *An Efficient Weighting Update Method to Achieve Acceptable Consistency Deviation in Analytical Target Cascading*, ASME International Design Engineering Technical Conferences, September 2004, Salt Lake City, Utah, USA.
- [78] *An Efficient Weighting Update Method to Achieve Acceptable Consistency Deviation in Analytical Target Cascading*, Automotive Research Center Conference, May 2004, Ann Arbor, MI, USA.
- [79] *An Optimal Marketing and Engineering Design Model for Product Development Using Analytical Target Cascading*, Tools and Methods of Competitive Engineering Conference, April 2004, Lausanne, Switzerland.

- [80] *A Simulation-based Vehicle Design Strategy for Requirements Validation*, Automotive Research Center Conference, May 12, 2003, Chrysler Headquarters, Auburn Hills, MI, USA.
- [81] *A Study of Emission Policy Effects on Optimal Vehicle Design Decisions*, ASME Design Engineering Technical Conferences, September 2003, Chicago, IL, USA.

MEDIA/PRESS

- [1] Loveday, E. (2011) "Why plug-in vehicles with "small" battery packs should be subsidized in a big way," *Autoblog Green*, Oct 6, 2010. <http://green.autoblog.com/2011/10/06/why-hybrid-plug-in-vehicles-battery-packs-should-be-subsidized/>
- [2] Niedermeyer, E. (2011) "Report knocks 'big battery' plug-in subsidies, will the DOE notice?" *The Truth About Cars*, Sept 28, 2011. <http://www.thetruthaboutcars.com/2011/09/report-knocks-big-battery-plug-in-subsidies-will-the-doe-notice/>
- [3] Lucas, P. (2011) "Are small batteries the future for hybrid cars," *TheGreenCarWebsite.co.uk*, Sept 28, 2011. <http://www.thegreencarwebsite.co.uk/blog/index.php/2011/09/28/are-small-batteries-the-future-for-hybrid-cars>
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- [6] Millikin, M. (2011) "CMU study finds that HEVs and PHEVs with small battery packs offer more emissions and oil displacement benefits per dollar spent than large pack PHEVs and BEVs; policy implications," *Green Car Congress*, Sept 27, 2011. <http://www.greencarcongress.com/2011/09/michalek-20110927.html>
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- [9] Ohnsman, A. (2011) “U.S. Battery, Plug-in Car Push Costs Exceed Rewards, New Study Says,” *Bloomberg Businessweek*, Sept 26, 2011. <http://www.bloomberg.com/news/2011-09-26/u-s-battery-plug-in-car-push-costs-exceed-rewards-study-says.html>
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- [11] Millikin, M. (2010) "CMU Study Explores Optimizing PHEV Design and Allocation to Minimize Life Cycle Cost, Petroleum Consumption, and GHG Emissions," *Green Car Congress*, Dec 6, <http://www.greencarcongress.com/2010/12/michalek-20101206.html>
- [12] Ramsey, M. (2010) "High Battery Cost Curbs Electric Cars," *Wall Street Journal*, Oct 17, <http://online.wsj.com/article/SB10001424052748703735804575536242934528502.html>
- [13] Petersen, J. (2010) "Toyota's Straight Talk on Plug-in Vehicles," *MSNBC*, July 12 2010, http://www.msnbc.msn.com/id/38204701/ns/business-motley_fool/
- [14] Edwards, C. (2010) "Batteries Struggle for Greater Power," *IEC Engineering and Technology Magazine* n9, June 16, <http://kn.theiet.org/magazine/issues/1009/battery-cars-1009.cfm>
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- [17] LaMonica, M. (2009) "Q&A: Will the Chevy Volt make money for GM?," *CNET News*, October 30, 2009, http://news.cnet.com/8301-11128_3-10386392-54.html
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- [20] Schneider, D. (2009) "Why Plug-Ins will Make (Dollars and) Sense," *IEEE Spectrum*, March 2009, <http://spectrum.ieee.org/energy/policy/why-plugins-will-make-dollars-and-sense>.
- [21] Schneider, D. (2009) "Why the Chevy Volt Doesn't Add Up," *IEEE Spectrum*, March 9, <http://spectrum.ieee.org/mar09/8068>
- [22] Peterson, A. (2009) "Carnegie Mellon Study Finds High Capacity Plug-In Hybrids Cost Inefficient," *Automobile Magazine*, March 5, <http://rumors.automobilemag.com/6463934/green/carnegie-mellon-study-finds-high-capacity-plug-in-hybrids-cost-inefficient/index.html>
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(Story also covered by about 20 other outlets, including the *Denver Post*, the *Dallas Morning News*, *Green Car Congress*, and *Edmunds*)

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