

Curriculum Vitae

David R. Keith
System Dynamics Group
MIT Sloan School of Management
dkeith@mit.edu

Education

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|--|---|-------------|
| <i>Doctor of Philosophy</i> | <i>MIT Engineering Systems Division</i> | <i>2012</i> |
| <i>Master of Environment</i> | <i>University of Melbourne</i> | <i>2006</i> |
| <i>Bachelor of Engineering (hons.)</i> | <i>University of Melbourne</i> | <i>2003</i> |
| <i>Bachelor of Commerce</i> | <i>University of Melbourne</i> | <i>2003</i> |

Title of Doctoral Thesis and Name of Thesis Advisor

Keith, D.R. (2012), *Essays on the dynamics of alternative fuel vehicle adoption: insights from the market for hybrid-electric vehicles in the United States*, Engineering Systems Division, Massachusetts Institute of Technology.

Advisor: John Sterman

Principal Field(s) of Interest

system dynamics, innovation diffusion, technology strategy, automotive, energy

Non-MIT Employment

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|--------------------------------|--------------------------------|-------------|-------------|
| <i>URS Corporation</i> | <i>Environmental Economist</i> | <i>2004</i> | <i>2008</i> |
| <i>General Motors (Holden)</i> | <i>Technology Cost Analyst</i> | <i>2003</i> | <i>2004</i> |

History of MIT Appointments

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|--|-----------------|----------------|
| <i>Mitsui Career Development Professorship</i> | <i>May 2016</i> | <i>Present</i> |
| <i>Assistant Professor</i> | <i>Oct 2014</i> | <i>Present</i> |
| <i>Research Affiliate</i> | <i>2012</i> | <i>2014</i> |

Awards

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| <i>Dana Meadows Award (best SD student paper)</i> | <i>2012</i> |
| <i>MITEI Martin Family Sustainability Fellowship</i> | <i>2011</i> |
| <i>American Australian Association – Alcoa Foundation Fellowship</i> | <i>2009</i> |
| <i>Australian Fulbright Scholarship for Study in the United States</i> | <i>2008</i> |

Professional Membership and Activities

Academy of Management - Member
Strategic Management Society – Member
System Dynamics Society – Member

Subjects Taught

| | | |
|----------|--|--------------------|
| 15.871/2 | <i>Introduction to System Dynamics</i> | <i>Spring 2016</i> |
| 15.879 | <i>Research Seminar in System Dynamics</i> | <i>Spring 2016</i> |
| 15.871/2 | <i>Introduction to System Dynamics</i> | <i>Spring 2015</i> |
| 15.879 | <i>Research Seminar in System Dynamics</i> | <i>Spring 2015</i> |

Thesis Supervision

Master's Theses Supervised

Houston, S.L. (2017), Automaker technology strategy and the cost of complying with the corporate average fuel economy standards, Technology and Policy Program, Massachusetts Institute of Technology.

Millard, D.A. (2016), Strategic analysis of technical, commercial and regulatory influences on the commercialization of hydrogen fuel cell vehicles, Leaders for Global Operations Program, Massachusetts Institute of Technology.

Tiwari, S. (2016), Improving understanding of alternative fuel vehicle market dynamics using interactive simulations, System Design and Management Program, Massachusetts Institute of Technology.

Theses in Progress

| | | | |
|----------------------|-------------------------------|------------|----------------|
| <i>Sergey Naumov</i> | <i>MIT Sloan</i> | <i>PhD</i> | <i>Ongoing</i> |
| <i>Jad Sassine</i> | <i>MIT Sloan</i> | <i>PhD</i> | <i>Ongoing</i> |
| <i>Yimeng Jiang</i> | <i>Australian Nat'l Univ.</i> | <i>PhD</i> | <i>Ongoing</i> |

Publications

1. Theses

Keith, D.R. (2012), Essays on the dynamics of alternative fuel vehicle adoption: insights from the market for hybrid-electric vehicles in the United States, Engineering Systems Division, Massachusetts Institute of Technology.

2. Refereed Journal Articles

Keith, David R., Houston, Samantha, and Sergey Naumov (2018), Vehicle Fleet Turnover and the Future of Fuel Economy, *Environmental Research Letters* (Forthcoming).

Keith, David R., Sterman, John D., and Jeroen Struben (2018), Supply constraints and waitlists in new product diffusion, *System Dynamics Review*.

Ge, Y., MacKenzie, D., & D.R. Keith (2017). Gas anxiety and the charging choices of plug-in hybrid electric vehicle drivers. *Transportation Research Part D: Transport and Environment*. <http://doi.org/10.1016/j.trd.2017.08.021>

Keith, D. R., Naumov, S., & J. Sterman (2017). Driving the Future: A Management Flight Simulator of the US Automobile Market. *Simulation and Gaming*, 48(6), 735–769. <http://doi.org/10.1177/1046878117737807>

Shafiei, E., Davidsdottir, B., Leaver, J., Stefansson, H., Asgeirsson, E.I. and D. Keith (2016), System Dynamics Analysis of Supply Push Strategies Governing the Transition to Biofuel Vehicles in a Market-oriented Renewable Energy System, *Energy*, 94, pp.409-421.

Wen, Y., MacKenzie, D., & D.R. Keith (2016). Modeling the Charging Choices of Battery Electric Vehicle Drivers by Using Stated Preference Data. *Transportation Research Record: Journal of the Transportation Research Board*, 2572, 47–55. <http://doi.org/10.3141/2572-06>

Zoepf, S. M., & D.R. Keith (2016). User decision-making and technology choices in the U.S. carsharing market. *Transport Policy*, 51, 150–157. <http://doi.org/10.1016/j.tranpol.2016.01.010>

Zoepf, S., MacKenzie, D., Keith, D. and W. Chernicoff (2013), Charging Choices and Fuel Displacement in a Large-Scale Demonstration of Plug-In Hybrid Electric Vehicles, *Transportation Research Record: Journal of the Transportation Research Board*, 2385, pp.1-10.

3. Articles in Refereed Conference Proceedings

Keith, D.R. (2018) Social Influence and the Formation of Markets for Hybrid and Electric Vehicles, Presentation, Academy of Management Annual Meeting, Chicago, August 2018.

Keith, D.R. (2018) Unintended Consequences of Automated Vehicles and Pooling for Urban Transportation Systems, Presentation, Professional Development Workshop on Fast-Moving Vehicle & Mobility Ecosystems, Academy of Management Annual Meeting, Chicago, August 2018.

Naumov, S., Keith, D.R. and C. Fine (2018), The Effect of Autonomous Vehicle on Demand for Driving: Is Pooling the Solution to Avoiding Traffic Gridlock?, International System Dynamics Conference, Reykjavik, August 2018.

Naumov, S. and D.R. Keith (2018) AVs, Shared Mobility, and the Cost of Driving: Will Lower Costs Reduce the Incentive to Pool?, What we Know: Evidence-based Behavioral Studies of Impact of Automated Vehicle Systems, Automated Vehicle Symposium, San Francisco, June 2018.

Keith, D.R. and S. Naumov (2018) Strategy Introduction of Hybrid Technologies, Poster, Strategy Science Conference, Philadelphia, June 2018.

Keith, D.R. (2018) Competitors or Cousins? Social Influence and the Formation of Markets for Hybrid and Electric Vehicles, Presentation, Industry Studies Conference, Seattle, May 2018.

Keith, D.R. and S. Naumov (2017). Blocking and Bridging: When Do Intergenerational Hybrids Help and Hinder Technological Transitions? Strategic Management Society Annual Conference, Houston TX.

Keith, D.R., Sassine, J. and J. Struben (2017), Within-Category Peer Effects in the US Market for Hybrid Electric Vehicles, Strategic Management Society Annual Conference, Houston TX.

Keith, D.R. (2017). Management Flight Simulators for Strategy and Sustainability: Exploring Transitional Challenges in the Diffusion of Alternative Fuel Vehicles. Academy of Management Annual Meeting. Atlanta, GA.

Keith, D.R. and S. Naumov (2017). Blocking and Bridging: When Do Intergenerational Hybrids Help and Hinder Technological Transitions? International System Dynamics Conference, Cambridge, MA.

Wilson, M. and D.R. Keith (2017). Exploring the Resilience of Boston's Urban Snow Management Policies. International System Dynamics Conference, Cambridge, MA.

Keith, D.R., Struben, J. and J.D. Sterman (2017). Peer Effects and the Spatio-temporal Diffusion of Hybrid Electric Vehicles. ISMS Marketing Science Conference, Los Angeles, CA.

Sassine, J. and D.R. Keith (2017). Within-category Peer Effects in the Market for Hybrid Electric Vehicles. ISMS Marketing Science Conference, Los Angeles, CA.

Keith, D.R. and S. Naumov (2016). Driving The Future: A Management Flight Simulator of the Market for Alternative Fuel Vehicles. International System Dynamics Conference, Delft, The Netherlands.

Keith, D.R. and S. Tiwari (2016). Do Interactive Management Flight Simulators Lead to Superior Learning Outcomes? An Experiment Using Amazon Mechanical Turk. International System Dynamics Conference, Delft, The Netherlands.

Jiang, Y. Keith, D.R. and M. Doolan (2015), A System Dynamics Hypothesis for the Disparate Alternative Fuel Vehicle Adoption Paths in Australia and the United States. International System Dynamics Conference, Cambridge, MA.

Wen, Y., MacKenzie, D., and D. Keith (2016). Modeling charging choices of PEV owners using stated preference data. Transportation Research Board Annual Meeting.

Keith, D.R., Sterman, J. and J. Struben (2015), Understanding Spatio-Temporal Diffusion of New Durable Products: The Toyota Prius Hybrid Vehicle, INFORMS Annual Meeting.

Wen, Y., MacKenzie, D., and D. Keith (2015). Modeling charging choices of PEV owners using stated preference data. In: Proceedings of the 28th Electric Vehicle Symposium (EVS 28).

Keith, D.R. (2014), Natural Gas Pathways and Alternative-Fuel Vehicle Diffusion in the US Automotive Fleet, International System Dynamics Conference, Delft, The Netherlands.

Keith, D.R., Sterman, J.D. and J.J.R. Struben (2012), Understanding Spatiotemporal Patterns of Hybrid-Electric Vehicle Adoption in the United States, International System Dynamics Conference, St.Gallen, Switzerland.

Keith, D.R., Sterman, J. and J. Struben (2011), Understanding Spreading Patterns of Hybrid Vehicle Adoption, International Conference on Complex Systems.

Keith, D.R. Sterman, J.D. and J.J.R. Struben (2011), Understanding Innovation Diffusion in the Presence of Supply Constraints and Price Feedback: The Case of the Toyota Prius, International System Dynamics Conference, Washington, DC.

Keith, D.R., Sterman, J. and J. Struben (2011), Understanding Spatiotemporal Patterns of Hybrid-Electric Vehicle Adoption in the United States, Transportation Research Board Annual Meeting.

4. Articles in Non-Refereed Conference Proceedings

5. Papers/Articles in Progress or Under Review

Wilson, M. and David R. Keith (2018), Winter Storm Response Decision-Making: Lessons from Boston's Snowiest Winter Ever (Revise and Resubmit – Production and Operations Management).

Keith, David R. and Hazhir Rahmandad (2018), Are On-Demand Platforms Winner-Take-All Markets? (Under Review).

Keith, David R. and Sergey Naumov (2018), Stepping Stone or Distraction? Intergenerational Hybrids as a Tool for Incumbent Adaptation to Technological Change (Under Review).

Naumov, Sergey and David R. Keith (2018), Unintended Consequences of Automated Vehicles and Pooling for Urban Transportation Systems (Under Review).

Keith, David R. and Sergey Naumov (2018), Is Sharing More Sustainable? New Product Sales During the Transition to High Product Utilization (Working Paper).

Naumov, Sergey and David R. Keith (2018), Hailing Rides Using On-Demand Mobility Platforms: What Motivates Consumers to Choose Pooling? (Working Paper).

Keith, David R., Jad Sassine and Jeroen Struben (2018), Within-Category Peer Effects in the US Market for Hybrid-Electric Vehicles (Working Paper).

Keith, David R. (2018), Competitors or Cousins? Social Influence and the Formation of Markets for Hybrid and Electric Vehicles (Working Paper).

Keith, David R. and John Paul MacDuffie (2018), Turning Points in the Future Mobility Value Chain (Working Paper).

Keith, David R., Taylor, Lauren R. and James Paine (2018), The Perniciousness of Scale in Non-Profit Organizations (Working Paper).

Keith, David R., Taylor, Lauren R., Paine, James, Dowidowicz, Anthony, and Richard Weisbach (2018), Organizational Poverty in Poverty Organizations: Why Do Non-Profits Continue to Underinvest in Capabilities? (Working Paper).

6. Other Publications

Struben, J., Sterman, J. and D. Keith (2015), Parameter and Confidence Interval

Estimation in Dynamic Models: Maximum Likelihood and Bootstrapping Methods in *Analytical Handbook for Dynamic Modelers*,

7. Technical Reports

Heywood, J.B. et al. (2009), An Action Plan for Cars: The Policies Needed to Reduce U.S. Petroleum Consumption and Greenhouse Gas Emissions, MIT Energy Initiative.

Invited Oral Presentations

Turning Points in the Future Mobility Value Chain, Invited Presentation, MIT Sloan Conference on Building Resilient Cities for the Future, Bangkok, December 2018.

Automated Vehicles and Pooling: Unintended Consequences for Urban Transportation Systems, Invited Presentation, International Conference on Mobility Challenges, Paris, December 2018.

Turning Points in the Future Mobility Value Chain, Invited Presentation, Ford of Mexico Ingenious Minds Conference, Tec de Monterrey Santa Fe, Mexico City, November 2018.

Turning Points in the Future of Mobility, Invited Presentation, Sloan Sustainability Initiative Lunch Series, October 2018.

Teaching with Simulations & Systems, Interactive Workshop, Network for Business Sustainability - Sustainability Centres Community Workshop, NYC, June 2018.

Competitors or Cousins? Social Influence and the Formation of Markets for Hybrid and Electric Vehicles, Invited Presentation, MIT Center for Energy and Environmental Policy Research Conference, May 2018.

The Electrification of Mobility: Where to From Here?, Invited Presentation, MIT Energy Initiative Energy Storage Center Workshop, April 2018.

Emerging Mobility Trends in the United States", Invited Presentation, MIT Sloan Administrative Staff Research Series, February 2018.

Best of Both Worlds, or Stepping Stone to the Future? Strategic Introduction of Hybrid Technologies as a Defense Against Disruption, Invited Presentation, Melbourne Business School, Melbourne, January 2018.

The Electrification of Mobility: Where to From Here? Presented to the MIT Energy Initiative Annual Research Conference, December 6th 2017.

Peer Effects in the Diffusion of Hybrid and Electric Vehicles, Presented to the University of Iceland, September 18th 2017.

The Future of Automotive Mobility, Presented to CERWeek, Houston, TX, March 13th 2017.

Emerging Mobility Trends in the United States. Presented to the Strategy Management

Society Extension Workshop on Innovation Ecosystems and Sustainable Mobility, September 21st 2016.

Emerging Mobility Trends in the United States. Presented to the ETH-MIT Workshop on Energy Futures – Europe and North America, Zurich, Switzerland, September 21st 2016.

The Energy and Environmental Impacts of Increasing Vehicle Autonomy: A System-Level Perspective, Presented to the MIT Sloan SD Seminar, October 16th 2015.

Understanding Spatiotemporal Patterns of Hybrid-Electric Vehicle Adoption in the United States, Presented to Stanford University School of Engineering, June 3rd, 2015.

Sustainable Mobility: Creating Markets for Alternative Fuel Vehicles, Presented to the University of Iceland and the University of Reykjavik, September 24th, 2014.

Sustainable Mobility: Creating Markets for Alternative Fuel Vehicles, Presented to the Australian National University College of Engineering, June 6th, 2014.

Social Contagion or Market Heterogeneity? Understanding Spatiotemporal Patterns of Hybrid Electric Vehicle Adoption in the United States, Presented to the University of Melbourne – Intellectual Property Research Institute of Australia, October 31st, 2013.

Understanding Consumer Adoption of Hybrid-Electric Vehicles in Australia, Presented to the Australian National University College of Engineering, August 13th, 2013.

Understanding Spatiotemporal Patterns of Hybrid Electric Vehicle Adoption in the United States, Presented to the University of New South Wales – Dynamic Modeling Workshop, February 13th, 2013.

Understanding Spatiotemporal Patterns of Hybrid Electric Vehicle Adoption in the United States, Presented to the University of Technology Sydney – Center for the Study of Choice, October 29th, 2012.