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Education:

1974-1976 Carleton College, Northfield, MN
1977-1978 University of California, Berkeley, A.B. Economics
1979-1983 Massachusetts Institute of Technology, Ph.D. Economics

Teaching and Research Interests:

Primary Fields: Energy & Environmental Economics, Government Regulation,
Industrial Organization, Business Strategy, Applied Microeconomic Theory
Other Fields: Finance, Public Finance

Teaching Positions Held:

1983-1990 Assistant Professor of Economics and Public Policy, Department of Economics
and Institute of Public Policy Studies, University of Michigan
1989-1990 Visiting Assistant Professor of Economics, Department of Economics,
University of California, Davis
1990-1994 Associate Professor of Economics, Department of Economics,
University of California, Davis
1992,1993 Visiting Associate Professor of Business Economics (Autumn),
Haas School of Business, University of California, Berkeley
1994 Visiting Associate Professor of Business Economics (March),
Distance learning MBA for Cathay Pacific Airlines
School of Business, University of Michigan
1994 Visiting Professor of Strategic Management (Winter),
Graduate School of Business, Stanford University
1994-1996 Professor of Economics, Department of Economics,
University of California, Davis
1996-2021 Professor of Business, Haas School of Business,
University of California, Berkeley
E.T. Grether Professor of Business Administration and Public Policy, 2000-2021
2021-present Professor of the Graduate School, Haas School of Business,
University of California, Berkeley

Other Past and Current Professional Positions:

1978-1979 Staff Economist, Office of Economic Analysis,
U.S. Civil Aeronautics Board
1981-present Member, American Economics Association
1990-1996 Research Associate, Institute of Transportation Studies,
University of California, Davis

1992-2002	Co-Director, Program On Workable Energy Regulation, University of California Energy Institute
1993-2000	Associate Editor of <i>International Journal of Industrial Organization</i>
1993-1995	Associate Editor of <i>Journal of Industrial Economics</i>
1995-2000	Editor of <i>Journal of Industrial Economics</i>
1997-2003	Member, Governing Board of California Power Exchange Corporation
1998-1999	Chair, Economic Analysis and Policy Group, Haas School of Business
1999-2000	Member, California Attorney General's Gasoline Task Force
1999-2002	Co-Director, National Bureau of Economic Research Project on E-Commerce
2002-2009	Co-Director, Center for the Study of Energy Markets, University of California Energy Institute
2004-2009	Member, Board of Editors, <i>Journal of Economic Literature</i>
1992-present	Research Associate, National Bureau of Economic Research
1992-2012	Associate Editor of <i>Review of Economics and Statistics</i>
1994-2014	Director, University of California Energy Institute
2007-2013	Member, Board of Editors, <i>American Economic Journal: Economic Policy</i>
2008-2017	Member, External Advisory Board, University of Michigan Energy Institute
2009-present	Member, Association of Environmental and Resource Economists
2010-2011	Member, Future of Aviation Advisory Committee, U.S. Department of Transportation
2010-2013	Member, Future of Transportation Fuels Working Group, U.S. Department of Energy, National Petroleum Council
2012-2013	Member, Emissions Market Assessment Committee, California Air Resources Board
2013-2016	Co-Editor, <i>Journal of the Association of Environmental & Resource Economists</i>
2014-2017	Member, Petroleum Market Advisory Committee, California Energy Commission Chair of PMAC 2015-2017
2015-2020	Member, Advisory Council, Bay Area Air Quality Management District
2016-2018	Member, Governing Board, Association of Environmental and Resource Economists
2009-2014, 2018-present	Faculty Director, Energy Institute at the Haas School of Business
2019-present	Member, Board of Governors, California Independent System Operator
2019-present	Member, University of California President's Economic Advisory Group

Honors, Scholarships, Fellowships and Grants:

1979-1981	M.I.T. Graduate Scholarship
1982-1983	Alfred P. Sloan Foundation Research Fellowship
1986	University of Michigan Rackham Research Fellowship
1986-1987	University of Michigan Teaching Development Award
1987-1990	National Science Foundation Research Grant #SES-8711576 Principal Investigator, "Efficiency in the Allocation of Operating Licenses"
Fall 1987	Michigan Economic Society Undergraduate Teaching Award
1988-1989	University of Michigan Rothschild Research Fellowship
1991-1993	Universitywide Energy Research Group Research Grant Co-Principal Investigator(with Colin Cameron)

“Asymmetric Retail Gasoline Price Responses to Crude Oil Price Changes”
 1996-1997 Recipient, Earl F. Cheit Outstanding Teaching Award for Haas Daytime MBA Program
 1996-1997 Finalist, Earl F. Cheit Outstanding Teaching Award for Haas PhD Program
 1996-1997 California Energy Commission
 Empirical Market Power Analysis of California Electricity Markets
 1998-1999 National Bureau of Economic Research/Sloan Foundation Research Grant
 “Why Do Firms Cut Costs?”
 1998 California Independent System Operator
 “Measuring Market Performance in California’s Electricity Industry”
 2002 Voted Favorite Core Curriculum Professor by Haas MBA Class of 2002
 2002 Hewlett Foundation/Energy Foundation Research Grant
 Principal Investigator, “Price-Responsive Demand in Electricity Markets”
 2003-2004 California Energy Commission Research Contract to U.C. Energy Institute
 Principal Investigator, “Market Power in California’s Gasoline Market”
 2005 Distinguished Service Award, Public Utility Research Center, University of Florida
 2005 Distinguished Faculty Mentoring Award (for graduate student mentoring), U.C. Berkeley
 2005-2006 Finalist, Earl F. Cheit Outstanding Teaching Award for Haas Daytime MBA Program
 2007-2008 Research Grant from Coleman Fung Risk Management Research Center
 Principal Investigator,
 “Security of Supply Concerns and Forward Price Premia in Natural Gas Markets”
 2001-2013 California Energy Commission Research Grant to U.C. Energy Institute
 Principal Investigator, “Center for the Study of Electricity Markets”
 2009-2014 U.C. Office of the President Grant
 Principal Investigator, “U.C. Center for Energy and Environmental Economics”
 2010 Microsoft Research Gift
 “The Impact of Dynamic Electricity Pricing on Low-Income Households”
 2010-2011 Lawrence Berkeley National Laboratory
 “Smart Grid and Dynamic Pricing”
 2012-2013 California Air Resources Board
 “Emissions Market Assessment Committee”
 2012-2014 California Air Resources Board
 “Market Simulation Group”
 2013 Research Gift from California Utilities Working Group
 “Investigating a Higher Renewables Portfolio Standard in California”
 2014 Power Association of Northern California Achievement Award for contributions
 to energy research and public policy
 2015 Distinguished Fellow of the Industrial Organization Society
 2009,’14,’15 *American Economic Review* Excellence in Refereeing Award
 2015 International Association for Energy Economics, Outstanding Contributions
 to the Profession Award
 2015 Research Gift from Google
 “Market Mechanisms for Reducing Greenhouse Gas Emissions”
 2015-16 Recipient, Earl F. Cheit Outstanding Teaching Award for Haas Daytime MBA Program
 2017 Energy Foundation Research Grant
 “Modelling an Extension of CA’s Cap & Trade Program to 2030”

2018	Sloan Foundation Research Grant “U.S. Utility Rate Database”
2021	California Air Resources Board “Review of Design and Implementation of GHG Reduction Scoping Plan”
2022	US Association for Energy Economics, Adelman-Frankel Award for unique and innovative contributions to the field of energy economics

Journal Publications:

“Price Discrimination in Free-Entry Markets,” *RAND Journal of Economics*, **16**(Autumn 1985).

“On the Efficiency of Competitive Markets for Operating Licenses,” *Quarterly Journal of Economics*, **103**(May 1988).

“Market Incentives for Safe Commercial Airline Operation,” (with Martin Zimmerman), *American Economic Review*, **78**(December 1988).

“The Economics of Costly Risk Sorting in Competitive Insurance Markets,” *International Review of Law and Economics*, **9**(June 1989).

“How to Carve a Medical Degree: Human Capital Assets in Divorce Settlements,” (with Paul Courant), *American Economic Review*, **79**(December 1989).

“Hubs and High Fares: Dominance and Market Power in the U.S. Airline Industry,” *RAND Journal of Economics*, **20**(Autumn 1989).

“Airline Mergers, Airport Dominance, and Market Power,” *American Economic Review Papers and Proceedings*, **80**(May 1990).

“Carrot and Yardstick Regulation: Enhancing Market Performance with Output Prizes,” (with Mark Bagnoli), *Journal of Regulatory Economics*, **3**(June 1991).

“The Dominant-Firm Advantage in Multi-Product Industries: Evidence from the U.S. Airlines,” *Quarterly Journal of Economics*, **106**(November 1991).

“Selling Costs and Switching Costs: Explaining Retail Gasoline Margins,” *RAND Journal of Economics*, **22**(Autumn 1991).

“The Evolution of U.S. Airline Competition,” *Journal of Economic Perspectives*, **7**(Spring 1992).

“Competition and Price Dispersion in the U.S. Airline Industry,” (with Nancy Rose), *Journal of Political Economy*, **103**(August 1994).

“Antitrust Policy in Aftermarkets,” (with Jeffrey MacKie-Mason and Janet Netz), *Antitrust Law Journal*, **63**(Winter 1995).

“Bankruptcy and Pricing Behavior in U.S. Airline Markets” (with Nancy Rose), *American Economic Review Papers and Proceedings*, **85**(May 1995).

“Dynamic Pricing in Retail Gasoline Markets” (with Andrea Shepard), *RAND Journal of Economics*, **27**(Autumn 1996).

“Settling for Coupons: Discount Contracts as Compensation and Punishment in Antitrust Lawsuits,” *Journal of Law and Economics*, **39**(October 1996).

“Market Power in California Electric Markets” (with James Bushnell, Edward Kahn, and Steven

Stoft), *Utilities Policy*, **5**(3/4, 1996).

“Do Gasoline Prices Respond Asymmetrically to Crude Oil Price Changes?” (with Colin Cameron and Richard Gilbert), *Quarterly Journal of Economics*, **112** (February 1997).

“Why Do All the Flights Leave at 8 a.m.? Competition and Brand Differentiation in Airline Scheduling” (with Janet Netz), *International Journal of Industrial Organization*, **17**(July 1999).

“An Empirical Analysis of the Potential for Market Power in California’s Electricity Industry” (with James Bushnell), *Journal of Industrial Economics*, **47**(September 1999).

“Market Power in Electricity Markets: Beyond Concentration Measures” (with James Bushnell and Christopher Knittel), *Energy Journal*, **20**(4,1999).

“Is Cost Cutting Evidence of X-Inefficiency?” (with Joseph Farrell), *American Economic Review Papers and Proceedings*, **90**(May 2000).

“Exercising Market Power in Proprietary Aftermarkets,” (with Jeffrey MacKie-Mason and Janet Netz), *Journal of Economics and Management Strategy*, **9**(Summer 2000).

“The Competitive Effect of Transmission Lines in a Deregulated Electricity Generation Market” (with James Bushnell and Steven Stoft), *RAND Journal of Economics*, **31**(Summer 2000).

“Economics and Electronic Commerce” (with Garth Saloner), *Journal of Economic Perspectives*, **15**(Winter 2001).

“The Trouble With Electricity Markets: Understanding California’s Restructuring Disaster,” *Journal of Economic Perspectives*, **16**(Winter 2002).

“Sticky Prices, Inventories, and Market Power in Wholesale Gasoline Markets,” (with Andrea Shepard), *RAND Journal of Economics*, **33**(Spring 2002).

“Measuring Market Inefficiencies in California’s Deregulated Wholesale Electricity Market” (with James Bushnell and Frank Wolak), *American Economic Review*, **92**(December 2002).

“The Impact of Bankruptcy on Airline Service Levels” (with Nancy Rose), *American Economic Review Papers and Proceedings*, **94**(May 2003).

“The Long-Run Efficiency of Real-Time Electricity Pricing,” *Energy Journal*,**26**(3) (2005).

“On the Efficiency of Competitive Electricity Markets With Time-Invariant Retail Prices,” (with Stephen Holland), *RAND Journal of Economics*, **36**(Autumn 2005).

“Customer Risk from Real-Time Retail Electricity Pricing: Bill Volatility and Hedgability”, *Energy Journal*,**28**(2) (2007).

“Wealth Transfers Among Large Customers from Implementing Real-Time Retail Electricity Pricing,” *Energy Journal*,**28**(2) (2007).

“Do Investors Forecast Fat Firms? Diagnosing Profit Dissipation from the Stock Market Values of Gold Mining Firms,” (with Joe Farrell), *RAND Journal of Economics*, **38**(Autumn 2007).

“Inefficiencies and Market Power in Financial Arbitrage: A Study of California’s Electricity Markets,” (with James Bushnell, Christopher Knittel, and Catherine Wolfram), *Journal of Industrial Economics*, **56**(2) (June 2008).

“Why Can’t U.S. Airlines Make Money?” *American Economic Review Papers and Proceedings*, **101**(May 2011). (A longer version is available as NBER Working Paper #16744)

“The Public and Private Economics of Renewable Energy,” *Journal of Economic Perspectives*, **26**(Winter 2012).

“The Equity and Efficiency of Two-Part Tariffs in U.S. Natural Gas Markets,” (with Lucas

Davis) *Journal of Law and Economics*, **55**(1), February 2012.

“The Redistributive Impact of Nonlinear Electricity Pricing,” *American Economic Journal: Economic Policy*, **4**(3), August 2012.

“Career Concerns, Inaction and Market Inefficiency: Evidence from utility regulation,” (with Meghan Busse and Ryan Kellogg), *Journal of Industrial Economics*, **60**(2), June 2012.

“Effective and Equitable Adoption of Opt-In Residential Dynamic Electricity Pricing,” *Review of Industrial Organization*, **42**(2), March 2013, 127-160.

“The Incidence of an Oil Glut: Who Benefits from Cheap Crude Oil in the Midwest?” (with Ryan Kellogg) *Energy Journal*, **35**(1), January 2014, 15-33.

“A Microeconomic Framework for Evaluating Energy Efficiency Rebound And Some Implications,” *Energy Journal*, **36**(1), January 2015, 1-21.

“The U.S. Electricity Industry After 20 Years of Restructuring,” (with James Bushnell) *Annual Review of Economics*, **7**, 2015, 437-463.

“The Power and the Limits of Industrial Organization,” *Review of Industrial Organization*, **48**(3), 2016, 241-246.

“The Distributional Effects of US Clean Energy Tax Credits,” (with Lucas Davis) *Tax Policy and the Economy*, **30**, 2016, 191-234.

“The Private Net Benefits of Residential Solar PV: The Role of Electricity Tariffs, Tax Incentives and Rebates,” *Journal of the Association of Environmental and Resource Economists*, **4**(S1), September 2017.

“Expecting the Unexpected: Emissions Uncertainty and Environmental Market Design”, (with James Bushnell, Frank A. Wolak, and Matthew Zaragoza-Watkins) *American Economic Review*, November 2019, **109**(11), pp. 3953-3977.

“Headwinds and Tailwinds: Implications of Inefficient Retail Energy Pricing for Energy Substitution,” (with James Bushnell) *Environmental and Energy Policy and the Economy*, 2022, **3**(1) pp.37-70.

“Do Two Electricity Pricing Wrongs Make a Right? Cost Recovery, Externalities, and Efficiency,” (with James Bushnell) *American Economic Journal: Economic Policy*, November 2022, **14**(4), pp. 80-110.

“Carbon Pricing, Clean Electricity Standards, and Clean Electricity Subsidies on the Path to Zero Emissions,” (with Ryan Kellogg) *Environmental and Energy Policy and the Economy*, 2023, **4**(1).

“The Economics of Electricity Reliability,” *Journal of Economic Perspectives*, forthcoming (with James Bushnell and Erin Mansur).

Other Publications:

“High Air Fares: Don’t Blame Deregulation,” *Washington Post*, August 25, 1987.

“USAir Merger Promises Higher Fares, Less Competition,” *Hartford Courant*, January 12, 1988.

“Losses in Airline Demand and Value Following Accidents,” (with Martin Zimmerman) in Moses and Savage, eds., *Transportation Safety in an Age of Deregulation*, Oxford: Oxford University Press, 1989.

“Dissipating the Airline Deregulation Dividend: The Decline of Competition at Hub Airports,” *Regulation*, Fall 1990 (and reply letter in Winter 1991 issue).

“Prospects for Competitive European Air Travel,” in W.J. Adams, ed. *Singular Europe: Economy and Polity of the European Community After 1992*, Ann Arbor: University of Michigan Press, 1992.

“USAir in 1986,” (with Andrea Shepard), Stanford Graduate School of Business Strategic Management Case S-SM-4, January 1993.

“The Economics of Customer Lock-In and Market Power in the Service Business,” (with Jeffrey MacKie-Mason and Janet Netz) in Patrick T. Harker, ed. *The Service Productivity and Quality Challenge*, Kluwer Academic Press, 1994.

“Uncle Sam at the Gas Pump: Causes and Consequences of Regulating Gasoline Distribution,” (with Richard Gilbert), *Regulation*, Spring 1993.

“A Guide to the Blue Book,” (principal authors Carl Blumstein and James Bushnell), *Electricity Journal*, September 1994.

“Repeat-Buyer Programs in Network Industries,” in Werner Sichel ed., *Networks, Infrastructure, and The New Task for Regulation*, University of Michigan Press, 1996.

“Airline Deregulation” (with Nancy Rose), entry in *The New Palgrave Dictionary of Law and Economics*, New York: Grove’s Dictionaries, 1998.

“Rapid Communication and Price Fixing: The Airline Tariff Publishing Company Case,” in John E. Kwoka and Lawrence J. White, eds., *The Antitrust Revolution: The Role of Economics*, Oxford University Press, 3rd edition, 1998. (Revised version in 4th edition, 2004.)

“A Cheaper Way to Clean Gasoline” (with Steven Stoft) in *San Francisco Chronicle*, March 16, 1999.

Comments on Kole and Lehn’s “Workforce Integration and the Dissipation of Value in Mergers: The Case of USAir’s Acquisition of Piedmont Aviation,” in *Mergers and Productivity*, Steven Kaplan, ed., University of Chicago Press, 2000.

“California ‘Lessons’ Derive from Mischaracterization of Our Work,” (with James Bushnell) letter in *The Electricity Journal*, March 2000.

“Electricity Restructuring: Deregulation or Reregulation?,” (with James Bushnell), *Regulation*, **23**(2, 2000).

“Understanding Competitive Pricing and Market Power in Wholesale Electricity Markets,” *The Electricity Journal*, July 2000.

“California Consumers Haven’t Seen Benefits of Deregulating the Electrical Industry Yet – What Went Wrong?” (with James Bushnell), *San Jose Mercury News*, August 27, 2000.

“Electricity Pricing Should Clue Consumers to Judicious Use,” *Los Angeles Times*, January 17, 2001.

“Government Aid to Airlines is Just Excess Baggage for Taxpayers,” *Los Angeles Times*, August 27, 2002.

“Power Politics Hurts Consumers,” *Financial Times*, August 19, 2003.

“What’s Wrong with Regulating Gasoline Prices?,” *Sacramento Bee*, September 12, 2003.

“Solar Initiative Has a Dark Side”, *San Jose Mercury News*, August 20, 2004.

“Mere drops in the world’s oil barrel”, *San Jose Mercury News*, June 2, 2005.

“Time-Varying Retail Electricity Prices: Theory and Practice,” in Griffin and Puller, eds., *Electricity Deregulation: Choices and Challenges*, Chicago: University of Chicago Press, 2005.

”Will Solar PV Save You Money?”, *San Francisco Chronicle*, April 21, 2008.

“Cost, Conflict and Climate: Navigating the Global Oil Market,” *Milken Institute Review*, 4th Quarter 2008. (a more detailed version of the paper is available as “Cost, Conflict and Climate: U.S. Challenges in the World Oil Market,” Center for the Study of Energy Markets Working Paper #177, University of California Energy Institute, Revised June 2008.)

“Gas Surcharge Could Help Deficit, Environment,” *Sacramento Bee*, November 17, 2008.

“Markets for Anthropogenic Carbon Within the Larger Carbon Cycle,” in *The Design and Implementation of U.S. Carbon Policy*, Don Fullerton and Catherine Wolfram eds., National Bureau of Economic Research and University of Chicago Press, 2012.

“Making the Wrong Case for Renewable Energy,” *Bloomberg Business Class*, February 13, 2012.

“The U.S. Can’t Control the World Oil Markets,” *U.S. News & World Report, Debate Club*, March 2, 2012.

“Why the U.S. Airlines Need to Adapt to a Slow-Growth Future,” *Bloomberg Business Class*, June 4, 2012.

“Seeking a fix for Californias gasoline market problems,” *Los Angeles Times*, December 2, 2012.

“How Airline Markets Work...Or Do They?” (with Nancy Rose), in N. Rose ed., *Economic Regulation and Its Reform: What Have We Learned?*, University of Chicago Press, 2014.

“Three Legacy Airlines and Southwest. Now What?” *Milken Institute Review* (Trends Section), Second Quarter, 2014.

Contributing author on Kolstad C., K. Urama, J. Broome, A. Bruvoll, M. Carillo Olvera, D. Fullerton, C. Gollier, W. M. Hanemann, R. Hassan, F. Jotzo, M. R. Khan, L. Meyer, and L. Mundaca, 2014: “Social, Economic and Ethical Concepts and Methods” in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

“An Economic Perspective on the EPAs Clean Power Plan”, (with Meredith Fowlie, Lawrence Goulder, Matthew Kotchen,(lead authors) James Bushnell, Lucas Davis, Michael Greenstone, Charles Kolstad, Christopher Knittel, Robert Stavins, Michael Wara, Frank Wolak, and Catherine Wolfram), *Science* 14 November 2014: Vol. 346 no. 6211 pp. 815-816.

“Learning to love paying 10 cents more per gallon” *Los Angeles Times*, November 14, 2014.

“Is electricity’s future really in the solar panels on your roof?” *Orange County Register*, August 2, 2015.

“Smug About Your Solar Rooftop? Not So Fast”, *Los Angeles Times*, January 20, 2016.

“The Economics of Fixed Cost Recovery by Utilities”, *The Electricity Journal*, **29**, 2016, 5-12.

“An Rx for cap and trade”, *Sacramento Bee*, August 11, 2016.

“Incandescent bulbs need to go in trash today”, *San Jose Mercury News* and *East Bay Times*, January 6, 2017.

“Mystery Gas Charge Cost California Families \$1,200 Since 2015”, *San Jose Mercury News* and *East Bay Times*, October 30, 2017.

“Keep California oil in the ground? The goal is good, but the policy doesn’t pencil out” *Los Angeles Times*, August 16, 2018.

“What Does Daylight Saving Time Really Save?” *San Jose Mercury News and East Bay Times*, September 27, 2018

“Forget the gas tax. Let’s get to the bottom of California’s 22-cents-a-gallon mystery surcharge” *Los Angeles Times*, October 11, 2018

“Forget limiting Uber and Lyft vehicles to reduce congestion” *San Francisco Chronicle*, December 21, 2018

“Energy whiz Severin Borenstein on keeping the lights on and the fires out after PG&Es bankruptcy” *Los Angeles Times*, January 16, 2019

“Gas prices actually aren’t that high” *Washington Post*, December 2, 2021

“Sorry, rooftop solar supporters, California incentives really do punish the poor” *Los Angeles Times*, March 28, 2022

“It’s time for rooftop solar to compete with other renewables” *Nature Energy*, 7(4), 298-298.

“Betting on cryptocurrency to gird Texas’ grid is magical thinking” *Houston Chronicle*, April 18, 2022

“A California gas tax compromise that’s built to last” *San Jose Mercury News and East Bay Times*, June 22, 2022

“The Economics of Decarbonizing Houses,” *Milken Institute Review*, Third Quarter 2022

“California’s rooftop solar bias is pointing us in the wrong direction” *San Jose Mercury News and East Bay Times*, December 13, 2022

Blog Posts: <https://energyathaas.wordpress.com/> (about 10 per year since 2012)

Educational Software:

“The Competitive Strategy Game,” Version 3.50, August 2011. A computer simulation of competition among firms for use in undergraduate and graduate courses in economics and business. (Since Version 1.0 was released in 1994, the CSG has been used in undergraduate, MBA, and/or Ph.D. courses at more than 90 colleges and universities in 23 countries including U.C. Davis, U.C. Berkeley, U.C. Irvine, Stanford University, University of Michigan, Purdue University, M.I.T., University of Chicago, Yale University, and London Business School.) See <http://csg.haas.berkeley.edu>

“The OPEC Game,” (with Jim Bushnell). A simulation of the world oil market in which student teams, each taking the position of one country in OPEC, make strategic decisions about oil production. Since its creation in 2001, the OPEC game has been used in three different courses at Berkeley and at Yale, Stanford, Texas A&M, UNC-Greensboro, and a number of other universities.

“The Electricity Strategy Game,” (with Jim Bushnell). A simulation of a wholesale electricity market in which student teams decide how much to bid for portfolios of electricity generators and then how to bid that power into a wholesale market. The game can also be augmented to include a tradable permits market for greenhouse gas emissions. Since its creation in 2001,

the ESG has been used at more than 30 universities including U.C. Berkeley, Northwestern, Texas A&M, Dartmouth, MIT, Wharton, Yale, University of Michigan, and Stanford.

Recent Working Papers:

“Designing Electricity Rates for An Equitable Energy Transition” Energy Institute at Haas Working Paper #314, U.C. Berkeley, February 2021 (with Meredith Fowle and James Sallee).

“Paying for Electricity in California: How Residential Rate Design Impacts Equity and Electrification” Energy Institute at Haas Working Paper #330, U.C. Berkeley, September 2022 (with Meredith Fowle and James Sallee).

“When We Change the Clock, Does the Clock Change Us?”, Energy Institute at Haas Working Paper #335, March 2023, (joint with Patrick Baylis and Ed Rubin).

Not-So-Recent Working Papers:

“California’s Cap-and-Trade Market Through 2030: A Preliminary Supply/Demand Analysis”, Energy Institute at Haas Working Paper #281, July 2017 (with James Bushnell and Frank A. Wolak).

“Report of the Market Simulation Group on Competitive Supply/Demand Balance in the California Allowance Market and the Potential for Market Manipulation”, Energy Institute at Haas Working Paper #251, U.C. Berkeley, July 2014 (with James Bushnell, Frank A. Wolak, and Matthew Zaragoza-Watkins).

“Regional and Income Distribution Effects of Alternative Retail Electricity Tariffs,” Energy Institute at Haas Working Paper #225, U.C. Berkeley, October 2011.

“Would Pricing Aviation GHGs Really Lower Efficiency or Profitability?: A Comment on Winchester et al, ‘The Impact of Climate Policy on U.S. Aviation’,” Energy Institute at Haas Working Paper #216, U.C. Berkeley, June 2011.

“An Index of Inter-City Business Travel for Use in Domestic Airline Competition Analysis”, U.C. Berkeley, June 2010.

“To What Electricity Price Do Consumers Respond? Residential Demand Elasticity Under Increasing-Block Pricing”, Center for the Study of Energy Markets Working Paper #195, University of California Energy Institute, September 2009.

“The Implications of a Gasoline Price Floor for the California Budget and Greenhouse Gas Emissions,” Center for the Study of Energy Markets Working Paper #182, University of California Energy Institute, revised December 2008.

“The Value (and Cost) of Time-Varying Electricity Production from Solar Photovoltaic Cells,” Center for the Study of Energy Markets Working Paper #176, University of California Energy Institute, January 2008.

“Electricity Rate Structures and the Economics of Solar PV: Could Mandatory Time-of-Use Rates Undermine California’s Solar Photovoltaic Subsidies?,” Center for the Study of Energy Markets Working Paper #172, University of California Energy Institute, September 2007.

“U.S. Domestic Airline Pricing, 1995-2004,” Competition Policy Center Working Paper CPC05-48, University of California, Berkeley, January 2005.

“Retail Policies and Competition in the Gasoline Industry,” (with James Bushnell) Center for the Study of Energy Markets Working Paper #144, University of California Energy Institute, May 2005.

“Market Power in California’s Gasoline Market,” (with James Bushnell and Matthew Lewis) Center for the Study of Energy Markets Working Paper #132, University of California Energy Institute, May 2004.

“Dynamic Pricing, Advanced Metering, and Demand Response in Electricity Markets,” (with Michael Jaske and Arthur Rosenfeld), Center for the Study of Energy Markets Working Paper CSEM-105, University of California Energy Institute, October 2002. v

“Price Incentives for Fuel Switching: Did Price Differences Slow the Phase-Out of Leaded Gasoline?”, POWER Working Paper PWP-010, University of California Energy Institute, April 1993.

Recent Academic Presentations:

- 2003-04 National Bureau of Economic Research, UC Santa Barbara, Cal Tech, Wharton, International Industrial Organization Conference
- 2004-05 University of Michigan, UC Irvine, University of Florida, American Economics Association, UC Berkeley, UCEI Ninth Annual POWER Conference
- 2005-06 National Bureau of Economic Research, UC Berkeley, Berkeley-Stanford IOfest '05
- 2006-07 University of Michigan, University of Toronto, Northwestern University, UC Berkeley, UC Davis, Resources for the Future
- 2007-08 National Bureau of Economic Research, UC Berkeley, University of Michigan, UC Davis, UCEI Thirteenth Annual POWER Conference
- 2008-09 University of East Anglia, Stanford, NYU, USDOJ, IOfest '08, Rice, Texas A&M, Reed College, American Economics Association, Industrial Organization Society, Arizona State, University of Chicago, UCEI Fourteenth Annual POWER Conference, UC Santa Cruz, Yale, MIT
- 2009-10 National Bureau of Economic Research (3), Lawrence Berkeley National Lab, Columbia University
- 2010-11 International Monetary Fund (2), UCSD, UC Berkeley, Stanford, American Economics Association, UCEI Sixteenth Annual POWER Conference
- 2011-12 Federal Reserve of San Francisco, National Bureau of Economic Research, Harvard University, Duke University, UC Davis
- 2012-13 Carnegie-Mellon University, Case Western Reserve, U.S. Department of Justice, U.C. Berkeley, University of Alberta, Energy Institute at Haas Eighteenth Annual POWER Conference
- 2013-14 University of Chicago, University of Cape Town, NBER, U.C. Berkeley, Stanford, University of Hawaii, Arizona State University, Toulouse School of Economics, University of East Anglia
- 2014-15 Stanford University, University of Michigan, Duke University, Industrial Organization Society, Resources for the Future, USEPA
- 2015-16 US Association for Energy Economics Annual Conference, University of Pittsburgh, University of Chicago (discussant), University of Arizona, Allied Social Science Association (discussant), Energy Institute at Haas POWER Conference, Sloan Foundation workshop, UC Berkeley, Association of Environmental and Resource Economists annual conference
- 2016-17 U.C. Berkeley, Northwestern, NBER, University of East Anglia

- 2017-18 U.C. Berkeley, University of Arizona, Berkeley-Stanford IOfest, NBER, Energy Institute at Haas POWER Conference
- 2018-19 University of Chicago, UC San Diego, University of Minnesota, Harvard, Association of Environmental and Resource Economists winter meeting
- 2020-21 Indiana University, University of East Anglia (UK), American Economics Association, Monash University, University of Basel, Pomona College
- 2021-22 University of Western Ontario, UC-wide Environmental Economics seminar, UC Berkeley Energy Institute at Haas

Recent Policy Presentations:

- 2003-04 Cornerstone conference on Market Manipulation, Haas Alumni Lunch, Oakland Rotary Club, Center for the Study of Electricity Markets, Foundation for American Communications, SF Public Utilities Commission, Northern California Power Agency, Pacific Gas & Electric Law Department, Haas Private Equity Conference, California Energy Commission, World Affairs Council, Power Association of Northern California, Electricity Consumers Research Council, American Society of Appraisers
- 2004-05 Rossmoor Democratic Club, Western Energy Institute, UC Berkeley Wellman Lunch, California Energy Commission, Haas Alumni Association of the South Bay, Discover Cal functions in LA and Irvine, Environmental Defense symposium, Power Systems Engineering Research Center, Public Utilities Research Center (Univ of Florida), National Association of Energy Service Companies, CleanTech Energy Investors
- 2005-06 Silicon Valley Leadership Group, Energy Producers and Users Group, Haas Katrina teach-in, LA County Bar Association, Association of Bay Area Governments, California Manufacturing and Technology Association, Delta Phi Epsilon fraternity, California Republican Assembly Caucus, League of Women Voters, Haas Alumni Association of San Francisco
- 2006-07 Sacramento Economics Roundtable, Lawrence Berkeley National Lab Physics Department, Berkeley Breakfast Club, Berkeley Rotary Club, CSEM electricity policy conference, UCLA Anderson forecasting conference, UC Berkeley Homecoming, Communications Institute National Energy Symposium, UC Office of the President's Agriculture Advisory Committee, UC Berkeley Foundation Trustee's meeting, American Institute of Chemical Engineer's annual meetings, UC Santa Barbara Emerging Energy Technologies conference, ACG/Haas private equity conference, California Institute for Energy and the Environment, UC Berkeley Energy Symposium, Commonwealth Club, MSRI climate change symposium
- 2007-08 Hanson-Briggett energy forum, California Public Utilities Commission, American Society of Heating, Refrigerating and Air-Conditioning Engineers, California Energy Commission, Councils of the California Public Utilities Commission, Haas Orange County Alumni Association, CSEM electricity policy conference, Claremont McKenna College, Haas teach-in on economic downturn, Western Bar Association, BERC Energy Symposium, Golden Gate Society of Petroleum Engineers, BERC Symposium on Public Investment, Richmond Rotary, Power Association of Northern California, Haas Alumni Reunion, Haas EWMBA end-of-year family day
- 2008-09 Haas Alumni Network–New York, Haas Alumni Network–Washington DC, Haas Alumni Network–Tokyo, Discover Cal–Redwood City, Discover Cal–Los Angeles, Calif. Manufacturers & Technology Association, UC Energy Institute, CalStart conference, Fueling California group, Berkeley Rotary Club, PG&E officers' retreat, Tesoro managers' dinner
- 2009-10 Jewish Community Center of the East Bay, Leadership California, UC Osher Lifelong Learning, Energy Institute at Haas Policy Conference, Haas Alumni Association of the South Bay, Multi-scale Systems Center, California Energy Efficiency Industry Council, California Clean

- Energy Fund, BERC Cleantech Symposium, Intel Power conference, Haas Alumni Reunion, Haas Alumni Network–Los Angeles
- 2010-11 Goldman Sachs, ACEEE, PG&E, California Energy Commission, California Public Utilities Commission
- 2011-12 Commonwealth Club, Power Association of Northern California, National Association of Regulatory Utilities Commissioners, California Foundation for Environment and the Economy, Berkeley Energy and Resources Collaborative, Contra Costa Council of Industries, Fueling California Policy Conference on Low Carbon Fuel Standard
- 2012-13 Haas Homecoming, EPRI, UC Berkeley Travers Conference, Haas alumni reunion, Haas CRB ARCS conference, Resources for the Future
- 2013-14 Band of Angels investors meeting, California Public Utilities Commission (2), MIT Center for Energy and Environmental Policy Research, U.C. Berkeley Alumni, U.C. Berkeley Emeritus Faculty Association, California Little Hoover Commission, Organization of Economic Cooperation and Development
- 2014-15 University of Michigan Ford School of Public Policy, Google, Iberdrola, Latham & Watkins (webinar on CA cap and trade), Berkeley/Albany/Emeryville League of Women Voters, Power Association of Northern California, Los Altos Morning Forum, Navigating the American Climate World Conference, US Association for Energy Economics - DC chapter, Sun Power
- 2015-16 Berkeley Breakfast Club, Conference of California Public Utilities Council, World Affairs Council of Sonoma, Citizens' Climate Lobby, Haas alumni of the East Bay, Sacramento Municipal Utility District
- 2016-17 Chicago conference on electricity distribution, Sierra Club, World Affairs Council, University of Hawai'i, California state legislature (2), California Foundation for the Environment and the Economy, Power Association of Northern California
- 2017-18 Alameda Municipal Power Board, Panetta Institute, Carbon Market Compliance Association, California Foundation for the Environment and the Economy, Commonwealth Club, California Public Utilities Commission (2), California State Legislature (2), Haas Alumni Reunion
- 2018-19 California Air Resources Board, Brookings/UC Berkeley Global Climate Action Summit, University of Chicago, Harvard, Berkeley Rotary Club
- 2019-20 California Air Resources Board (2), London School of Economics Bay Area Alumni, California Energy Commission, California Municipal Utilities Association, California Foundation on the Environment and the Economy, Berkeley Energy Resources Collaborative, Haas alumni reunion, Air & Waste Management Association
- 2020-21 Berkeley Energy Resources Collaborative, Indiana University Bonser Lecture, CPUC, California Energy Commission, Harvard Electricity Policy Group, Cal Alumni-NYC, CFEE, World Affairs Council-Sonoma
- 2021-22 Aspen Economic Strategy Group, San Diego Taxpayers Association, CPUC, Energy Institute webinar, Northern California Power Administration, FERC, CARB, UC Davis Energy Graduate Group, Capitol Weekly Energy Forum, Haas Golden Grads Reunion, Resources for the Future

Selected Professional Activities:

Testified before U.S. House of Representatives, Subcommittee on Aviation on proposals for market allocation of airport landing and takeoff slots at 'slot-constrained' airports (9/85).

Member of National Academy of Sciences panel examining the impacts of regulatory reform (10/88).

Co-organizer and participant in Department of Transportation seminar on airline policy, including D.O.T. Secretary Skinner and Assistant Secretary Shane, (2/91).

Participant in Department of Transportation briefing on airline policy for D.O.T. Secretary Card and Assistant Secretary Shane, (8/92).

Co-organizer and Chair of National Bureau of Economic Research conference on “Cooperation, Coordination, and Collusion Among Firms,” (5/93).

Testified before California joint legislative committee on electricity rates and the restructuring of the California electricity industry (10/94).

Organizer of the winter meeting of the National Bureau of Economic Research Program in Industrial Organization (2/95).

Testified before the California Little Hoover Commission on regulation of the California electricity industry (3/96).

Co-organizer (with Ben Hermalin) of IOfest '96 — the first joint Berkeley-Stanford conference in industrial organization (4/96).

Testified before the Minnesota state legislature on airfares at Minneapolis/St. Paul Airport (6/96).

Testified before the California state legislature on market power in the California gasoline markets and the implementation of state-mandated reformulated gasoline (10/96).

Co-organizer (with Ben Hermalin) of IOfest '97 — the third annual joint Berkeley-Stanford conference in industrial organization (10/97).

Testified before a committee of the Transportation Research Board on competition in the U.S. Airline Industry (1/99)

Testified before the California state legislature on oversight and market power in the California electricity markets (3/99).

Testified before the California state legislature on California gasoline prices and markets (4/99 and 6/99).

Organizer of IOfest '99 — the fifth annual joint Berkeley-Stanford conference in industrial organization (10/99).

Testified before the California state legislature on legislative proposals to mitigate gasoline price spikes (3/00 and 4/00).

Testified before the California state legislature on proposals to lower electricity prices and increase supplies (8/00).

Testified before the California state legislature on California electricity crisis (2/01).

Testified before the California state legislature on market manipulation in the California electricity market (5/01).

Testified before the U.S. Senate Committee on Governmental Affairs on the California electricity crisis (6/01).

Organizer of IOfest '01 — the seventh annual joint Berkeley-Stanford conference in industrial organization (10/01).

Testified before the California state legislature on implementing real-time electricity pricing

(6/02).

Organizer of IOfest '03 — the ninth annual joint Berkeley-Stanford conference in industrial organization (10/03).

Testified before the California state legislature on California gasoline prices (12/03).

Co-organizer (with Alan Sorensen) of the winter meeting of the National Bureau of Economic Research program in Industrial Organization (2/04).

Co-organizer (with Catherine Wolfram) of IOfest '05 — the eleventh annual joint Berkeley-Stanford conference in industrial organization (10/05).

Testified before the U.S. Senate Judiciary Committee on competition in the oil refining sector (3/06).

Organizer of inaugural CSEM oil/gasoline conference (12/06).

Organizer of IOfest '07 — the 13th annual joint Berkeley-Stanford conference in industrial organization (10/07).

Testified before California Assembly on Fuel Prices (10/08).

Testified before California Committee on the Twenty-First Century Economy about raising revenues through taxes on externalities (3/09).

Co-organizer (with Dennis Carlton) of NBER Universities Research Conference on “Competition and Government Intervention in the Airline Industry” (5/09).

Organizer of IOfest '11 — the 17th annual joint Berkeley-Stanford conference in industrial organization (10/11).

Testified before California Assembly and CPUC on research and privacy issues related to energy consumption data (9/13).

Co-organizer (with Ben Handel) of IOfest '13 — the 19th annual joint Berkeley-Stanford conference in industrial organization (11/13).

Co-organizer (with Ben Handel) of NBER winter meeting of Industrial Organization program (1/14).

Organizer or co-organizer of annual Energy Institute POWER research conference on energy markets and regulation (1996-2014).

Co-organizer (with Ben Handel) of IOfest '15 — the 21st annual joint Berkeley-Stanford conference in industrial organization (10/15).

Testified before California State Assembly on legislation to modify Bagley-Keane open meeting law, 4/18.

Testified before California State Assembly on gasoline prices, 6/22.

Executive Education Teaching:

“Fundamentals of Electricity Markets,” 2-day course taught with James Bushnell (1/03, 1/04, 9/04, 1/05, 1/06, 1/07, 1/08, 3/09)

“Advanced Topics in Electricity Markets,” 1-day course taught with James Bushnell (3/07)

“Economic Fundamentals of Energy and the Environment,” 2-day course taught with James Bushnell (4/07, 3/08, 3/09, 6/10, 7/12, 3/13, 9/13, 8/14, 5/16, 12/16, 9/17, 6/18, 10/19, 1/20, 9/20, 2/21, 9/21, 2/22, 10/22, 6/23)

Stanford Hoover Summer Teaching Institute on the Economics and Politics of Regulation (module on Energy and Environmental economics), 8/14, 8/15, 8/16, 8/17, 8/18

Dissertations Advised:

Chair or Co-Chair

Victor Stango, Department of Economics (UC Davis), 1995, chair
David Andrade, Department of Economics (UC Davis), 1997, chair
Christopher Knittel, Department of Economics, 1999, co-chair
Eric Emch, Department of Economics, 2000, co-chair
Bennet Zelter, Haas School of Business, 2000, co-chair
Justine Hastings, Department of Economics, 2001, co-chair
Steven L. Puller, Department of Economics, 2001, chair
Erin T. Mansur, Department of Economics, 2002, chair
Matthew Lewis, Department of Economics, 2004, chair
Celeste Saravia, Department of Economics, 2004, chair
Meredith Fowlie, Department of Agricultural & Resource Economics, 2006, co-chair
Amol Phadke, Energy & Resources Group, 2006, chair
Jennifer Shanefelter, Department of Economics, 2007, chair
Andrea Martens, Haas School of Business, 2008, chair
Ryan Kellogg, Department of Agricultural & Resource Economics, 2008, co-chair
Koichiro Ito, Department of Agricultural & Resource Economics, 2011, co-chair
Catherine Hausman, Department of Agricultural & Resource Economics, 2013, co-chair
Naim Darghouth, Energy & Resources Group, 2013, chair
Erica Myers, Department of Agricultural & Resource Economics, 2014, chair
Judson Boomhower, Department of Agricultural & Resource Economics, 2015, chair
Walter Graf, Department of Agricultural & Resource Economics, 2016, co-chair
Joshua Blonz, Department of Agricultural & Resource Economics, 2017, co-chair
Joachim Seel, Energy & Resources Group, 2017, chair
Louis Preonas, Department of Agricultural & Resource Economics, 2018, co-chair
Stephen Jarvis, Energy & Resources Group, 2020, chair

Member

Bart Lipman, Department of Economics (Michigan), 1985
Gail Summerfield, Department of Economics (Michigan), 1986
Stephen Polasky, Department of Economics (Michigan), 1986
Eban Goodstein, Department of Economics (Michigan), 1989
Janet Netz, Department of Economics (Michigan), 1992
Matthew W. White, Department of Economics, 1995
Daniel Rascher, Department of Economics, 1997
Wedad Elmaghraby, Department of Industrial Engineering & Operations Research, 1998
Haru Connolly, Department of Economics, 1998
Kyle Mayer, Haas School of Business, 1999
Guy Holburn, Haas School of Business, 2001
Nathan Hultman, Energy & Resources Group, 2002
Pinar Karaca-Mandic, Department of Economics, 2004
Karen Herter, Energy & Resources Group, 2006
Greg Nemet, Energy & Resources Group, 2007
Matthias Fripp, Energy & Resources Group, 2008
Robert Letzler, Graduate School of Public Policy, 2008
Howard Chong, Department of Agricultural & Resource Economics, 2011
Kate Foreman, Department of Agricultural & Resource Economics, 2013
Matthew Zaragoza-Watkins, Department of Agricultural & Resource Economics, 2014
Andrew Mills, Energy & Resources Group, 2015

Patrick Baylis, Department of Agricultural & Resource Economics, 2016
Carla Peterman, Energy & Resources Group, 2016
Ranjit Deshmukh, Energy & Resources Group, 2016
Karl Dunkle Werner, Department of Agricultural & Resource Economics, 2021
Jesse Buchsbaum, Department of Agricultural & Resource Economics, 2022
Will Gorman, Energy & Resources Group, 2022
Marshall Blundell, Department of Agricultural & Resource Economics, 2022
Jenya Kahn-Lang, Department of Agricultural & Resource Economics, 2022