

## JHIH-SHYANG SHIH

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<b>EDUCATION</b>	Post-Doc., Engineering and Public Policy, Carnegie Mellon University Ph.D., System Analysis and Economics for Public Decision Making, Johns Hopkins University M.S., Environmental Systems, National Cheng-Kung University B.S., Environmental Engineering, National Cheng-Kung University	1991-1995 1985-1990 1981-1983 1977-1981
<b>RESEARCH EXPERIENCE</b>	Fellow, Resources for the Future Consultant, Resources for the Future Special Research Consultant, US EPA (AAAS-EPA Fellow) Research Associate, Department of Engineering and Public Policy, Carnegie Mellon University Consultant, Argonne National Laboratory	1998-present 1995-1997 1995 1991-1995 1995
<b>TEACHING EXPERIENCE</b>	Instructor, Mathematical Foundation for Public Decision Making, Part-Time Programs in Engineering and Applied Science, Whiting School of Engineering, The Johns Hopkins University	1997
<b>HONORS AND AWARDS</b>	Assistant Editor, International Journal of Society Systems Science AWWA Small Systems Division Best Paper Award Who's Who in Science and Engineering, 4th-Ed Director, Oversea Chinese Environmental Engineering and Scientist Association American Association for the Advancement of Science (AAAS)/EPA Fellow Ji-Dian Liang Fellowship Junior Scientist Traveling Award, NATO Advanced Study Institute Research Assistant Fellowship, The Johns Hopkins University Tuition Fellowship, The Johns Hopkins University Chairman of Chinese Graduate Student Association, The Johns Hopkins University Graduate Scholarship, National Cheng-Kung University	2007-present 2007 1998 1997-1998 1995 1994 1993 1987-1990 1985-1990 1986 1981-1983
<b>INVITED REVIEWER</b>	<i>Agricultural and Resource Economics Review, American Association for the Advancement of Science, Annals of Regional Science, Automatica, Environment and Development Economics, Environmental Science and Technology, Growth and Change, International Journal of Society Systems Science, International Transactions in Operational Research, Journal of the Air and Waste Management Association, Journal of Environmental Economics and Management, Journal of Hazardous Materials, Journal of Policy Analysis and Management, Land Economics, Municipal Engineer, Socio-Economic Planning Sciences, Swarthmore College Honors Program examiner (Operations Research and Environmental Systems Engineering), U.S. Environmental Protection Agency (EPA)</i>	
<b>PROFESSIONAL ASSOCIATIONS</b>	American Association for the Advancement of Science Association of Environmental and Resource Economists Institution for Operations Research and Management Science	
<b>REFERRED PUBLICATIONS</b>	Shih, Jhih-Shyang, Dallas Burtraw, Karen L. Palmer, and Juha Siikamäki (2008). "Air Emissions of Ammonia and Methane from Livestock Operations: Valuation and Policy Options," <i>Journal of Air and Waste Management Association</i> , Vol. 58, pp. 1117-1129.	
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Morgenstern, Richard D., Mun S. Ho, Jhih-Shyang Shih, Xuehua Zhang (2004). "The Near-Term Impacts of Carbon Mitigation Policies on Manufacturing Industries," *Energy Policy*, November, Vol. 32, No. 16, pp. 1825-1841.

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Morgenstern, Richard D., William A. Pizer and Jhih-Shyang Shih (2002). "Jobs versus the Environment: An Industry-Level Perspective," *Journal of Environmental Economics and Management*, 43(3), 412-436.

Marianov, Vladimir, Charles S. ReVelle and Jhih-Shyang Shih (2002). "Anticoverage Models for Obnoxious Material Transportation," *Environment and Planning B: Planning and Design*, 29(1), 141 - 150.

Morgenstern, Richard D., William A. Pizer and Jhih-Shyang Shih (2001). "The Cost of Environmental Protection," *The Review of Economics and Statistics*, 83(4): 732-738.

Shih, Jhih-Shyang, Garrick E. Louis and Karen Palmer (2001). "Recycling" in Encyclopedia of Global Change: Environmental Change and Human Society, Goudie A.S. Ed., Oxford University Press, March.

Morgenstern, Richard D., Jhih-Shyang Shih and Stuart Sessions (2000). "Comparative Risk Assessment: An International Comparison of Methodologies and Results," *Journal of Hazardous Materials*, 78, 19-39.

Shih, Jhih-Shyang, Armistead G. Russell and Gregory J. McRae (1998). "An Optimization Model for Photochemical Air Pollution Control," *European Journal of Operational Research*, 106(1), 1-14.

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Shih, Jhih-Shyang and Charles S. ReVelle (1995). "Water Supply Operations during Drought: A Discrete Hedging Rule," *European Journal of Operational Research*, 82, 163-175.

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PUBLICATIONS**

Shih, Jhih-Shyang, Winston Harrington, William Pizer, and Kenneth Gillingham. "Economies of Scale in Community Water Systems." In *The Business of Water: A Concise Overview of Challenges and Opportunities in the Water Market*. Steve Maxwell, Editor. January, 2008. American Water Works Association. Denver, CO.

Morgenstern, Richard D., William A. Pizer, Jhih-Shyang Shih. "Evaluating Voluntary U.S. Climate Programs: The Case of Climate Wise." In *The Reality Check: The Nature and Performance of Voluntary Environmental Programs in the United States, Europe, and Japan*. Richard D. Morgenstern and William A. Pizer, Editors. February, 2007. Resources for the Future, Washington DC.

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**RESOURCES**

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**CONFERENCE  
PROCEEDINGS**

Shih, Jhih-Shyang, Dallas Burtraw, Karen Palmer and Juha Siikamaki. "Valuation of Air Emissions from Livestock Operations and Options for Policy." *Proceedings of Workshop on Agricultural Air Quality: State of the Science*, June 5-8, 2006. Potomac, Maryland. Ed. Viney P. Aneja, William H. Schlesinger, Raymond Knighton, Greg Jennings, Dev Niyogi, Wendell Gilliam, and Clifford S. Duke. Raleigh: North Carolina State University, 2006.

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Shih, Jhih-Shyang and H. Christopher Frey. "Coal Blending Optimization Under Uncertainty," Tenth Annual International Pittsburgh Coal Conference, September 1993, Pittsburgh, Pennsylvania, p. 1110-1115.

Shih, Jhih-Shyang and Charles S. ReVelle. "Water Supply Operations during Drought," *Proceeding of Water Forum '92*, August 1992, Baltimore, Maryland, p. 310-315.

**DISCUSSION  
PAPERS**

Ho, Mun, Richard D. Morgenstern, Jhih-Shyang Shih. "Impact of Carbon Price Policies on U.S. Industry." RFF Discussion Paper 08-37. December 2008.

Pizer, William A., Richard D. Morgenstern, Jhih-Shyang Shih. "Evaluating Voluntary Climate Programs in the United States." RFF Discussion Paper 08-13. July 2008.

Macauley, Molly K. and Jhih-Shyang Shih. "A Cost-Index Approach to Valuing Investment In Far Into The Future Environmental Technology." RFF Discussion Paper 07-29. June 2007.

Shih, Jhih-Shyang, Dallas Burtraw, Karen Palmer and Juha Siikamaki. "Air Emissions of Ammonia and Methane from Livestock Operations: Valuation and Policy Options." RFF Discussion Paper 06-11. March 2006.

Palmer, Karen L., Dallas Burtraw, and Jhih-Shyang Shih. "Reducing Emissions from the Electricity Sector: The Costs and Benefits Nationwide and for the Empire State." RFF Discussion Paper 05-23. June 2005.

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Macauley, Molly K., Karen L. Palmer, Jhih-Shyang Shih, Sarah Cline, and Heather Holsinger. "Modeling the Costs and Environmental Benefits of Disposal Options for End-of-Life Electronic Equipment: The Case of Used Computer Monitors," RFF Discussion Paper 01-27. June 2001.

Burtraw, Dallas, Alan J. Krupnick, Richard D. Morgenstern, William A. Pizer and Jhih-Shyang Shih. "Workshop Report: Pollution Abatement Costs and Expenditures (PACE) Survey Design for 2000 and Beyond," RFF Discussion Paper 01-09. April 2001.

Allen Blackman, Steven Newbold, Jhih-Shyang Shih and Joe Cook. "The Benefits and Costs of Informal Sector Pollution Control: Mexican Brick Kilns," RFF Discussion Paper 00-46. Oct. 2000.

Morgenstern, Richard D., William A. Pizer and Jhih-Shyang Shih. "Jobs versus the Environment: Is There a Trade-off?" RFF Discussion Paper 99-01. Oct. 1998.

Morgenstern, Richard D., William A. Pizer and Jhih-Shyang Shih. "The Cost of Environmental Protection," RFF Discussion Paper 98-36. May 1998.

Morgenstern, Richard D., William A. Pizer and Jhih-Shyang Shih. "Are We Overstating the Economic Costs of Environmental Protection?" RFF Discussion Paper 97-36. May 1997.

**SELECTED  
PRESENTATIONS**

Shih, Jih-Shyang. "China SPARROW." USGS, Feb. 22<sup>th</sup>, 2008, Reston, VA.

Shih, Jih-Shyang, Dallas Burtraw, Karen L. Palmer, and Juha Siikamäki. "Air Emissions of Ammonia and Methane from Livestock Operations: Valuation and Policy Options." Trans-Atlantic INFRADAY Conference on Applied Infrastructure Modeling and Policy Analysis. *"Critical Infrastructures in Energy and Other Networked Industries"* College Park, MD (USA). November 2, 2007.

Shih, Jih-Shyang, Dallas Burtraw, Karen Palmer, and Juha Siikamäki. "Air Emissions of Ammonia and Methane from Livestock Operations: Valuation and Policy Options." Invited poster presentation. The Fourth California Annual Climate Change Research Conference, Sept. 10-13, 2007, Sacramento, CA.

Shih, Jih-Shyang, Dallas Burtraw, Karen Palmer, Juha Siikamäki. "Valuation of Air Emissions from Livestock Operations and Options for Policy," Workshop on Agricultural Air Quality: State of the Science, June 5-8, 2006, Bolger Conference Center, Potomac, Maryland.

Shih, Jih-Shyang. "The Development of Clean Coal Technology in the US." Invited speaker. 2007 CTCI Foundation Environmental & Energy Convention. January 16-18, 2007. Taipei, Taiwan, ROC.

Yan, Tingting, Jih-Shyang Shih, and James N. Sanchirico. "Sustainable Groundwater Management using Economic Incentive Approaches." Poster presentation. AGU Fall Meeting. December 11-15, 2006. San Francisco, CA.

Shih, Jih-Shyang, Winston Harrington, William A. Pizer, and Kenneth T. Gillingham. "Economies of Scale in Community Water Systems," 36<sup>th</sup> Annual Regulatory Policy Conference, Dec. 5-8, 2004, Charleston, South Carolina.

Shih, Jih-Shyang, Michelle S. Bergin, Alan J. Krupnick and Armistead G. Russell. "Controlling Ozone and Fine Particulates with Meteorological Variability: Development of an Integrated Framework." INFORMS Annual Meeting. October 25-27, 2004. Denver, Colorado.

Shih, Jih-Shyang. "Controlling Ozone and Fine Particulates with Meteorological Variability: Development of an Integrated Framework," DOGEE Department Seminar, The Johns Hopkins University, Dec. 2, 2003, Baltimore, Maryland.

Shih, Jih-Shyang, Michelle S. Bergin, Alan J. Krupnick, and Armistead G. Russell. "Source-Receptor Matrices and Cost-Benefit Analysis With Meteorological Variability for Ambient Ozone and Fine Particulates: Development and Demonstration of an Integrated Model and Framework." Air & Waste Management Association Annual Conference, June 22-26, 2003, San Diego, CA.

Macauley, Molly K. and Jih-Shyang Shih. "Effects of Carbon Policies and Technological Change on Consumer Surplus in Electricity Generation," Japan ESRI Collaboration Projects Forum, Feb. 27 – Mar. 1, 2003, Tokyo, Japan.

Macauley, Molly K. and Jih-Shyang Shih, Emily Aronow, David Austin, Tom Bath, and Joel Darmstadter. "Measuring the Potential of Renewable Energy." 5<sup>th</sup> Conference on Global Economic Analysis, June 5-7, 2002. Taipei, Taiwan, ROC.

Macauley, Molly K. Karen L. Palmer, Jih-Shyang Shih\*, Sarah Cline and Heather Holsinger. "Modeling the Costs and Environmental Benefits of Disposal Options for End-of-Life Electronic Equipment: The Case of Used Computer Monitors," Taiwan EPA. August 23, 2001. Taipei, Taiwan, ROC.

Macauley, Molly K., Karen L. Palmer, Jih-Shyang Shih, Sarah Cline and Heather Holsinger. "Modeling Used Computer Monitor Discard Behavior," International Forum of the Collaboration Project in March 2000, Economic and Social Research Institute, Economic Planning Agency, Government of Japan. March 15 - 18, 2001. Tokyo, Japan.

Macauley, Molly K., Karen L. Palmer, Jhih-Shyang Shih, Sarah Cline and Heather Holsinger. "Using Incentives to Increase Recycling of Electronic Equipment: A Project Update." International Forum of the Collaboration Project in Autumn 2000, Economic Research Institute, Economic Planning Agency, Government of Japan, September 22 - 24, 2000, Osaka, Japan.

Blackman, Allen, Steven Newbold, Jhih-Shyang Shih and Joe Cook. "Benefits and Costs of Alternative Pollution Control Strategies for Traditional Brick Kilns in Cd. Juárez, Mexico: Model Description and Preliminary Results." AAEA, July 31 - August 2, 2000, Tampa, FL.

Shih, Jhih-Shyang, Garrick E. Louis and Francis C. McMichael. "An Optimization Model for Municipal Solid Waste Recycling." INFORMS Spring 2000. May 7-10. Salt Lake City, Utah.

Blackman, Allen, Steven Newbold and Jhih-Shyang Shih. "Benefits and Costs of Alternative Pollution Control Strategies for Traditional Brick Kilns in Cd. Juárez, Mexico: Some Preliminary Results." Joint Advisory Committee meeting. December 2, 1999. El Paso, Texas.

Louis, Garrick E. and Jhih-Shyang Shih. "A Flexible Inventory System for Municipal Solid Waste Recycling." US EPA, OSW, October 6, 1999, Washington, DC.

Shih, Jhih-Shyang. "An Optimization Model for Photochemical Air Pollution Control," invited speaker, Systems Group, DOGEE, The Johns Hopkins University. Nov. 17, 1998, Baltimore, Maryland.

Shih, Jhih-Shyang. "An Air Quality Management Model: Considering Uncertainty and Spatial Distribution of Pollutants," invited speaker, School of Civil and Environmental Engineering, Georgia Institute of Technology. September 29, 1998. Atlanta, Georgia.

Shih, Jhih-Shyang. "Risk and Cost-Benefit Analysis in Environmental Decision Making," Taiwan EPA Workshop. May 20, 1998, Taipei, Taiwan, ROC.

Shih, Jhih-Shyang, Armistead G. Russell and Gregory J. McRae. "Optimal Photochemical Air Pollution Control." The 5th MTETS conference, May 26 to May 30, 1998, Southeast University, Nanjing, PRC.

Shih, Jhih-Shyang, Armistead G. Russell and Gregory J. McRae. "Optimal Photochemical Air Pollution Control." invited workshop presentation, May 25, 1998, Southeast University, Nanjing, PRC.

Shih, Jhih-Shyang, Armistead G. Russell and Laurie McNair. "An Air Quality Management Model: Considering Uncertainty and Spatial Distribution of Pollutants." INFORMS National Meeting, May 5 - 8, 1996, Washington DC.

Shih, Jhih-Shyang. "Photochemical Pollution Control: Considering Uncertainty and Spatial Distribution of Pollutants." Dept. Seminar, Catholic University of America, Dept. Of Civil Engineering, April 18, 1996.

Shih, Jhih-Shyang. "Photochemical Pollution Control: Considering Uncertainty and Spatial Distribution of Pollutants." AAAS/EPA Fellowship, Aug. 9<sup>th</sup>, 1995, Washington, DC.

Shih, Jhih-Shyang and Gregory J. McRae. "An Optimization Model for Urban Air Pollution Control: A Los Angeles Case." ORSA/TIMS National Meeting, 24-27 April, 1994, Boston.

Shih, Jhih-Shyang and H. Christopher Frey. "Coal Blending Optimization Under Uncertainty." Annual Meeting of the Society for Risk Analysis, Dec. 4-7, 1994, Baltimore, Maryland.

Shih, J.-S.\* and C. Frey. "Coal Blending Optimization Under Uncertainty." Center for Transportation Analysis. December 6, 1993, Oak Ridge, Tennessee.

Shih, J.-S.\* and C. Frey. "Coal Blending Optimization Under Uncertainty." Tenth Annual International Pittsburgh Coal Conference. September 20-24, 1993, Pittsburgh, Pennsylvania.

Shih, Jih-Shyang and Charles S. ReVelle. "Water Supply Operations During Drought." NATO Advanced Study Institute, Engineering Risk and Reliability in a Changing Physical Environment: New Developments in Water Resources Management with Application to Non-Steady Conditions. May 24 - June 3, 1993, Hotel du Golf, Deauville, France.

Shih, Jih-Shyang and Charles S. ReVelle. "Water Supply Operations During Drought." Water Forum '92, Aug. 2-5, 1992, Baltimore, Maryland.