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### EDUCATION

Ph.D. (Economics)	Cornell University	1974
M.A. (Economics)	Cornell University	1972
B.A. (Economics)	University of Utah	1970

### RESEARCH AND TEACHING FIELDS

Environmental & Resource Economics	Natural & Man-Made Hazards
Energy Economics	Economic Development
Regional & Urban Economics	Applied General Equilibrium Analysis

### EMPLOYMENT HISTORY

Professor, Department of Geography, The Pennsylvania State University	2002-
Professor, Department of Energy, Environmental, and Mineral Economics, The Pennsylvania State University (Department Head, 1988-02)	1988-02
Professor, Department of Mineral Resource Economics, West Virginia University (Department Chairman, 1986-88)	1984-88
Associate Professor, Department of Mineral Resource Economics, West Virginia University (Department Chairman, 1981-83)	1981-84
Faculty Associate, Regional Research Institute, West Virginia University	1981-88
Assistant Professor, Department of Economics, University of California, Riverside	1977-81
Lecturer, Department of Economics, University of California, Riverside	1975-77
Senior Council Economist, New York State Council of Economic Advisers	1974-75

### RECENT VISITING POSITIONS

Visiting Fellow, East-West Center	2004
Resident Visitor, Resources for the Future	2001

### RECENT ADVISORY POSITIONS

U.S. EPA Advisory Panel on the Second Generation Climate Policy Model	2004
Chair, NSF Site Review Team, Center for Decision-Making under Uncertainty	2004
National Academy of Sciences, Panel on Economic Benefits of Improved Seismic Monitoring	2003-

Consortium for Atlantic Regional Assessment of Climate Change, Advisory Council	2003-
NSF/Earthquake Engineering Research Institute, Panel on Research Opportunities for Earthquake Engineering	2001-03
Pennsylvania Consortium for Interdisciplinary Environmental Policy, Committee on Climate Change and Energy (Chair, 2001-03)	2001-
Multidisciplinary Center for Earthquake Engineering Research, Research Committee	2001
Editorial Board, <i>Energy Policy</i>	2000-
Editorial Board, <i>Pacific and Asian Journal of Energy</i>	1995-
Editorial Board, <i>Resource and Energy Economics</i>	1993-

### **SELECTED PUBLICATIONS**

#### *Recent Refereed Journal Articles*

- “Modeling Regional Economic Resilience to Disasters: A Computable General Equilibrium Analysis of Water Service Disruptions,” Journal of Regional Science, forthcoming (with S. Liao).
- “Reducing the Conflict Between Climate Policy and Energy Policy in the U.S.: The Important Role of the States,” Energy Policy, forthcoming (with T. Peterson).
- “Incentive-Based Approaches to Greenhouse Gas Mitigation in Pennsylvania: Protecting the Environment and Promoting Fiscal Reform,” Widener Law Journal, forthcoming (with R. McKinstry and C. Ripp).
- “A Greenhouse Gas Emissions Inventory for Pennsylvania,” Journal of the Air and Waste Management Association, forthcoming (with B. Yarnal and others).
- “Global Climate Change and the Value of Solar Energy in the U.S. Agriculture,” Land Economics, forthcoming (with R. Kamat and J. Shortle).
- “Defining and Measuring Economic Resilience to Disasters,” Disaster Prevention and Management, Vol. 13, No. 4, 2004, pp. 307-14.
- “Interregional Burden-Sharing of Greenhouse Gas Mitigation in the United States,” Mitigation and Adaptation Strategies for Global Change, Vol. 9, No. 3, 2004, pp. 477-500 (with Z. Zhang).
- “Greenhouse Gas Mitigation Action Planning,” Penn State Environmental Law Review, Vol. 12, No. 1, 2003, pp. 153-71.
- “A Dynamic Analysis of the Marketable Permits Approach to Global Warming Policy: A Comparison of Spatial and Temporal Flexibility,” Journal of Environmental Economics and Management, Vol. 44, No. 1, 2002, pp. 45-69 (with B. K. Stevens).
- “Business Interruption Losses from Natural Hazards: Conceptual and Methodological Issues in the Case of the Northridge Earthquake,” Environmental Hazards: Human and Policy Dimensions, Vol. 4, No. 2, 2002, pp. 1-14 (with D. Lim).
- “Greenhouse Gas Reduction in the U.S.: Identifying Winners and Losers in an Expanded Permit Trading System,” Energy Journal, Vol. 23, No. 1, 2002, pp. 1-18 (with G. Oladosu).
- “An Economic Analysis of Flexible Permit Trading in the Kyoto Protocol,” International Environmental Agreements, Vol. 1, No. 2, 2001, pp. 219-42 (with B. K. Stevens).
- “Characterizing Economic Impacts and Responses to Climate Change,” Global and Planetary Change, Vol. 25, No. 2, 2000, pp. 67-81 (with J. Shortle and others).

Recent Research Reports

Greenhouse Gas Emissions Inventory for Pennsylvania, Report to the Pennsylvania Department of Environmental Protection, Center for Integrated Regional Assessment, The Pennsylvania State University, 2003 (with B. Yarnal and others).

User Costs in Seismic Risk Management for Urban Infrastructure Systems, Report to the National Science Foundation, Department of Geography, University of Washington, 2002 (with S. Chang and others).

Chad-Cameroon Development Project: Economic Impact Assessment of Cameroon, Report to the World Bank for ExxonMobil, URS Corporation, Houston, TX, 2002 (with F. Bayne).

Mid-Atlantic Regional Assessment (MARA): The Impacts of Climate Change, Report to the U.S. Environmental Protection Agency, The Pennsylvania State University, 2000 (with A. Fisher and others).

Recent Contributions to Public Documents

National Research Council. 2005. Economic Benefits of Improved Seismic Monitoring, Washington, DC: National Academy Press, 2004 (with other members of a National Academy of Sciences Panel).

European Union. 2003. "Understanding Sources of Resiliency to Natural Hazards," in A. van der Veen et al. (eds.) Proceedings of the Joint NEDEIS and University of Twente Workshop: In Search of a Common Methodology for Damage Estimation, Bruxelles: Office for Official Publications of the European Communities, 2003, pp. 137-50 (with S. Liao).

National Institute of Building Sciences/Federal Emergency Management Agency, "Indirect Economic Losses," Flood Loss Estimation Methodology, Washington, DC, 2003 (with H. Cochrane and S. Chang).

Earthquake Engineering Research Institute, Securing Society Against Catastrophic Loss: A Research and Technology Transfer Plan, Report to the National Science Foundation, Oakland, CA, 2002 (with other members of an Expert Review Panel).

**PROFESSIONAL PRESENTATIONS (Selected)**Conferences of Professional Organizations

American Economic Association Meetings: 1986, 1987

American Association for the Advancement of Science Meetings: 1991, 1992, 1994

American Society of Civil Engineers

Structural Engineers Joint World Congress: 1998

U.S. Conference on Lifeline Earthquake Engineering: 1999

Association of American Geographers Meetings: 2003, 2004

Association of Environmental and Resource Economists

European Meetings: 1992, 1993, 1996, 1997, 2000, 2001, 2003, 2004

World Congress: 1998

International Association for Energy Economics

International Meetings: 1999, 2001, 2002

North American Meetings: 2000

International Society for Ecological Economics Biennial Meetings: 1996, 1998

Regional Science Association

European Meetings: 1994

North American Meetings: 1990, 1992, 1994-97, 1999, 2001-03

Pacific Meetings: 1995

Western Economic Association, 1980, 1994, 1999

### **PROFESSIONAL RESEARCH ACTIVITIES (Recent and Current)**

#### **Major Grant and Contract Research**

- Principal Investigator and Project Director, Pennsylvania Department of Environmental Protection contract – Economic Impact Modeling of Pennsylvania’s Indigenous Resources, 2004-.
- Track A Team Leader, National Institute of Building Sciences/Federal Emergency Management contract – Independent Study to Assess Future Savings from Hazard Mitigation Activities (requested by U.S. Congress), 2003-04 (consultant to Applied Technology Council).
- Principal Investigator and Project Director, National Science Foundation grant (through the Multidisciplinary Center for Earthquake Engineering Research) – Modeling Regional Economic Losses from Earthquakes: LA Lifeline Study, 2003-04.
- Co-Principal Investigator and Project Leader, Pennsylvania Department of Environmental Protection contract – Pennsylvania Greenhouse Gas Emissions Inventory, 2001-03.
- Co-Principal Investigator, U.S. Department of Energy NIGEC contract – Climate Change and Policy Impacts on the Southeastern U.S. Economy, 2000-01 (subcontractor through University of Alabama; renewed Phase 2, 2001-02).

#### **Consultantships**

- DHS Center for Risk and Economic Analysis of Terrorism Events – Analyzing Threats to the Economy through Computable General Equilibrium Analysis, 2004-.
- U.S. Department of Defense – Independent Review Panel on Economic Impact Analysis Methodology for the Base Realignment and Closure 2005 Process (through Booz Allen Hamilton), 2004.
- U.S. Department of Homeland Security – Development of a Framework to Estimate the Economic Impacts of Terrorist Attacks (subcontractor to ABS Consulting), 2004.
- ICF Consulting, Inc. – Upgrading the Outer Continental Shelf Economic Impact Models for the Gulf of Mexico and the Alaska OCS, 2003-.
- Center for Energy and Economic Development – Economic Impact of Wind-Generated Electricity Displacement of Coal, 2003.