

**CARNEGIE MELLON UNIVERSITY and  
SANTA FE INSTITUTE**

**VITAE**

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| <b>NAME</b>                   | <b>John Howard Miller</b>   |  |
| <b>ADDRESS</b>                | Carnegie Mellon University<br>Porter Hall 208<br>Pittsburgh, PA 15213<br>(412) 268-3229 (office)<br>(412) 268-6938 (fax)<br>email: miller@santafe.edu<br>www: <a href="http://zia.hss.cmu.edu/">http://zia.hss.cmu.edu/</a>   | Santa Fe Institute<br>1399 Hyde Park Road<br>Santa Fe, NM 87501<br>(505) 984-8800 (office)<br>(505) 982-0565 (fax) |
| <b>EDUCATION</b>              | Ph.D., Economics, University of Michigan, 1988.<br>M.A., Economics, University of Michigan, 1984.<br>B.A., Economics, with Distinction, University of Colorado, 1982.<br>B.S., Finance, Cum Laude, University of Colorado, 1982.  |  |
| <b>RESEARCH INTERESTS</b>     | Economic and game theory, complex adaptive systems theory, auction markets, cooperation, experimental economics, and adaptive computation.  |  |
| <b>ACADEMIC POSITIONS</b>     | Research Professor, Santa Fe Institute, 2003 to present.<br>Professor of Economics and Decision Sciences, Department of Social and Decision Sciences (SDS) (and Graduate School of Industrial Administration (GSIA), by courtesy), Carnegie Mellon University (CMU), 2000 to present.<br>Associate Professor of Economics and Decision Sciences, SDS (and GSIA, by courtesy), CMU, 1995 to 1999.<br>Assistant Professor of Economics and Decision Sciences, SDS, (and GSIA, by courtesy), CMU, 1990 to 1994.<br>External Professor, Santa Fe Institute, 1989 to present.<br>Post-doctoral Fellow, Santa Fe Institute, 1988 to 1990. |  |
| <b>ADMIN. POSITIONS</b>       | Head, Department of Social and Decision Sciences, Carnegie Mellon University, 2002 to present.<br>Head, Information Systems Program (and Major prior to 2000), Carnegie Mellon University, 1998 to 2001.<br>Director (and cofounder with J. Holland) of the program in Adaptive Computation, Santa Fe Institute, 1990 to 1992. Directorate, 1992 to 1999.   |  |
| <b>FELLOWSHIPS AND HONORS</b> | Elliot Dunlap Smith Award for Distinguished Teaching and Educational Service, College of Humanities and Social Sciences, CMU, 1995.<br>Outstanding Teaching Award, Dept. of Social and Decision Sciences, CMU, 1991.<br>Maxwell Visiting Fellow, Santa Fe Institute, 1991.<br>Sigma Xi, 1991.<br>Post-doctoral Fellowship, Santa Fe Institute, 1988 to 1990.<br>NICHD Graduate Fellowship in Economic Demography, 1983 to 1987.<br>Val B. Fischer Award in Social Sciences, University of Colorado, 1982.<br>Phi Beta Kappa, 1982.  |  |

**TEACHING  
AND  
RESEARCH  
EXPERIENCE**

Cofounder, codirector, and faculty member for the annual *Graduate Workshop in Computational Economics*, Santa Fe, New Mexico, 1995 to present.

Teaching, Department of Social and Decision Sciences, Carnegie Mellon University, 1990 to present. Courses in game theory, principles of economics and social decision making (laboratory-based), intermediate microeconomics and policy analysis, empirical research methods, complex adaptive systems theory, and graduate research.

Resident research director for the Adaptive Computation program, Santa Fe Institute, Santa Fe, New Mexico, 1990.

Post-doctoral Fellow, Santa Fe Institute, Santa Fe, New Mexico, 1988 to 1990.

Teaching Assistant, Department of Economics, University of Michigan, 1987 to 1988 (core graduate microeconomic theory courses under H. Varian and L. Blume).

Research Fellow, Economic Demography Training Program, University of Michigan, Population Studies Center, 1983 to 1987.

Editorial Assistant and Reviewer, 1985 to 1986 (reviewed, edited, proof-read, and developed questions for H. Varian, *Intermediate Microeconomics: A Modern Approach* (Norton, 1987), and created questions and answers for T. Bergstrom and H. Varian, *Workouts in Intermediate Microeconomics* (Norton, 1987)).

Research Assistant, Department of Economics, University of Michigan, 1985 (under T. Bergstrom).

Teaching Assistant, Department of Economics, University of Michigan, 1983, and Department of Economics, University of Colorado, 1981 to 1982.

Researcher, Office of Energy Conservation, State of Colorado, 1981 to 1983.

**ADDITIONAL  
INFORMATION**

Editorial Board, Santa Fe Institute (since 1999).

Associate Editor *Journal of Economic Behavior and Organizations* (since 1996).

Associate Editor *Journal of Computational Economics* (since 1997).

Editorial board for *Journal of Evolutionary Economics* (since 1998).

Referee for *American Economic Review*, *American Political Science Review*, *BioScience*, *Complexity*, *Complex Systems*, *Computational Economics*, *Economic Behavior and Organization*, *Economic Dynamics and Control*, *Economic J.*, *Evolutionary Economics*, *Games and Economic Behavior*, *ICGA*, *IEEE*, *Intl. J. of Game Theory*, *J. of Economics*, *J. of Econometrics*, *J. of Economic Education*, *J. of Political Economy*, *J. of Theoretical Biology*, *J. of Theoretical Politics*, National Science Foundation, *PhysicaD*, and Social Sciences and Humanities Research Council of Canada.

Cofounded and coorganized a workshop on “Computational Political Economy” (with K. Kollman and S. Page), NSF, Ann Arbor, MI, Fall, 1998.

Cofounded and coorganized workshops on “Theoretical Computation in Economics” (with M. Boldrin) and “Adaptive Computation” (with J. Holland), Santa Fe Institute, Santa Fe, New Mexico, Spring 1992.

Invited lecturer, Summer School on Complex Systems Analysis, Santa Fe, New Mexico, 1989–91, 1995–1998. Full lecture series in 1995 and 1998.

Invited participant, research workshop on “Complexity and Evolution,” Institute for Scientific Interchange, Torino, Italy, May 1990.

Invited participant for the following Santa Fe Institute workshops (title of talks available on request): “The Global Economy as a Complex Adaptive System” (Sep, 1993), “Crude Look at the Whole” (June, 1993), “Operations Research and Complex Adaptive Systems” (May, 1992), “Theoretical Computation in Economics” (April, 1992), “Founding Workshop in Adaptive Computation” (March, 1992), “Adaptive Processes and Organizations: Models and Data” (Feb, 1992), “Price Dynamics and Trading Strategies in Double Auction Markets II” (June, 1991),

“Emergence of Market Structure” (May, 1991), “Waddington Meetings on Theoretical Biology” (May, 1991), “Learning, Rationality, and Games” (April, 1991), “Technological Innovation” (Feb, 1991), “Learning in Economics, Psychology, and Computer Science” (Jan, 1991), “Strategic Market Games and the Theory of Money” (Dec, 1990), “A Framework for Understanding Technological Evolution” (Oct, 1990), “Price Dynamics and Trading Strategies in Double Auction Markets” (May, 1990), “The Economy as an Evolving, Complex System” (Sep, 1989 and 1988).

## INVITED TALKS

Santa Fe Institute, Public Lecture Series, “Complex Political Systems” (Oct, 1998); Association of American Law Schools, “Computational Models of Complex Systems” (Jan, 1998);

Honda Research and Development, “Complex Systems and Adaptive Computation” (May, 1997); Columbia University, “Tiebout Models of Sorting” (Apr, 1997); U. of Michigan, “Decentralized Sorting” (Apr, 1997); American Association for the Advancement of Science, “Computational Models and Social Theory” (S. Page) (Feb, 1997); UCLA, Conference on Computable Economics (invited moderator), (Feb, 1997); American Economic Association, “Computational Models of Agent Sorting” (Jan, 1997);

SFI, Fall Science Symposium, “Complex Political Systems” (Oct, 1996); Consortium of Colleges for Organizational Research, “Computational Models of Complex Social Systems” (Jul, 1996); UCLA, “Roundtable Discussion on Computational Economics” (Feb, 1996); Robert Morris, “Learning By Doing: Teaching Economics with Experiments” (Feb, 1996); Wharton, “Auctions with Artificial Adaptive Agents” (Feb, 1995);

6th Int. Conf. on Socio-Economics, Paris, “Demand for Altruism” (July, 1994); Johns Hopkins U., D. of Economics, “Coevolution of Strategic Agents” (March, 1994); Conf. on Research in Computational Economics, U. of Minnesota, invited discussant on “Artificial Intelligence in Computational Economics” (March, 1994); Conf. on Multiple Equilibria and Evolutionary Processes, UCLA, “Auctions with Artificial Adaptive Agents” (March, 1994); Cal Tech, “Coevolution and Games” (March, 1994); U. of Colorado, “Computational Theory in Economics” (Jan, 1994);

Princeton U., D. of Ecology and Evolutionary Biology, “Adaptation in Biology and Economics” (Oct, 1993); U. of Pittsburgh, D. of Economics, Pittsburgh, Pennsylvania, “Adaptation and Game Theory” (April, 1993); Santa Fe Institute Science Symposium, Santa Fe, New Mexico, “Adaptive Behavior in Markets” (March, 1993);

Bay Area Symposium on Adaptive Computation, Stanford, California, “The Coevolution of Economic Agents and Markets” (July, 1992); Conf. on Computational Economics, Austin, Texas, “The Effectiveness of Neural Networks as Traders in Computerized Double Auction Markets” (May, 1992); Wharton, “AAA and Games” (Feb, 1992); New York U. and Russel Sage, “Strategic Adaptation in Games” (Jan, 1992);

U. of Michigan, “Complex Systems Models of Technological Change” (Nov, 1991) and “Towards a Theory of Complex Adaptive Systems” (Nov, 1990); Fourth Intl. Conf. on Genetic Algorithms, San Diego, California, “Keynote: Artificial Adaptive Agents in Economic Theory,” (July, 1991); Economic Dynamics and Control Society, Capri, Italy (J. Rust), “The Double Auction Tournament” (June, 1991); American Economic Association, Washington, D.C.,

“Artificial Adaptive Agents,” (Dec, 1990); CMU, D. of Philosophy, “Learning with Genetic Algorithms” (Dec, 1990); U. of Colorado, D. of Economics, “Genetic Algorithms and Economic Theory” (June, 1990); Inst. for Scientific Interchange, Torino, Italy and Dipartimento Di Economia, Trento, Italy, “Evolution of Automata” (May, 1990); George Mason U., “Evolutionary Economics: Learning from Computation” (April, 1990); U. of New Mexico, D. of Physics, “Complexity and Economics” (April, 1990); U. of Wisconsin—Madison, D. of Economics, “AAA and Economic Theory” (April, 1990); Public Choice Society and the Economic Science Association, Tucson, Arizona, “The Santa Fe Institute’s Double Auction Tournament,” (March, 1990); Intl. Symp. on Dynamical Systems and Evolutionary Economics, Austin, Texas, “The Coevolution of Automata,” (April, 1989);

## SEMINARS AND CONFERENCES

CMU, SDS, “Institutions and Agent Sorting” (Feb, 1997), “Computational Social Science” (Nov, 1995), “Giving According to GARP” (Oct, 1995), “Rational Giving” (May, 1994), “Insights from the SFI Computerized Double Auction Tournament” (March, 1992), “AAA and Social Theory” (Sep, 1991), “Why Do We See So Much Cooperation” (Feb, 1991), “Auctions with AAA” (Nov, 1990), “Complex Adaptive Systems” (Oct, 1990); CP<sup>2</sup>, Pennsylvania State U., “Adaptation and Auction Behavior” (April, 1992); American Economic Assoc. and Econometric Society, “Auctions with AAA” and “Rational Cooperation in Finitely Repeated Prisoner’s Dilemma: An Experimental Test” (Dec, 1990); Public Choice Society and Economic Science Assoc., “Auctions with AAA” (March, 1990).

## RESEARCH GRANTS

*Creating a New Paradigm for Online Education* (co-PI with four others). Hewlett Foundation, 2002 to 2005, \$1,900,000.  
*Collaborative Research on Computational Political Economy* (co-PI with K. Kollman and S. Page). NSF, 1997 to 1999, \$200,000.  
*Human Dimensions of Global Climatic Change* (co-PI with many others). NSF cooperative agreement, 1996 to 2001, \$5,300,000.  
*A Graduate Workshop in Computational Economics* (co-PI with S. Page). Santa Fe Institute and Coopers and Lybrand (and McCune Foundation, 2001), 1995 to present, approximately \$75,000 each year.  
*Collaborative Research on Party Competition in Democratic Elections* (co-PI with K. Kollman and S. Page). NSF, 1994 to 1996, \$150,000.  
*Founding Workshop on Theoretical Computation in Economics* (with M. Boldrin). Sloan Foundation, National Bureau of Economic Research (NSF), and National Center for Supercomputing Applications, April, 1992, \$28,000.  
*Founding Workshop on Adaptive Computation*. Sloan Foundation, March, 1992, \$30,000.  
*Analysis of Adaptive Agents*. CMU Faculty Development Grant, 1991, \$3,200.  
*The Analysis of Strategic Behavior*. Sun Microsystems Equipment Grant, 1990, \$56,000.

## WORKING PAPERS AND NOTES

Ken Kollman, John H. Miller, and Scott E. Page, “A Simplified Framework for Analyzing the Behavior of Political Institutions,” 1999.  
 Ken Kollman, John H. Miller, and Scott E. Page, “Discovering Solutions to Difficult Problems,” 1999.  
 Ramon Marimon and John H. Miller, “Money as a Medium of Exchange in an Economy with Genetically Reproduced Decision Rules,” notes, 1990.  
 John H. Miller, “A Strategic Taxonomy of Repeated 2x2 Games Played by Adaptive Agents,” note.

- John H. Miller, “Towards a Mathematics of a Turing Gas,” June, 1990.  
 Robin Cowan and John H. Miller, “Economic Life on a Lattice: Equilibria, Information, and Rules of Thumb,” Santa Fe Institute working paper, 90-010, 1990.  
 John H. Miller, “A Genetic Model of Adaptive Economic Behavior,” University of Michigan working paper, 1986.

## SOFTWARE

- EconX*, an online educational system for teaching the core principles of economics via experiments, 2004 to present, located at <http://www.econx.com>.  
*EconU*, a prototype online educational system for teaching the core principles of economics via experiments, 1998 to 2003.

## BOOKS IN PROGRESS

- John H. Miller and Scott E. Page, *Complex Adaptive Social Systems*.

## PUBLISHED BOOKS

- Ken Kollman, John H. Miller, and Scott E. Page (eds.), *Computational Political Economy*, forthcoming, MIT Press.  
 Theodore Bergstrom and John H. Miller, *Experiments with Economic Principles: Microeconomics* 2nd ed, McGraw Hill, 2000 (1997 1st ed).  
 Theodore Bergstrom and John H. Miller, *Instructor’s Manual for Experiments with Economic Principles: Microeconomics* 2nd ed, McGraw Hill, 2000 (1997 1st ed).

## PUBLISHED PAPERS

- J. Stephen Lansing and John H. Miller, “Cooperation, Games, and Ecological Feedback: Some Insights from Bali,” *Current Anthropology*, forthcoming.  
 John H. Miller and Scott Moser, “Communication and Coordination,” *Complexity*, forthcoming.  
 John H. Miller and Scott Page, “The Standing Ovation Problem,” *Complexity*, forthcoming.  
 James Andreoni and John H. Miller, “Analyzing Choice with Revealed Preference: Is Altruism Rational?” in Charles Plott and Vernon Smith (eds.), *The Handbook of Experimental Economics Results*, North Holland (2005).  
 James Andreoni and John H. Miller, “Giving According to GARP: An Experimental Study of Rationality and Altruism,” *Econometrica*, 70 (2002):737–753.  
 John H. Miller, Carter Butts, and David Rode, “Communication and Cooperation,” *Journal of Economic Behavior and Organization*, 47 (2002):179–95.  
 John H. Miller, “Evolving Information Processing Organizations,” in Alessandro Lomi and Erik R. Larsen (eds.) *Dynamics of Organizations: Computational Modeling and Organization Theories*, MIT Press, Cambridge, Massachusetts (2001):307–27.  
 Ken Kollman, John H. Miller, and Scott Page, “Consequences of Nonlinear Preferences in a Federal Political System,” in Diana Richards (ed.), *Political Complexity: Nonlinear Models of Politics*, University of Michigan Press, Ann Arbor, MI (2000):23–45.  
 Ken Kollman, John H. Miller, and Scott E. Page, “Decentralization and the Search for Policy Solutions,” *Journal of Law, Economics, and Organization*, 16 (2000):102–28.

- John H. Miller and Peter Stadler, "The Dynamics of Adaptive Parties under Spatial Voting," *Journal of Economic Dynamics and Control*, 23 (1998):171–189.
- Robin Cowan and John H. Miller, "Technological Standards with Local Externalities and Decentralized Behavior," *Journal of Evolutionary Economics* 8 (1998):285–96.
- John H. Miller, "Active Nonlinear Tests (ANTs) of Complex Simulations Models," *Management Science* 44:6 (June, 1998):820–30.
- Ken Kollman, John H. Miller, and Scott Page, "Political Parties and Electoral Landscapes," *British Journal of Political Science* 28 (1998):139–158.
- Ken Kollman, John H. Miller, and Scott Page, "Political Institutions and Sorting in a Tiebout Model," *American Economic Review* 87:5 (December, 1997):977–992.
- Ken Kollman, John H. Miller, and Scott Page, "Landscape Formation in a Spatial Voting Model," *Economic Letters* 55:1 (August, 1997): 121–130.
- Ken Kollman, John H. Miller, and Scott E. Page, "Computational Political Economy," in *The Economy as an Evolving Complex System II*, Brian Arthur, Steven Durlauf, and David Lane (eds.), Addison Wesley, 1997.
- John H. Miller, "The Coevolution of Automata in the Repeated Prisoner's Dilemma," *Journal of Economic Behavior and Organization* 29:1 (January, 1996):87–112.
- James Andreoni and John H. Miller, "Auctions with Adaptive Artificial Agents," *Journal of Games and Economic Behavior* 10 (1995):39–64.
- Steven Klepper and John H. Miller, "Entry, Exit, and Shakeouts in the United States in New Manufactured Products," *International Journal of Industrial Organization* 13 (1995):567–91.
- John H. Miller and Martin Shubik, "Some Dynamics of a Strategic Market Game," *Journal of Economics* 60 (1994).
- John Rust, John H. Miller, and Richard Palmer, "Characterizing Effective Trading Strategies: Insights from a Computerized Double Auction Tournament," *Journal of Economic Dynamics and Control* 18 (1994):61–96.
- James Andreoni and John H. Miller, "Rational Cooperation in the Finitely Repeated Prisoner's Dilemma: Experimental Evidence," *Economic Journal* 103:418 (May, 1993):570–85.
- James Andreoni and John H. Miller, "Auction Experiments in Artificial Worlds," *Cuadernos*, 54 (1993/2):211–221 (translated into Spanish).
- David Kendrick, et al., *Research Opportunities in Computational Economics*, report to the National Science Foundation, 1991, and *Journal of Computational Economics* 6 (November, 1993):257–314.
- Scott Page, Ken Kollman, and John H. Miller, "Adaptive Parties and Spatial Voting Theory," in B. Grofman (ed), *Information, Participation and Choice*, University of Michigan Press (1993):161–72.
- Peter Stadler, Walter Fontana, and John H. Miller, "Random Catalytic Reaction Networks," *PhysicaD* 63:3/4 (May, 1993):378–92.
- Ken Kollman, John H. Miller, and Scott Page, "Adaptive Parties in Spatial Elections," *American Political Science Review* 86 (December, 1992):929–37.
- John Rust, John H. Miller, and Richard Palmer, "Behavior of Trading Automata in a Computerized Double Auction Market," in *The Double Auction Market: Institutions, Theories, and Evidence*, D. Friedman and J. Rust (eds), Addison Wesley (1992):155–98.
- John H. Holland and John H. Miller, "Artificial Adaptive Agents in Economic Theory," *American Economic Review, Papers and Proceedings* 81 (May, 1991):365–70.
- John H. Miller and James Andreoni, "Can Evolutionary Dynamics Explain Free Riding in Experiments?," *Economics Letters* 36 (1991):9–15;

- Stephanie Forrest and John H. Miller, "Emergent Behaviors of Classifier Systems," *PhysicaD* 42 (1990):213–27.
- John H. Miller, "Artificial Intelligence Techniques and the Analysis of Strategic Behavior," invited paper, DRET, INSTITUT d'Expertise et de Prospective de L'ECOLE NORMALE SUPERIEURE, Paris, 1990 (translated into French).
- John Rust, Richard Palmer, and John H. Miller, "A Double Auction Market for Computerized Traders," *Proceedings of the 1989 Advanced Computing for the Social Sciences Conference*, Oak Ridge National Laboratory and the U.S. Bureau of the Census, 1990.
- John H. Miller and Stephanie Forrest, "The Dynamical Behavior of Classifier Systems: An Approach," in *Proceedings of the Third Annual Conference on Genetic Algorithms and Their Applications*, Morgan-Kaufman, 1989.
- Richard Palmer, John Rust, and John H. Miller, "A Double Auction Market for Computerized Traders: Participant's Manual," Santa Fe Institute, 1989.