CURRICULUM VITAE
JAN TOBOCHNIK

Dow Distinguished Professor in the Natural Sciences

Department of Physics
Kalamazoo College
Kalamazoo, MI 49006
(269) 337-7098
e-mail: jant@kzoo.edu

Professional Employment

2000–	Professor of Physics and Computer Science, Kalamazoo College
2022–2023	Chair, Department of Physics, Kalamazoo College
Fall 2018	Distinguished Visiting Professor, National Chiao Tung University, Taiwan
Winter 2014	Acting Provost, Kalamazoo College
2012–2013	Visiting Scholar, Physics Department, Boston University
2001–2011	Editor, American Journal of Physics
2007–2008	Interim Provost, Kalamazoo College (on leave as Editor of AJP)
1996–2007	Chair, Department of Physics, Kalamazoo College
1991–2000	Associate Professor of Physics and Computer Science, Kalamazoo College
1991–1992	Visiting Professor, Department of Physics, McGill University
1985–1991	Assistant Professor of Physics and Computer Science, Kalamazoo College
Fall 1988, 1989	Visiting Scholar, Center for Fundamental Materials Research, Michigan State University
1985–1986	Visiting Scholar, Polymer Center, Boston University
Spring 1985	Visiting Assistant Professor, Clark University
1982–1983	Assistant Professor, Worcester Polytechnic Institute
Summer 1981	Visiting Scientist, IBM, Yorktown Heights
1980–1982	Research Associate, Rutgers University

Education

Ph.D., Physics, Cornell University, June 1980. Thesis title "Monte Carlo study of phase transitions in two dimensional systems with continuous symmetry." Thesis advisor: Geoffrey V. Chester.
B. A. Summa Cum Laude, Physics, Amherst College, June 1975. Undergraduate thesis title: "The ferroelectric phase transition in triglycine sulfate." Thesis adivsor: Joel E. Gordon.

Honors and Professional Activities

- Reviewed eleven physics departments.
- Part of the Open Source Physics Team which was awarded the 2020 Excellence in Physics Education Award by the American Physical Society.
- Selected as the winner of the 2017 Oersted Medal of the American Association of Physics Teachers (AAPT).
- Co-editor, Computational Physics section, American Journal of Physics (AJP), 2011– .
- Member of the AJP Resource Letter Advisory Board, 2015-2017.
- Fellow of the American Association of Physics Teachers (AAPT), selected 2014. AAPT Distinguished Service Citation, 2012.
- Editor, AJP, 2001–2011. Ex officio member of the AAPT Executive Committee and member of the Publications Committee.
- Divisional Associate Editor, Physical Review Letters, 2001-2006.

- Member of the Committee on Publishing Policy of the American Institute of Physics, 2006–2012.
- Fellow of the American Physical Society (APS), elected 1999.
- Named as one of the inaugural group of 534 Outstanding Referees by the APS, 2008.
- Co-editor, Computer Simulations Department, Computers in Physics 1989–1998 and Computing in Science and Engineering 1999–2001.
- Elected member of the Executive Committee of the APS Division of Computational Physics, 1997–99.
- Awarded Lucasse Fellowship for excellence in scholarship at Kalamazoo College, 1995–96.
- Co-Chair of the Gordon Research Conference on Physics Research and Education: Thermal and Statistical Physics, June 2000. Co-founder of the series on Physics Research and Education.
- Guest co-editor of the first ever theme issue of the AJP on Statistical and Thermal Physics, December 1999.
- Member of APS, AAPT, and its Michigan branch.
- Member of American Association of University Professors (President of Kalamazoo College chapter 1996–1998, Treasurer 2003–).
- Member of Phi Beta Kappa (President of Kalamazoo College chapter 1997–98, 2022–23, President of the Southwest Michigan Association 2005–2010).

Research
Theoretical condensed matter physics with a focus on computer simulations in statistical physics. Research has included studies of networks, lattice models of earthquakes, structural glass transitions, granular matter, phospholipid phase transitions, quenching of binary alloys, transport through random media, quantum Monte Carlo, percolation, Monte Carlo renormalization group methods, and two-dimensional phase transitions. Currently working on patent citation networks, melting in three dimensions, neural system simulations, and econophysics.

Teaching
Physics: Introductory Mechanics, Electricity and Magnetism, Modern Physics, Atomic and Nuclear Physics, Computer Programming and Simulation, Thermal Physics, Electrodynamics, Quantum Mechanics, Classical Mechanics, Medical Physics, Chaos.

Computer Science: Introductory Computer Science, Computer Science for Non-Science majors, Models and Simulation, Digital Electronics, Programming Languages.

First Year Seminar devoted to teaching the critical thinking and writing skills required in college, including intercultural understanding.

Publications: Books

Statistical and Thermal Physics With Computer Applications, second edition, H. Gould and J. Tobochnik, Princeton University Press, Princeton (2021).

Solutions Manual to Statistical and Thermal Physics With Computer Applications, second edition, J. Tobochnik and H. Gould, Princeton University Press, Princeton (2021).

"Ranking Algorithms: Application for Patent Citation Network," Hayley Beltz, Timothy Rutledge, Raoul R. Wadhwa, Péter Bruck, Jan Tobochnik, Anikó Fülöp, György Fenyvesi, and Péter Érdi, in *Information Quality in Information Fusion and Decision Making*, Éoi Bossé and Galina Rogova, Eds., Springer (2019).

Modeling Wealth Inequality: How the rich get richer and the poor get poorer, Jan Tobochnik, Wolfgang Christian and Harvey Gould, `https://itunes.apple.com/us/book/modeling-wealth-inequality/id1064963964?ls=1&mt=11` (2016).

Statistical and Thermal Physics With Computer Applications, H. Gould and J. Tobochnik, Princeton University Press, Princeton (2010).

Solutions Manual to Statistical and Thermal Physics With Computer Applications, J. Tobochnik and H. Gould, Princeton University Press, Princeton (2010).

"Estimating the dynamics of kernel-based evolving networks," Gábor Csárdi, Katherine J. Strandburg, László Zalányi, Jan Tobochnik, and Péter Érdi, in *Unifying Themes in Complex Systems*, pp. 90–97, Springer (2008).

An Introduction to Computer Simulation Methods: Applications to Physical Systems, third edition, H. Gould, J. Tobochnik and Wolfgang Christian, Addison-Wesley, Reading, MA (2007).

An Introduction to Computer Simulation Methods: Applications to Physical Systems, second edition, H. Gould and J. Tobochnik, Addison-Wesley, Reading, MA (1996). Translated into Japanese.

Thermal and Statistical Physics: Consortium for Upper-level Physics Software, H. Gould, L. Spornick, and J. Tobochnik, John Wiley & Sons, New York (1995). Translated into Japanese.

An Introduction to Computer Simulation Methods: Applications to Physical Systems, Parts 1 and 2, H. Gould and J. Tobochnik, Addison-Wesley, Reading, MA (1988). Translated into Russian.

Publications: Refereed Articles

1. "Simulation of a generalized asset exchange model with economic growth and wealth distribution," Kang K. L. Liu, N. Lubbers, W. Klein, J. Tobochnik, B. M. Boghosian, and Harvey Gould, Phys. Rev. E. **104**, 014150 (2021).

2. "2017 Oersted Medal Presentation: The changing face of physics and the students who take physics," Jan Tobochnik, Am. J. Phys. **85**, 409 (2017); doi: 10.1119/1.4980008.

3. "Recognition of emerging technology trends: class-selective study of citations in the U.S. Patent Citation Network," Péter Bruck, István Réthy, Judit Szente, Jan Tobochnik, Péter Érdi, Scientometrics **107**,1465-1475, DOI 10.1007/s11192-016-1899-0 (2016).

4. "Prediction of emerging technologies based on analysis of the US patent citation network," Péter Érdi, Kinga Makovi, Zoltán Somogyvári, Katherine J. Strandburg, J. Tobochnik, Péter Volf, and László Zalányi, Scientometrics **95**, 225–242DOI 10.1007/s11192-012-0796-4 (2013).

5. "Patent citation networks revisited: Signs of a twenty-first century change,?" Katherine J. Strandburg, Gábor Csárdi, J. Tobochnik, Péter Érdi, and László Zalányi, North Carolina Law Review **87** (5), 1657–1698 (2009).

6. "Teaching statistical physics by thinking about models and algorithms," J. Tobochnik and H. Gould, Am. J. Phys. **76**, 353–359 (2008); physics/0712.3488.

7. "Modeling innovation by a kinetic description of the patent citation system," Gábor Csárdi, Katherine J. Strandburg, László Zalányi, J. Tobochnik, and Péter Érdi, Physica A **374** (2), 783–793 (2007); physics/0508132.

8. "Network science and law: A sales pitch and a sample," Katherine J. Strandburg, Gábor Csárdi, Péter Érdi, László Zalányi, and J. Tobochnik, Berkeley Technology Law Journal **21** (4), 1293–1362 (2006).

9. "Understanding the temperature and the chemical potential through computer simulations," J. Tobochnik, H. Gould, and Jonathan Machta, Am. J. Phys. **73**(8), 708–716 (2005), physics/0411161.

10. "Properties of a random attachment growing network," László Zalányi, Gábor Csárdi, Tamás Kiss, Máté Lengyel, Rebecca Warner, J. Tobochnik, and Péter Érdi, Phys. Rev. E **68**, 066104 (2003), cond-mat/0305299.

11. "Teaching computational physics to undergraduates," J. Tobochnik and H. Gould, in *Annual Reviews of Computational Physics IX*, D. Stauffer, ed., World Scientific, Singapore (2001).

12. "Resource Letter CPPPT-1: Critical point phenomena and phase transitions," J. Tobochnik, Am. J. Phys. **69**, 255 (2001);

13. "Clusters and fluctuations at mean-field critical points and spinodals," W. Klein, H. Gould, J. Tobochnik, F. J. Alexander, M. Anghel, and Gregory Johnson, Phys. Rev. Lett. **85**, 1270 (2000), cond-mat/0001230.

14. "Granular collapse as a percolation transition," J. Tobochnik, Phys. Rev. E **60**, 7137 (1999), cond-mat/9905254.

15. "Simulation of hydrogen bonding and hydration in pure lipid bilayers," J. Tobochnik, M. J. Zuckermann, and Z. Zhang, Phys. Rev. E **51**, 6204 (1995).

16. "Universal conductivity in the two-dimensional boson Hubbard model," G. G. Batrouni, B. Larson, R. T. Scalettar, J. Tobochnik, and J. Wang, Phys. Rev. B **48**, 9628 (1993), cond-mat/9302037.

17. "Lattice model for hydrogen bonding and hydration in pure lipid bilayers," Z. Zhang, J. Tobochnik, M. J. Zuckermann, and J. Silvius, Phys. Rev. E **47**, 3721 (1993).

18. "Random-walk simulation of the dielectric constant of a composite material," R. I. Cukier, S. Y. Sheu, and J. Tobochnik, Phys. Rev. B **42**, 5342 (1990).

19. "Random walk calculation of conductivity in continuum percolation," J. Tobochnik, D. Laing, and G. Wilson, Phys. Rev. A **41**, 3052 (1990).

20. "Efficient random walk algorithm for computing conductivity in continuum percolation systems," Comput. Phys., J. Tobochnik **4** (2), 181 (1990).

21. "The conductance of a plane containing random cuts," J. Tobochnik, M. A. Dubson, M. L. Wilson, and M. F. Thorpe, Phys. Rev. A **40**, 5377 (1989).

22. "Monte Carlo Simulation of hard spheres near random closest packing using spherical boundary conditions," J. Tobochnik and P. M. Chapin, J. Chem. Phys. **88**, 5824 (1988).

23. "Early time instabilities in a dynamic percolation model," J. Tobochnik, H. Gould, and W. Klein, Phys. Rev. B **33**, 377 (1986).

24. "Some developments in the theory of modulated order: II. Deformable lattice models and the ANNNI Model as a random magnet," T. DeSimone, R. M. Stratt, and J. Tobochnik, Phys. Rev. B **32**, 1549 (1985).

25. "Kinetics of a first order phase transition: Computer simulations and theory," O. Penrose, J. Lebowitz, J. Marro, M. Kalos, and J. Tobochnik, J. Stat. Phys. **34**, 399 (1984).

26. "Long-range orientational order in two dimensional liquid crystals," J. Tobochnik and G. V. Chester, Phys. Rev. A **27**, 1221 (1983).

27. "Properties of the q-State clock model for $q = 4$, 5, and 6," J. Tobochnik, Phys. Rev. B **26**, 6201 (1982).

28. "Properties of two dimensional polymers," J. Tobochnik, I. Webman, J. L. Lebowitz, and M. H. Kalos, Macromolecules **15**, 549 (1982).

29. "Calculation of the dynamical exponent z for the three-state Potts model," J. Tobochnik and C. Jayaprakash, Phys. Rev. B **25**, 4893 (1982).

30. "Monte Carlo renormalization group analysis of the antiferromagnetic three-state Potts model on a square lattice," J. Tobochnik and C. Jayaprakash, Phys. Rev. B **25**, 4890 (1982).

31. "Monte Carlo study of melting in two dimensions," J. Tobochnik and G. V. Chester, Phys. Rev. B **26**, 6778 (1982).

32. "Physics of the dynamical critical exponent in one dimension," R. Cordery, S. Sarker, and J. Tobochnik, Phys. Rev. B **24**, 5402 (1981).

33. "Dynamic Monte Carlo renormalization group," J. Tobochnik, S. Sarker, and R. Cordery, Phys. Rev. Lett. **46**, 1417 (1981).

34. "Monte Carlo renormalization group analysis of the classical Heisenberg model in two dimensions," S. H. Shenker and J. Tobochnik, Phys. Rev. B **22**, 4462 (1980).

35. "Monte Carlo Study of the planar spin model," J. Tobochnik and G. V. Chester, Phys. Rev. B **20**, 3761 (1979).

Publications: Columns in Computers in Physics

- "Entropy driven phase transitions," H. Gould, J. Tobochnik, and L. Colonna-Romano, **11** (2), 157 (1997).
- "Lattice simulations of biological membranes," J. Tobochnik and H. Gould, **10** (6), 542 (1996).
- "Fortran compilers for personal computers," Neal Tobochnik and J. Tobochnik, **7** (6), 672 (1993).
- "Quantum Monte Carlo on a lattice," George Batrouni, J. Tobochnik, and H. Gould, **6** (6), 673 (1992).
- "Dynamics of the classical Heisenberg chain," Zoran Slanic, H. Gould, and J. Tobochnik, **5** (6), 630 (1991).
- "Diffusion Quantum Monte Carlo," P. J. Reynolds, J. Tobochnik, and H. Gould, **4** (6), 662 (1990).
- "An introduction to quantum Monte Carlo," J. Tobochnik, H. Gould, and K. Mulder, **4** (4), 431 (1990).
- "More on fractals and chaos: Multifractals," H. Gould and J. Tobochnik, **4** (2), 202 (1990).
- "Quantifying chaos," J. Tobochnik and H. Gould, **3** (6), 86 (1989).
- "Overcoming critical slowing down," H. Gould and J. Tobochnik, **3** (4), 82 (1989).

Publications: Articles in Conference Proceedings

- "The inverse problem of evolving networks with application to social nets," Gábor Csárdi, Katherine J. Strandburg, J. Tobochnik, and Péter Érdi, in *Handbook of Large-Scale Random Networks Series: Bolyai Society Mathematical Studies*, Vol. **18**, Béla Bollobás, Robert Kozma and Dezsö Miklós, eds. (2009).
- "Teaching students to write computer simulations in Java," J. Tobochnik, Comp. Phys. Comm. **121-122**, 562–568 (1999).
- "Big and little uses of the computer in a statistical mechanics course," J. Tobochnik, *Computing in Advanced Undergraduate Physics*, edited by David M. Cook, Lawrence University, 59 (1990).
- "The melting of two dimensional solids," J. Tobochnik and G. V. Chester, in *Ordering in Two Dimensions*, Amsterdam, Netherlands, North Holland, 339 (1981).

Book Reviews

- *The Model Thinker: what you need to know to make data work for you*, Scott E. Page, Basic Books, NY (2018); reviewed by Jan Tobochnik, Cognitive Systems Research **56** (August), 116-118 (2019).
- *What Editors Want: An AuthorÕs Guide to Scientific Journal Publishing*, Philippa J. Benson and Susan C. Silver, Uinversity of Chicago Press (2013); reviewed by J. Tobochnik, Physics Today **66** (12), 50–52 (2013).

- *Computational Methods for Physics*, Joel Franklin, Cambridge University Press (2013) reviewed by J. Tobochnik, Am. J. Phys. **81**, 879 (2013).
- *A First Course in Computational Physics and Object-Oriented programming with C++*, David Yevick, Cambridge University Press (2005); reviewed by J. Tobochnik, Physics Today **59** (3), 63–64 (2006).
- *Computational Physics*, Rubin H. Landau, and Manuel Páez, Wiley (1997); *An Introduction to Computational Physics*, Tao Pang, Cambridge University Press (1997); *Stochastic Simulation in Physics*, P. Kevin MacKeown, Springer (1998); reviewed by H. Gould and J. Tobochnik, Am. J. Phys. **67**, 94 (1999).
- *Understanding Molecular Simulation*, Daan Frenkel and Berend Smit, Academic Press (1996), reviewed by J. Tobochnik, Comput. Phys. **11** (4), 351 (1997).

External Funding

- "Melting of three dimensional colloidal crystals," Petroleum Research Fund, $65,000, 2013–2016.
- "OPTIC: Open Physics Technology for Interactive Curricula," with Wolfgang Christian, Anne J. Cox, H. Gould, and Mario J. Belloni, National Science Foundation, $450,000, 2005–2010.
- "U.S.- Hungary research on social networks as evolving complex networks," with Péter Érdi, National Science Foundation, $16,050, 2004–2005.
- "Model studies of the glass transition," Petroleum Research Fund, $30,000, 1999–2001.
- "New curricular materials for upper level undergraduate courses on thermal and statistical physics," National Science Foundation $293,885, 1998–2003, with H. Gould.
- "Dynamics of Hydrogen bond networks," Petroleum Research Fund, $25,000, 1996–99.
- "Development of curricular materials for an introductory level computer simulation laboratory in physics," National Science Foundation ILI, $99,960, 1993–95, with H. Gould.
- "Development of curricular materials and software for the incorporation of computational physics into upper level undergraduate physics courses," National Science Foundation $182,936, 1993–97, with H. Gould.
- "Lattice models for Hydrogen bonding in lipid bilayers," Petroleum Research Fund, $25,000, 1993–96.
- "Diffusion in porous media," Petroleum Research Fund, $20,000, 1990–93.
- "Computer simulation laboratory for undergraduate thermal physics and introductory physics," National Science Foundation ILI, $13,750, 1988–90.
- "A community science and mathematics educational software resource and development center," Kalamazoo Foundation, with David Winch, $30,000, 1988–91.
- Grant of computer equipment from Apple Computer, $19,116, 1988.
- "Cooperative science educational software development center," Kalamazoo Consortium for Higher Education, with David Winch, $13,400, 1987–89.
- "Computer simulation and theoretical studies of transport in inhomogenous media," Petroleum Research Fund, $19,200, 1986–89.
- "Computer simulation of quenched binary fluids," Research Corporation, $9,400, 1986–88.
- "Transport in inhomogeneous media," Cornell Supercomputer Center, $20,000 of computer time, 1986.