

Van M. Savage
Curriculum Vitae
October, 2005

ACADEMIC ADDRESS:

Harvard University
Bauer Center for Genomics Research
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RESEARCH INTERESTS:

Effects of size and temperature on cellular, individual, and ecosystem processes including evolution and development; cell and genome size; optimal networks; ecosystem dynamics

EDUCATION:

Ph.D. in Physics, Washington University, St. Louis, MO, Carl Bender, Adviser, 2001
A.M. in Physics, Washington University, St. Louis, MO, 1999
B.S. in Physics, Rhodes College, Memphis, TN, *cum laude*, *Phi Beta Kappa*, *Sigma Pi Sigma*,
1996

RESEARCH EXPERIENCE:

Systems Biology Postdoctoral Fellow, Bauer Center for Genomics Research,
Harvard University, Cambridge, MA, 2004-present
Postdoctoral Fellow, The Santa Fe Institute, Santa Fe, NM and Particles and Fields Group, T-8,
Los Alamos National Laboratory, Los Alamos, NM, 2001-2004
Graduate Research Assistantship, Quantum Field Theory DOE grant, Washington University,
St. Louis, MO, 1997-2001
Graduate Research Assistantship, Nuclear Magnetic Resonance, Washington University,
St. Louis, MO, 1997

GRANTS AND AWARDS:

NSF Physics Graduate Fellowship, The Santa Fe Institute, Santa Fe, NM 2000
Meritorious Award in Mathematical Contest in Modeling sponsored by Consortium for
Mathematics and Its Applications (COMAP) and the NSA, member of three person team that
finished in top 15 out of 393 teams from over 150 top universities, Rhodes College, Memphis,
TN, 1996
Physics Award for Outstanding Student, Rhodes College, Memphis, TN, 1995
University Scholarship, Rhodes College, Memphis, TN, 1992-1996

COMMITTEES AND PROFESSIONAL SERVICE:

Adviser to Alex Herman (currently in MD/PhD program at UCSF), Research Experience for
Undergraduates, Santa Fe Institute, Santa Fe, NM, 2002-2004
Referee, Nature, The American Naturalist, Ecology Letters, Trends in Ecology and Evolution,
Journal of Theoretical Biology, British Journal of Cancer, Tree Physiology, Physics in
Medicine and Biology, Journal of Physics A: Mathematics and General, Journal of
Mathematical Physics, Physics Letters A, International Journal of Modern Physics Letters
Member of Selection Committee for the Complex Systems Summer School at the Santa Fe
Institute, Santa Fe, NM, 2002-2004
Member of Teaching Assistant Committee, Washington University, St. Louis, MO, 2000
Graduate Council Representative and Student Government Senator, Washington University, St.
Louis, MO, 1998-2000

Chair of Academic Affairs Committee, Along with two others, I wrote a 40 page report based on our extensive research and dialogue with other colleges that suggested changes to the tenure-review process at Rhodes College. The majority of our suggestions were adopted.
Rhodes College, Memphis, TN, 1994-1996
Student Government Representative, Rhodes College, Memphis, TN, 1994-1996.

TEACHING EXPERIENCE:

Faculty, Santa Fe Institute Complex Systems Summer School, Beijing, China, 2005
Guest Lecturer, Introductory Physics, Washington University, St. Louis, MO, University College, 1998, and Summer, 2001
Teaching Assistant, Epic of Evolution (joint course between Physics, Biology, and Earth and Planetary Sciences Departments), provided solution sets, helped with in-class demonstrations and assigning of final grades, and graded, Washington University, St. Louis, MO, 2000
Teaching Assistant, Mathematical Methods in Physics and Advanced Mathematical Methods in Physics, provided solution sets and graded, Washington University, St. Louis, MO, 1998-1999
Teaching Assistant, Physics and Society, provided solution sets, held office hours, helped assign final grades, and graded, Washington University, St. Louis, MO, 1998
Teaching Assistant, Introductory Physics, taught 3 lab sections per week, assigned final lab grades, one of 4 TAs to hold office hours, and graded, Washington University, St. Louis, MO, 1996-1998
Teaching Assistant, Intermediate Lab, guided students through experiments, helped assign final grades, and graded, Rhodes College, Memphis, TN, 1994-1995

PUBLICATIONS:

Biology Papers:

1. J. E. Cohen, T. Jonsson, C. B. Muller, H. C. J. Godfray, and V. M. Savage, (2005). Body sizes of hosts and parasitoids in individual feeding relationships, *Proceedings of the National Academy of Sciences, USA* **102(3)**, 684-689
2. J. F. Gillooly, A. P. Allen, J. H. Brown, J. J. Elser, C. Martinez del Rio, V. M. Savage, G. B. West, W. H. Woodruff, and A. Woods. (2005). The Metabolic Basis of Whole-Organism RNA and Phosphorus Content, *Proceedings of the National Academy of Sciences, USA* **102**, 11923-11927.
3. V. M. Savage and G. B. West (2005). Biological scaling and physiological time: Biomedical applications. *Complex System Science in Biomedicine*. Ed. T. S. Deisboeck and J. Y. Kresh, New York, Kluwer Academic.
4. V. M. Savage, J. F. Gillooly, J. H. Brown, G. B. West, and E. L. Charnov, (2004). Effects of body size and temperature on population growth, *The American Naturalist* **163(3)**, 429-441.
5. V. M. Savage (2004). Improved approximations to scaling relationships for species, populations, and ecosystems across latitudinal and elevational gradients. *Journal of Theoretical Biology* **227(4)**, 525-534.
6. V. M. Savage, J. F. Gillooly, W. H. Woodruff, G. B. West, A. P. Allen, B. J. Enquist, and J. H. Brown (2004). The predominance of quarter-power scaling in biology. *Functional Ecology* **18(2)**, 257-282.
7. J. H. Brown, J. F. Gillooly, A. P. Allen, V. M. Savage, and G. B. West. (2004) Toward a metabolic theory of ecology, *Ecology* **85(7)**, 1771-1789.
8. V. M. Savage (2003). Is biology just chemistry?: Book review of "Ecological Stoichiometry: The Biology of Elements from Molecules to the Biosphere" by Robert W. Sterner and James J. Elser. *Complexity* **8(6)**, 42-44.
9. S. K. M. Ernest, B. J. Enquist, J. H. Brown, E. L. Charnov, J. F. Gillooly, V. M. Savage, E. P.

- White, F. A. Smith, E. A. Hadly, J. P. Haskell, S. K. Lyons, B. A. Maurer, K. J. Niklas & B. Tiffney (2003) Thermodynamic and metabolic effects on the scaling of production and population energy use. *Ecology Letters* **6**, 990-995.
10. J. Jun, J. W. Pepper, **V. M. Savage**, J. F. Gillooly, and J. H. Brown. (2003). Allometric scaling in centrally foraging ant colonies, *Evolutionary Ecology Research* **5(2)**, 297-303.
 11. G. B. West, **V. M. Savage**, J. Gillooly, B. J. Enquist, W. H. Woodruff, and J. H. Brown. (2003). But why *does* metabolic rate scale with body size? *Nature*, **421**, 713-714.
 12. J. F. Gillooly, E. L. Charnov, G. B. West, **V. M. Savage**, and J. H. Brown (2002). Biological time: effects of size and temperature on developmental time, *Nature* **417**, 70-73.
 13. J. F. Gillooly, J. H. Brown, G. B. West, **V. M. Savage**, and E. L. Charnov (2001). The universal metabolic rate: effects of size and temperature on the metabolic rate of plants, animals and microbes, *Science* **293**, 2248-2251.
 14. **V. M. Savage** and G. B. West, Towards a quantitative, metabolic theory of mammalian sleep, Submitted to *Public Library of Science*.
 15. **V. M. Savage**, C. T. Webb, and J. Norberg, A trait-based framework for studying the effects of biodiversity on ecosystem functioning. To be submitted to *Journal of Theoretical Biology*.
 16. **V. M. Savage**, A.P. Allen, J. F. Gillooly, A. B. Herman, J. H. Brown, and G. B. West, Scaling of number, size, and metabolic rate of cells with body size in mammals. To be submitted to *Public Library of Science*.
 17. A. B. Herman, **V. M. Savage**, and G. B. West, The allometry of tumor growth. *In preparation*.

Physics Papers:

Note: In particle physics **authors are listed alphabetically**, not by order of importance or contribution. If authors were listed by contribution, I would be first author on all except 21.

18. C. W. Bernard and **V. M. Savage** (2003). \mathcal{PT} -symmetric quantum field theories and the Langevin equation. *Czech Journal of Physics*, **54**, 109-118.
19. F. Cooper and **V. M. Savage** (2002). Dynamics of the chiral phase transition in the 2+1 dimensional Gross-Neveu model, *Physics Letters B* **545**, 307-314.
20. C. W. Bernard and **V. M. Savage** (2001). Numerical simulations of \mathcal{PT} -symmetric quantum field theories, *Physical Review D* **64**, 085010.
21. C. M. Bender, M. V. Berry, P. N. Meisinger, **V. M. Savage**, and M. Simsek (2001). Complex WKB analysis of energy-level degeneracies of non-Hermitian Hamiltonians, *Journal of Physics A Letters* **34**, L31-L36.
22. C. M. Bender, K. A. Milton, and **V. M. Savage** (2000). Solution of Schwinger-Dyson equations for \mathcal{PT} -symmetric quantum field theories, *Physical Review D* **62**, 085001.
23. C. M. Bender, S. Boetcher, and **V. M. Savage** (2000). Conjecture on the interlacing of zeros in complex Sturm-Liouville problems, *Journal of Mathematical Physics* **41**, 6381-6387.
24. C. M. Bender, S. Boetcher, H. F. Jones, and **V. M. Savage** (1999). Complex square well—a new exactly solvable quantum mechanical model, *Journal of Physics A* **32**, 6771-6781.
25. C. M. Bender, F. Cooper, P. N. Meisinger, and **V. M. Savage** (1999). Variational ansatz for \mathcal{PT} -symmetric quantum mechanics, *Physics Letters A* **259**, 224-231.

INVITED PRESENTATIONS:

Biology Talks:

Colloquium Speaker, “Scaling in biology: A unifying approach to cells, individuals, and Ecosystems”, James Cook University, Townsville, Australia, 2005.

Invited Speaker and Participant, Vascular Design A: Working meeting of the ARC-NZ Research Network for Vegetation Function, Macquarie University, Sydney, Australia, 2005.

- Invited Speaker*, Gordon Research Conference, “The Allometry of Stoichiometry”, Bates College, ME, 2004.
- Plenary Speaker*, Undergraduate Research and Creative Activity Symposium, Rhodes College, Memphis, TN, 2004
- Colloquium Speaker*, PRIMES program (joint between biology, engineering, and math departments), “Resource-distribution networks and biochemical kinetics”, Colorado State University, Fort Collins, CO, 2003
- Symposium Speaker*, Ecological Society of America Annual Meeting, “Effects of body size and temperature on population growth”, Savannah, GA, 2003
- Invited Speaker*, Santa Fe Institute workshop: Towards an ecology based on first principles of size, temperature, and stoichiometry, “Effects of size and temperature on population growth”, Santa Fe, NM, 2002
- Invited Speaker*, Biology Seminar, “Scaling in populations and ecosystems”, University of Arizona, Tucson, AZ, 2002

Physics Talks:

- Invited Speaker*, International workshop on non-Hermitian Hamiltonians, “ \mathcal{PT} -symmetric quantum field theories and the Langevin equation”, Prague, Czech Republic, 2003.
- Invited Speaker*, Physics Theory Seminar, “Numerical simulations of \mathcal{PT} -symmetric but non-Hermitian Hamiltonians”, Ohio State University, Columbus, OH, 2002

REFERENCES:

Geoffrey B. West
President of the Santa Fe Institute
Senior Laboratory Fellow, Los Alamos National Laboratory
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Santa Fe, NM 87501
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Ted Williams Senior Scientist, Dana Farber Cancer Institute
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