

# Paul Tupper

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## EDUCATION

- **Ph.D., Scientific Computing-Computational Mathematics.** (April 2002).  
Stanford University.  
Advisor: Prof. Andrew Stuart
- **B.Sc. (Honours), Mathematics** (June 1997).  
Simon Fraser University, Canada.

## POSITIONS HELD

- **Professor**, Department of Mathematics, Simon Fraser University (2016–Present).
- **Associate Professor**, Department of Mathematics, Simon Fraser University (2008–2016).
- **Assistant Professor**, Department of Mathematics and Statistics, McGill University (2004–2008).
- **Postdoctoral Fellow**, Centre for the Physics of Materials, McGill University (2002–2004).
- **Graduate Student / Research Fellow / Teaching Fellow**, Stanford University (1997–2002).

## REFEREED PUBLICATIONS

- JOHN ALDERETE, PAUL TUPPER.  
“*Connectionist approaches to generative phonology.*”  
To appear in A. Bosch and S. J. Hannahs (eds.), *The Routledge handbook of phonological theory*, to appear.
- GAVIN JENKINS, JORDAN I. BARNES, PAUL TUPPER, MARK BLAIR.  
“*A modeling link between cognitive and biological homeostasis.*”  
Proceedings of the 29th Annual Meeting of the Cognitive Science Society, *talk*, to appear.
- DAVID BRYANT, PAUL TUPPER,  
“*Constant distortion embeddings of symmetric diversities.*”  
Analysis and Geometry of Metric Spaces, 2016.
- PAUL TUPPER, BOBAK SHAHRIARI,  
“*Which learning algorithms can generalize identity-based rules to novel inputs?*”  
Proceedings of the 28th Annual Meeting of the Cognitive Science Society, *poster*, 2016.
- GAVIN JENKINS, PAUL TUPPER,  
“*A dynamic neural field model of speech cue compensation.*”  
Proceedings of the 28th Annual Meeting of the Cognitive Science Society, *poster*, 2016.
- JORDAN I. BARNES, MARK R. BLAIR, PAUL F. TUPPER, R. CALEN WALSH,  
“*A dynamic neural field model of self-regulated eye movements during category learning.*”  
Proceedings of the 27th Annual Meeting of the Cognitive Science Society, *poster*, 2015.
- PAUL F. TUPPER,  
“*Exemplar Dynamics and Sound Merger in Language.*”  
SIAM Journal on Applied Mathematics, 2015.
- PAUL F. TUPPER,  
“*Exemplar Dynamics Models of the Stability of Phonological Categories.*”  
Proceedings of the 26th Annual Meeting of the Cognitive Science Society, *talk*, 2014.
- DAVID BRYANT AND PAUL TUPPER,  
“*Diversities and the Geometry of Hypergraphs.*”  
Discrete Mathematics & Theoretical Computer Science, Volume 16, No. 2, 2014.
- JOHN ALDERETE, PAUL TUPPER, STEFAN A. FRISCH,  
“*Phonological Constraint Induction in a Connectionist Network: Learning OCP-Place Constraints from Data.*”  
Language Sciences, Volume 37, May 2013, Pages 52–69.

- DAVID BRYANT AND PAUL F. TUPPER,  
*“Hyperconvexity and tight-span theory for diversities.”*  
 Advances in Mathematics, Volume 231, Issue 6, 20 December 2012, Pages 3172–3198.
- PAUL TUPPER AND XIN YANG,  
*“A Paradox of State-Dependent Diffusion and How to Resolve It.”*  
 Proceedings of the Royal Society A, 8 December 2012 vol. 468 no. 2148, 3864–3881.
- P. F. TUPPER AND MICHAEL FRY,  
*“Sonority and Syllabification in a Connectionist Network: An Analysis of BrbrNet.”*  
 The Sonority Controversy, Steve Parker, ed. Walter de Gruyter, Aug 31, 2012, 385–406.
- JOHN ALDERETE, PAUL TUPPER, STEFAN A. FRISCH,  
*“Phonotactic learning without a priori constraints: Arabic root cooccurrence restrictions revisited.”*  
 Proceedings of the 48th annual meeting of the Chicago Linguistics Society, 2012.
- DAVID COTTRELL, PETER SWAIN, PAUL TUPPER,  
*“A stochastic branching-diffusion model for gene expression.”*  
 Proceedings of the National Academy of Sciences, June 19, 2012 vol. 109 no. 25, 9699–9704.
- MARC RYSER, NILIMA NIGAM, PAUL TUPPER,  
*“On the well-posedness of the stochastic Allen-Cahn equation in two dimensions.”*  
 Journal of Computational Physics, Volume 231, Issue 6, 20 March 2012, Pages 2537–2550.
- JEAN-FRANÇOIS LEMIEUX, BRUNO TREMBLAY, JAN SEDLÁČEK, PAUL TUPPER, STEPHEN THOMAS, DAVID HUARD AND JEAN-PIERRE AUCLAIRE,  
*“Improving the numerical convergence of viscous-plastic sea ice models with the Jacobian-free Newton-Krylov method.”*  
 Journal of Computational Physics, Volume 229, Issue 8, 20 April 2010, Pages 2840–2852.
- B. CHARBONNEAU, Y. SVYRYDOV, AND P. F. TUPPER,  
*“Weak Convergence in the Prokhorov Metric of Methods for Stochastic Differential Equations.”*  
 IMA Journal of Numerical Analysis, (2010) 30 (2): 579–594.
- P. F. TUPPER,  
*“The Relation between Approximation in Distribution and Shadowing in Molecular Dynamics.”*  
 SIAM Journal on Applications of Dynamical Systems, June 2009, 8(2), 734–755.
- P. F. TUPPER AND M. GRANT,  
*“Phase Field Crystals as a Coarse-Graining in Time of Molecular Dynamics.”*  
 Europhysics Letters, **81** No. 4 (February 2008) 40007 (4pp).
- P. F. TUPPER,  
*“A Conjecture about Molecular Dynamics.”*  
 Mathematics and Computation, a Contemporary View: The Abel Symposium 2006. Chapter 5, November 2008.
- D. COTTRELL AND P. F. TUPPER,  
*“Energy Drift in Molecular Dynamics Simulations.”*  
 BIT Numerical Mathematics, Vol. 47, No. 3, September 2007, 507–523.
- P. F. TUPPER,  
*“Computing Statistics for Hamiltonian Systems: A Case Study.”*  
 JCAM, Vol. 205, Issue 2, August 2007, (826–834).
- T. LEPAGE, S. LAWI, P. TUPPER, D. BRYANT,  
*“Continuous and Tractable models for the Variation of Evolutionary Rates.”*  
 Mathematical Biosciences, Vol. 199, Issue 2, February 2006, (216–233).
- P. F. TUPPER,  
*“Ergodicity and the Numerical Simulation of Hamiltonian Systems.”*  
 SIAM Journal on Applied Dynamical Systems, Vol. 4, 2005, (563–587).
- P. F. TUPPER,  
*“A Test Problem for Molecular Dynamics Integrators.”*  
 IMA Journal of Numerical Analysis, Vol. 25, 2005, (286–309).
- R. KUPFERMAN, A. M. STUART, J. R. TERRY, P. F. TUPPER,  
*“Long Term Behaviour of Large Mechanical Systems with Random Initial Data.”*  
 Stochastics and Dynamics, Vol. 2, No. 4, 2002, (533–562).

- P. F. TUPPER,  
“*Adaptive Model Reduction for Chemical Kinetics.*”  
BIT Numerical Mathematics, Vol. 42, No. 2, 2002, (447–465).
- C. ILIADIS, A. CHAMPAGNE, J. JOSÉ, S. STARRFIELD, P. TUPPER,  
“*Thermonuclear Reaction Rate Variations for Nova Nucleosynthesis*”  
Astrophys. J. Supp. 142, 2002, (105–137).
- C. MOISAN, P. TUPPER, J. G. ROGERS, AND J. K. DE JONG,  
“*A Monte Carlo Study of the Acceptance to Scattered Events in a Depth Encoding PET Camera.*”  
IEEE Trans. Nucl. Sci., Vol. 43, No. 3, 1996, (1974–1980).

## GRANTS HELD

- *Canada Research Chair, Tier 2*, 2014–2019. \$100,000 per year for 5 years.
- *NSERC Discovery Accelerator Supplement*, 2014–2017. \$40,000 per year for 3 years.
- *NSERC Discovery Grant*, 2014–2019. \$23,000 per year for 5 years.
- *Canada Research Chair, Tier 2*, 2009–2014. \$100,000 per year for 5 years.
- *NSERC Discovery Grant*, 2009–2014. \$22,000 per year for 5 years.
- *NSERC Discovery Grant*, 2004–2008. \$12,000 per year for 5 years.

## INVITED PRESENTATIONS

### Only selected talks shown

- “*Eye-Tracking Studies of Category Learning: Fitting Complex Models to Individuals*”  
Statistics and Actuarial Science Seminar, Simon Fraser University. March 13th, 2015.
- “*Exemplar dynamics and sound merger in language*”  
Mathematics Seminar, University of Otago. March 3rd, 2015.
- “*Exemplar Dynamics Models of the Stability of Phonological Categories*”  
Canadian Applied and Industrial Mathematics Society Conference. June 24th, 2014.
- “*Simulating State-Dependent Diffusions*”  
1st Canadian Symposium in Numerical Analysis and Scientific Computing. Québec City, Québec. June 18th 2013.
- “*Brisk Introduction to Branching Processes with a Model of Gene Expression*”  
2013 SIAM Conference on Dynamical Systems. Snowbird, Utah. May 21st 2013.
- “*Using the Lorentz gas to resolve a paradox of state-dependent diffusion*”  
Banff International Research Station: Open Dynamical Systems: Ergodic Theory, Probabilistic Methods and Applications. Banff, Alberta. April 9th 2012.
- “*Shadowing the Trajectories of Molecular Dynamics*”  
Pacific Northwest Numerical Analysis Seminar. Nanaimo, B. C. October 1st 2011.
- “*Integrating connectionist and symbolic approaches to phonotactics: Arabic root cooccurrence restrictions revisited.*” Jointly with John Alderete.  
UBC Phonology Seminar. Vancouver, B.C. October 22nd 2010.
- “*From Distance to Diversity: Extending the Concept of a Metric Space*”  
SFU Canada Research Chairs Seminar Series. Burnaby, B.C. September 16th 2010.
- “*Shadowing the Trajectories of Molecular Dynamics*”  
EPSRC Network: Mathematical Challenges in Molecular Dynamics: 2nd Annual Conference. Bath, U.K. July 15th 2009.
- “*The Relation Between Shadowing and Weak Convergence in Molecular Dynamics*”  
SIAM Conference on Applications of Dynamical Systems. Snowbird, Utah. May 29th, 2007.
- “*A difficult open conjecture in the analysis of molecular dynamics.*”  
The Abel Symposium 2006. Ålesund, Norway. May 27th 2006.
- “*Ergodicity and the numerical simulation of Hamiltonian systems.*”  
Leslie Fox Prize Competition. Dundee, Scotland. June 27th 2005.

## EVENT ORGANISATION

- Computational Math Day, IRMACs Centre, Simon Fraser University, August 6th, 2014.
- Computational Math Day, IRMACs Centre, Simon Fraser University, August 7th, 2013.
- Minisymposium on Branching Processes in Mathematical Biology, SIAM Snowbird Conference, May 2013.
- Computational Math Day, IRMACs Centre, Simon Fraser University, August 8th, 2012.
- Minisymposium on Mathematical Aspects of Molecular Dynamics, ICIAM 2011, Vancouver. July 2011.
- Chaos and Ergodicity of Realistic Hamiltonian Systems, Workshop at CRM, December 11-14th, 2007. Jointly with Henk Broer. 4 day workshop.
- Stochastic Spatial Models of Biochemical Systems, Minisymposium at CAIMS 2007, May 20-24th, 2007. Jointly with Peter Swain.
- Montreal Scientific Computing Days, CRM, Feb 25-26th, 2006. With Anne Bourlioux and Thomas Wihler. 2-day program with short courses and student lectures. Approximately 70 registrants.
- Mathematical Issues in Molecular Dynamics, Banff International Research Station, June 4-9th, 2005. Jointly with Bob Skeel. 5-day workshop with 40 participants.
- Extracting Macroscopic Information from Molecular Dynamics, CRM, April 7-9th, 2005. Jointly with Andrew Stuart. 3 day workshop with 12 speakers.

## SUPERVISION

### PhD Students

- Benjamin Goodman. 2013–current.
- Marc Ryser. 2007–2011. Jointly with Nilima Nigam and Svetlana Komarova.  
**Winner of 2013 Canadian Mathematical Society Doctoral Dissertation Prize.**
- David Cottrell. 2004–2009. Jointly with Peter Swain.
- Thomas Lepage. 2005 – 2007. Jointly with David Bryant.

### MSc Students

- Jie Jian, 2016–Present.
- Xin Yang, 2011–2014.
- Sarah Kok, 2010–2012. Jointly with Sandy Rutherford.
- Stephanie Langille, 2009–2011.
- Steven Maye, 2007– 2006.
- David Cottrell, 2002 – 2004.
- Ivo Panayotov, 2002 – 2004. Jointly with Martin Gander.

### Selected Undergraduate Students

- Andrew Poelstra, Summer 2012–2013. **Solo author paper in *Journal of Function Spaces and Applications*.**
- Michael Fry, Summer 2011–2012. **Coauthored book chapter in *The Sonority Controversy*.**
- Jean-Piere Auclair, Summer 2007. **Coauthored paper in *J. Computational Physics*.**
- Yuriy Svyrydov, Summer 2006. Jointly with Benoit Charbonneau. **Coauthored paper in *IMA J. of Numerical Analysis*.**