

**Address for Correspondence:**

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**Education and Scientific Training:**

- Postdoctoral, Harvard University. 2009  
Advisor: Prof Howard C. Berg  
Theme: FRET experiments on bacterial chemotaxis signalling
- Ph.D., University of Cambridge. 2003  
Advisor: Prof Dennis Bray  
Thesis title: The spatial organisation of cell signalling pathways — a computer-based study.
- B.S. & M.S., Keio University, Japan. 1998

**Professional Appointments:**

- 2013 - present: Group Leader (with Tenure)  
FOM Institute for Atomic and Molecular Physics (AMOLF)
- 2009 - 2013: Group Leader (Tenure Track)  
FOM Institute for Atomic and Molecular Physics (AMOLF)
- 2003 - 2009: Postdoctoral Fellow with Prof. Howard C. Berg, Harvard University.
- 2002 - 2003: Research Lectureship, Institute for Advanced Biosciences, Keio University.

**Grants and Awards:**

- FOM Program Grant (lead PI) “The signal is the noise: physical origins of stochasticity in organism-level behavior” (2014).
- Allen Distinguished Investigator Award (2013).
- FOM Program Grant (co-PI) “Crowd management: physics of genome processing in complex environments” (2013).
- NWO VIDI Grant (PI) “Physics of cellular control circuits: from single molecules to behavioral strategies” (2012).
- FOM Project Grant (PI) “Superresolution imaging of live-cell signaling dynamics” (2011).
- FOM Program Grant (co-PI) “Spatial design of biochemical regulation networks” (2009).
- Ruth L. Kirschstein Postdoctoral Fellowship, NIH (2005).
- Postdoctoral Fellowship, Bauer Center for Genomics Research, Harvard University (2004).
- Glaxo International Scholarship, British Council (1998).
- Overseas Research Student Award, Committee of Vice Chancellors and Principals, UK (1998).

**Courses:**

- June 2005: Advanced Bacterial Genetics Summer Course, Cold Spring Harbor Laboratory, NY.

**Teaching:**

- Fall 2014: Lecturer:  
Physical Biology of the Cell (jointly with Prof. E. Peterman, VU)  
Amsterdam University College
- 2010-present: Guest Lecturer:  
Physics Honours Programme,  
Utrecht University.
- November 2012: Guest Lecturer:  
AMOLF Nanophotonics Course,  
Philips Research.
- November 2012 & December 2013: Guest Lecturer:  
Molecular Biophysics Course,  
Leiden University.
- January 2012: Guest Lecturer:  
Microbial Systems Biology,  
University of Basel.
- March 2010: Guest Lecturer:  
Highlight Lecture for Physics Undergraduates,  
University of Amsterdam.
- August 2007: Guest Lecturer:  
First q-bio Summer School on Cellular Information Processing,  
Los Alamos National Laboratory, Los Alamos, NM, USA.
- July 2004 – September 2005: Research supervisor for two masters students  
Department of Molecular & Cellular Biology, Harvard University.
- October 2002 – August 2003: Research Lecturer in Computational Systems Biology  
Institute for Advanced Biosciences, Keio University.

**Peer Review:**

- 2001 - present: *Ad hoc* referee for Reviews of Modern Physics, Physical Review Letters, Physical Review E, PNAS, Science Signaling, Nature Biotechnology, PLoS Biology, Biophysical Journal, Physical Biology, PLoS Computational Biology, Journal of Molecular Biology, Journal of Theoretical Biology, FEBS Letters, Bioinformatics, Cold Spring Harbor Laboratory Press.

**Scientific conferences:**

- 2009 - 2014: Program committee, Annual Q-Bio Conference on Cellular Information Processing, Santa Fe, USA
- 2013 – present: Organizer for KNAW Biophysics Meetings (jointly with G. Stephens, VU)
- 2011: Review committee, The 11th International Conference on Bacterial Locomotion and Signal Transduction (BLAST XI), New Orleans, USA.

**Research Interests:**

Biophysics, Physics of behavior, Biological signalling,, High-resolution imaging, Stochastic processes, Statistical physics, Bacterial chemotaxis, Motile behaviour and neural dynamics of *C. elegans*

**Selected Publications:**

Flores, M., Shimizu, T. S., ten Wolde, P. R. & Tostevin, F. (2012). Signalling noise enhances chemotactic drift of *E. coli*. Phys Rev Lett, 109:148101.

Lazova, M. D., Butler, M. T., **Shimizu, T. S.\*** & Harshey, R.M.\* (2012). *Salmonella* chemoreceptors McpB and McpC mediate a repellent response to L-cystine: a potential mechanism to avoid oxidative conditions. *Mol Microbiol* 84:697–711.

(\* Joint corresponding authors)

Lazova, M. D., Ahmed, T., Bellomo, D., Stocker, R. & **Shimizu, T. S.** (2011). Response rescaling in bacterial chemotaxis. *PNAS* 108:33870-33875.

Celani, A., **Shimizu, T. S.** & Vergassola, M. (2011). Molecular and functional aspects of bacterial chemotaxis. *J Stat Phys* 144:219-240.

**Shimizu, T. S.**, Tu, Y. & Berg, H. C. (2010). A modular gradient-sensing network for chemotaxis in *Escherichia coli* revealed by responses to time-varying stimuli. **Mol. Syst. Biol.** 6:382.

Ahmed, T., **Shimizu, T. S.**, Stocker, R. (2010). Microfluidics for bacterial chemotaxis. **Integrative Biology** 2:604-629.

Ahmed, T., **Shimizu, T. S.**, Stocker, R. (2010). Bacterial chemotaxis in linear and nonlinear steady microfluidic gradients. **Nano Letters** 10:3379-3385.

Tu, Y., **Shimizu, T. S.** & Berg, H. C. (2008). Modeling the chemotactic response of *Escherichia coli* to time-varying stimuli. *PNAS* 105:14855-14860.

**Shimizu, T. S.**, Le Novère, N. (2008). Looking inside the box: bacterial transistor arrays. **Mol Microbiol** 69:5-9.

Sourjik, V., Vaknin, A., **Shimizu, T. S.** & Berg, H. C. (2007). In vivo measurement by FRET of pathway activity in bacterial chemotaxis. **Methods Enzymol** 423:365-391.

**Shimizu, T. S.**, Delalez, N., Pichler, K. & Berg, H. C. (2006). Monitoring bacterial chemotaxis by using bioluminescence resonance energy transfer: absence of feedback from the flagellar motors. *PNAS* 103:2093-2097.

Korobkova, E., Emonet, T., Vilar, J. M., **Shimizu, T. S.** & Cluzel, P. (2004). From molecular noise to behavioural variability in a single bacterium. **Nature** 428:574-578.

**Shimizu, T. S.**, Aksenov, S. V. & Bray, D. (2003). A spatially extended stochastic model of the bacterial chemotaxis signalling pathway. **J Mol Biol** 329:291-309.

Levin, M D, **Shimizu, T. S.** & Bray, D. (2002). Binding and diffusion of CheR molecules within a cluster of membrane receptors. **Biophys J** 82:1809-1817.

Le Novère, N. & **Shimizu, T. S.** (2001). StochSim: modelling of stochastic biomolecular processes. **Bioinformatics** 17:575-576.

**Shimizu, T. S.**, Le Novère, N., Levin, M. D., Bevil, A. J., Sutton, B. J. & Bray, D. (2000). Molecular model of a lattice of signalling proteins involved in bacterial chemotaxis. **Nature Cell Biol** 2:792-796.

Morton-Firth, C. J., **Shimizu T. S.** & Bray D. (1999). A Free-energy-based Stochastic Simulation of the Tar Receptor Complex. **J Mol Biol** 286:1059-1074.