

Dustin Reishus

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Education

University of Southern California <i>Doctor of Philosophy in Computer Science</i> Advisor: Professor Leonard Adleman Dissertation: On the Mathematics of Self-Assembly	December 2009
University of Southern California <i>Master of Science in Computer Science</i>	December 2005
University of Southern California <i>Bachelor of Science in Computer Engineering and Computer Science</i>	May 2003
California Institute of Technology <i>Computing Beyond Silicon Summer School</i>	Summer 2002

Research Experience

Computing Innovation postdoctoral research fellow Research topics include: Self-organizing distributed and swarm robotics (including development of the Droplet swarm robotic platform), algorithms for self-organizing robotic systems, theoretical foundations of swarm robotics	2010–2012
Graduate research assistant Research topics include: Algebraic complex analysis, event-systems model of self-assembly, DNA self-assembly, self-assembled electronic circuits, stochastic chemical reaction networks	2003–2010
Undergraduate research assistant Research topics include: DNA computation, exquisite detection of small molecules, tile assembly model of self-assembly	2001–2003

Teaching Experience

Instructor, University of Colorado CS 7000-002: Swarm Intelligence and Self-Assembly (Designed curriculum and taught course)	Fall 2011
Teaching assistant, University of Southern California CS 303: Analysis of algorithms	Fall 2009
CS 571: Web technologies	Fall 2009
EE 327: Digital Electronics	Spring 2003

Honors and Awards

Computing Innovation Postdoctoral Fellowship	2010–2012
National Science Foundation (NSF) Graduate Research Fellowship	2004–2009
USC Trustee Scholarship	1999–2003
Engineering Honors Program	1999–2003
Upsilon Pi Epsilon (computer science honors organization)	2002
Tau Beta Pi (engineering honors organization)	2002
Eta Kappa Nu (electrical engineering honors organization)	2002
Resident Honors Program	1999–2000
Japan / US Senate International Scholarship	1999

Recent Service

Program Committee Member	
International Conference on Swarm Intelligence (ANTS)	2012
Research in Applied Computation Symposium (RACS)	2011
Conference Reviewer	
IEEE International Conference on Robotics and Automation (ICRA)	2012
International Symposium on Distributed Autonomous Robotic Systems (DARS)	
International Conferences on Autonomous Agents and Multiagent Systems (AAMAS)	
IEEE International Conferences on Self-Adaptive and Self-Organizing Systems (SASO)	2011
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	
IEEE Symposium on Foundations of Computer Science (FOCS)	
ACM Symposium on Theory of Computing (STOC)	
Journal Reviewer	
International Journal of Robotics Research	2012
Theory of Computing	2011
Advanced Science Letters	
Science Fair Judge	
Intel International Science and Engineering Fair	2012
Boulder Valley School District Regional Science Fair	
Intel International Science and Engineering Fair	2011
Boulder Valley School District Regional Science Fair	
California State Science Fair	2010
Los Angeles County Science Fair	

Dissertation

- [1] Dustin Reishus. *On the Mathematics of Self-Assembly*, PhD thesis, University of Southern California, December 2009.

Journal Publications

- [1] Leonard Adleman, Jarkko Kari, Lila Kari, Dustin Reishus, and Petr Sosik*, *The undecidability of the infinite ribbon problem: Implications for computing by self-assembly*, SIAM Journal on Computing **38** (2009), no. 6, 2356–2381.
- [2] Yuriy Brun and Dustin Reishus*, *Path finding in the tile assembly model*, Theoretical Computer Science. **410** (2009), no. 15, 1461–1472.
- [3] Dustin Reishus, Bilal Shaw, Yuriy Brun, Nickolas Chelyapov, and Leonard Adleman, *Self-assembly of DNA double-double crossover complexes into high-density, doubly connected, planar structures*, Journal of American Chemical Society (JACS) **127** (2005), no. 50, 17590–17591.
- [4] Nickolas Chelyapov, Yuriy Brun, Manoj Gopalkrishnan, Dustin Reishus, Bilal Shaw, and Leonard Adleman, *DNA triangles and self-assembled hexagonal tilings*, Journal of American Chemical Society (JACS) **126** (2004), no. 43, 13924–13925.

Conference Publications

- [1] Ken Sugawara, Dustin Reishus, Nikolaus Correll. *Object Transportation by Granular Convection Using Swarm Robots*, Proceedings of the 10th International Symposium on Distributed Autonomous Robotic Systems (DARS2012) (Baltimore, MD, USA), November 2012.
- [2] David Doty, Matthew J. Patitz, Dustin Reishus, Robert T. Schweller, and Scott M. Summers*, *Strong Fault-Tolerance for Self-Assembly with Fuzzy Temperature*, Proceedings of the 51st Symposium on Foundations of Computer Science (FOCS2010) (Las Vegas, NV, USA), 2010, pp. 417–426.
- [3] Yuriy Brun and Dustin Reishus*, *Connecting the dots: Molecular machinery for distributed robotics*, Proceedings of the 14th International Meeting on DNA Computing (DNA08) (Prague, Czech Republic), June 2008, pp. 27–35.
- [4] Dustin Reishus, *Design of a self-assembled electronic memory circuit*, Proceedings of the 5th Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO08) (Snowbird, UT, USA), April 2008, pp. 239–246.
- [5] Yuriy Brun, Manoj Gopalkrishnan, Dustin Reishus, Bilal Shaw, Nickolas Chelyapov, and Leonard Adleman, *Building blocks for DNA self-assembly*, Proceedings of the 1st Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO04) (Snowbird, UT, USA), April 2004, pp. 2–15.

*Authors listed alphabetically

- [6] Leonard Adleman, Jarkko Kari, Lila Kari, and Dustin Reishus*, *On the decidability of self-assembly of infinite ribbons*, Proceedings of the 43rd Symposium on Foundations of Computer Science (FOCS02) (Ottawa, Ontario, Canada), 2002, pp. 530–537.

Unrefereed Publications

- [1] Erik Komendera, Dustin Reishus, and Nikolaus Correll. *Assembly by intelligent scaffolding*, Technical Report CU-CS 1080-11, University of Colorado at Boulder, 2011.
- [2] Leonard Adleman, Manoj Gopalkrishnan, Ming-Deh Huang, Pablo Moisset, and Dustin Reishus*, *On the Mathematics of the Law of Mass Action*, arXiv:0706.1234 [math.FA], October 2008.
- [3] Michael deLorimier, Alexandre Mathy, Dustin Reishus, Rolfe Schmidt, Bilal Shaw, and Li Chin Wong, *Algorithmic Self-Assembly of Circuits*, Computing Beyond Silicon Summer School final report, August 2002.

Selected Mentions in Popular Media

- [1] Olivia Solon, *Swarm of tiny robots form ‘liquid that thinks’*, December 18, 2012, <http://www.wired.co.uk/news/archive/2012-12/18/swarm-robots>
- [2] Rebecca Boyle, *Ping Pong Ball-Sized Robots Can Swarm Together To Form A Smart Liquid*, December 18, 2012, <http://www.popsci.com/technology/article/2012-12/ping-pong-ball-sized-robots-can-swarm-together-form-smart-liquid>
- [3] Mark Prigg, *The ‘ping pong ball’ robots that could soon be gardening on Mars (and they could even build us a space station there)*, December 17, 2012 <http://www.dailymail.co.uk/sciencetech/article-2249420/Could-swarms-ping-pong-robots-soon-gardening-Mars.html>
- [4] *Researchers creating team of pingpong-ball-sized robots*, December 14, 2012, <http://phys.org/news/2012-12-team-pingpong-ball-sized-robots-video.html>
- [5] *Research: Tiny robots may think as a group*, December 14, 2012, http://www.upi.com/Science_News/Technology/2012/12/14/Research-Tiny-robots-may-think-as-a-group/UPI-93131355534619/
- [6] *‘Liquid That Thinks:’ Swarm of Ping-Pong-Ball-Sized Robots Created*, December 14, 2012, <http://www.sciencedaily.com/releases/2012/12/121214143027.htm>