

Short biography and CV for Steen Rasmussen

Dr. Steen Rasmussen (Ph.D. Technical University of Denmark, 1985) has pioneered approaches, methods, and applications for self-organizing processes in natural and artificial systems: abstract self-programmable matter, molecular dynamics (MD) lattice gas simulations for molecular self-assembly, rational and evolutionary protocell design, disaster mitigation and decision support systems based on collective intelligence, as well as novel simulations for large-scale socio-technical systems. He is the Team Leader for the Self-Organizing Systems team at Los Alamos, External Professor at the Santa Fe Institute, and he was recently Guest Professor at University of Copenhagen. He leads the Los Alamos Protocell Assembly (LDRD-DR) project, and heads the Astrobiology program at Los Alamos developing experimental and computational protocells and Cell-Like Entities, with the USAF as a co-sponsor. Further, he is the co-director on the European Union sponsored Programmable Artificial Cell Evolution (PACE) project, and he was one of the founders of the Artificial Life movement. He was the Chair of the Science and Engineering Leadership Team (SELT) for 2001-2002 in the Earth and Environmental Science (EES) Division at LANL. He co-developed the Transportation Simulation System (TRANSIMS), which is now used by the USA Department of Transportation, he co-directed the Urban Security Initiative at LANL, which developed an integrated simulation framework for urban systems, and he was part of the original Los Alamos team on Critical Infrastructure Protection, sponsored by the Department of Homeland Security. He has published 75 peer reviewed papers and many internal technical reports, given more than 150 invited presentations outside of home institutions, and he has co-organized eight international and several national conferences. He recently (September 2003) organized the two first international protocell meetings one at Los Alamos and the Santa Fe Institute and one at ECAL in Dortmund, Germany. Many communications about his work inside and outside of the scientific establishment have appeared on television and in newspapers, periodicals, and books. Since 2000 he has sponsored 11 postdocs (theorists and experimentalists) and 25 graduate and undergraduate students.

FORMAL EDUCATION:

Ph.D., (Physics) Technical University of Denmark (TUD) 1985.

M.Sc., (Physics & Physical Chemistry) Technical University of Denmark (TUD) 1982.

Philosophy studies at University of Copenhagen 1978-1981.

SCIENTIFIC EMPLOYMENT AND EXPERIENCE:

10/02 – present, Team Leader, Self-Organizing Systems, EES, Los Alamos National Laboratory.

08/04 – 05/05, Guest Professor, Institute for Biochemistry and Genetics, University of Copenhagen.

02/97 – 09/02, Staff Scientist, Earth and Environmental Science (EES), Los Alamos National Laboratory.

11/92 – 02/97, Staff Scientist, Simulation Applications, Los Alamos National Laboratory.

10/91 – 10/92, Staff Scientist, Theoretical Division, Los Alamos National Laboratory.

09/88 – present, Part time Researcher in Residence and later (2004) External Professor, Santa Fe Institute.

09/88 – 09/91, Postdoc, Center for Nonlinear Studies (CNLS), Los Alamos National Laboratory.

11/85 – 09/88, Postdoc, Physics Laboratory, Technical University of Denmark.

SELECTED HONOURS AND AWARDS:

1988 Award “P. Gorm-Petersens Mindelegat” in the presence of Her Majesty the Queen, Magrethe II of Denmark; 1991-1996 Associate Editor, *Nanobiology*; 1993-present Editorial Board, *Artificial Life*; 2000 Cerro Grande Wildfire Award for web-based disaster mitigation; 2004 Los Alamos Achievement Awards for Excellence: (i) Protocell Design & (ii) Simulation of Critical Infrastructures. 2005 World Technology Network Reward, biotechnology category, radical protocell design.

ADDITIONAL WEB INFORMATION:

<http://www.ees.lanl.gov/staff/steen> <http://protocells.lanl.gov> <http://www.protocell.org/PACE>

SELECTED PAPERS

- S. Rasmussen, L. Chen, D. Deamer, D. Krakauer, N. Packard, P. Stadler, & M. Bedau, Transitions from nonliving to living matter, *Science* **303** (2004) 963.
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- S. Rasmussen, L. Chen, M. Nilsson, and S. Abe, Bridging nonliving and living matter, *Artificial Life*, **9** (2003) 269.
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- S. Rasmussen, N. Baas, M. Olesen, B. Meyer, and M. Nilsson, Ansatz for dynamical hierarchies, *Artificial Life*, **7** (2001) 329.
- M. Nilsson, S. Rasmussen, B. Mayer, and D. Whitten, Molecular Dynamics (MD) Lattice Gas: 3-D molecular self-assembly, in: *New Constructions in Cellular Automata*, Eds D. Griffeth and C. Moore, Oxford University Press (2003) 183.
- M. Bedau, J. McCaskill, N. Packard, S. Rasmussen, C. Adami, D. Green, T. Ikegami, K. Kaneko, and T. Ray, Open problems in artificial life, *Artificial Life* **6** (2000) 363.
- B. Mayer and S. Rasmussen, Dynamics and simulation of self-reproducing micelles, *Int. J. of Modern Phys. C* **11** (2000) 809.
- G. Heiken, G.A. Valentine, M. Brown, S. Rasmussen, D. George, R. Greene, E. Jones, K. Olsen, C. Andersson, Modeling Cities—The Los Alamos Urban Security Initiative, *Journal of Public Works Management and Policy* **4** (2000) 198.
- B. Mayer, G. Koehler, and S. Rasmussen, Simulation and Dynamics of Entropy Driven, Molecular Self-Assembly Processes, *Physical Review E* **55** (1997) 4489-4499.
- T.T. Puck, R. Johnson, and S. Rasmussen, A system for mutation measurement in mammalian cells: Application to gamma-irradiation, *Proc. Natl. Acad. Sci. USA* **94** (1997) 1218
- K. Nagel and S. Rasmussen, Traffic at the edge of chaos, *Artificial Life IV*, Ed. R.A. Brooks and P. Maes, MIT Press (1994) 222.
- R. Feldberg, C. Knudsen, S. Rasmussen, Recursive definition of global cellular automata mappings, *Phys. Rev. E* **49** (1994) 1699
- H. Hotani, R. Lahoz-Beltra, B. Combs, S. Hameroff, S. Rasmussen, Liposomes, Microtubules, and Artificial Cells; *Nanobiology* **1** (1992) 61
- S. Rasmussen, C. Knudsen, R. Feldberg, and M. Hindsholm, The Coreworld: Emergence and Evolution of Cooperative Structures in a Computational Chemistry, *Physica D* **42** (1990) 11
- S. Rasmussen, H. Karampurwala, R. Vaidyanath, K. Jensen, and S. Hameroff, Computational Connectionism within Neurons: A Model of Cytoskeletal Automata Subserving Neural Networks, *Physica D* **42** (1990) 428
- B. Bollobas and S. Rasmussen, First Cycles in Random Directed Graph Processes, *Discrete Math.*, **75** (1989) 55
- S. Rasmussen, Toward a Quantitative Theory of the Origin of Life, In: *Artificial Life*, Ed. C. Langton, Addison-Wesley, (1989) 79

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