Susanne Still

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Date: August 30, 2017.

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Current position

Professor University of Hawai'i at Manoa (UHM), Department of Information and Computer Sciences (ICS).
Cooperating Graduate Faculty UHM, Department of Physics and Astronomy.

Previous positions

2011-2017	*Associate Professor*	University of Hawai'i at Mānoa, ICS.
2005-2011	*Assistant Professor*	University of Hawai'i at Mānoa, ICS.
2001-2005	*Research Staff Member*	Princeton University, Physics Department, Theoretical Biophysics Group, Prof. Dr. W. Bialek.
2000-2001	*Post-Doctoral Researcher*	NEC Research Institute, Princeton, NJ, Group: Prof. Dr. W. Bialek.
1995-2000	*Research Assistant*	ETH Zürich, Switzerland, Physics Department and Institute of Neuroinformatics.

Education

2000	Dr. nat. sci. (equiv. PhD) Physics Department, ETH Zürich, Switzerland. Advisors: Dr. M. Mahowald, Prof. Dr. K. Hepp, Prof. Dr. R. J. Douglas.
1995	Physik Diplom (equiv. Master's degree in physics) Universität Hannover, Germany. *1994-95 Diplomarbeit (Master's Thesis)* Paul Scherrer Institute, Switzerland. 1993-94 ETH Zürich, Switzerland.
1992	Physik Vordiplom (equiv. Bachelor's degree in physics) Universität Hannover, Germany.

Grants and fellowships

2013-2015	Large Grand Awardee and Member: Foundational Questions Institute. Project title: [Foundations of Information processing in living systems](#) (with G. E. Crooks).
2013, 2014	Visiting Scientist, International Center for Theoretical Physics (ICTP), Trieste, Italy.
2009	Junior Fellow, Institute for Advanced Study, Collegium Budapest, Hungary.
2009	Visiting Scientist, Max Planck Institute: Mathematics in the Natural Sciences, Leipzig, Germany.
2008	Visitor, Institute for Advanced Study, Collegium Budapest, Hungary.
2006-2010	UBM: Research Experiences in Mathematical Biology; NSF (senior personnel); PI: L. C. Wilson, Mathematics, University of Hawai'i at Mānoa.
2002-2003	Forschungsstipendium, Deutsche Forschungsgesellschaft (Research Grant, German Research Association).
1993-1994	"EMSφS" Scholarship.

Publications

Preprints

2017   S.Still, Thermodynamic cost and benefit of data representations. arXiv:1705.00612

2017   E Stopnitzky and S. Still, Non-equilibrium odds for the emergence of life. arXiv:1705.02105

2016   G. Crooks and S. Still, Marginal and Conditional Second Laws of Thermodynamics. arXiv:1611.04628

Articles

2016   A. L. Grimsmo and S.Still, Quantum Predictive Filtering. *Phys. Rev. A* 94, 012338

2016   F. Caccioli, I. Kondor, M. Marsili and S.Still. Liquidity Risk And Instabilities In Portfolio Optimization. *International Journal of Theoretical and Applied Finance* 19 (5) 1650035.

2016   G. P. Berman, A. I. Nesterov, R. T. Sayre and S.Still, On improving the performance of nonphotochemical quenching in CP29 light-harvesting antenna complex. *Physics Letters A*, 380 (13), pp. 1279 1283.

2014   S. Still, Lossy is lazy. *Proceedings of the Seventh Workshop on Information Theoretic Methods in Science and Engineering* Eds. J. Rissanen, P. Mylymäki, T. Roos, N. P. Santhanam.

2014   S. Still, Information Bottleneck Approach to Predictive Inference. *Entropy* 16(2), 968-989.

2014   L.J. Miller, R. Gazan and S. Still. Unsupervised classification and visualization of unstructured text for the support of interdisciplinary collaboration. *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing*, pp. 1033–1042.

2013   C.W. Hamilton, C. Beggan, S. Still, M. Beuthe, R. Lopes, D. Williams, J. Radebaugh, *W. Wright*. Spatial distribution of volcanoes on Io: implications for tidal heating and magma ascent. *Earth and Planetary Science Letters*, 361, 272 286.

2012   S. Still, D. A. Sivak, A. J. Bell and G. E. Crooks. The thermodynamics of prediction. *Physical Review Letters* 109 (12) 120604.

2012   S. Still and D. Precup. An information-theoretic approach to curiosity-driven reinforcement learning. *Theory in Biosciences* 131 (3) pp. 139-148.

2011   F. Caccioli, S. Still, M. Marsili, and I. Kondor. Optimal liquidation strategies regularize portfolio selection. *The European Journal of Finance*, 19 (6), 554-571 (preprint on arxiv:1004.4169)

2010   S. Still and I. Kondor. Regularizing Portfolio Optimization. *New Journal of Physics* 12, 075034

2010   S. Still, J. P. Crutchfield, and C. Ellison. Optimal causal inference: estimating stored information and approximating causal architecture. *Chaos* 20, 037111

2009   S. Still. Information-theoretic approach to interactive learning. *EPL* 85, 28005

2009   D. Mandic, S. Still and S. C. Douglas. Duality between widely linear and dual channel adaptive filtering. *Proc. IEEE Int. Conf. on Acoustics, Speech and Signal Processing*, pp: 1729-1732

2006   S. Still, K. Hepp and R. J. Douglas. Neuromorphic Walking Gait Control. *IEEE Transactions on Neural Networks*, 17 (2) pp. 496-508

2004   S. Still and W. Bialek. How many clusters? An information theoretic perspective. *Neural Computation* 16, pp. 2483-2506

2004   S. Still, W. Bialek and L. Bottou. Geometric Clustering using the Information Bottleneck method. *Advances In Neural Information Processing Systems 16*, S. Thrun, L. K. Saul and B. Schölkopf (Eds.), MIT Press, Cambridge, MA

2003   E. Schneidman, S. Still, M. J. Berry II and W. Bialek. Network information and connected correlations. *Physical Review Letters* 91, 238701

2001   S. Still, B. Schölkopf, K. Hepp and R. J. Douglas. Four-legged Walking Gait Control Using a Neuromorphic Chip Interfaced to a Support Vector Learning Algorithm. *Advances in Neural Information Processing Systems 13*, T. K. Leen, T. Dietterich, and V. Tresp (Eds.), MIT Press, Cambridge, MA, pp. 741-747

1999   S. Still and G. LeMasson. Traveling waves in a ring of three inhibitory coupled model neurons. *Neurocomputing* 26-27, pp. 533-539

Book Chapter

1998   S. Still and M.W. Tilden. Controller for a four legged walking machine. *Neuromorphic Systems: Engineering Silicon from Neurobiology*, L.S. Smith, A. Hamilton (Eds.), World Scientific.

Technical reports

2007   S. Still and J. P. Crutchfield. Structure or Noise? Santa Fe Institute Working Paper no. 07-08-020. arxiv:0708.0654

2006   S. Still and W. Bialek. Active Learning and optimal predictions. Technical Report, University of Hawai'i, Mānoa, Honolulu, USA.

Misc. conference contributions

2012   L.J. Miller and S. Still Information Theoretic Clustering of Astrobiology Documents, Astrobiology Science Conference, Atlanta, Georgia.

2006   S. Still, M. Dinculescu and D. Precup. An information-theoretic approach for Building Approximate Predictive Models. *Neural Information Processing Systems (NIPS) 20* Workshop on Grounding Sensation, Knowledge, and Cognition in Sensori-Motor Experience.

2005   S. Still. *Active learning and optimal behavior. Neural Information Processing Systems (NIPS)19* Workshop on Value of Information in Inference, Learning and Decision-Making.

2001   S. Still, A. K. Schenk, B. D. Wright, A. J. Doupe and W. Bialek. Information theoretic approaches to the analysis of complex natural sounds. *Gordon Conference Sensory Coding and the Natural Environment – Probabilistic models of perception*, Mount Holyoke College, MA, USA.

1998   S. Still and M.W. Tilden. Coupled Oscillators and Walking Control: A Hardware Implementation

of a Distributed Motor System. *Proc. 26th Göttingen Neurobiology Conference* (2), N. Elsner and R. Wehner (Eds.), Georg Thieme, Stuttgart.

1998   C. Collin and S. Still. Towards a Neuronally-Controlled Walking Machine. *2nd Int. Conf. on Cognitive and Neural Systems*, Boston, MA, USA.

Theses

2000   S. Still. Walking gait control for four-legged robots. PhD Thesis, ETH Zürich, Department of Physics.

1995   S. Still. Characterization and Optimization of Lithium-Carbon-Intercalation Electrodes for the use in Litium-Ion-Exchange Batteries. Diplomarbeit, Universität Hannover, Department of Physics.

Manuscripts in preparation

G. Crooks and S. Still, On the first Law of thermodynamics.

S. Still, M. Marsili, J. Song, R. Diaz and I. Perez-Castillo, Statistical physics of generalized Szillard engines.

Invited Talks and Workshops

Invited Talks at Conferences and Workshops

11/2016   *Statistical Physics, Information Processing and Biology*, Santa Fe Institute, Santa Fe, NM

09/2016   *Information, Control, and Learning–The Ingredients of Intelligent Behavior*, Center for Brain Sciences, Hebrew University, Jerusalem, Israel.

08/2016   *The Foundational Questions Institute 5th International Conference*, Banff, Canada.

07/2015   *Conference on Sensing, Information and Decision at the Cellular Level*, International Center for Theoretical Physics (ICTP), Trieste, Italy.

05/2015   *Nature as Computation*, Beyond Center for Fundamental Concepts in Science, Arizona State University, Tempe, AZ.

04/2015   *Workshop on Entropy and Information in Biological Systems*, National Institute for Mathematical and Biological Synthesis, University of Tennessee, Knoxville, TN.

10/2014   *Biological and Bio-Inspired Information Theory.* Banff International Research Station for Mathematical Innovation and Discovery (BIRS), Canada.

07/2014   *The Seventh Workshop on Information Theoretic Methods in Science and Engineering (WITMSE 2014)*, Honolulu, HI.

05/2014   *Statistical Mechanics Foundations of Complexity — Where do we stand?*, Santa Fe Institute, NM.

01/2014   *The Foundational Questions Institute Fourth International Conference*, Vieques Island, PR.

05/2013   *MONA (Modeling Neural Activity: Statistics, Dynamical Systems, and Networks)*, Kauai, HI.

01/2011   *Berkeley Mini Stat. Mech. Meeting*, UC Berkeley, CA.

01/2011   *Workshop on measures of complexity*, Santa Fe Institute, NM.

03/2010   *American Physics Society March Meeting*, Focus Session Physics of Behavior, Portland, OR.

09/2009   *European Conference on Complex Systems*, Warwick (ECCS 09), Workshop on Information, Computation, and Complex Systems.

08/2009   Keynote Lecture. *The Second International Conference on Guided Self-Organization (GSO)*, Leipzig, Germany.

07/2009   *Chaos/Xaoc*, Conference Center of the National Academy of Sciences in Woods Hole, MA.

04/2006   *Bellairs Reinforcement Learning Workshop*, Barbados.

12/2005   *Neural Information Processing Systems (NIPS)*, Workshop on "Models of Behavioral Learning",

Vancouver, BC, Canada.

07/2004   *Kavli Institute for Theoretical Physics (KITP)*, University of California, Santa Barbara. Program: Understanding the Brain.

12/1998   Workshop on "Learning Chips and Neurobots". *Neural Information Processing Systems (NIPS)*, Breckenridge, CO.

Teaching faculty at Summer Schools

04/2016   *Spring College in the Physics of Complex Systems*, International Center for Theoretical Physics (ICTP), Trieste, Italy.

09/2010   *Eigth Fall Course on Computational Neuroscience*, Bernstein Center for Computational Neuroscience, and Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany.

08/2008   *Sante Fe Institute Complex Systems Summer School* at the Institute of Theoretical Physics, Chinese Academy of Sciences (CAS), Beijing, China.

09/2008   *Ecole Recherche Multimodale d'Information Techniques & Sciences (ERMITES)*; Université du Sud Toulon-Var, Laboratoire des Sciences de l'Information et des Systèmes, Association Francaise de la Communication Parlée; Giens, France.

Invited Department Colloquia and Seminars

11/2016   *Condensed Matter Seminar*, UC Santa Cruz.

08/2016   *Biophysics Seminar*, Simon Fraser University, Vancouver, Canada.

06/2013   *Max Planck Institute for Dynamics and Self-organization*, Göttingen, Germany.

04/2013   *Scuola Internazionale Superiore di Studi Avanzati (SISSA)*, Trieste, Italy.

03/2013   *The University of Auckland*, Physics Department, Auckland, NZ.

03/2013   *The University of the South Pacific*, Physics Department, Suva, Fiji.

11/2012   *Stanford University*, Center for Mind, Brain and Computation.

08/2012   *University of Hawaii at Mānoa*, Physics Colloquium.

10/2011   *University of California at Berkeley*, Redwood Center for Theoretical Neuroscience.

08/2011   *ETH/UNI Zürich*, Institute for Neuroinformatics, Switzerland.

04/2011   *Santa Fe Institute*, Santa Fe, NM.

09/2010   *University of Edinburgh*, Institute of Perception, Action and Behaviour, Edinburgh, UK.

04/2010   *University of British Columbia, Canada*, Physics Colloquium.

03/2010   *University of Victoria, Canada*, Physics Colloquium.

01/2010   *University of California at Berkeley*, Redwood Center for Theoretical Neuroscience.

12/2009   *Universität Köln*, Germany, Physics Department.

11/2009   *International Center of Theoretical Physics (ICTP)*, Trieste, Italy.

04/2009   *University of California at Davis*, Computational Science & Engineering Center, Davis, CA.

10/2008   *Max Planck Institute for Biological Cybernetics*, Machine Learning Seminar, Tübingen, Germany.

09/2007   *University of Montreal*, Montreal, Canada. Department of Computer Science.

09/2007   *McGill University*, Montreal, Canada. *McGill-UdeM-MITACS* Machine Learning Seminar.

01/2007   *University of Hawaii at Mānoa*, Physics Colloquium.

03/2007   *University of California at Davis*, Computational Science and Engineering Center, Davis, CA.

01/2007   *TU Munich*, Institute of Computer Science, Munich, Germany.

01/2007   *ETH Zürich*, Institute for Neuroinformatics, Zürich, Switzerland.

01/2007   *IDSIA*, Institute for Artificial Intelligence (Istituto Dalle Molle di Studi sull'Intelligenza Artificiale), Lugano, Switzerland.

01/2007   *ETH Zürich*, Institute of Computer Sciences, Zürich, Switzerland.

07/2006   *Max Planck Institute for Biological Cybernetics*, Tübingen, Germany.

06/2006   *McGill University*, Montreal, Canada. Department of Computer Science.

10/2005   *University of Hawai'i, Mānoa*, Honolulu, HI, Medical Informatics, ICS.

09/2005   *University College Dublin*, Dublin, Ireland.

04/2005   *University of Hawai'i at Mānoa*, Honolulu, HI, Mathematics Colloquium.

04/2005   *University of Hawai'i, Hilo*, Hilo, HI, Department of Computer Science.

04/2005	*University of Hawai'i, Mānoa*, Honolulu, HI, Department of Electrical Engineering.
04/2003	*Columbia University*, New York, NY, Applied Mathematics Seminar.
03/2003	*University of British Columbia*, Vancouver, Canada, Department of Physics.
08/2003	*Humboldt University*, Berlin, Germany, Theoretical Biology Seminar.
08/2003	*Hamilton Institute, National University of Ireland*, Maynooth, Ireland. Machine Learning and Cognitive Neuroscience Seminar.
08/2003	*University of Hawai'i*, Honolulu, HI. Department of Electrical Engineering.
07/2003	*Max Planck Institute for Biological Cybernetics*, Tübingen, Germany, Machine Learning Seminar.
07/2003	*ETH Zürich*, Switzerland, Institute for Neuroinformatics.
1998	*Max Planck Institute of Fluid Dynamics*, Göttingen, Germany.
1998	*Max Planck Institute of Biological Cybernetics*, Tübingen, Germany.

Invited Workshop Participant

08/2017	Thermodynamics of Computation in Chemical and Biological Systems, Santa Fe Institute, NM
08/2017	Thermodynamics and Computation: Towards a New Synthesis, Santa Fe Institiute, NM.
10/2009	Financial risk, market complexity and regulation. Collegium Budapest, Hungary.
04/2009	NSF: Opportunities and Challenges in Uncertainty Quantification for Complex Interacting systems. University of Southern California.

Selected Press

06/18/2015 Life's quantum crystal ball, by C. Piekema in Plus.

02/19/2015 Nostalgia Just Became a Law of Nature, by S. DeDeo in Nautilus.

11/29/2014 http://fqxi.org/community/podcast/2014.11.29. Podcast - Foundational Questions Institute.

04/05/2013 Volcanoes on Jupiter's moon Io out of place, M. Wall for NBC News.

10/04/2012 Proteins remember the past to predict the future, P. Ball in Nature News.

Students and Postdocs

Current Ph.D. students

- Lisa Miller, ICS.

- Elan Stopnitzky, Physics.

- Carlos Andrade Silva, ICS.

Masters students (thesis option)

Emiliano Miranda (2013) "Statistical learning in video games".
Now at Imber Studios LLC (Co-founder, Technical Director).
Lisa Miller(2012) "Information theoretic clustering of astrobiology documents".
Now Ph.D. student in my group, and faculty at KCC.
Lane McIntosh (2012) (M.A. Mathematics) "Information Processing and Energy Dissipation in Neurons".
Now Ph.D. student at Stanford University.

Postdoc

Dr. Taku Ishikawa (2015-2017) *Markerless motion capture for human movement analysis.* Sponsored by the National Printing Bureau of Japan, Research Institute.

Ph.D. committee member

(exp. 2018)   John Russell, Physics.
(exp. 2019)   Pat Collins, Mathematics.
2016   Dr. Pardis Niknejadi, Physics. Now Post-Doc at DESY, Hamburg, Germany.
2016   Dr. Johnatan Page, Economics. Now Director of Analytics at UHERO.
2010   Dr. Christopher Hamilton, Geophysics. Now faculty at University of Arizona.
2010   Dr. Hunter Hatfield, Linguistics. Now faculty at University of Otago, NZ.

Editorial and peer review service

Editorial Board

- Entropy

Reviewer

- Advances in Complex Systems
- CHAOS
- Computer Vision and Pattern Recognition
- European Biophysical Journal (EBJ)
- IEEE Transactions on Neural Networks and Learning Systems
- Neural Computation
- Journal of Banking and Finance
- Neural Information Processing Systems (NIPS)
- Physical Review Letters (PRL)
- Physical Review E
- Transactions on Pattern Analysis and Machine Intelligence
- Transactions on Knowledge and Data Engineering

Conference Organization

06/26-28/2013   Modeling Neural Activity (MONA): Statistics, Dynamical Systems and Networks. Lihue, HI; *Local Chair.*

University Service

Lecture series (organizer)

2005-present   Mānoa Seminar Series in Machine Learning and Computational Neuroscience

Mānoa service

AY 16-17   Search Advisory Committee for the Dean of the College of Engineering.

AY 16-17   Convener for Excellence in Teaching Awards (CNS).

AY 15-16   Search Advisory Committee for the Dean of the College of Natural Sciences (CNS).

AY 15-16   HHMI 2017 Undergraduate Science Ed Grant: Working Group no.2 ("killer" courses).

AY 15-16   CNS Interim Associate Dean Search Committee.

AY 09-10   Foundations FS (focus on symbolic reasoning) Working Group.

ICS service

- DPC

- Curriculum committee (Chair)

- Space and infrastructure committee (Chair, S2017)

- Graduate committee

- ICS 141 working group

Physics service

- DPC (external member, hiring committee, 2011).

Member of Professional Associations

- American Physical Society
- Deutsche Physikalische Gesellschaft (German Physical Society)