

Curriculum Vitae

Steve Pressé

Website (soon to be changed): statphysbio.physics.iupui.edu
stevenpresse@gmail.com

Current Positions

- Jan. 2017 **Arizona State University**
-present Associate Professor – Dept. of Physics and School of Molecular Sciences
- Jan. 2013 **Indiana Univ. - Purdue Univ. Indianapolis**
-Dec. 2016 Assistant Professor of Biophysics – Dept. of Physics
[Adjunct – Cell & Integrative Physio. (IU School Med.) and Chemistry]

Education

- 2008 **University of California San Francisco, San Francisco CA**
-2012 Postdoctoral fellow, Biophysics (K.A. Dill group)
- 2003 **Massachusetts Institute of Technology, Cambridge MA**
-2008 Ph.D., Chemical Physics (R.J. Silbey group);
Thesis title: Role of fluctuations and defects in select condensed matter problems
- 2000 **McGill University, Montréal QC**
-2003 B.Sc., Honors Bio-organic Chemistry, minor German Language; GPA: 3.94/4.00

Publications (* denotes corresponding author)

Published (in rank)

- I. Sgouralis, **S. Pressé***, “ICON: an adaptation of infinite HMMs for time traces with drift”, **Biophys. J.**, 112, 2117 (2017)
- I. Sgouralis, **S. Pressé***, “An introduction to infinite HMMs for single molecule data analysis”, **Biophys. J.**, 112, 2021 (2017)
- M. Tavakoli, J.N. Taylor, C.-B. Li, T. Komatsuzaki, **S. Pressé***, “Single molecule data analysis: An introduction”, **Adv. Chem. Phys.**, accepted (2017)
- H. Jashnsaz, M. Al Jaboori, C. Weistuch, N. Miller, T. Nguyen, V. Meyerhoff, B. McCoy, S. Perkins, R. Wallgren, B. Ray, K. Tsekouras, G. Anderson*, **S. Pressé***, “Hydrodynamic Hunters”, **Biophys. J.**, 112, 1282 (2017)
- Featured on:** Biophys. J. Research Highlight, EurakeAlert!, Bild.de, Sueddeutsche.de, Sciencedirect.com, Welt.de, Zeit.de, Spiegel.de, SciShow (260k+ views) and 37+ additional sites.
- A. Lee, K. Tsekouras, C. Calderon, C. Bustamante, **S. Pressé***, “Unraveling the thousand word picture: An Introduction to super-resolution data analysis”, **Chem. Rev.**, DOI: 10.1021/acs.chemrev.6b00729 (2017)

K. Tsekouras, T.C. Custer, N.G. Walter, **S. Pressé***, “A novel method to accurately locate and count large numbers of steps by photobleaching”, **MBoC**, 2, 3601 (2016)

G. Rollins, J.Y. Shin, C. Bustamante, **S. Pressé***, “A stochastic approach to the molecular counting problem in super-resolution microscopy”, **Proc. Natl. Acad. Sc.** (Direct Submission), 112, E110 (2015)

Featured on: EurakeAlert!, PNAS Research Highlight, IUPUI SoS Website

C. Riedel, R. Gabizon, C.A.M. Wilson, K. Hamadani, K. Tsekouras, S. Marqusee, **S. Pressé***, C. Bustamante*, “The heat released during catalytic turnover enhances the enzymes diffusion”, **Nature**, 517, 227 (2015)

Featured on: Nature News and Views, C&EN Highlights, Phys.org, IUPUI SoS Website

H. Jashnsaz, T. Nguyen, H. Petrache, **S. Pressé***, “Inferring models of bacterial dynamics toward point sources”, **PLoS ONE**, 10, e0140428 (2015)

S. Pressé*, “A data-driven alternative to the fractional Fokker-Planck equation”, **J. Stat. Mech.: Th. and Expmt.**, P07009 (2015)

K. Tsekouras, A. Siegel, R. Day, **S. Pressé***, “Inferring diffusion dynamics from FCS in heterogeneous nuclear environments”, **Biophys. J.**, 109, 7 (2015)

S. Pressé*, K. Ghosh, J. Lee, K. Dill, “Reply to C. Tsallis ‘Conceptual inadequacy of the Shore and Johnson axioms for wide classes of complex systems’ ”, **entropy**, 17, 5043 (2015)

S. Pressé*, “Nonadditive entropy maximization is incompatible with Bayesian updating”, **Phys. Rev. E.**, 90, 052149 (2014)

S. Pressé*, J. Peterson, J. Lee, P. Elms, J.L. MacCallum, S. Marqusee, C. Bustamante, K. Dill, “Single molecule conformational memory extraction: P5ab RNA hairpin”, **J. Phys. Chem. B**, 118, 6597 (2014)

S. Pressé*, K. Ghosh, J. Lee, K. Dill, “Nonadditive entropies yield probability distributions with biases not warranted by the data”, **Phys. Rev. Lett.**, 111, 180604 (2013)

Featured on: Science Daily, IUPUI SoS Website

S. Pressé*, K. Ghosh, J. Lee, K. Dill, “Principles of maximum entropy and maximum caliber in statistical physics”, **Rev. Mod. Phys.**, 85, 1115 (2013)

M. Sen, R.A. Maillard, K. Nyquist, P. Rodriguez-Aliaga, **S. Pressé**, A. Martin*, C. Bustamante*, “The ClpXP protease functions as a motor with constant ‘rpm’ but different ‘gears’ ”, **Cell**, 115, 636 (2013)

Featured on: IUPUI SoS Website

S. Pressé*, J. Lee, K. Dill, “Extracting conformational memory from single-molecule kinetic data”, **J. Phys. Chem. B**, 117, 495 (2013)

Prior publications

J. Lee*, **S. Pressé***, “Microcanonical origin of the maximum entropy principle for open systems”, **Phys. Rev. E**, 86, 041126 (2012)

J. Lee*, **S. Pressé***, “A derivation of the master equation from path entropy maximization”, **J. Chem. Phys.**, 137, 074103 (2012)

G.J. Peterson*, **S. Pressé**, K. Peterson, K.A. Dill, “Simulated evolution of protein-protein interaction networks with realistic topology”, **PLoS ONE**, 7, e39052 (2012)

H. Ge*, **S. Pressé**, K. Ghosh, K.A. Dill, “Markov processes follow from the principle of maximum caliber”, **J. Chem. Phys.**, 136, 064108 (2012)

Selected by the Editors as a Research Highlight.

S. Pressé*, K. Ghosh, K.A. Dill, “Modeling stochastic dynamics in biochemical systems with feedback using maximum caliber”, **J. Phys. Chem. B**, 115, 6202 (2011)

S. Pressé, K. Ghosh, R. Phillips*, K.A. Dill*, “Dynamical fluctuations in biochemical reactions and cycles”, **Phys. Rev. E**, 82, 031905 (2010)

G. J. Peterson, **S. Pressé**, K.A. Dill*, “Nonuniversal power law scaling in the probability distribution of scientific citations”, **Proc. Natl. Acad. Sc.**, 107, 16023 (2010)

S. Pressé, R.J. Silbey*, “Radiating dipoles near curved interfaces”, **Phys. Rev. A**, 77, 043402 (2008)

S. Pressé, R.J. Silbey*, “Memory effects on the convergence properties of the Jarzynski equality”, **Phys. Rev. E**, 74, 061105 (2006)

J.M. Hodgkiss, N.H. Damrauer, **S. Pressé**, J. Rosenthal, D.G. Nocera*, “Electron transfer driven by proton fluctuations in a hydrogen-bonded donor-acceptor assembly”, **J. Phys. Chem. B**, 110, 18853 (2006)

S. Pressé, R.J. Silbey*, “Anomalous temperature-isotope dependence in proton-coupled electron transfer”, **J. Chem. Phys.**, 124, 164504 (2006)

S. Pressé, R.J. Silbey*, “Ordering of limits in the Jarzynski equality”, **J. Chem. Phys.**, 124, 054117 (2006)

Teaching and Mentoring (in rank):

Research Mentoring:

4 postdoctoral fellows: Konstantinos Tsekouras (Jul. 2013 - June 2017), Ioannis Sgouralis (Jul. 2016 -), Mateusz Chwastyk (Feb. 2017 -), David Rowland (Jan. 2017 -)

3 graduate students: Hossein Jashnsaz (Jan. 2013 - June 2017), Meysam Tavakkoli (June 2015 -), Sina Jazani (June 2015 -)

3 Ph.D. rotation students (IUSM, 2014-2015): José Victorino, Anthony Dioquino, Guanying Bi

1 master’s intern: Robert Zigon (Jun. 2013-Sep. 2013)

27 undergraduates:

2016-2017: Stephanie Perkins, Brian McCoy, Nick Miller, Mohammed Al-Juboori, Viktoria Meyerhoff, Corey Weistuch (SUNY Stony Brook), Ross Wallgren, Christopher O'Connor, Margaret Ann Christy (REU, Purdue), Gregory Jevens (REU, CUNY)

2015-2016: Stephanie Perkins, Nicholas Proctor, Brian McCoy, Nick Miller, Mohammed Al-Juboori, Viktoria Meyerhoff, Lindsay Hale (UROP), Corey Weistuch (REU, SUNY Stony Brook)

2014-2015: Stjepan Kraljic, Lana Serikof, Michaela Conteh, Justin Sciscoe, Harshel Naik, Camilo Gomez, Jaime Velazquez, Jacques Roettcher, Nicholas Proctor, Bryan McCoy, Kylee Johnson, Ian Daly, Morgan Cook, Mohammed Al-Juboori

2013-2014: Peter Anderson, Fawaz Butt, Tyler Nguyen, Bhavesh Ghandi, Jason Walsman

5 high-school students: Lucas Burke (2013), Ephraim Retta (2013), Roger Biak (2014), Matt Muhoberac (2015), Emily Perez (2016)

Teaching:

Undergraduate: 25100 Lecture – Electricity and Magnetism (Fall 2015).

Undergraduate: 25100 Recitation – Electricity and Magnetism
(Spring 2013, Fall 2013, Fall 2014, Spring 2015, Fall 2016).

Graduate: 58500 Lecture – Biophysics (Fall 2014, Fall 2016).

Graduate: 61700 Lecture – Statistical Mechanics (Fall 2013).

Scholarships, Fellowships, Grants and Awards

- 2017 – **Moore Foundation/Research Corporation – 3 Co-PI grant**
‘Follow the Leader: Forecasting collective cancer dynamics’
(\$ 168,750 including 12.5% indirect, split equally among 3 Co-PI’s)
- 2016 – **NSF CAREER – Single PI grant**
‘NSF CAREER: Data-Driven Models for Biological Dynamics’
(\$ 1,000,000 including indirect)
- **Army Research Office, Mechanical Sciences Division – Single PI grant**
‘Multi-Dimensional and Dissipative Dynamical Systems: Maximum Entropy as a Principle for Modeling Dynamics and Emergent Phenomena in Complex Systems’
(\$ 360,000 including indirect)
- 2015 – **Research Corporation Scialog Fellow for “Molecules Come to Life”**
- **GSIRF Grant ‘Advancing photobleaching as a versatile single molecule counting tool’**
(\$ 56,000 direct), PI: Steve Pressé, Co-PI: Ken Dunn
- **IUCRG Grant ‘Using quantitative in vivo microscopy to build predictive models of drug-induced liver injury’**
(\$ 50,000 direct), Co-PI: Steve Pressé, Richard Day, Ken Dunn
- **Purdue Research Foundation Summer Grant** (\$ 9,000 + fringe)

- 2014 – **National Science Foundation – Single PI grant**
‘Determining in vivo protein complex stoichiometry from superresolution microscopy’
(\$ 470,350 including indirect)
- **Purdue Research Foundation Research Grant** (\$ 18,000 + fringe)
- 2013 – **Burroughs-Wellcome Travel Grant** (\$ 12,000 total)
- **Purdue Research Foundation Summer Grant** (\$ 8,000 + fringe)
- 2008-2010 – **FQRNT¹ Postdoctoral Scholarship** (Approx. \$ 59,000 total)
- 2007-2008 – **FQRNT Doctoral Scholarship** (Approx. \$ 27,500 total)
- 2005-2007 – **NSERC² Doctoral Scholarship** (Approx. \$ 42,000 total)
- 2003-2005 – **NSERC Master’s Scholarship** (Approx. \$ 38,500 total)
- 2004 – **Outstanding Teaching Award, MIT Chemistry Dept.**
- 2003 – **John Williamson Frederick Peacock Memorial Scholarship Award** (Approx. \$ 5,000)
– **Society of Chemical Industry Merit Award**
– **Anachemia Prize in Chemistry**
– **Lucien Piché Award** (Approx. \$ 1,500)
– **R.F. Robertson Award in Physical Chemistry**
- 2002 – **Herbert J. Brennen Scholarship** (Approx. \$ 2,000)
– **Canadian Society for Chemistry, Silver Medal**
– **Frederic J. LeMaistre Award** (Approx. \$ 1,000)
– **Undergraduate research NSERC scholarship** (Approx. \$ 4,500)

Conferences, Seminars, Workshops

Invited Talk - Seminar, Dept. Biophysics and Biophysical Chem., Johns Hopkins School of Medicine, Baltimore MD, Nov. 2017

Invited Talk - Workshop on “Deciphering Complex Energy Landscape and Kinetic Network from Single Molecules to Cells”, Dijon, France, Sep. 2017

Invited Lecturer - Workshop – 11th Annual q-bio Summer School, Fort Collins CO, Jun. 2017

Co-Organizer - Workshop on “The Complexity of Dynamics and Kinetics from Single Molecules to Cells”
–Telluride Science Research Center, Telluride CO, Jun. 2017
Co-organizers: Stephen R. Berry, Tamiki Komatsuzaki

Organizer - and Session Chair “Tracking, Localization and Inference in Live Cells: Methods and Applications” –American Physical Society (APS), New Orleans LA, Mar. 2017

Invited Talk - Symposium, American Physical Society (APS), New Orleans LA, Mar. 2017

¹Le Fonds québécois de la recherche sur la nature et les technologies

²Natural Sciences and Engineering Research Council of Canada

Invited Talk - Gordon Research Conference on Stochastic Physics in Biology, Ventura CA, Jan. 2017

Invited Talk - Seminar, Chemistry Dept., Rice, Houston TX, Nov. 2016

Invited Talk - Seminar, MidQBio Conference, Purdue, West Lafayette IN, Oct. 2016

Invited Talk - Seminar, Center for Molecular Simulation, Univ. Calgary, Calgary AB, Oct. 2016

Invited Lecturer - Workshop – 10th Annual q-bio Summer School, Fort Collins CO, Jul. 2016

Invited Talk - Workshop on “Single Molecule Workshop: Theory Meets Experiment” –Telluride Science Research Center, Telluride CO, Jul. 2016

Invited Talk - EMBO Conference: The biochemistry and chemistry of biocatalysis, Oulu, Finland, Jun. 2016

Invited Talk - Conference on “Mathematical and Computational Medicine”, Ohio State U., Columbus OH, May 2016

Invited Talk - Seminar, Dept. Molecular Science, Arizona State U., Tempe AZ, May 2016

Invited Talk - Statistical Physics Seminar, Dept. of Chemistry, UC Berkeley, Berkeley CA, Apr. 2016

Invited Talk - Biophysics Seminar, Dept. of Chemistry, U. Chicago, Chicago IL, Apr. 2016

Invited Talk - Physics Frontier Seminar, UIUC, Urbana-Champaign IL, Apr. 2016

Co-Organizer - and Session Chair “Inference in Biophysics” –American Physical Society (APS), Baltimore MD, Mar. 2016
Co-organizer: David Schwab

Invited Talk - Seminar, Dept. of Physics, Iowa State U., Ames IA, Mar. 2016

Primary Co-Organizer - MBI workshop on “Modeling and Inference from Single Molecule to Cells” – Ohio State MBI Workshop, Columbus OH, Feb. 2016
Co-organizers: Ashok Prasad, John Fricks, Jayajit Das

Invited Talk - MBI workshop on “Modeling and Inference from Single Molecule to Cells” – Ohio State MBI Workshop, Columbus OH, Feb. 2016

Invited Talk - Seminar, Dept. of Physics, McGill U., Montréal QC, Feb. 2016

Invited Talk - Seminar, Dept. of Chemistry, McGill U., Montréal QC, Feb. 2016

Invited Talk - Seminar, Biodesign and Dept. of Physics, Arizona State U., Tempe AZ, Jan. 2016

Invited Talk - Workshop on “Deciphering molecular complexity from protein functions to cellular network” – Pacificchem 2015, Honolulu HI, Dec. 2015

Invited Talk - Seminar, Dept. of Physics, Arizona State U., Tempe AZ, Oct. 2015

Invited Talk - Seminar, Biophysics Seminar, Ohio State U., Columbus OH, Sep. 2015

Invited Talk - Seminar, Nationwide Children’s Hospital, Ohio State U., Columbus OH, Sep. 2015

Invited Talk - Seminar, Battelle Center, Ohio State U., Columbus OH, Sep. 2015

Invited Lecturer - Workshop – 9th Annual q-bio Summer School, Fort Collins CO, Jul. 2015

Invited Talk - Workshop on “Biophysical Dynamics” –Telluride Science Research Center, Telluride CO, Jul. 2015

Co-Organizer - Workshop on “The Complexity of Dynamics and Kinetics from Single Molecules to Cells” –Telluride Science Research Center, Telluride CO, Jun. 2015

Co-organizers: Stephen R. Berry, Tamiki Komatsuzaki

Invited Talk - Seminar, Dept. of Physics and Astronomy, University of Missouri, Columbia MO, Apr. 2015

Invited Talk - Seminar, Dept. of Physics and Astronomy, Purdue, West Lafayette IN, Mar. 2015

Invited Participant - Scialog “Molecules come to life” hosted by the Research Corporation, Tucson AZ, Mar. 2015

Organizer - and Session Chair “Stochastic Model Inference from Biophysical Data” –American Physical Society (APS), San Antonio TX, Mar. 2015

Invited Talk - Seminar, 2nd Zing Conference on Mathematical Medicine, Cancun, Mexico, Dec. 2014

Invited Talk - Seminar, Physics Dept., Michigan State University, Lansing MI, Nov. 2014

Invited Talk - Seminar, Faculty Homecoming, IUPUI, Indianapolis IN, Oct. 2014

Invited Talk - Seminar, Center for *In Silico Protein Science*, KIAS, Seoul, South Korea, Sep. 2014

Invited Talk - Seminar, Chemistry Dept., Seoul National University, Seoul, South Korea, Sep. 2014

Invited Talk - 14th KIAS Conference on Protein Structure and Function, Seoul South Korea, Sep. 2014

Invited Talk - Seminar, Chemistry and Chemical Bio. Dept., IUPUI, Indianapolis IN, Sep. 2014

Invited Talk - Seminar, Biology Dept., IUPUI, Indianapolis IN, Sep. 2014

Organizer - and Session Chair “Probability Inverse Problems in Biophysics” –SIAM Life Sciences, Charlotte NC, Aug. 2014

Invited Talk - Symposium, SIAM Life Sciences, Charlotte NC, Aug. 2014

Attendee - New Faculty Workshop, AAPT, College Park MD, Jun. 2014

Invited Talk - Symposium, American Physical Society (APS), Denver CO, Mar. 2014

Organizer - and Session Chair “Inferring Physical Models from Noisy Biological Data” –American Physical Society (APS), Denver CO, Mar. 2014

Poster - Biophysical Society (BPS), San Francisco CA, Feb. 2014

Invited Talk - Seminar, Integrative Physiology Dept., IU School Medicine, Indianapolis IN, Jan. 2014

Invited Talk - Seminar, Computer Science Dept., IUPUI, Indianapolis IN, Jan. 2014

Invited Talk - Seminar, Physics Dept., Ball State University, Muncie IN, Oct. 2013

Invited Talk - Workshop on “Single Molecule Dynamics” –Telluride Science Research Center, Telluride CO, Jul. 2013

Invited Talk - Workshop on “Complexity of Dynamics and Kinetics in Many Dimensions” –Telluride Science Research Center, Telluride CO, Jul. 2013

Invited Talk - Seminar, iM2CS Group – Math Dept., IUPUI, Indianapolis IN, Apr. 2013

Invited Talk - Seminar, Indiana Academy of Sciences, Indianapolis IN, Mar. 2013

Invited Talk - Seminar, Statistics Dept., Pennsylvania State University, College Park PA, Mar. 2013

Contributed Talk - American Physical Society (APS), Baltimore MD, Mar. 2013

Invited Talk - Seminar, Physics Dept., IUPUI, Indianapolis IN, Feb. 2013

Poster - Gordon Research Conference on Stochastic Physics in Biology, Ventura CA, Jan. 2013

Contributed Talk - Biophysics Seminar, Physics Dept., UC Berkeley, Berkeley CA, Apr. 2012

Invited Talk - Seminar, Chemical Physics Lab., NIH-NIDDK, Bethesda MD, Apr. 2012

Invited Talk - Seminar, Chemistry Dept., Wichita State University, Wichita KS, Apr. 2012

Invited Talk - Seminar, Physics Dept., IUPUI, Indianapolis IN, Apr. 2012

Contributed Talk - American Chemical Society (ACS), San Diego CA, Mar. 2012

Contributed Talk - American Physical Society (APS), Boston MA, Feb. 2012

Contributed Talk – (talk on behalf of Julian Lee)– Biophysical Society (BPS), San Diego CA, Feb. 2012

Invited Talk - Seminar -Physics Dept., Concordia University, Montréal, Jan. 2012

Invited Talk - Seminar -Single molecule group, UC Berkeley, Berkeley CA, Jul. 2011

Contributed Talk - Biophysical Society (BPS), Baltimore MD, March 2011

Poster - Gordon Research Conference on Stochastic Physics in Biology, Ventura CA, Jan. 2011

Poster - Biophysical Society (BPS), San Francisco CA, Feb. 2010

Invited Talk - Seminar -Single molecule group, UC Berkeley, Berkeley CA, Jan. 2010

Poster - American Chemical Society (ACS), San Francisco CA, Mar. 2010

Invited Talk - Seminar, Dept. of Physics and Astronomy, U. of Denver, Denver CO, Jan. 2009

Poster - XXIII IUPAP International Conference on Statistical Physics, Genoa, Italy, Jul. 2007

Contributed Talk - American Chemical Society (ACS), Atlanta GA, Mar. 2006

Poster - American Conference of Theoretical Chemistry (ACTC), Los Angeles CA, Jul. 2005

Attendee - Workshop in Computational Biophysics offered by K. Schulten group, Boston MA, Dec. 2004

Activities and Initiatives

2017-	Presenter of an interactive program (“Bacterial Serengeti”) at the South Mountain Education Center (Phoenix Zoo affiliated)
2015	Member of the Journal <i>entropy</i> ’s editorial board
-2016	Co-Organizer of IUPUI’s iM2CS Seminar Member IUPUI Imaging Research Initiative (IRI) Council Presenter of an interactive program entitled “Bacterial Serengeti” at the Indianapolis Zoo (K-12)
2014	Indiana Academy of Sciences – Chair Elect (Physics Section)
-2015	
2013	Indiana Academy of Sciences – Vice-Chair Elect (Physics Section)
2013	Hosted high school students through the D.J. Angus-Sciencetech foundation
-present	and ACS project SEED
2005	MIT organizer of the Greater Boston Theoretical Chemistry Lecture Series
-2008	

– Organized conferences and symposia listed in “Conferences” section above

Member: Sigma Xi, Golden Key, American Physical Society (APS).

Ad hoc reviewer (journals): *Nat. Comm.*, *Nat. Meth.*, *Biophys. J.*, *Phys. Rev. E*, *Phys. Rev. A*, *Phys. Rev. X*, *Phys. Rev. Lett.*, *Proc. Natl. Acad. Sc.*, *J. Stat. Phys.*, *Phys. Bio.*, *Phys. Lett. A*, *entropy*, *RSC's Chemical Science*, *PLoS Comp. Bio.*, *Pramana Physics*

Ad hoc reviewer (funding programs/agencies): Fondecyt (Chilean National Science and Technology Commission), Kavli Microbiome Ideas Challenge, Netherlands Organization for Funding Research

Languages and other abilities

Native fluency in **French**, **English** and **Italian**; solid working knowledge of **German** and **Spanish**.
Other abilities: Playing the violin, harpsichord.