

# Shiwei Lan

Researcher

Annenberg 338

CMS, CalTech

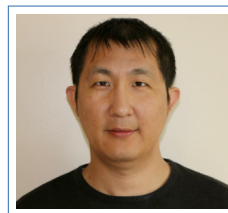
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## Education

2013

**Ph.D. in Statistics**, *University of California-Irvine*, Irvine, California.

2010

**M.S. in Mathematics**, *University of California-Irvine*, Irvine, California.

2005

**B.S. in Mathematics**, *Nanjing University*, Nanjing, China.

## Experience

2016

**Postdoctoral Scholar/Instructor**, *California Institute of Technology*, Pasadena, California.

2014

**Postdoctoral Research Fellow**, *University of Warwick*, Coventry, U.K..

2006

2014

**Research/Teaching Assistant**, *University of California-Irvine*, Irvine, California.

## Preprints

2017

Holbrook, Andrew, Shiwei Lan, Jeffrey Streets, and Babak Shahbaba (July 2017). "The nonparametric Fisher information geometry and the chi-square process density prior". arXiv:1707.03117.

2017

Lan, Shiwei, Andrew Holbrook, Norbert J. Fortin, Ombao Hernando, and Babak Shahbaba (Nov. 2017). "Flexible Bayesian Dynamic Modeling of Covariance and Correlation Matrices". arXiv:1711.02869.

## Publications

2017

Beskos, Alexandros, Mark Girolami, Shiwei Lan, Patrick E. Farrell, and Andrew M. Stuart (2017). "Geometric MCMC for infinite-dimensional inverse problems". In: *Journal of Computational Physics* 335.Supplement C, pp. 327–351.

2017

Holbrook, Andrew, Shiwei Lan, Alexander Vandenberg-Rodes, and Babak Shahbaba (Dec. 2017). "Geodesic Lagrangian Monte Carlo over the space of positive definite matrices: with application to Bayesian spectral density estimation". In: *Journal of Statistical Computation and Simulation*.

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- 2017 Karcher, Michael D., Julia A. Palacios, Shiwei Lan, and Vladimir N. Minin (2017). "phylo-dyn: an R package for phylodynamic simulation and inference". In: *Molecular Ecology Resources* 17.1, pp. 96–100.
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- 2017 Schneider, Tapio, Shiwei Lan, Andrew Stuart, and João Teixeira (Dec. 2017). "Earth System Modeling 2.0: A Blueprint for Models That Learn From Observations and Targeted High-Resolution Simulations". In: *Geophysical Research Letters*. DOI: 10.1002/2017GL076101.
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- 2016 House, Thomas, Ashley Ford, Shiwei Lan, Samuel Bilson, Elizabeth Buckingham-Jeffery, and Mark Girolami (24 August 2016). "Bayesian uncertainty quantification for transmissibility of influenza, norovirus and Ebola using information geometry". In: *Journal of The Royal Society Interface* 13.121.
- 
- 2016 Lan, Shiwei, Tan Bui-Thanh, Mike Christie, and Mark Girolami (Mar. 2016). "Emulation of higher-order tensors in manifold Monte Carlo methods for Bayesian Inverse Problems". In: *Journal of Computational Physics* 308, pp. 81–101.
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- 2016 Lan, Shiwei and Babak Shahbaba (2016). "Chapter 2 of Algorithmic Advances in Riemannian Geometry and Applications". In: *Advances in Computer Vision and Pattern Recognition*. Ed. by Ha Quang Minh and Vittorio Murino, pp. 25–71.
- 
- 2015 Lan, Shiwei, Julia A. Palacios, Michael Karcher, Vladimir N. Minin, and Babak Shahbaba (2015). "An efficient Bayesian inference framework for coalescent-based nonparametric phylodynamics". In: *Bioinformatics* 31.20, pp. 3282–3289.
- 
- 2015 Lan, Shiwei, Vasileios Stathopoulos, Babak Shahbaba, and Mark Girolami (2015). "Markov Chain Monte Carlo from Lagrangian Dynamics". In: *Journal of Computational and Graphical Statistics* 24.2, pp. 357–378.
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- 2014 Lan, Shiwei, Jeffrey Streets, and Babak Shahbaba (July 2014). "Wormhole Hamiltonian Monte Carlo". In: *Proceedings of the 28th AAAI Conference on Artificial Intelligence*. Pp. 1953–1959.
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- 2014 Lan, Shiwei, Bo Zhou, and Babak Shahbaba (22–24 Jun 2014). "Spherical Hamiltonian Monte Carlo for Constrained Target Distributions". In: *Proceedings of the 31st International Conference on Machine Learning*. Proceedings of Machine Learning Research 32.1. Ed. by Eric P. Xing and Tony Jebara, pp. 629–637.
- 
- 2014 Shahbaba, Babak, Shiwei Lan, Wesley O. Johnson, and Radford M. Neal (May 2014). "Split Hamiltonian Monte Carlo". In: *Statistics and Computing* 24.3, pp. 339–349.

2014

Shahbaba, Babak, Shiwei Lan, and Jeffrey Streets (2014). "Contribution to the Discussion of the Paper 'Geodesic Monte Carlo on Embedded Manifolds'". In: *Scandinavian Journal of Statistics* 41.1, pp. 14–15.

2014

Shahbaba, Babak, Bo Zhou, Shiwei Lan, Hernando Ombao, David Moorman, and Sam Behseta (2017/09/28 2014). "A Semiparametric Bayesian Model for Detecting Synchrony Among Multiple Neurons". In: *Neural Computation* 26.9, pp. 2025–2051.

## Teaching

Lecturer Bayesian Analysis (CalTech, 17W, 30 hours)  
 Certificate *Certificate of Interest* (17) by CalTech Project for Effective Teaching Program  
 Guest Hamiltonian Monte Carlo (13), Bayesian Statistics (14), Statistical Computing  
 Lecturer Method (UCI, 17W, 4 hours)  
 Teaching Calculus (07/08/09), Math for Econ (08/09), Linear Algebra (10), Intro to Bio  
 Assistant Stats (11/12/13), Intro Prob and Stats Theory (11), Stats Methods (11), Stats  
 Methods for Data Analysis (12/13)

## Activities

### Reviewing

Journals Statistical Analysis and Data Mining, Scandinavian Journal of Statistics, PLOS ONE, Journal of Computational and Graphical Statistics, Scientific Research Essays, SIAM J. Uncertainty Quantification, SIAM J. Scientific Computing, Journal of the American Statistical Association

### Selective Invited Talks

|                |  |   |
|----------------|--|---|
| Duke           | <b>About <math>\infty</math>-Dimensional Geometric MCMC</b>              | <i>SAMSI workshop17</i>                       |
| Atlanta        | <b>Geometric MCMC for Infinite-Dimensional Inverse Problems</b>          | <i>SIAM CSE17</i>                             |
| Lausanne, CH   | <b>Geometric <math>\infty</math>-Dimension MCMC for Inverse Problems</b> | <i>SIAM UQ16</i>                              |
| Warwick, UK    | <b>Spherical Augmentation for Constrained Probability Distributions</b>  | <i>WCPM15</i>                                 |
| Warwick, UK    | <b>Gaussian Process-Geometric Monte Carlo For Big Models</b>             | <i>MIR@W15</i>                                |
| Warwick, UK    | <b>Geometric Techniques in Advanced MCMC</b>                             | <i>EQUIP 14</i>                               |
| Beijing, China | <b>Spherical HMC for Constrained Target Distributions</b>                | <i>ICML 14</i>                                |
| Oviedo, Spain  | <b>Split Hamiltonian Monte Carlo</b>                                     | <i>ERCIM on Computing &amp; Statistics 12</i> |
| UC-Irvine      | <b>Lagrangian Dynamical Monte Carlo</b>                                  | <i>AI/ML seminar 12</i>                       |

## Skills

### Mathematics

|                   |   |                    |   |
|-------------------|---|--------------------|---|
| <b>Statistics</b> | Bayesian Data Analysis<br>Statistical Computing | <b>Mathematics</b> | Uncertainty Quantification<br>Data Assimilation |
|-------------------|---|--------------------|---|

### Computing

|                  |               |                 |                        |
|------------------|---------------|-----------------|------------------------|
| <b>Languages</b> | C/C++, Python | <b>Software</b> | Matlab, R, SAS, FEniCS |
|------------------|---------------|-----------------|------------------------|