



Susan Holmes

Professor of Statistics

Bio

BIO

Trained in the French school of Data Analysis in Montpellier, Susan Holmes has been working in non parametric multivariate statistics applied to Biology since 1985. She has taught at MIT, Harvard and was an Associate Professor of Biometry at Cornell before moving to Stanford in 1998. She created the Thinking Matters class: Breaking Codes and Finding patterns and likes working on big messy data sets, mostly from the areas of Immunology, Cancer Biology and Microbial Ecology. Her theoretical interests include applied probability, MCMC (Monte Carlo Markov chains), Graph Limit Theory, Differential Geometry and the topology of the space of Phylogenetic Trees. She wrote the book

Modern Statistics for Modern Biology with Wolfgang Huber from EMBL and teaches the material as a crash course (BIOS221) regularly every year. Her current focus is improving the statistical analyses and reproducibility of data in perturbation studies of the Human Microbiome.

ACADEMIC APPOINTMENTS

- Professor, Statistics
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- CoDirector, Mathematical and Computational Sciences IDP, (2002-2017)
- Director, VIGRE program in Statistics, (2005-2014)
- Professor, Member, BioX, (2003- present)

HONORS AND AWARDS

- CASBS Fellow, Center for the Advanced study of the Behavioral Sciences (2017-2018)
- Breiman Lecturer, NIPS (December, 2016)
- Fellow, Fields Institute in Mathematical Sciences, Toronto, Canada (2015)
- Director's Transformative Research Award, NIH (2013)
- John Henry Samter University Fellow in Undergraduate Education, Stanford (2012)
- Fellow of the Institute of Mathematical Statistics, IMS (2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member and Chair (2010-2012), Science Board, NimBioS (2007 - 2012)

- Science Boards, Fields Research Institute in the Mathematical Sciences (2012 - 2015)
- Council Member, Institute of Mathematical Statistics (2018 - present)

PROGRAM AFFILIATIONS

- Symbolic Systems Program

LINKS

- My lab website: <http://statweb.stanford.edu/~susan/LabIndex.html>
- My website: <http://statweb.stanford.edu/~susan/SusanPerso.html>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our work focuses on large heterogeneous multi-layer data analyses. Whether using image analysis and segmentation for the study of cancer and immune cell interactions, or brain imaging and DNA sequence analyses for the study of dependencies between genetic and neurological dynamics, all these statistical studies have involved large complex datasets of different types where dynamics of interactions between different components of a system are the key to understanding the underlying biology.

We have generalized methods such as Principal Components Analysis (PCA) to more diverse data incorporating spatial information as well as tree dependency structures. This has proved useful in the study of drug resistant mutations in HIV and in the study of the dynamics of bacterial communities in the Human Microbiome.

The statistical bases for these nonparametric methods are computer intensive methods using optimization and Kernels and we often find useful embeddings of high dimensional data in low dimensional structures, the extreme case being finding a natural ordering in high dimensional data. More general manifolds have also proved useful in one of our current projects, joint with Xavier Pennec of INRIA-SophiaAntipolis which focuses on the uses of differential geometry in computational anatomy and image processing.

In a long term collaboration with Professor David Relman (Stanford Medical School) we are developing a multi-table toolbox of non parametric methods that enable users to normalize and visualize the multiple facets of the microbiota in the human body under different classes of perturbations. The tools developed in this project are all open source packages developed in R and provide an example of reproducible research in action.

PROJECTS

- Study of the dynamics of the human microbiome. - Stanford University (March 1, 2013 - 2018)
- Hierarchical Testing - Stanford University (8/1/2012)
- Multivariate Data Analysis of Drug Resistance in HIV - Stanford University (9/1/2003)
- Multiway Data Analysis for the Human Microbiome - Stanford University (11/1/2013 - 10/31/2018)

Teaching

COURSES

2019-20

- Applied Statistics III: STATS 305C (Spr)
- Biostatistics: BIO 141, STATS 141 (Aut)
- Modern Statistics for Modern Biology: BIOS 221, STATS 366 (Aut)

- Statistical Methods in Computational Genetics: STATS 155 (Aut)

2018-19

- Applied Statistics I: STATS 305A (Aut)
- Breaking Codes, Finding Patterns: THINK 3 (Aut)
- Modern Statistics for Modern Biology: STATS 366 (Sum)
- Statistical Methods in Computational Genetics: STATS 155 (Aut)

2017-18

- Modern Statistics for Modern Biology: BIOS 221, STATS 366 (Sum)

2016-17

- Breaking Codes, Finding Patterns: THINK 3 (Aut)
- Modern Statistics for Modern Biology: STATS 366 (Sum)
- PhD First Year Student Workshop: STATS 303 (Aut, Win, Spr)
- Statistical Methods in Computational Genetics: STATS 155 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Gabe Reder, Hannah Wastyk

Postdoctoral Faculty Sponsor

Anne-Maud Ferreira, Pratheepa Jegathan, Laura Marie Symul

Orals Evaluator

Mona Azadkia

Doctoral (Program)

Mona Azadkia, Stephen Bates, Fang Cai, Michael Celentano, Nima Hamidi, Nikolaos Ignatiadis, Zhimei Ren, Jaime Roquero Gimenez, Evan Rosenman, Michael Sklar, Youngtak Sohn, Jingyi Tay, Andy Tsao, Qian Zhao

Postdoctoral Research Mentor

Anne-Maud Ferreira, Pratheepa Jegathan, Laura Marie Symul

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biomedical Informatics (Phd Program)
- Biomedical Informatics (Masters Program)
- Microbiology and Immunology (Phd Program)

Publications

PUBLICATIONS

- **Latent variable modeling for the microbiome** *BIostatistics*
Sankaran, K., Holmes, S. P.
2019; 20 (4): 599–614
- **Multitable Methods for Microbiome Data Integration** *FRONTIERS IN GENETICS*
Sankaran, K., Holmes, S. P.
2019; 10

- **Modern Statistics for Modern Biology** <http://bios221.stanford.edu/book/>
Holmes, S., Huber, W.
Cambridge University Press.2019
- **Ten quick tips for effective dimensionality reduction.** *PLoS computational biology*
Nguyen, L. H., Holmes, S.
2019; 15 (6): e1006907
- **Simple statistical identification and removal of contaminant sequences in marker-gene and metagenomics data.** *Microbiome*
Davis, N. M., Proctor, D. M., Holmes, S. P., Relman, D. A., Callahan, B. J.
2018; 6 (1): 226
- **TRACKING NETWORK DYNAMICS: A SURVEY USING GRAPH DISTANCES** *ANNALS OF APPLIED STATISTICS*
Donnat, C., Holmes, S.
2018; 12 (2): 971–1012
- **Latent variable modeling for the microbiome.** *Biostatistics (Oxford, England)*
Sankaran, K., Holmes, S. P.
2018
- **Bayesian Nonparametric Ordination for the Analysis of Microbial Communities** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*
Ren, B., Bacallado, S., Favaro, S., Holmes, S., Trippa, L.
2017; 112 (520): 1430–42
- **DADA2: High-resolution sample inference from Illumina amplicon data.** *Nature methods*
Callahan, B. J., McMurdie, P. J., Rosen, M. J., Han, A. W., Johnson, A. J., Holmes, S. P.
2016; 13 (7): 581-583
- **Waste not, want not: why rarefying microbiome data is inadmissible.** *PLoS computational biology*
McMurdie, P. J., Holmes, S.
2014; 10 (4)
- **Microbial biogeography and ecology of the mouth and implications for periodontal diseases.** *Periodontology 2000*
Proctor, D. M., Shelef, K. M., Gonzalez, A., Davis, C. L., Dethlefsen, L., Burns, A. R., Loomer, P. M., Armitage, G. C., Ryder, M. I., Millman, M. E., Knight, R., Holmes, S. P., Relman, et al
2020; 82 (1): 26–41
- **Expanded Spectrum of Antiretroviral-Selected Mutations in Human Immunodeficiency Virus Type 2.** *The Journal of infectious diseases*
Tzou, P. L., Descamps, D., Rhee, S., Raugi, D. N., Charpentier, C., Taveira, N., Smith, R. A., Soriano, V., de Mendoza, C., Holmes, S. P., Gottlieb, G. S., Shafer, R. W.
2020
- **TIGIT is upregulated by HIV-1 infection and marks a highly functional adaptive and mature subset of natural killer cells.** *AIDS (London, England)*
Vendrame, E., Seiler, C., Ranganath, T., Zhao, N. Q., Vergara, R., Alary, M., Labbé, A. C., Guédou, F., Poudrier, J., Holmes, S., Roger, M., Blish, C. A.
2020
- **Characterization of the Impact of Daclizumab Beta on Circulating Natural Killer Cells by Mass Cytometry.** *Frontiers in immunology*
Ranganath, T., Simpson, L. J., Ferreira, A. M., Seiler, C., Vendrame, E., Zhao, N., Fontenot, J. D., Holmes, S., Blish, C. A.
2020; 11: 714
- **Influenza-Induced Interferon Lambda Response Is Associated With Longer Time to Delivery Among Pregnant Kenyan Women.** *Frontiers in immunology*
Seiler, C., Bayless, N. L., Vergara, R., Pintye, J., Kinuthia, J., Osborn, L., Matemo, D., Richardson, B. A., John-Stewart, G., Holmes, S., Blish, C. A.
2020; 11: 452
- **Treated HIV Infection Alters Phenotype but Not HIV-Specific Function of Peripheral Blood Natural Killer Cells.** *Frontiers in immunology*
Zhao, N. Q., Ferreira, A., Grant, P. M., Holmes, S., Blish, C. A.
2020; 11: 829
- **Variability in the analysis of a single neuroimaging dataset by many teams.** *Nature*

- Botvink-Nezer, R., Holzmeister, F., Camerer, C. F., Dreber, A., Huber, J., Johannesson, M., Kirchler, M., Iwanir, R., Mumford, J. A., Adcock, R. A., Avesani, P., Baczkowski, B. M., Bajracharya, et al
2020; 582 (7810): 84–88
- **Analysis of unusual and signature APOBEC-mutations in HIV-1 pol next-generation sequences.** *PloS one*
Tzou, P. L., Kosakovsky Pond, S. L., Avila-Rios, S., Holmes, S. P., Kantor, R., Shafer, R. W.
2020; 15 (2): e0225352
 - **Gut microbiota plasticity is correlated with sustained weight loss on a low-carb or low-fat dietary intervention** *Scientific Reports*
Grembi, J. A., Nguyen, L. H., Haggerty, T. D., Gardner, C. D., Holmes, S. P., Parsonnet, J.
2020; 10
 - **Successful strategies for human microbiome data generation, storage and analyses** *JOURNAL OF BIOSCIENCES*
Holmes, S.
2019; 44 (5)
 - **Successful strategies for human microbiome data generation, storage and analyses.** *Journal of biosciences*
Holmes, S.
2019; 44 (5)
 - **Specific gut microbiome members are associated with distinct immune markers in pediatric allogeneic hematopoietic stem cell transplantation.** *Microbiome*
Ingham, A. C., Kielsen, K., Cilieborg, M. S., Lund, O., Holmes, S., Aarestrup, F. M., Muller, K. G., Pamp, S. J.
2019; 7 (1): 131
 - **Reproducible, interactive, scalable and extensible microbiome data science using QIIME 2.** *Nature biotechnology*
Bolyen, E., Rideout, J. R., Dillon, M. R., Bokulich, N. A., Abnet, C. C., Al-Ghalith, G. A., Alexander, H., Alm, E. J., Arumugam, M., Asnicar, F., Bai, Y., Bisanz, J. E., Bittinger, et al
2019
 - **Nuclear degradation dynamics in a nonapoptotic programmed cell death.** *Cell death and differentiation*
Yalonetskaya, A., Mondragon, A. A., Hintze, Z. J., Holmes, S., McCall, K.
2019
 - **Treatment-Specific Composition of the Gut Microbiota Is Associated With Disease Remission in a Pediatric Crohn's Disease Cohort.** *Inflammatory bowel diseases*
Sprockett, D., Fischer, N., Boneh, R. S., Turner, D., Kierkus, J., Sladek, M., Escher, J. C., Wine, E., Yerushalmi, B., Dias, J. A., Shaoul, R., Kori, M., Snapper, et al
2019
 - **Multitable Methods for Microbiome Data Integration.** *Frontiers in genetics*
Sankaran, K., Holmes, S. P.
2019; 10: 627
 - **Pregnancy-Induced Alterations in NK Cell Phenotype and Function.** *Frontiers in immunology*
Le Gars, M., Seiler, C., Kay, A. W., Bayless, N. L., Starosvetsky, E., Moore, L., Shen-Orr, S. S., Aziz, N., Khatri, P., Dekker, C. L., Swan, G. E., Davis, M. M., Holmes, et al
2019; 10: 2469
 - **Simple statistical identification and removal of contaminant sequences in marker-gene and metagenomics data** *MICROBIOME*
Davis, N. M., Proctor, D. M., Holmes, S. P., Relman, D. A., Callahan, B. J.
2018; 6
 - **Gut microbiome transition across a lifestyle gradient in Himalaya** *PLOS BIOLOGY*
Jha, A. R., Davenport, E. R., Gautam, Y., Bhandari, D., Tandukar, S., Ng, K. M., Fragiadakis, G. K., Holmes, S., Gautam, G., Leach, J., Sherchand, J., Bustamante, C. D., Sonnenburg, et al
2018; 16 (11)
 - **Metagenomic analysis with strain-level resolution reveals fine-scale variation in the human pregnancy microbiome** *GENOME RESEARCH*
Goltsman, D., Sun, C. L., Proctor, D. M., DiGiulio, D. B., Robaczewska, A., Thomas, B. C., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Banfield, J. F., Relman, D. A.
2018; 28 (10): 1467–80

- **Differential Induction of IFN-alpha and Modulation of CD112 and CD54 Expression Govern the Magnitude of NK Cell IFN-gamma Response to Influenza A Viruses** *JOURNAL OF IMMUNOLOGY*
Kronstad, L. M., Seiler, C., Vergara, R., Holmes, S. P., Bish, C. A.
2018; 201 (7): 2117–31
- **Metagenomic analysis with strain-level resolution reveals fine-scale variation in the human pregnancy microbiome.** *Genome research*
Goltsman, D. S., Sun, C. L., Proctor, D. M., DiGiulio, D. B., Robaczewska, A., Thomas, B. C., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Banfield, J. F., Relman, D. A.
2018
- **Differential Induction of IFN-alpha and Modulation of CD112 and CD54 Expression Govern the Magnitude of NK Cell IFN-gamma Response to Influenza A Viruses.** *Journal of immunology (Baltimore, Md. : 1950)*
Kronstad, L. M., Seiler, C., Vergara, R., Holmes, S. P., Blish, C. A.
2018
- **Characterization of the impact of daclizumab beta on circulating natural killer cells by mass cytometry**
Ranganath, T., Seiler, C., Vendrame, E., Le Gars, M., Fontenot, J. D., Fam, S., Holmes, S., Blish, C.
LIPPINCOTT WILLIAMS & WILKINS.2018
- **A spatial gradient of bacterial diversity in the human oral cavity shaped by salivary flow.** *Nature communications*
Proctor, D. M., Fukuyama, J. A., Loomer, P. M., Armitage, G. C., Lee, S. A., Davis, N. M., Ryder, M. I., Holmes, S. P., Relman, D. A.
2018; 9 (1): 681
- **Gut microbiome transition across a lifestyle gradient in Himalaya.** *PLoS biology*
Jha, A. R., Davenport, E. R., Gautam, Y., Bhandari, D., Tandukar, S., Ng, K. M., Fragiadakis, G. K., Holmes, S., Gautam, G. P., Leach, J., Sherchand, J. B., Bustamante, C. D., Sonnenburg, et al
2018; 16 (11): e2005396
- **Interactive Visualization of Hierarchically Structured Data.** *Journal of computational and graphical statistics : a joint publication of American Statistical Association, Institute of Mathematical Statistics, Interface Foundation of North America*
Sankaran, K., Holmes, S.
2018; 27 (3): 553–63
- **Topologically Constrained Template Estimation via Morse-Smale Complexes Controls Its Statistical Consistency** *SIAM JOURNAL ON APPLIED ALGEBRA AND GEOMETRY*
Miolane, N., Holmes, S., Pennec, X.
2018; 2 (2): 348–75
- **Multivariate Heteroscedasticity Models for Functional Brain Connectivity** *FRONTIERS IN NEUROSCIENCE*
Seiler, C., Holmes, S.
2017; 11: 696
- **Parallel imaging of Drosophila embryos for quantitative analysis of genetic perturbations of the Ras pathway.** *Disease models & mechanisms*
Goyal, Y., Levario, T. J., Mattingly, H. H., Holmes, S., Shvartsman, S. Y., Lu, H.
2017
- **Mutational Correlates of Virological Failure in Individuals Receiving a WHO-Recommended Tenofovir-Containing First-Line Regimen: An International Collaboration.** *EBioMedicine*
Rhee, S., Varghese, V., Holmes, S. P., van Zyl, G. U., Steegen, K., Boyd, M. A., Cooper, D. A., Nsanzimana, S., Saravanan, S., Charpentier, C., de Oliveira, T., Etiebet, M. A., Garcia, et al
2017; 18: 225-235
- **Mass Cytometry Analytical Approaches Reveal Cytokine-Induced Changes in Natural Killer Cells.** *Cytometry. Part B, Clinical cytometry*
Vendrame, E., Fukuyama, J., Strauss-Albee, D. M., Holmes, S., Blish, C. A.
2017; 92 (1): 57-67
- **Prevalence of Drug-Resistant Minority Variants in Untreated HIV-1-Infected Individuals With and Those Without Transmitted Drug Resistance Detected by Sanger Sequencing.** *The Journal of infectious diseases*
Clutter, D. S., Zhou, S., Varghese, V., Rhee, S. Y., Pinsky, B. A., Jeffrey Fessel, W., Klein, D. B., Spielvogel, E., Holmes, S. P., Hurley, L. B., Silverberg, M. J., Swanstrom, R., Shafer, et al
2017; 216 (3): 387–91

- **Multidomain analyses of a longitudinal human microbiome intestinal cleanout perturbation experiment.** *PLoS computational biology*
Fukuyama, J., Rumker, L., Sankaran, K., Jeganathan, P., Dethlefsen, L., Relman, D. A., Holmes, S. P.
2017; 13 (8): e1005706
- **Discussion of "50 Years of Data Science"** *JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS*
Holmes, S., Josse, J.
2017; 26 (4): 768–69
- **Multi-Table Differential Correlation Analysis of Neuroanatomical and Cognitive Interactions in Turner Syndrome.** *Neuroinformatics*
Seiler, C., Green, T., Hong, D., Chromik, L., Huffman, L., Holmes, S., Reiss, A. L.
2017
- **Exact sequence variants should replace operational taxonomic units in marker-gene data analysis.** *The ISME journal*
Callahan, B. J., McMurdie, P. J., Holmes, S. P.
2017
- **STATISTICAL PROOF? THE PROBLEM OF IRREPRODUCIBILITY** *Bulletin of the American Mathematical Society*
Holmes, S. P.
2017
- **Multidomain analyses of a longitudinal human microbiome intestinal cleanout perturbation experiment** *PLOS Computational Biology*
Fukuyama, J., Rumker, L., Sankaran, K., Jeganathan, P., Relman, D. A., Holmes, S. P.
2017; 13 (8): e1005706
- **Replication and refinement of a vaginal microbial signature of preterm birth in two racially distinct cohorts of US women.** *Proceedings of the National Academy of Sciences of the United States of America*
Callahan, B. J., DiGiulio, D. B., Goltsman, D. S., Sun, C. L., Costello, E. K., Jeganathan, P., Biggio, J. R., Wong, R. J., Druzin, M. L., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Relman, et al
2017
- **Interactive Visualization of Hierarchically Structured Data** *Journal of Computational and Graphical Statistics*
Sankaran, K., Holmes, S. P.
2017
- **Template Shape Estimation: Correcting an Asymptotic Bias** *SIAM J Imaging Science*
Miolane, N., Holmes, S., Pennec, X.
2017; 10 (2): 808-844
- **Bayesian Nonparametric Ordination for the Analysis of Microbial Communities** *Journal of the American Statistical Association*
Ren, B., Bacallado, S., Favaro, S., Holmes, S., Trippa, L.
2017
- **1,2-Dichloroethane Exposure Alters the Population Structure, Metabolism, and Kinetics of a Trichloroethene-Dechlorinating Dehalococcoides mccartyi Consortium.** *Environmental science & technology*
Mayer-Blackwell, K., Fincker, M., Molenda, O., Callahan, B., Sewell, H., Holmes, S., Edwards, E. A., Spormann, A. M.
2016: -?
- **HIV-1 Protease, Reverse Transcriptase, and Integrase Variation** *JOURNAL OF VIROLOGY*
Rhee, S., Sankaran, K., Varghese, V., Winters, M. A., Hurt, C. B., Eron, J. J., Parkin, N., Holmes, S. P., Holodniy, M., Shafer, R. W.
2016; 90 (13): 6058-6070
- **Measuring multivariate association and beyond.** *Statistics surveys*
Josse, J., Holmes, S.
2016; 10: 132–67
- **Bioconductor workflow for microbiome data analysis: from raw reads to community analyses.** *F1000Research*
Callahan, B. J., Sankaran, K., Fukuyama, J. A., McMurdie, P. J., Holmes, S. P.
2016; 5: 1492-?
- **Interpreting Prevotella and Bacteroides as biomarkers of diet and lifestyle.** *Microbiome*

- Gorvitovskaia, A., Holmes, S. P., Huse, S. M.
2016; 4 (1): 15-?
- **Measuring multivariate association and beyond.** *Statistics Surveys*
Josse, J., Holmes, S.
2016; 10: 132-167
 - **More effective drugs lead to harder selective sweeps in the evolution of drug resistance in HIV-1.** *eLife*
Feder, A. F., Rhee, S., Holmes, S. P., Shafer, R. W., Petrov, D. A., Pennings, P. S.
2016; 5
 - **Marine mammals harbor unique microbiotas shaped by and yet distinct from the sea.** *Nature communications*
Bik, E. M., Costello, E. K., Switzer, A. D., Callahan, B. J., Holmes, S. P., Wells, R. S., Carlin, K. P., Jensen, E. D., Venn-Watson, S., Relman, D. A.
2016; 7: 10516-?
 - **REPRODUCIBLE RESEARCH WORKFLOW IN R FOR THE ANALYSIS OF PERSONALIZED HUMAN MICROBIOME DATA.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Callahan, B., Proctor, D., Relman, D., Fukuyama, J., Holmes, S.
2016; 21: 183-194
 - **Variation in Taxonomic Composition of the Fecal Microbiota in an Inbred Mouse Strain across Individuals and Time** *PLOS ONE*
Hoy, Y. E., Bik, E. M., Lawley, T. D., Holmes, S. P., Monack, D. M., Theriot, J. A., Relman, D. A.
2015; 10 (11)
 - **Temporal and spatial variation of the human microbiota during pregnancy** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
DiGiulio, D. B., Callahan, B. J., McMurdie, P. J., Costello, E. K., Lyell, D. J., Robaczewska, A., Sun, C. L., Goltsman, D. S., Wong, R. J., Shaw, G., Stevenson, D. K., Holmes, S. P., Relman, et al
2015; 112 (35): 11060-11065
 - **Human NK cell repertoire diversity reflects immune experience and correlates with viral susceptibility** *SCIENCE TRANSLATIONAL MEDICINE*
Strauss-Albee, D. M., Fukuyama, J., Liang, E. C., Yao, Y., Jarrell, J. A., Drake, A. L., Kinuthia, J., Montgomery, R. R., John-Stewart, G., Holmes, S., Blish, C. A.
2015; 7 (297)
 - **de Finetti Priors using Markov chain Monte Carlo computations** *STATISTICS AND COMPUTING*
Bacallado, S., Diaconis, P., Holmes, S.
2015; 25 (4): 797-808
 - **Pregnancy does not attenuate the antibody or plasmablast response to inactivated influenza vaccine**
Bayless, N., Kay, A., Fukuyama, J., Aziz, N., Dekker, C., Mackey, S., Swan, G., Davis, M., Holmes, S., Blish, C.
AMER ASSOC IMMUNOLOGISTS.2015
 - **Shiny-phyloseq: Web application for interactive microbiome analysis with provenance tracking.** *Bioinformatics*
McMurdie, P. J., Holmes, S.
2015; 31 (2): 282-283
 - **Biological Threats** *MATHEMATICS OF PLANET EARTH: MATHEMATICIANS REFLECT ON HOW TO DISCOVER, ORGANIZE, AND PROTECT OUR PLANET*
Lewis, M., Crowley, J., Muthukumaraswamy, K., Conway, J. M., Basor, E., Diaconis, P., Holmes, S., Smith, R., Kaper, H., Rousseau, C.
2015; 140: 173-86
 - **de Finetti Priors using Markov chain Monte Carlo computations.** *Statistics and computing*
Bacallado, S., Diaconis, P., Holmes, S.
2015; 25 (4): 797-808
 - **Temporal and spatial variation of the human microbiota during pregnancy.** *Proceedings of the National Academy of Sciences of the United States of America*
DiGiulio, D. B., Callahan, B. J., McMurdie, P. J., Costello, E. K., Lyell, D. J., Robaczewska, A., Sun, C. L., Goltsman, D. S., Wong, R. J., Shaw, G., Stevenson, D. K., Holmes, S. P., Relman, et al
2015

- **Enhanced natural killer-cell and T-cell responses to influenza A virus during pregnancy** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Kay, A. W., Fukuyama, J., Aziz, N., Dekker, C. L., Mackey, S., Swan, G. E., Davis, M. M., Holmes, S., Blish, C. A.
2014; 111 (40): 14506-14511
- **structSSI: Simultaneous and Selective Inference for Grouped or Hierarchically Structured Data** *JOURNAL OF STATISTICAL SOFTWARE*
Sankaran, K., Holmes, S.
2014; 59 (13)
- **Connections and Extensions: A Discussion of the Paper by Girolami and Byrne** *SCANDINAVIAN JOURNAL OF STATISTICS*
Diaconis, P., Seiler, C., Holmes, S.
2014; 41 (1): 3–7
- **HIV-1 transmission networks in a small world.** *journal of infectious diseases*
Pennings, P. S., Holmes, S. P., Shafer, R. W.
2014; 209 (2): 180-182
- **Positive Curvature and Hamiltonian Monte Carlo**
Seiler, C., Rubinstein-Salzedo, S., Holmes, S., Ghahramani, Z., Welling, M., Cortes, C., Lawrence, N. D., Weinberger, K. Q.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2014
- **structSSI: Simultaneous and Selective Inference for Grouped or Hierarchically Structured Data.** *Journal of statistical software*
Sankaran, K., Holmes, S.
2014; 59 (13): 1–21
- **Nasal Microenvironments and Interspecific Interactions Influence Nasal Microbiota Complexity and S. aureus Carriage.** *Cell host & microbe*
Yan, M., Pamp, S. J., Fukuyama, J., Hwang, P. H., Cho, D., Holmes, S., Relman, D. A.
2013; 14 (6): 631-640
- **Detection of cytomegalovirus drug resistance mutations by next-generation sequencing.** *Journal of clinical microbiology*
Sahoo, M. K., Lefterova, M. I., Yamamoto, F., Waggoner, J. J., Chou, S., Holmes, S. P., Anderson, M. W., Pinsky, B. A.
2013; 51 (11): 3700-3710
- **Genetically dictated change in host mucus carbohydrate landscape exerts a diet-dependent effect on the gut microbiota** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Kashyap, P. C., Marcobal, A., Ursell, L. K., Smits, S. A., Sonnenburg, E. D., Costello, E. K., Higginbottom, S. K., Domino, S. E., Holmes, S. P., Relman, D. A., Knight, R., Gordon, J. I., Sonnenburg, et al
2013; 110 (42): 17059-17064
- **Prototypical Recombinant Multi-Protease-Inhibitor-Resistant Infectious Molecular Clones of Human Immunodeficiency Virus Type 1** *ANTIMICROBIAL AGENTS AND CHEMOTHERAPY*
Varghese, V., Mitsuya, Y., Fessel, W. J., Liu, T. F., Melikian, G. L., Katzenstein, D. A., Schiffer, C. A., Holmes, S. P., Shafer, R. W.
2013; 57 (9): 4290-4299
- **ANALYSIS OF CASINO SHELF SHUFFLING MACHINES** *ANNALS OF APPLIED PROBABILITY*
Diaconis, P., Fulman, J., Holmes, S.
2013; 23 (4): 1692-1720
- **Harvester ants use interactions to regulate forager activation and availability** *ANIMAL BEHAVIOUR*
Pinter-Wollman, N., Bala, A., Merrell, A., Queirolo, J., Stumpe, M. C., Holmes, S., Gordon, D. M.
2013; 86 (1): 197-207
- **Nucleoside reverse transcriptase inhibitor resistance mutations associated with first-line stavudine-containing antiretroviral therapy: programmatic implications for countries phasing out stavudine.** *journal of infectious diseases*
Tang, M. W., Rhee, S., Bertagnolio, S., Ford, N., Holmes, S., Sigaloff, K. C., Hamers, R. L., de Wit, T. F., Fleury, H. J., Kanki, P. J., Ruxrungtham, K., Hawkins, C. A., Wallis, et al
2013; 207: S70-7
- **Nucleoside reverse transcriptase inhibitor resistance mutations associated with first-line Stavudine-containing antiretroviral therapy: programmatic implications for countries phasing out Stavudine.** *journal of infectious diseases*

- Tang, M. W., Rhee, S., Bertagnolio, S., Ford, N., Holmes, S., Sigaloff, K. C., Hamers, R. L., de Wit, T. F., Fleury, H. J., Kanki, P. J., Ruxrungtham, K., Hawkins, C. A., Wallis, et al
2013; 207: S70-7
- **Interval Graph Limits** *ANNALS OF COMBINATORICS*
Diaconis, P., Holmes, S., Janson, S.
2013; 17 (1): 27-52
 - **phyloseq: An R Package for Reproducible Interactive Analysis and Graphics of Microbiome Census Data.** *PLoS ONE*
McMurdie, P. J., Holmes, S.
2013; 8 (4)
 - **Harvester ants use interactions to regulate forager activation and availability.** *Animal behaviour*
Pinter-Wollman, N., Bala, A., Merrell, A., Queirolo, J., Stumpe, M. C., Holmes, S., Gordon, D. M.
2013; 86 (1): 197–207
 - **Interval Graph Limits.** *Annals of combinatorics*
Diaconis, P., Holmes, S., Janson, S.
2013; 17 (1): 27–52
 - **Prototypical Recombinant Multi-Protease Inhibitor Resistant Infectious Molecular Clones of Human Immunodeficiency Virus Type-1.** *Antimicrobial agents and chemotherapy*
Varghese, V., Mitsuya, Y., Fessel, W. J., Liu, T. F., Melikian, G. L., Katzenstein, D. A., Schiffer, C. A., Holmes, S. P., Shafer, R. W.
2013
 - **Advancing Our Understanding of the Human Microbiome Using QIIME.** *Methods in enzymology*
Navas-Molina, J. A., Peralta-Sánchez, J. M., González, A., McMurdie, P. J., Vázquez-Baeza, Y., Xu, Z., Ursell, L. K., Lauber, C., Zhou, H., Song, S. J., Huntley, J., Ackermann, G. L., Berg-Lyons, et al
2013; 531: 371-444
 - **Sampling from a Manifold** *Festschrift for Joe Eaton*
Diaconis, P., Holmes, S., Shahshahani, M.
IMS.2013
 - **Low-Level Persistence of Drug Resistance Mutations in Hepatitis B Virus-Infected Subjects with a Past History of Lamivudine Treatment** *ANTIMICROBIAL AGENTS AND CHEMOTHERAPY*
Margeridon-Thermet, S., Svarovskaia, E. S., Babrzadeh, F., Martin, R., Liu, T. F., Pacold, M., Reuman, E. C., Holmes, S. P., Borroto-Esoda, K., Shafer, R. W.
2013; 57 (1): 343-349
 - **PRC2/EED-EZH2 Complex Is Up-Regulated in Breast Cancer Lymph Node Metastasis Compared to Primary Tumor and Correlates with Tumor Proliferation In Situ** *PLOS ONE*
Yu, H., Simons, D. L., Segall, I., Carcamo-Cavazos, V., Schwartz, E. J., Yan, N., Zuckerman, N. S., Dirbas, F. M., Johnson, D. L., Holmes, S. P., Lee, P. P.
2012; 7 (12)
 - **Denoising PCR-amplified metagenome data** *BMC BIOINFORMATICS*
Rosen, M. J., Callahan, B. J., Fisher, D. S., Holmes, S. P.
2012; 13
 - **Computational Tools for Evaluating Phylogenetic and Hierarchical Clustering Trees** *JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS*
Chakerian, J., Holmes, S.
2012; 21 (3): 581-599
 - **Nest site and weather affect the personality of harvester ant colonies** *BEHAVIORAL ECOLOGY*
Pinter-Wollman, N., Gordon, D. M., Holmes, S.
2012; 23 (5): 1022-1029
 - **The Molecular Architecture of the Eukaryotic Chaperonin TRiC/CCT** *STRUCTURE*
Leitner, A., Joachimiak, L. A., Bracher, A., Moenkemeyer, L., Walzthoeni, T., Chen, B., Pechmann, S., Holmes, S., Cong, Y., Ma, B., Ludtke, S., Chiu, W., Hartl, et al
2012; 20 (5): 814-825

- **Phyloseq: a bioconductor package for handling and analysis of high-throughput phylogenetic sequence data.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
McMurdie, P. J., Holmes, S.
2012: 235-246
- **Nest site and weather affect the personality of harvester ant colonies.** *Behavioral ecology : official journal of the International Society for Behavioral Ecology*
Pinter-Wollman, N., Gordon, D. M., Holmes, S.
2012; 23 (5): 1022–29
- **Comparisons of distance methods for combining covariates and abundances in microbiome studies.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Fukuyama, J., McMurdie, P. J., Dethlefsen, L., Relman, D. A., Holmes, S.
2012: 213-224
- **A multifaceted analysis of HIV-1 protease multidrug resistance phenotypes** *BMC BIOINFORMATICS*
Doherty, K. M., Nakka, P., King, B. M., Rhee, S., Holmes, S. P., Shafer, R. W., Radhakrishnan, M. L.
2011; 12
- **THE DUALITY DIAGRAM IN DATA ANALYSIS: EXAMPLES OF MODERN APPLICATIONS** *ANNALS OF APPLIED STATISTICS*
De la Cruz, O., Holmes, S.
2011; 5 (4): 2266-2277
- **The effect of individual variation on the structure and function of interaction networks in harvester ants** *JOURNAL OF THE ROYAL SOCIETY INTERFACE*
Pinter-Wollman, N., Wollman, R., Guetz, A., Holmes, S., Gordon, D. M.
2011; 8 (64): 1562-1573
- **Adaptive importance sampling for network growth models** *ANNALS OF OPERATIONS RESEARCH*
Guetz, A. N., Holmes, S. P.
2011; 189 (1): 187-203
- **Colonic Contribution to Uremic Solutes** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Aronov, P. A., Luo, F. J., Plummer, N. S., Quan, Z., Holmes, S., Hostetter, T. H., Meyer, T. W.
2011; 22 (9): 1769-1776
- **Site-Specific Mobilization of Vinyl Chloride Respiration Islands by a Mechanism Common in Dehalococoides** *BMC GENOMICS*
McMurdie, P. J., Hug, L. A., Edwards, E. A., Holmes, S., Spormann, A. M.
2011; 12
- **Colony variation in the collective regulation of foraging by harvester ants** *BEHAVIORAL ECOLOGY*
Gordon, D. M., Guetz, A., Greene, M. J., Holmes, S.
2011; 22 (2): 429-435
- **PhyloChip microarray analysis reveals altered gastrointestinal microbial communities in a rat model of colonic hypersensitivity** *NEUROGASTROENTEROLOGY AND MOTILITY*
Nelson, T. A., Holmes, S., ALEKSEYENKO, A. V., Shenoy, M., DeSantis, T., Wu, C. H., Andersen, G. L., Winston, J., Sonnenburg, J., Pasricha, P. J., Spormann, A.
2011; 23 (2)
- **Visualization and statistical comparisons of microbial communities using R packages on Phylochip data.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Holmes, S., Alekseyenko, A., Timme, A., Nelson, T., Pasricha, P. J., Spormann, A.
2011: 142-153
- **Colony variation in the collective regulation of foraging by harvester ants.** *Behavioral ecology : official journal of the International Society for Behavioral Ecology*
Gordon, D. M., Guetz, A., Greene, M. J., Holmes, S.
2011; 22 (2): 429–35
- **Bioinformatics and Data Analysis** *Handbook of Molecular and Cellular Methods in Biology and Medicine*
de La Cruz, O., Holmes, S.

CRC.2011; 3rd: 409–436

- **Adaptive importance sampling for network growth models.** *Annals of operations research*
Guetz, A. N., Holmes, S. P.
2011; 189 (1): 187–203
- **A classification model for G-to-A hypermutation in hepatitis B virus ultra-deep pyrosequencing reads** *BIOINFORMATICS*
Reuman, E. C., Margeridon-Thermet, S., Caudill, H. B., Liu, T., Borroto-Esoda, K., Svarovskaia, E. S., Holmes, S. P., Shafer, R. W.
2010; 26 (23): 2929-2932
- **Quantitative, Architectural Analysis of Immune Cell Subsets in Tumor-Draining Lymph Nodes from Breast Cancer Patients and Healthy Lymph Nodes** *PLOS ONE*
Setiadi, A. F., Ray, N. C., Kohrt, H. E., Kapelner, A., Carcamo-Cavazos, V., Levic, E. B., Yadegarynia, S., van der Loos, C. M., Schwartz, E. J., Holmes, S., Lee, P. P.
2010; 5 (8)
- **Constrained patterns of covariation and clustering of HIV-1 non-nucleoside reverse transcriptase inhibitor resistance mutations** *JOURNAL OF ANTIMICROBIAL CHEMOTHERAPY*
Reuman, E. C., Rhee, S., Holmes, S. P., Shafer, R. W.
2010; 65 (7): 1477-1485
- **Localized Plasticity in the Streamlined Genomes of Vinyl Chloride Respiring Dehalococoides** *PLOS GENETICS*
McMurdie, P. J., Behrens, S. F., Mueller, J. A., Goeke, J., Ritalahti, K. M., Wagner, R., Goltsman, E., Lapidus, A., Holmes, S., Loeffler, F. E., Spormann, A. M.
2009; 5 (11)
- **Nonpolymorphic Human Immunodeficiency Virus Type 1 Protease and Reverse Transcriptase Treatment-Selected Mutations** *ANTIMICROBIAL AGENTS AND CHEMOTHERAPY*
Shahriar, R., Rhee, S., Liu, T. F., Fessel, W. J., Scarsella, A., Towner, W., Holmes, S. P., Zolopa, A. R., Shafer, R. W.
2009; 53 (11): 4869-4878
- **Impaired interferon signaling is a common immune defect in human cancer** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Critchley-Thorne, R. J., Simons, D. L., Yan, N., Miyahira, A. K., Dirbas, F. M., Johnson, D. L., Swetter, S. M., Carlson, R. W., Fisher, G. A., Koong, A., Holmes, S., Lee, P. P.
2009; 106 (22): 9010-9015
- **An Interactive Java Statistical Image Segmentation System: GemIdent** *JOURNAL OF STATISTICAL SOFTWARE*
Holmes, S., Kapelner, A., Lee, P. P.
2009; 30 (10): 1-20
- **How site fidelity leads to individual differences in the foraging activity of harvester ants** *BEHAVIORAL ECOLOGY*
Beverly, B. D., McLendon, H., Nacu, S., Holmes, S., Gordon, D. M.
2009; 20 (3): 633-638
- **Ultra-Deep Pyrosequencing of Hepatitis B Virus Quasispecies from Nucleoside and Nucleotide Reverse-Transcriptase Inhibitor (NRTI)-Treated Patients and NRTI-Naive Patients** *15th Conference on Retroviruses and Opportunistic Infections*
Margeridon-Thermet, S., Shulman, N. S., Ahmed, A., Shahriar, R., Liu, T., Wang, C., Holmes, S. P., Babrzadeh, F., Gharizadeh, B., Hanczaruk, B., Simen, B. B., Egholm, M., Shafer, et al
OXFORD UNIV PRESS INC.2009: 1275–85
- **An Interactive Java Statistical Image Segmentation System: GemIdent.** *Journal of statistical software*
Holmes, S., Kapelner, A., Lee, P. P.
2009; 30 (10)
- **Minority Human Immunodeficiency Virus Type 1 Variants in Antiretroviral-Naive Persons with Reverse Transcriptase Codon 215 Revertant Mutations** *JOURNAL OF VIROLOGY*
Mitsuya, Y., Varghese, V., Wang, C., Liu, T. F., Holmes, S. P., Jayakumar, P., Gharizadeh, B., Ronaghi, M., Klein, D., Fessel, W. J., Shafer, R. W.
2008; 82 (21): 10747-10755
- **HORSESHOES IN MULTIDIMENSIONAL SCALING AND LOCAL KERNEL METHODS** *ANNALS OF APPLIED STATISTICS*
Diaconis, P., Goel, S., Holmes, S.

2008; 2 (3): 777-807

- **Natural variation of HIV-1 group M integrase: Implications for a new class of antiretroviral inhibitors** *RETROVIROLOGY*
Rhee, S., Liu, T. F., Kiuchi, M., Zioni, R., Gifford, R. J., Holmes, S. P., Shafer, R. W.
2008; 5
- **Genomic interrogation of ancestral *Mycobacterium tuberculosis* from south India** *8th International Congress on Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases*
Narayanan, S., Gagneux, S., Hari, L., Tsolaki, A. G., Rajasekhar, S., Narayanan, P. R., Small, P. M., Holmes, S., DeRiemer, K.
ELSEVIER SCIENCE BV.2008: 474-83
- **An interactive statistical imaging system and pilot application to characterize axillary lymph nodes in breast cancer**
Kohrt, H. E., Kapelner, A., Holmes, S., Lee, P. P.
AMER SOC CLINICAL ONCOLOGY.2008
- **The short-term regulation of foraging in harvester ants** *BEHAVIORAL ECOLOGY*
Gordon, D. M., Holmes, S., Nacu, S.
2008; 19 (1): 217-222
- **Threshold Graph Limits and Random Threshold Graphs.** *Internet mathematics*
Diaconis, P., Holmes, S., Janson, S.
2008; 5 (3): 267-320
- **Dynamical bias in the coin toss** *SIAM REVIEW*
Diaconis, P., Holmes, S., Montgomery, R.
2007; 49 (2): 211-235
- **HIV-1 subtype B protease and reverse transcriptase amino acid covariation** *PLOS COMPUTATIONAL BIOLOGY*
Rhee, S., Liu, T. F., Holmes, S. P., Shafer, R. W.
2007; 3 (5): 836-843
- **Down-regulation of the interferon signaling pathway in T lymphocytes from patients with metastatic melanoma** *PLOS MEDICINE*
Critchley-Thorne, R. J., Yan, N., Nacu, S., Weber, J., Holmes, S. P., Lee, P. P.
2007; 4 (5): 897-911
- **Unusual codon bias in vinyl chloride reductase genes of *Dehalococcoides* species** *APPLIED AND ENVIRONMENTAL MICROBIOLOGY*
McMurdie, P. J., Behrens, S. F., Holmes, S., Spormann, A. M.
2007; 73 (8): 2744-2747
- **Gene expression network analysis and applications to immunology** *BIOINFORMATICS*
Nacu, S., Critchley-Thorne, R., Lee, P., Holmes, S.
2007; 23 (7): 850-858
- **An interactive statistical image segmentation and visualization system** *4th International Conference on Medical Information Visualisation*
Kapelner, A., Lee, P. R., Holmes, S.
IEEE COMPUTER SOC.2007: 81-86
- **Differences in the temporal emergence of primary and secondary NRTI and PI drug-resistance mutations (DRMs)**
Rhee, S. Y., Liu, T. F., Holmes, S. P., Shafer, R. W.
INT MEDICAL PRESS LTD.2007: S67
- **Differences in the temporal emergence of primary and secondary NRTI and PI drug-resistance mutations (DRMs)** *16th International HIV Drug Resistance Workshop*
Rhee, S. Y., Liu, T. F., Holmes, S. P., Shafer, R. W.
INT MEDICAL PRESS LTD.2007: S67-S67
- **Forager activation and food availability in harvester ants** *ANIMAL BEHAVIOUR*
Schafer, R. J., Holmes, S., Gordon, D. M.
2006; 71: 815-822
- **Constraints on Yukawa-type deviations from Newtonian gravity at 20 microns** *PHYSICAL REVIEW D*

-
- Smullin, S. J., Geraci, A. A., Weld, D. M., Chiaverini, J., Holmes, S., Kapitulnik, A.
2005; 72 (12)
- **Profile of immune cells in axillary lymph nodes predicts disease-free survival in breast cancer** *PLOS MEDICINE*
Kohrt, H. E., Nouri, N., Nowels, K., Johnson, D., Holmes, S., Lee, P. P.
2005; 2 (9): 904-919
 - **Rapid assessment of recognition efficiency and functional capacity of antigen-specific T-cell responses** *JOURNAL OF IMMUNOTHERAPY*
Kohrt, H. E., Shu, C. T., Stuge, T. B., Holmes, S. P., Weber, J., Lee, P. P.
2005; 28 (4): 297-305
 - **Memory T cells have gene expression patterns intermediate between naive and effector** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Holmes, S., He, M., Xu, T., Lee, P. P.
2005; 102 (15): 5519-5523
 - **Sequential Monte Carlo methods for statistical analysis of tables** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*
Chen, Y. G., Diaconis, P., Holmes, S. R., Liu, J. S.
2005; 100 (469): 109-120
 - **Immune profile in tumor-draining nodes predicts disease-free survival in breast cancer**
Kohrt, H. E., Nowels, K., Holmes, S., Lee, P. P., Johnson, D.
SPRINGER.2005: S17
 - **Error distribution for gene expression data** *STATISTICAL APPLICATIONS IN GENETICS AND MOLECULAR BIOLOGY*
Purdom, E., Holmes, S. P.
2005; 4
 - **Gene expression diversity among Mycobacterium tuberculosis clinical isolates** *MICROBIOLOGY-SGM*
Gao, Q., Kripke, K. E., Saldanha, A. J., Yan, W. H., Holmes, S., Small, P. M.
2005; 151: 5-14
 - **Heterogeneity within antigen-specific T cell responses revealed by differential dynamics of TCR downregulation.** *46th Annual Meeting of the American-Society-of-Hematology*
Kohrt, H. E., Shu, C. T., Holmes, S. P., Weber, J., Lee, P. P.
AMER SOC HEMATOLOGY.2004: 50B-50B
 - **Diversity and recognition efficiency of T cell responses to cancer** *PLOS MEDICINE*
Stuge, T. B., Holmes, S. P., Saharan, S., Tuettenberg, A., Roederer, M., Weber, J. S., Lee, P. P.
2004; 1 (2): 149-160
 - **Microarray analysis reveals differences in gene expression of circulating CD8+ T cells in melanoma patients and healthy donors** *CANCER RESEARCH*
Xu, T., Shu, C. T., Purdom, E., Dang, D., Ilsley, D., Guo, Y., Weber, J., Holmes, S. P., Lee, P. P.
2004; 64 (10): 3661-3667
 - **Bioinformatics and management science: Some common tools and techniques** *OPERATIONS RESEARCH*
Abbas, A. E., Holmes, S. R.
2004; 52 (2): 165-190
 - **An in vitro human cell-based assay to rank the relative immunogenicity of proteins** *TOXICOLOGICAL SCIENCES*
Stickler, M., Rochanayon, N., Razo, O. J., Mucha, J., Gebel, W., Faravashi, N., Chin, R., Holmes, S., Harding, F. A.
2004; 77 (2): 280-289
 - **Stein's method: expository lectures and applications** *Institute of Mathematical Statistics Lecture Notes—Monograph Series.*
edited by Diaconis, P., Holmes, S.
Inst. Math. Statist. .2004
 - **Probability by surprise** *Mathematical Adventures for Students and Amateurs*
Holmes, S.
edited by Shubin, T., Hayes, D.

MAA.2004: 135–153

- **Human population-based identification of CD4(+) T-cell peptide epitope determinants** *JOURNAL OF IMMUNOLOGICAL METHODS*
Stickler, M., Chin, R., Faravashi, N., Gebel, W., Razo, O. J., Rochanayon, N., Power, S., Valdes, A. M., Holmes, S., Harding, F. A.
2003; 281 (1-2): 95-108
- **Bootstrapping phylogenetic trees: Theory and methods** *STATISTICAL SCIENCE*
Holmes, S.
2003; 18 (2): 241-255
- **Bradley Efron: A conversation with good friends** *STATISTICAL SCIENCE*
Holmes, S., Morris, C., Tibshirani, R.
2003; 18 (2): 268–81
- **An in vitro human cell-based assay to rank the relative immunogenicity of proteins**
Harding, F. A., Rochanayon, N., Razo, J., Gebel, W., Faravashi, N., Chin, R., Holmes, S., Mucha, J., Stickler, M. M.
FEDERATION AMER SOC EXP BIOL.2003: C308
- **The i-mune assay for the identification of functional CD4+T cell epitopes in any protein: population-based immunodominant primary and memory epitope regions**
Harding, F. A., Chin, R., Faravashi, N., Gebel, W., Razo, J., Rochanayon, N., Holmes, S., Valdes, A. M., Stickler, M. M.
FEDERATION AMER SOC EXP BIOL.2003: C308
- **Statistics for phylogenetic trees** *THEORETICAL POPULATION BIOLOGY*
Holmes, S.
2003; 63 (1): 17-32
- **A back migration from Asia to sub-Saharan Africa is supported by high-resolution analysis of human Y-chromosome haplotypes** *AMERICAN JOURNAL OF HUMAN GENETICS*
Cruciani, F., Santolamazza, P., Shen, P. D., Macaulay, V., Moral, P., Olckers, A., Modiano, D., Holmes, S., Destro-Bisol, G., Coia, V., Wallace, D. C., Oefner, P. J., Torroni, et al
2002; 70 (5): 1197-1214
- **Discussion on the meeting on 'Statistical modelling and analysis of genetic data'** *JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES B- STATISTICAL METHODOLOGY*
Balding, D. J., Carothers, A. D., Marchini, J. L., Cardon, L. R., Vetta, A., Griffiths, B., Weir, B. S., Hill, W. G., Goldstein, D., Strimmer, K., Myers, S., Beaumont, M. A., Glasbey, et al
2002; 64: 737-775
- **Geometry of the space of phylogenetic trees** *ADVANCES IN APPLIED MATHEMATICS*
Billera, L. J., Holmes, S. P., Vogtmann, K.
2001; 27 (4): 733-767
- **Statistical problems involving permutations with restricted positions** *Symposium on State of the Art in Probability and Statistics: Festschrift for Willem R VanZwet*
Diaconis, P., Graham, R., Holmes, S. P.
INST MATHEMATICAL STATISTICS.2001: 195–222
- **Analysis of a nonreversible Markov chain sampler** *ANNALS OF APPLIED PROBABILITY*
Diaconis, P., Holmes, S., Neal, R. M.
2000; 10 (3): 726-752
- **Matchings and phylogenetic trees** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Diaconis, P. W., Holmes, S. P.
1998; 95 (25): 14600-14602
- **The next linear collider test accelerator's rf pulse compression and transmission systems** *17th Particle Accelerator Conference*
Tantawi, S. G., Adolphsen, C., Holmes, S., LAVINE, T., Loewen, R. J., Nantista, C., Pearson, C., Pope, R., Rifkin, J., Ruth, R. D., Vlieks, A. E.
IEEE.1998: 3192–3194
- **Are there still things to do in Bayesian statistics?** *Conference on Probability, Dynamics and Causality*

Diaconis, P., Holmes, S.

KLUWER ACADEMIC PUBL.1997: 5-18

- **Bootstrap confidence levels for phylogenetic trees (vol 93, pg 7085, 1996) *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA***

Efron, B., Halloran, E., Holmes, S.

1996; 93 (23): 13429-13434

- **GRAY CODES FOR RANDOMIZATION PROCEDURES *STATISTICS AND COMPUTING***

Diaconis, P., Holmes, S.

1994; 4 (4): 287-302

PRESENTATIONS

- An Introduction to Principal Component Analysis - Woods Hole summer school (STAMPS) for microbiologists. (8/8/2014 - 8/8/2014)