Jeff M. Phillips

Assistant Professor — University of Utah
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Education

Duke University

Ph.D. in Computer Science, January, 2009.
Thesis Title: *Small and Stable Descriptors of Distributions for Geometric Statistical Problems*.
Advisor: Pankaj K. Agarwal.

Rice University

Bachelor of Science in Computer Science, May 2003.
Bachelor of Arts in Mathematics, May 2003.

Research Interests

Algorithms for Data Analytics: Handling Uncertainty, Computational Geometry, Data Mining, Machine Learning, Computational Statistics, Databases.

Research Experience

University of Utah, School of Computing (Assistant Professor) (2011-present)

Algorithms for Data Analytics.

University of Utah, School of Computing (Postdoctoral CI Fellow) (2009-2011)

Mentor: Suresh Venkatasubramanian. Worked on algorithms for spatial statistics and shape analysis.

Duke University, Department of Computer Science (Postdoctoral Associate) (2009)

Supervisor: Pankaj K. Agarwal. Worked on computational geometry for geospatial analysis.

Duke University, Department of Computer Science (Research Assistant) (2003-2009)

Advisor: Pankaj K. Agarwal. Worked on computational geometry (coresets, shape matching), computational statistics, computational biology, databases.

Yahoo! Research (Research Intern) (Summer 2007)

Advisor: Michael Mahoney. Worked on geometric interpretations of high dimensional data sets.

AT&T Research (Visiting Researcher) (Summer/Winter 2005)

Host: Suresh Venkatasubramanian. Worked on computational statistics and data mining.

Rice University, Department of Computer Science (Research Assistant) (2000-2003)

Advisor: Lydia E. Kavraki. Worked on robotic path planning and physical simulation.

The Charles Stark Draper Laboratory, Inc. (Research Scientist) (2002-2003)

Advisor: Nazareth Bedrossian. Worked on path planning for space shuttle navigation.

Fellowships and Awards

Best Paper Award at 2nd MultiClust Workshop: Discovering, Summarizing and Using Multiple Clusterings. (2011)
CCC-CRA-NSF Computing Innovation Fellowship. (2009)

2 year postdoctoral fellowship — 60 awarded among all graduating computer scientists in US

Best Student Paper at International Conference on Automata, Languages and Programming. (2008)
Distinguished Department Service Award (Duke Computer Science). (2008)

For 5 years of department service — never before awarded

Outstanding Department Service Award (Duke Computer Science). (2006)
NSF Graduate Research Fellowship. (2004-2007)

3 year full graduate fellowship

James B. Duke Fellowship. (2003-2007)

4 years partial Duke graduate fellowship

C. S. Draper Laboratory Fellowship. (2003-2007)

4 year full graduate fellowship — declined

James S. Waters Creativity Award. (2002)

Annual Rice Undergraduate Research Award

NASA/Texas Space Grant Consortium Undergraduate Scholarship. (2002)

Annual Texas Undergraduate Research Award

Brown Undergraduate Research Internship Award. (May 2001, September 2001)

Rice Undergraduate Research Award, won twice

Who's Who Among Students in American Universities & Colleges. (2002)
Vice President's Appreciation Award for Community Service (Rice University). (2001)

Selected Publications (available on webpage)

[P1] Mergeable Summaries.
Pankaj K. Agarwal, Graham Cormode, Zengfeng Huang, Jeff M. Phillips, Zhewei Wei, and Ke Yi.
31st ACM Symposium on Principals of Database Systems (PODS), May, 2012.

[P2] Protocols for Learning Classifiers on Distributed Data.
Hal Daume III, Jeff M. Phillips, Avishek Saha, and Suresh Venkatasubramanian.
15th International Conference on Artificial Intelligence and Statistics (AISTATS), April, 2012.

[P3] Efficient Threshold Monitoring for Distributed Probabilistic Data.
Mingwang Tang, Feifei Li, Jeff M. Phillips, and Jeffrey Jestes.
28th IEEE International Conference on Data Engineering (ICDE), April, 2012.

[P4] Uncertainty Visualization in HARDI based on Ensembles of ODFs.
Fangxiang Jiao, Jeff M. Phillips, Yaniv Gur, and Chris R. Johnson.
5th IEEE Pacific Visualization Symposium (PacificVis), February, 2012.

[P5] Lower Bounds for Number-in-Hand Multiparty Communication Complexity, Made Easy.
Jeff M. Phillips, Elad Verbin, and Qin Zhang.
23th Annual ACM-SIAM Symposium on Discrete Algorithms (SoDA), January, 2012.

[P6] Generating A Diverse Set Of High-Quality Clusterings. **Best Paper Award.**
Jeff M. Phillips, Parasaran Raman, Suresh Venkatasubramanian.
2nd MultiClust Workshop: Discovering, Summarizing and Using Multiple Clusterings (MULTICLUST), September, 2011.

[P7] Geometric Computation on Indecisive Points.
Allan G. Jørgensen, Maarten Löffler, and Jeff M. Phillips.
Algorithms and Data Structures Symposium (WADS), August, 2011.

[P8] Computing Hulls, Centerpoints, and VC-Dimension in Positive Definite Space.
P. Thomas Fletcher, John Moeller, Jeff M. Phillips, and Suresh Venkatasubramanain.
Algorithms and Data Structures Symposium (WADS), August, 2011.
arXiv:0912.1580.

[P9] Comparing Distributions and Shapes Using the Kernel Distance.
Sarang Joshi, Raj Varma Kommaraju, Jeff M. Phillips, and Suresh Venkatasubramanain.

ACM Symposium on Computational Geometry (SoCG), June, 2011.
arXiv:1001.0591.

[P10] Spatially-Aware Comparison and Consensus for Clusterings.
Jeff M. Phillips, Parasaran Raman, and Suresh Venkatasubramanain.
SIAM International Conference on Data Mining (SDM), April, 2011.
arXiv:1102.0026.

[P11] (Approximate) Uncertain Skylines.
Peyman Afshani, Pankaj K. Agarwal, Lars Arge, Kasper Dalgaard Larsen, and Jeff M. Phillips.
14th International Conference on Database Theory (ICDT), March, 2011.

[P12] Stability of ε-Kernels.
Pankaj K. Agarwal, Jeff M. Phillips, Hai Yu.
18th Annual European Symposium on Algorithms (ESA), September, 2010.

[P13] Metrics for Uncertainty Analysis and Visualization of Diffusion Tensor Images.
Fangxiang Jiao, Jeff M. Phillips, Jeroen Stinstra, Jens Krueger, Raj Varma Kummaraju, Edward Hsu, Julie Korenberg, Chris R. Johnson.
5th International Workshop on Medical Imaging and Augmented Reality (MIAR), September, 2010.

[P14] A Unified Algorithmic Framework for Multi-Dimensional Scaling.
Arvind Agarwal, Jeff M. Phillips, and Suresh Venkatasubramanian.
16th Annual ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), July, 2010.

[P15] Lipschitz Unimodal and Isotonic Regression on Paths and Trees.
Pankaj K. Agarwal, Jeff M. Phillips, and Bardia Sadri.
9th Latin American Theoretical Informatics Symposium (LATIN), April, 2010.

[P16] Shape Fitting on Point Sets with Probability Distributions.
Maarten Löffler and Jeff M. Phillips.
17th Annual European Symposium on Algorithms (ESA), September, 2009.

[P17] An Efficient Algorithm for Euclidean 2-Center with Outliers.
Pankaj K. Agarwal and Jeff M. Phillips.
16th Annual European Symposium on Algorithms (ESA), September, 2008.

[P18] Algorithms for ε-Approximations of Terrains. **Best Student Paper.**
Jeff M. Phillips.
International Colloquium on Automata, Languages and Programming (ICALP), July 2008.

[P19] Spatial Scan Statistics for Graph Clustering.
Bei Wang, Jeff M. Phillips, Robert Schreiber, Dennis Wilkinson, Nina Mishra, and Robert E. Tarjan.
SIAM International Conference on Data Mining (SDM), April 2008.

[P20] Value-Based Notification Conditions in Large Publish/Subscribe Systems.
Badrish Chandramoulli, Jeff M. Phillips, and Jun Yang.
International Conference on Very Large Data Bases (VLDB), Septermber, 2007.

[P21] Outlier Robust ICP for Minimizing Fractional RMSD.
Jeff M. Phillips, Ran Liu, and Carlo Tomasi.
International Conference on 3-D Digital Imaging and Modeling (3DIM), August 2007.
Poster/abstract in *Eurographics Symposium on Geometric Processing (SGP)*, June 2006.

[P22] Segmenting Motifs in Protein-Protein Interface Surfaces.
Jeff M. Phillips Johannes Rudolph, and Pankaj K. Agarwal.
Workshop on Algorithms in Bioinformatics (WABI), September 2006.

[P23] Spatial Scan Statistics: Approximations and Performance Study.
Deepak Agarwal, Andrew McGregor, Jeff M. Phillips, Suresh Venkatasubramanian, and Zhengyuan Zhu.
ACM SIGKDD International Conference on Knowledge Discovery and Data (KDD), August 2006.

[P24] On Bipartite Matching under the RMS Distance.
Pankaj K. Agarwal and Jeff M. Phillips.
Canadian Conference on Computational Geometry (CCCG), August 2006.

[P25] Hunting of the Bump: On Maximizing Statistical Discrepancy.
Deepak Agarwal, Jeff M. Phillips, and Suresh Venkatasubramanian.

SIAM-ACM Symposium on Discrete Algorithms (SoDA), January 2006.

[P26] Guided Expansive Spaces Trees: A Search Technique for Motion- and Cost-Constrainted State Spaces.
Jeff M. Phillips, Nazareth Bedrossian, and Lydia E. Kavraki.
IEEE International Conference on Robotics and Automation (ICRA), April 2004.

[P27] Simulated Knot Tying.
Jeff M. Phillips, Andrew Ladd, and Lydia E. Kavraki.
IEEE International Conference on Robotics and Automation (ICRA), May 2002.

Manuscripts (available upon request)

[M28] A Gentle Introduction to the Kernel Distance.
Jeff M. Phillips and Suresh Venkatasubramanain.
arXiv:1103.1625, March, 2011.

Scientific Software (available upon request)

Spatial Scan Statistics for Axis-Parallel Rectangles.

C code for detecting maximal discrepancy rectangles.
Algorithms are exact or approximate on gridded or general position data.

Fractional ICP.

C code for aligning and visualizing point sets, curves, and surfaces using Fractional ICP.
Multiple alignment.

Motifs Segmentation for Protein-Protein Interface Surfaces.

C code for segmenting and visualizing structural motifs on interface surfaces.
Integrated into MAPS: http://biogeometry.cs.duke.edu/research/docking/

Contributed/Invited Talks

Conference Presentations

Algorithms and Data Structures Symposium. (2011)
Symposium on Computational Geometry. (2011)
Latin American Theoretical Informatics Symposium. (2010)
European Symposium on Algorithms. (2008,2009,2010)
International Colloquium on Automata, Languages, and Programming. (2008)
International Conference on 3-D Digital Imaging and Modeling. (2007)
Workshop on Algorithms in Bioinformatics. (2006)
ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. (2006)
Canadian Conference on Computational Geometry. (2006)
ACM-SIAM Symposium on Discrete Algorithms. (2006)
AIAA Guidance, Navigation, and Control. (2003)
AAS/AIAA Space Flight Mechanics Meeting. (2003)
IEEE International Conference on Robotics and Automation. (2002,2004)

Invited Seminars

NII Shonan Meeting, Japan. (2012)
JMM: SIAM Minisymposium on Computational Geometry, Boston, MA (2012)
Peking University, Beijing, China. (2011)
Yahoo! Labs, Santa Clara, CA. (2011)
University of Utah, Salt Lake City, UT. (2009,2011)

Texas A&M University, College Station, TX. (2011)
The Ohio State University, Columbus, OH. (2010)
Duke University, Durham, NC (2010)
MADALGO, University of Aarhus, Denmark. (2008,2010)
Institute for Science and Technology: Austria. (2009)
Statistical and Applied Mathematical Sciences Institute, RTP, NC. (2006)
AT&T: Shannon Labs, Florham Park, NJ. (2005)
NASA, Johnson Space Center, TX. (2003)
Draper Laboratories, Cambridge, MA. (2002)

Teaching

University of Utah, School of Computing

Data Mining. (Spring 2012)
Data Mining Seminar. (Spring 2012)
Models of Computation for Massive Data. (Fall 2011)
Seminar on Modeling Data with Uncertainty. (Fall 2010)

Service Activities

University of Utah

Poster Chair, Graduate Recruitment. (2012)
Admissions Committee. (2012)

Duke Computer Science Department

Graduate Student Representative. (2006-2007)
Chair, Graduate Recruitment. (2004, 2005, 2006)
Organizer, Duke Computer Science Graduate Student Retreat. (2008)

Proposed, developed, and led first ever graduate student 3-day retreat for Duke computer science, now biennial event

Committee Member, Graduate Program Reevaluation. (2007-2008)
Curator, Triseminar. (2004-2007)

Organized and led discussions in weekly graduate student-only research seminar

Co-Curator, Duke Computer Science Algorithms Seminar. (2005-2006)

Rice University

President, Rice Society of Computer Scientists. (2002-2003)

Helped start *CSters*: women in computer science group
Restarted ACM Programming Team

Executive Vice President, Jones Residential College. (2001-2002)

External Service

Program Committee, *Robotics: Science and Systems*. (2006)
Reviewer, *Computational Geometry: Theory and Applications (CGTA),* Computational Statistics and Data Analysis (CSDA), *Computational Statistics (COST),* Discrete and Computational Geometry (DCG), *International Journal of Computational Geometry (IJCGA),* The London Mathematical Society (MLS), *SIAM Journal of Discrete Mathematics (SIDMA),* ACM Transactions on Algorithms

(TALG), *IEEE Transactions on Knowledge Discovery and Data Engineering (TKDE),* The Visual Computer (VisComp). *ACM Symposium on Computational Geometry (SoCG)*, *ACM-SIAM Symposium on Discrete Algorithms (SoDA)*, *ACM Symposium on Theory of Computing (SToC)*, *European Symposium on Algorithms (ESA)*, *International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX)*, *ACM Symposium on Principles of Database Systems (PODS)*, *Algorithms and Data Structures Symposium (WADS)*, *Scandinavian Symposium and Workshops on Algorithm Theory (SWAT)*, *Latin American Symposium on Theoretical Informatics (LATIN)*, *ACM International Conference for High Performance Computing, Networking, Storage, and Analysis (SC)*, *BMC Systems Biology*, *Signal Processing Letters*

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