
Ruchira S. Datta

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U.S. Citizen

QB3 Institute, Stanley Hall
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Research Interests

Computational biology, microbial ecology, and game theory.

Education

University of California at Berkeley, Ph.D., Mathematics, December 2003,
Algebraic Methods in Game Theory. Supervisor: Bernd Sturmfels.

University of California at Berkeley, M.S., Computer Science, December 2002,
Using Computer Algebra To Compute Nash Equilibria. Supervisor: Richard Fateman.

California Institute of Technology, B.S., Mathematics.

Select Publications

Raffi Hagopian, John R. Davidson, **Ruchira S. Datta**, Bushra Samad, Glen R. Jarvis and Kimmen Sjölander, “SATCHMO-JS: a webserver for simultaneous protein multiple sequence alignment and phylogenetic tree construction”, in *Nucleic Acids Research* 2010, 38(suppl 2): W23–W28. doi:10.1093/nar/gkq298
Featured article (top 5%).

Ruchira S. Datta, “Finding all Nash equilibria of a finite game using polynomial algebra”, in *Economic Theory*, Volume 42, No. 1, January 2010, 55–96, doi:10.1007/s00199-009-0447-z

Ruchira S. Datta, Christopher Meacham, Bushra Samad, Christoph Neyer, and Kimmen Sjölander, “Berkeley PHOG: PhyloFacts orthology group prediction web server”, in *Nucleic Acids Research* 2009, 37(suppl 2): W84–W89. doi:10.1093/nar/gkp373

Ruchira S. Datta, “Universality of Nash Equilibria”, in *Mathematics of Operations Research*, Vol. 28, No. 3, August 2003, pp. 424–432.

Recent Employment Experience

UC Berkeley: QB3 Institute; Postdoctoral Researcher; July 2007–; Postdoctoral supervisor: Kimmen Sjölander. Developing novel computational methods in protein informatics, including protein structure prediction, orthology inference, automated functional annotation, and prediction of protein-protein interaction.

Google Inc.; Software Engineer; 2004–2006. **International Search Quality.** Creating and implementing novel algorithm for diacritical insensitivity and transliteration. Creating and implementing novel algorithm for stemming in several languages. **Google Book Search.** Measuring, modeling, and analyzing

user behavior on a website with a complex user interface. Designing and implementing dimensional model and infrastructure to support these analyses. Supervising Ph.D student intern in classification/clustering project.

UC Davis: Mathematics; Lecturer; Winter 2004; Teaching calculus.

Other Publications

Ursula Pieper, Benjamin M. Webb, David T. Barkan, Dina Schneidman-Duhovny, Avner Schlessinger, Hannes Braberg, Zheng Yang, Elaine C. Meng, Eric F. Petersen, Conrad C. Huang, **Ruchira S. Datta**, Parthasarathy Sampathkumar, Mallur S. Madhusudhan, Kimmen Sjölander, Thomas E. Ferrin, Stephen K. Burley and Andrej Sali, “ModBase, a database of annotated comparative protein structure models, and associated resources”, in *Nucleic Acids Research* 2011, 39(suppl 1): D465–D474. doi:10.1093/nar/gkq1091 *Featured article (top 5%)*.

Ruchira S. Datta, Matthew W. Lux, Philip E. Bourne, “PLoS Computational Biology Conference Postcards from PSB 2010”, in *PLoS Computational Biology* 2010, 6(4):e1000746. doi:10.1371/journal.pcbi.1000746

Allyson L. Lister, **Ruchira S. Datta**, Oliver Hoffman, Roland Krause, Michael Kuhn, Bettina Roth, Reinhard Schneider, “Live Coverage of Intelligent Systems for Molecular Biology/European Conference on Computational Biology (ISMB/ECCB) 2009”, in *PLoS Computational Biology* 2009, 6(1): e1000640. doi:10.1371/journal.pcbi.1000640

Allyson L. Lister, **Ruchira S. Datta**, Oliver Hoffman, Roland Krause, Michael Kuhn, Bettina Roth, Reinhard Schneider, “Live Coverage of Scientific Conferences Using Web Technologies”, in *PLoS Computational Biology* 2009, 6(1): e1000563. doi:10.1371/journal.pcbi.1000563

P. Gaudet, L. Lane, P. Fey, A. Bridge, S. Poux, A. Auchincloss, K. Axelsen, S. Braconi Quintaje, E. Boutet, P. Brown, E. Coudert, **R.S. Datta**, W.C. de Lima, T. de Oliveira Lima, S. Duvaud, N. Farriol-Mathis, S. Ferro Rojas, M. Feuermann, A. Gateau, U. Hinz, C. Hulo, J. James, S. Jimenez, F. Jungo, G. Keller, P. Lemercier, D. Lieberherr, M. Moinat, A. Nikolskaya, I. Pedruzzi, C. Rivoire, B. Roechert, M. Schneider, E. Stanley, M. Tognolli, K. Sjölander, L. Bougueleret, R.L. Chisholm, and A. Bairoch, “Collaborative annotation of genes and proteins between UniProtKB/Swiss-Prot and dictyBase”, in *Database* 2009:bap016, doi:10.1093/database/bap016

Ruchira S. Datta, “Using Computer Algebra to Compute Nash Equilibria”, in the (refereed) *Proceedings of the 2003 International Symposium on Symbolic and Algebraic Computation*, August 2003, pp. 74–79.

Ruchira S. Datta, “Polynomial Graphs With Applications To Graphical Games,

Extensive-Form Games, and Games With Emergent Node Tree Structures”,
arXiv.org:math.AC/0612463.

Mustafa Ergen, Duke Lee, **Ruchira Datta**, Jeff Ko, Anuj Puri, Raja Sengupta,
and Pravin Varaiya, “Comparison of Wireless Token Ring Protocol with IEEE
802.11”, in *Journal of Internet Technology*, Vol. 4, No. 4.

Published Patent Applications

Inventors: **Datta, Ruchira S.** *Simplifying query terms with transliteration*, U.S. Patent
Application 20070288230.

Inventors: **Datta, Ruchira S.** *Augmenting queries with synonyms from synonyms map*,
U.S. Patent Application 20070288448.

Inventors: **Datta, Ruchira S.**, and Lopiano, Fabio. *Augmenting queries with syn-
onyms selected using language statistics*, U.S. Patent Application 20070288449.

Inventors: Lopiano, Fabio, and **Datta, Ruchira S.** *Query language determination
using query terms and interface language*, U.S. Patent Application 20070288450.

Invited Talks and Conference Presentations

Los Cabos, México, World Molecular Engineering Network, May 2010

Bay Area Bioinformatics Meetup, Berkeley, California, April 2010

Plant & Animal Genome, Phylogenomics Workshop, January 2010

Western Evolutionary Biology Meeting, Berkeley, California, December 2009

ISMP, Chicago, Illinois, August 2009

WTGC, Hinxton, Cambridge, UK, The Quest for Orthologs, July 2009

Vrije Universiteit Amsterdam, Netherlands, IBIVU Seminar, June 2009

Cloudera Inc., Technical Talk, June 2009

Plant & Animal Genome, Phylogenomics Workshop, January 2009

BiCi, Italy, Biological Networks, September 2008

CGS, UNAM, México, Workshop on Phylogenomics, August 2008

DoE MAGGIE Review Meeting, Lawrence Berkeley Laboratory, November 2007

UC Berkeley, Student Algebraic Statistics Seminar, May 2007

UC Davis Genome Center, Evolution Discussion Group Seminar, May 2007

Virginia Bioinformatics Institute, Research Seminar, April 2007

IBM Almaden Research, Technical Talk Series, March 2007

Stanford, Seminar Series in BioMathematical Methodology, March 2007

IMA, Industrial Problems Seminar, February 2006

San Francisco State, Algebra-Geometry-Combinatorics Seminar, December 2005

Google Inc., Zürich Tech Talk Series, May 2005

Santa Clara University, Math Colloquium, April 2005

Bay Area Discrete Mathematics Day, San José State University, April 2005
Computational Real Algebraic Geometry Workshop, MSRI, April 2004
UC Berkeley, Microeconomic Theory Seminar, February 2004
UC Davis, Discrete Math & Representation Theory Seminar, February 2004
Tulane University, Math Colloquium, February 2004
University of Arizona, Special Mathematics Colloquium, January 2004
Georgia Tech, Informal Geometry Seminar, November 2003
Lockheed Martin, Modelling, Simulation & Information Sciences, August 2003
ISSAC, Drexel University, August 2003
Lawrence Berkeley Laboratory, Arkin Lab Systems Biology, July 2003
NSF/DARPA CARGO Review Meeting, Santa Rosa, California, May 2003
Microsoft Research, Theory Group Seminar, March 2003
University of Minnesota, Combinatorics Seminar, September 2002
MTNS, Notre Dame University, August 2002
Symbolic Computational Algebra, University of Western Ontario, July 2002
UC Davis, Informal Optimization Seminar, May 2002
UIUC, Wireless Networks and Convergence, October 2001
UC Berkeley, Research Seminar in Computational Biology, April 2001

Posters

R.S. Datta, U. Pieper, A. Sali, and K. Sjölander, “Phylogenomic Inference for Functional Annotation of a Bacterial Genome: *Helicobacter pylori*”, *Meeting in Microbial Genomics*, Lake Arrowhead, California, September 2010

Ruchira Datta and Kimmen Sjölander, “Phylogenomic Inference for Large Scale Microbial Functional Annotation”, *Human Microbiome Research Conference*, St. Louis, Missouri, August–September 2010

Ruchira S. Datta and Kimmen Sjölander, “Berkeley PHOG: Phylogenomic Orthology Prediction, With Applications to Inferring Interactions”, *Computational Systems Bioinformatics (CSB)*, Stanford, August 2010

Ruchira S. Datta, Sriram Sankararaman, Bryan Kolaczkowski, Dean Starrett, Chris Meacham, and Kimmen Sjölander, “New Methods from the Berkeley Phylogenomics Group”, *Intelligent Systems for Molecular Biology (ISMB)*, Stockholm, July 2009

Ruchira S. Datta, Terry Farrah, Sriram Sankararaman, David Eramian, Eswar Narayanan, Andrej Šali, and Kimmen Sjölander, “Matchmaker: Improving alignment accuracy through phylogenomics”, *Protein Modeling Workshop*, UCSF, July 2008

Kimmen Sjölander, Duncan Brown, Nandini Krishnamurthy, and **Ruchira S. Datta**, “Automated Protein Subfamily Identification : PhyloFacts Phylogenomics Encyclopedias”, *Intelligent Systems for Molecular Biology (ISMB)*, Toronto, July 2008

Previous Employment Experience

UC Berkeley: Mathematics; Graduate Student Researcher; Fall 2002–Fall 2003; Coordinating seminar on Mathematics of Phylogenetic Trees, Fall 2003.

Lockheed Martin; Technical Associate; Summer 2003; Implementing A* algorithm for integer programming with Lagrangian heuristic.

UC Berkeley: Mathematics; Technical Assistant; Summer 2002; Editing, indexing, and contributing to the book *Solving Systems of Polynomial Equations*.

UC Berkeley: Electronics Research Lab & Institute for Transportation Studies; Graduate Student Researcher; Summer 2001–Summer 2002. Implementing Wireless Token Ring Protocol; researching ad-hoc service networks.

SRC Systems Inc.; Thermal Analysis; Software Engineer; 1996–1998. Primarily responsible for maintaining and adding functionality to commercial software application for thermal analysis of buildings.

Hewlett-Packard Laboratories: 3D Modeling; Technical Associate; 1995. Designing and implementing spreadsheet interface for 3D modelling.

Lawrence Berkeley Laboratory: Earth Sciences; Staff Scientist; 1994. Interactively generating 2-dimensional Voronoi diagrams.

Lockheed Martin: Tomography; Programmer/Analyst; 1993. Implementing Feldkamp algorithm for 3-D reconstruction from X-ray images.

UC Berkeley: Materials Science & Mineral Engineering; Student Researcher; 1992. Randomly generating tangent discs under constraint.

Woodward-Clyde Consultants: Seismology; Programmer/Analyst; 1991. Calculating theoretical seismograms.

AT&T Bell Labs; Technical Associate; 1990. Generating conformance tests of a PBX switch to the ASAI protocol.

AT&T Bell Labs; Technical Associate; 1989. Developing software for generating conformance tests of boundary-scan hardware implementations, later marketed by AT&T as TAPDANCE.

AT&T Bell Labs; Technical Associate; 1988. Developing software to decode several OSI layers of communication protocols for a passive protocol monitor.

AT&T Information Systems; Technical Associate; 1987. Developing software to audit a database.

Journals Refereed

Comparative and Functional Genomics; PLoS ONE.

Organizing Committees

Bay Area Discrete Mathematics Day, 2006–2009.

Professional Society Memberships

ASM (American Society for Microbiology)

ACM (Association for Computing Machinery)

IEEE Computer Society

ISCB (International Society for Computational Biology)

ISME (International Society for Microbial Ecology)

ISS (International Symbiosis Society)

SIAM (Society for Industrial and Applied Mathematics)

References

Upon request.