Ruriko Yoshida

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EDUCATION

- **University of California**, Davis, CA.
  Ph.D. in Mathematics, June 2004.
- **University of California**, Berkeley, CA.
  B.A. in Mathematics, May 2000.

RESEARCH

- Computational Biology, Phylogeny, Discrete Optimization, and Algebraic Statistics.
- Publications (* means Yoshida is the corresponding author):
  - Book Published:
    - *Integer Points in Polyhedra* (Matthias Beck, Christian Haase, Bruce Reznick, Michele Vergne, Volkmar Welker, Ruriko Yoshida). Contemporary Mathematics. Volume 452. American Mathematical Society (6 April 2008). ISBN:978-0821841730.
  - Published:
    1. *Extremal Positive Semidefinite Matrices whose Sparsity Pattern is given by Graphs Without K_5 Minors* (with L. Solus and C. Uhler). Linear algebra and its Applications. vol. 509, pp. 247-275. 2016.
    2. * *Normalizing kernels in the Billera-Holmes-Vogtmann treespace* (with G. Weyenberg and D. Howe). IEEE/ACM Transactions on Computational Biology and Bioinformatics. 2016. DOI:http://doi.ieeecomputersociety.org/10.1109/TCBB.2016.2565475
    3. * *Distributions of topological tree metrics between a species tree and a gene tree* (With J. Xi and J. Xie). Annals of Institute of Statistical Mathematics. 2016. doi:10.1007/s10463-016-0557-x.
    4. * *Phylogenetic Tree Distances* (with G. Weyenberg). In: Kliman, R.M. (ed.), Encyclopedia of Evolutionary Biology. vol. 3, pp. 285–290. 2016. Oxford: Academic Press.
    5. *Efficiencies of the NJp, maximum likelihood, and Bayesian methods of phylogenetic construction for compositional and non-compositional genes* (with M. Nei). Molecular Biology and Evolution. 2016. doi: 10.1093/molbev/msw042.
    6. * Reviewer for Mathematical Reviews (MathSciNet); 52 reviews all-time including a review for the book *Spectral clustering and biclustering.*
    7. * *Reconstructing the phylogeny: computational methods.* In "Algebraic and Discrete Mathematical Methods for Modern Biology," edited by Robeva. Elsevier. 2015. 293–319.
    8. *The characteristic imset polytope of Bayesian networks with ordered nodes* (With J. Xi). SIAM Discrete Math. 2015. 29(2), 697–715.
    9. * *kdetrees: Nonparametric Estimation of Phylogenetic Tree Distributions*, (with G. Weyenberg, P. Huggins, C. Schardl, and D. Howe). Bioinformatics. 2014, 30(16), pp2280–2287. doi: 10.1093/bioinformatics/btu258.
    10. * *Markov degree of of the three-state toric homogeneous Markov chain model*, (with D. Haws, A. Martn del Campo, and Takemura). Contributions to Algebra and Geometry. 2014, Volume 55, Issue 1, pp 161–188. DOI:10.1007/s13366-013-0178-y.

11. *Using HPC for teaching and learning bioinformatics software: Benefits and challenges* (Tyler Parke1, Mark Farman, Elizabeth Farnsworth, Derek Fox, Jerzy W Jaromczyk, Jolanta Jaromczyk, Neil Moore, Christopher L Schardl, Ruriko Yoshida and Pat Calie), BMC Bioinformatics, vol 14, Suppl 17:A18.
12. * *Book review on "Stochastic Modelling for Systems Biology" by Wilkinson.* Journal of the American Statistical Association. 2013. Vol. 108, p. 1554.
13. *Approximate techniques in solving optimal camera placement problems* (Jian Zhao, Ruriko Yoshida, Sen-ching Samson Cheung, David Haws). International Journal of Distributed Sensor Networks, vol. 2013, Article ID 241913, 15 pages, 2013. doi:10.1155/2013/241913.
14. * *Estimating the Number of Zero-One Multi-way Tables via Sequential Importance Sampling* (with J. Xi and D. Haws). Annals of Institute of Statistical Mathematics. Volume 65, Issue 4 (2013), Page 763-783. DOI: 10.1007/s10463-012-0392-7.
15. *Phylogenetic Tree Reconstruction: Geometric Approaches* (with T. Hodge and D. Hows) a book chapter in *Mathematical Concepts and Methods in Modern Biology* edited by T. Hodget and R. Robeva. Elsevier Press, 2013. page 307–340.
16. * *Livestock Evacuation Planning for Natural and Man-made Emergencies* (with C. Vogiatzis, I. Aviles-Spadoni, P. Pardalos and S. Imamoto), International Journal of Mass Emergency and Disasters. Colume 31, number 1, 2013. p25–37.
17. *Plant-Symbiotic Fungi as Chemical Engineers: Multi-Genome Analysis of the Clavicipitaceae Reveals Dynamics of Alkaloid Loci*, (with Christopher Schardl, Jaromczyk, Neil Moore, David Haws, Thomas Bullock, et al.). PLOS Genetics. 2013. `http://www.plosgenetics.org/article/info:doi/10.1371/journal.pgen.1003323`.
18. * *Algebraic methods for molecular phylogenetics.* Annals of Institute of Statistical Mathematics. Volume 60, number 2. 2012. p279–288.
19. *Prevalence of Anti-Brucella canis Antibodies in 1104 dogs at general animal hospital and 120 dogs at kennel*, (with Shigeki Imamoto, Takashi Iwasaki, Kikuo Miyoshi, Shuichiro Watanabe, Youhei Yamashita, Mitsuru Iba, Mikako Imamoto, Shinichi Namba, Takehisa Soma). Journal of Animal Clinical Medicine. 2012. vol.3 p96-102
20. * *A support vector machine based test for incongruence between sets of trees in tree space*, (with David Haws, Peter Huggins, Eric M. O'Neill, David W. Weisrock). BMC Bioinformatics. Volume 13. Number 210. doi:10.1186/1471-2105-13-210.
21. *Chondrocyte response to Tensile and Compressive cyclic loading modalities* (with Srinath Kamineni, Zubair Wani, Kai-Nan An, Zong-Ping Luo), Journal of Musculoskeletal Research (JMR), 2012, Volume 0 Issue 2 1250006 (9 pages) DOI: 10.1142/S0218957712500066.
22. *Approximate techniques in solving optimal camera placement problems*, (with Jian Zhao, David Haws, and Sen-ching Samson Cheung) in the Eleventh IEEE International Workshop on Visual Surveillance, ICCV Workshops 2011, 1705–1712.
23. *Degree bounds for a minimal Markov basis for the three-state toric homogeneous Markov chain model* (with David Haws and Abraham Martin del Campo) in the Proceedings of the Second CREST–SBM International Conference "Harmony of Gröbner Bases and the Modern Industrial Society." 2012. page 63–98. Available at `http://arxiv.org/abs/1108.0481`.
24. * *First steps toward the geometry of cophylogeny*, (with P. Huggins and M. Owen) in the Proceedings of the Second CREST–SBM International Conference "Harmony of Gröbner Bases and the Modern Industrial Society." 2012. page 99 – 116. Available at `http://arxiv.org/abs/0809.1908`.
25. *Late Removal of Titanium Hardware from the Elbow Is Problematic*, Abdo Bachoura, Ruriko Yoshida, Christian Lattermann, and Srinath Kamineni. ISRN Orthopedics. Volume 2012 (2012), Article ID 256239, 4 pages Available at `http://www.isrn.com/journals/orthopedics/contents/`.
26. *Optimality of the Neighbor Joining Algorithm and Faces of the Balanced Minimum Evolution Polytope* (with D. Haws and T. Hodge), 2011, Bulletin of Mathematical Biology. Volume 73, Number 11, 2627-2648. Published on-line DOI: 10.1007/s11538-011-9640-x Available at `http://arxiv.org/abs/1004.2073`.

27. * *Bayes estimators for phylogenetic reconstruction* (with P Huggins, W. Li, D. Haws, T. Friedrich, J. Liu), 2011, Volume 60, Issue 4, Systematic Biology. page 528–540. Available at `http://arxiv.org/abs/0911.0645`.
28. *Experiments with the site frequency spectrum*, (Raazesh Sainudiin, Kevin Thornton, Jennifer Harlow, James Booth, Michael Stillman, Ruriko Yoshida, Robert Griffiths, Gil McVean, and Peter Donnelly), 2011, 829-872, Volume 73, issue 4, Bulletin of Mathematical Biology. DOI: 10.1007/s11538-010-9605-5.
29. * *Statistical analysis on detecting recombination sites in DNA-β satellites associated with the old world geminiviruses*, (with K. Xu), Front. Psychiatry 2010. doi: 10.3389/fpsyt.2010.00138. Available at http://arxiv.org/abs/1006.4397
30. * *Open Problems on Connectivity of Fibers with Positive Margins in Multi-dimensional Contingency Tables*, Vol. 1, No. 1, 2010, 13-26 ISSN 1309-3452, J of Algebraic Statistics.
31. * *Statistical Phylogenetic Tree Analysis Using Differences of Means*, (with Elissaveta Arnaoudova, David Haws, Peter Huggins, Jerzy W. Jaromczyk, Neil Moore, Chris Schardl), Front. Psychiatry volume 1 number 47. 2010. doi:10.3389/fnins.2010.00047 Available at `http://arxiv.org/abs/1004.2101`.
32. *Phylotree – a toolkit for computing experiments with distance-based methods for genome coevolution*, Elissaveta Arnaoudova, Jerzy W Jaromczyk, Neil Moore, Christopher L Schardl, Ruriko Yoshida. BMC Bioinformatics 2010, 11(Suppl 4):P6 (23 July 2010)
33. * *Markov bases and subbases for bounded contingency tables* (with F. Rapallo), Annals of Institute of Statistical Mathematics, 62(4), 2010, 785–805 (Available at `http://arxiv.org/abs/0905.4841` and `http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s10463-010-0289-2`).
34. *On connectivity of fibers with positive marginals in multiple logistic regression* (with H. Hara and A. Takemura). J of Multivariate Analysis. 101(4), 2010, 909–925.
35. *Counting Tables using the Double Saddlepoint Approximation* (with J. Booth and V. Zipunnikov), the Journal of Computational and Graphical Statistics, 18(4) December 1, 2009, 915–929.
36. * *Computing holes in semi-groups and its applications to transportation problems* (with R. Hemmecke and A. Takemura), Contributions to Discrete Mathematics, Volume 4, Number 1, 2009, 81 - 91. Available at http://cdm.ucalgary.ca/index.php/cdm/article/viewPDFInterstitial/149/95
37. *A Generating Function for all Magic Squares and the Volume of the Birkhoff Polytope* (with J. De Loera and F. Liu), Journal of Algebraic Combinatorics, 30(1), 2009, 113 – 139.
    Available at http://www.springerlink.com/content/m6627810x2013373/
38. *Markov Bases for Two-way Subtable Sum Problems*, (with H. Hara and A. Takemura), J of Pure and Applied Algebra, 213(8) 2009, 1507 – 1521. Available at arXiv:0708.2312.
39. *A Markov Basis for Conditional Test of Common Diagonal Effect in Quasi-Independence Model for Two-Way Contingency Tables* (with H. Hara and A. Takemura), J of Computational Statistics and Data Analysis, 53, 2009, 1006 – 1014.
40. * *Holes in semigroups and their applications to the two-way common diagonal effect model* (with A. Takemura and P. Thomas). In: Proceedings of the 2008 International Conference on Information Theory and Statistical Learning, ITSL 2008, CSREA Press, ISBN: 1-60132-079-5, 67 – 72.
41. *Markov Chains, Quotient Ideals, and Connectivity with Positive Margins* (with Y. Chen and I. Dinwoodie), in "Algebraic and Geometric Methods in Statistics" dedicated to Professor Giovanni Pistone (P. Gibilisco, E. Riccomagno, M.-P. Rogantin, H. P. Wynn, eds.), 2008, 99 – 110.
42. * *A novel test for host-symbiont codivergence indicates ancient origin of fungal endophytes in grasses* (with Chris L. Schardl, Kelly D. Craven, Adam Lindstrom, Skyler Speakman, and Arnold Stromberg), Systematic Biology Volume 57, 2008, 483 – 498.
43. * *Geometry of Neighbor-Joining Algorithm for Small Trees* (with K. Eickmeye), the refereed proceedings of the third international conference on Algebraic Biology, Springer LNC Series, 2008, 82 – 96.

44. *On the optimality of the neighbor-joining algorithm* (with K. Eickmeyer, P. Huggins, and L. Pachter), Algorithms for Molecular Biology, Volume 3, Issue 5, 2008, `http://www.almob.org/content/3/1/5`
45. *Indispensable Monomials of Toric Ideals and Markov Bases* (with Aoki and Takemura), the Journal of Symbolic Computation Volume 43, 2008, 490 – 509.
46. * *Saturation Points on Faces of a Rational Polyhedral Cone* (with Takemura), in Proceedings of the Joint Summer Research Conference on Integer Points in Polyhedra-Geometry, Number Theory, Representation Theory, Algebra, Optimizations, Statistics. Contemporary Mathematics. Volume 452. American Mathematical Society, 2008, 147 – 162.
47. * *A generalization of the integer linear infeasibility problem* (with Takemura), Discrete Optimization Volume 5, Issue 1, 2008, 36 – 52.
48. *On the enumeration of certain weighted graphs* (with Bóna and Ju), Discrete Applied Math Volume 155, Issue 11, 1 June 2007, 1481 – 1496.
49. *Beyond Pairwise Distances: Neighbor Joining with Phylogenetic Diversity Estimates* (with Levy and Pachter), the Molecular Biology and Evolution, 2006, 23(3) 491 – 498.
50. * *Book review on Markov Processes and Applications*, J of the American Statistical Association, 10, June 2010, 3 – 4.
51. *Indispensable Monomials of Toric Ideals and Markov Bases* (with Aoki and Takemura), "the Asian Symposium on Computer Mathematics (ASCM) 2005", edited by S. Pae, H. Park, 2005, 200 – 202, Korea Institute for Advanced Study.
52. *Fairground game computations* (with P. Huggins and J. B. Kadane), Significance, Letters, Volume. 2, Issue 2, June 2005, 92.
53. * *Maximum Likelihood Estimation of Phylogenetic Tree and Substitution Rates via Generalized Neighbor-joining and the EM Algorithm* (with Hobolth), "Algebraic Biology 2005, Computer Algebra in Biology", edited by H. Anai and K. Horimoto, vol. 1, 2005, 41 – 50, Universal Academy Press, INC..
54. *Applications of Interval Methods to Phylogenetic Trees* (with Sainudiin), a chapter contributing to a book "Algebraic Statistics for Computational Biology" edited by Lior Pachter and Bernd Sturmfels, (2005), Cambridge University Press, 359 – 374.
55. *A Computational Study of Integer Programming Algorithms Based on Barvinok's Rational Functions* (with De Loera, Haws, Hemmecke, and Huggins), the Journal of Discrete Optimization, Vol 2, Issue 2, June 30 2005, 135 –144.
56. *Short Rational Functions and their Applications to Integer Programming* (with Woods), the newsletter of SIAM's Activity Group on Optimization, vol. 16 no. 1–2, 2005, 15 – 19.
57. *Three Kinds of Integer Programming Algorithms based on Barvinok's Rational Functions* (with De Loera, Haws, Hemmecke, and Huggins), Integer Programming and Combinatorial Optimization: 10th International IPCO Conference, Springer, (D. Bienstock and G. Nemhauser eds.), 2004, 244 – 255.
58. *Reconstructing trees from dissimilarity maps*, (with Levy and Su), RECOMB 2004 meeting abstracts, 2005, 19.
59. *Effective Lattice Point Counting in Rational Convex Polytopes* (with De Loera, Hemmecke, and Tauzer), the Journal of Symbolic Computation, vol. 38 no. 4, 2004, 1273 – 1302.
60. *Short Rational Functions for Toric Algebra and Applications* (with De Loera, Haws, Hemmecke, Huggins, and Sturmfels), the Journal of Symbolic Computation, vol. 38 no. 2, 2004, 959 – 973.
61. * *Barvinok's Rational Functions: Algorithms and Applications to Optimization, Statistics, and Algebra*, Ph.D. Thesis, 2004, University of California, Davis.

· To Appear:

1. * *Semigroups – A Computational Approach* (with F. Kohl, Y. Lin and J. Rauh). To appear in the proceedings of the 8th Mathematical Society of Japan Seasonal Institute.
2. *Multi Loci Phylogenetic Analysis with Gene Tree Clustering* (with K. Fukumizu and C. Vogiatzis). Conditionally accepted in Annals of Operations Research.

3. * *Stochastic safety radius on Neighbor-Joining method and Balanced Minimal Evolution on small trees*, (with J. Xi, J. Xie, and S. Forcey) to appear in the proceedings of the 10th Workshop on Uncertainty Processing.
4. *HGT alternatives: Trans-species polymorphism, paralogy and loss, and frequency dependent selection in alkaloid biosynthesis genes.* (with Christopher L. Schardl, Patrick J. Calie, Simona Florea, Jerzy W. Jaromczyk, Neil Moore, Padmaja Nagabhyru, Juan Pan, Grady Weyenberg, Carolyn A. Young). Appear to Mycological Society of America annual meeting.

· Submitted:

1. *Principal Component Analysis and the Locus of the Fréchet Mean in the Space of Phylogenetic Trees* (with T. Nye, X. Tang, and G. Weyenberg). Submitted to Biometrika.
2. * *Tropical Fermat-Weber points* (with B. Lin). Submitted to SIAM Discrete Math.
3. * *Convexity in Tree Spaces* (with B. Lin, B. Sturmfels, and X. Tang). Sumitted to SIAM Discrete Math.
4. *Hybrid Schemes for Exact Conditional Inference in Discrete Exponential Families* (with D. Kahle and L. Garcia-Puente). Submitted to Submitted to Annals of Institute of Statistical Mathematics.

· Preprint:

1. *Semigroups and sequential importance sampling for multiway tables* (with J. Xi, S. Wei, F. Zhou, and D. Haws). Available at `http://arxiv.org/abs/1111.6518`
2. *Nonparametric Estimation of Gene Tree Distributions*, (with Peter Huggins).
3. *Computing holes in semi-groups* (with Hemmecke and Takemura). Available at arXiv:math.CO/0607599.
4. *Combinatorial algorithms for reconstructing phylogenetic trees from dissimilarity maps*, (with D. Levy and F. Su), preprint.
5. *Partitioning the Sample Space on Five Taxa for the Neighbor Joining Algorithm* (with K. Eickmeyer). Preprint. Available at arXiv:math.CO/0703081.

◇ Thesis Advisor: Jesús De Loera, University of California, Davis, CA.

◇ Postdoctoral Mentor: Lior Pachter, University of California, Berkeley, CA.

◇ Postdoctoral Mentor: Mark Huber, Claremont McKenna College, Claremont, CA.

◇ Students:

· Qiwen Kang

· Xu Zhang

◇ Former Students:

· Jing Xi (Mathematics department, NCSU, working with Dr. Seth Sullivant)

· Grady Weyenberg (University of Bristol)

◇ Former Postdoc:

· Peter Huggins (Carnegie Mellon University group affiliated with Google Pittsburgh).

· David Haws (IBM)

◇ Former Masters student: Skyler Speakman (H. John Heinz III School of Public Policy & Management, Carnegie Mellon University).

Software

◇ `Shinrin` (with Levy and Pacther), software to reconstruct phylogenetic trees from DNA sequences via the Neighbor Joining method with subtree weights, available at URL:=`http://bio.math.berkeley.edu/mjoin`.

◇ `LattE` (with De Loera, Haws, Hemmecke, Huggins, and Tauzer), software to count the number of lattice points inside a rational convex polytope via Barvinok's cone decomposition, available at URL:=`http://www.math.ucdavis.edu/~latte`.

Grant Development

◇ Current/past funded

- **Source (period)**: NSF Grant number: 1622369. (September 1st, 2016 to August 31st, 2019).
  Principal Investigator: R. Yoshida
  Role: Principal Investigator
  Amount: $100,404 in total
  Title: Collaborative Research: CDS&E: Applied Algebraic Statistics through R

- **Source (period)**: NSF Grant number: 1360777. (September 16th, 2013 to February 3rd 2014).
  Principal Investigator: S. Petrovic
  Role: co Principal Investigator
  Amount: $10,000 in total
  Title: Algebraic Statistics 2014: Conference at IIT

- **Source (period)**:Japan Society for the Promotion of Science (JSPS) (April 1st, 2014 to March 31st, 2017).
  Principal Investigator: K. Fukumizu
  Role: Oversea Collaborator
  Amount: 4,900,000 yens for direct cost
  Title: Applications of algebraic geometry to statistical data analysis
  Efforts: one trip to Japan a year.

- **Source (period)**: NIH Research Project Grant Program (R01) from the Joint DMS/BIO/NIGMS Math/Bio Program. Grant number: R01GM086888. Award Document Number: RGM086888A. (July 1st, 2008 to June 30th, 2014).
  Principal Investigator: R. Yoshida
  Role: Principal Investigator
  Amount: $1,000,000 for direct cost ($400,000 for indirect cost)
  Title: Geometry of gene cophylogenies as relates to genome evolution and speciation
  Efforts: one summer and one academic month.

- **Source (period)**: NSF Grant number: 0949532. (March 1st, 2010 to February 28th, 2013).
  Principal Investigator: D. Weisrock
  Role: co Principal Investigator
  Amount: $450,000 in total
  Title: Genome-level resolution of species boundaries and phylogeny of the North American tiger salamander radiation
  Efforts: one summer.

- **Source (period)**: NIMBioS (Fall, 2010 to Summer, 2012).
  Principal Investigator: D. Weisrock and R. Yoshida
  Role: Principal Investigator
  Amount: in total
  Title: Working Group on Species Delimitation

◇ Fellowship

- 2007 Summer Faculty Research Fellowship from University of Kentucky, KY.
- 2001 and 2003 Summer Research Fellowship from Graduate Studies at University of California, Davis.

Selected Talks

◇ The Oberwolfach Workshop "Statistics for Data with Geometric Structure" 21 January – 27 January 2018 at Oberwolfach Germany.

◇ Algebraic and Symplectic Geometry, Arakelov Theory and Applications. GEOMAP "Mediterranean month in Phylogenetics" June 12th to July 10th 2017 in Barcelona and Porquerolles.

◇ The Oberwolfach Workshop "Algebraic Statistics" 16 April – 22 April 2017 at Oberwolfach Germany.

- "AMS Special Session - Algebraic Statistics" The AMS Joint Mathematics Meeting in Atlanta, January 4-7, 2017.
- "Discrete Math Biology" minisymposium at SIAM discrete math meeting in Atlanta, June 6th – 10th, 2016.
- "Applications of Algebraic Methods to Statistics" at Research Institute of Mathematical Science (RIMS) of Kyoto University from 20 June – 24 June, 2016.
- "Algebraic and Combinatorial Methods in Mathematical Biology" for the AMS Spring Southeastern Sectional Meeting at University of Georgia, Athens, GA March 5-6, 2016.
- Special session on "Applications of CAT(0) Cube Complexes" at Fall Eastern Sectional AMS Meeting Rutgers University, New Brunswick, NJ November 14-15, 2015.
- Combinatorics seminar at Texas A&M, November 6th, 2015.
- Colloquium series at Department of of Biostatistics at Columbia University, Oct 29th, 2015.
- Applied Math seminar at University of Notre Dame, October 15th 2015.
- "Algebraic and Discrete Methods in Mathematical Biology" at the 15th International Symposium on Biomathematics and Ecology Education and Research (BEER), which will be held this year Oct. 9-11 at Illinois State University in Normal, IL.
- "Algebraic statistics and its interactions with combinatorics, computation, and network science" at the Fall 2015 AMS Central Section meeting to be held at Loyola University, Chicago, October 3-4, 2015.
- The 8th MSJ SI 2015 Mathematical Society of Japan, Seasonal Institute Current Trends on Gröbner Bases July 1st to 10th 2015, Osaka Japan.
- Algebraic Statistics 2015 June 8–11, 2015, Department of Mathematics University of Genoa.
- Normaliz workshop, May 15th and 16th, 2015. Institute of Mathematics, Albrechtstr. 28a, Osnabrück.
- The 7th International Conference of the ERCIM WG on Computational and Methodological Statistics (ERCIM 2014) in Pisa, Italy from December 6th to 8th 2014.
- Special Session "Algebraic Statistics" at the AMS Fall Western Sectional Meeting in San Francisco on October 25-26, 2014.
- Computational Algebraic Statistics, Theories and Applications (CASTA 2014), January 21st to 24th, 2014. Kyoto, Japan.
- Clemson University Algebra and Discrete Math (ADM) Seminar, Sept 26th, 2013.
- Minisymposium on applications of algebraic geometry to phylogenetics at SIAM on Algebraic Geometry at Colorado State University from August 1st to 4th 2013.
- Teaching Discrete and Algebraic Mathematical Biology to Undergraduates July 28th - August 2nd, 2013 at MBI, Ohio.
- East African School on Applicable Algekraic Geometry 6th to 28th July 2013 Bandari College, Mombasa, Kenya.
- 19th Conference on Applications of Computer Algebra, July 2nd – 6th, 2013, at AC Hotel Málaga Palacio.
- Seminar at Institute of Statistical Mathematics on Feb 27th 2013.
- Seminar at Universität Salzburg on November 28th 2012.
- Symposium on "Mathematical Models of Complex Biological Systems" at Biomathematics and Ecology: Education and Research (BEER) 2012, November 9th to 11th 2012 at St. Louis, MO.
- INFORMS Annual meeting 2012, Phoenix AZ October 14th to 17th.
- The 9th workshop on Uncertainty Processing 2012 in the Czech Republic on September 12th to 15th.
- Workshop on Convex Polytopes, Kyoto, July 23–27, 2012, Kyoto, Japan.
- The 2nd Institute of Mathematical Statistics Asia Pacific Rim Meeting, July 1st to 4th, 2012, Tokyo, Japan.
- Algebraic Statistics in the Alleghenies at Penn State, June 8-15, 2012

- Workshop on Graphical Models: Mathematics, Statistics and Computer Science, April 16-18, 2012 at the Field Institute, Toronto.
- The Annual New Zealand Phylogenetics Meeting, Sunday 29th January – Friday 3rd February, 2012, University of Canterbury, New Zealand.
- Minisymposium on Categorical Data: Contingency Tables and Network Structures at the 2011 SIAM Conference on Applied Algebraic Geometry, October 6th to 9th, 2011 at North Carolina State University.
- Minisymposium on Infinite-dimensional systems of polynomial equations with symmetry at the 2011 SIAM Conference on Applied Algebraic Geometry, October 6th to 9th, 2011 at North Carolina State University.
- Workshop at Tsukuba, Japan, July 8th and 9th, 2011.
- Workshop on Combinatorial Optimization, Statistics, and Applications (COSA), March 14th to 15th, 2011, TU Munich, Germany.
- The 1st Joint North American Meeting on Industrial and Applied Mathematics (NAMIAM) on 8th to10th December, 2010 at the Universidad del Mar, Huatulco, Oaxaca, Mexico.
- Statistics Seminar at Mathematics, Statistics, and Computer Science department, University of Illinois at Chicago on November 10th, 2010.
- Mathematical and Computational Biology Seminar, UC Berkeley, CA on September 8th, 2010.
- Bioinformatics Seminar at North Carolina State University on Tuesday May 18, 2010.
- The Second CREST–SBM International Conference "Harmony of Groebner bases and the modern industrial society" Osaka, Japan, June 28th to July 2nd, 2010.
- Minisymposium on Discrete Mathematical Biology, SIAM Conference on Discrete Mathematics, June 14th to 17th, 2010 at the Hyatt Regency Austin, Austin, Texas.
- UT-ORNL-KBRIN Bioinformatics Summit 2010, March 19th to 21st, 2010 Lake Barkley State Resort Park Cadiz, KY.
- The colloquium at mathematics department in Western Michigan University, January 29th, 2010.
- Special session on "Applicable Algebraic Geometry" in the 2009 AMS Fall Central Section meeting October 16th through 18th, 2009 at Baylor University in Waco, TX.
- Seminar talk on July 30th, 2009 at POSTECH, South Korea.
- Lectures on July 28th to 29th, 2009 at KAIST, South Korea.
- Special session on "Algebra and Number Theory with Polyhedra" in the 2009 Spring Western Section Meeting of the American Mathematical Society, at the San Francisco State University on April 25 and 26, 2009, San Francisco, CA.
- Special session on "Advances in the Theory of Integer Linear Optimization and its Extensions" in the 2009 Spring Western Section Meeting of the American Mathematical Society, at the San Francisco State University on April 25 and 26, 2009, San Francisco, CA.
- Special session on "Applications of Algebraic and Geometric Combinatorics" at the Spring 2009 AMS Southeastern Sectional Meeting in Raleigh, NC, April 4th and 5th, 2009.
- A midprogram workshop of SAMSI program year on "Algebraic Methods in Systems Biology and Statistics" entitled "Algebraic Statistical Models" organized by Mathias Drton, Eva Riccomagno, and Seth Sullivant, on January 17-19, 2009, at SAMSI, NC.
- Workshop on "Algebraic Statistics" at MSRI, Berkeley, CA, on December 15th to 18th, 2008.
- Computational Algebraic Statistics, Theories and Applications (CASTA2008) in Kyoto, Japan, December 10th to 11th, 2008.
- The AMS sectional meeting "Applications of Algebraic Geometry" at the University of British Columbia in Vancouver, October 4th to 5th, 2008.
- Mixed integer programming (MIP 2008) at Columbia University, in New York City, NY on August 4th to 7th, 2008.

- Mathematical explorations in contemporary Statistics at Grande Albergo, Sestri Levante (GE) - Italy on May 19th to 20th, 2008.
- A special session on Toric Varieties at the SIAM-SEAS (Society for Applied and Industrial Mathematics-Southeastern Atlantic Section) 2008 Meeting at University of Central Florida in Orlando on March 14th and 15th, 2008.
- Future Directions in Phylogenetic Methods and Models at Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, December 17th to 21st 2007.
- AMS 2007 Fall Southeastern Meeting: Special Session on Combinatorial Enumeration, Optimization, Geometry, and Statistic. Middle Tennessee State University, Murfreesboro, TN, November 3rd to 4th, 2007.
- Tokyo daigaku, Kagaku kenkyuhi, Kenkyu shukai at Toyohashi, Japan, October 25th to 27th, 2007.
- A colloquium talk in the Department of Mathematics in University of Louisville, Oct 12th, 2007.
- Current Challenges and Problems in Phylogenetics at Isaac Newton Institute for Mathematical Sciences, Cambridge, UK on September 3rd to 7th 2007.
- The Joint Statistical Meetings in UT on July 28th to August 2nd, 2007.
- ATLANTIC COAST CONFERENCE ON MATHEMATICS IN THE LIFE AND BIOLOGICAL SCIENCES at Virginia Tech on May 3rd to 5th, 2007 (co-sponsored by VT and SAMSI/NC State).
- Institute for Mathematics and its Applications Annual Program Year Workshop, Applications in Biology, Dynamics, and Statistics at Institute for Mathematics and its Applications, Minnesota on March 5th to 9th, 2007
- Research Institute for Mathematical Sciences International Conference on Theoretical Effectivity and Practical Effectivity of Grobner Bases at Research Institute of Mathematical Sciences Kyoto University on January 22nd to 26th, 2007.
- Statistics Seminar at Oxford University, Oxford, UK on November 28th, 2006.
- Research Institute for Mathematical Sciences WORKSHOP on Development of Computational Algebraic Statistics at Research Institute of Mathematical Sciences Kyoto University on November 6th to 10th, 2006.
- Statistics Seminar, Statistics Department, Carnegie Mellon University, PA on October 11th, 2006.
- Statistics Seminar, Statistics Department, Cornell University, Ithaca, NY, on October 4th, 2006.
- Freie Universität Berlin, Germany, on July 6th, 2006.
- Otto-von-Guericke University Magdeburg, Germany, on June 29th, 2006.
- Institute of Statistical Mathematics, Tokyo, Japan on May 29th, 2006.
- Special Session on Enumerative Aspects of Polytopes American Mathematics Society 2006 Spring Western Section Meeting, in San Francisco State University, CA, on April 29th to April 30th, 2006.
- Optimization seminar, University of California Davis, CA, April 28, 2006.
- The Mathematical Colloquium at Colorado State University, CO on February 1st, 2006.
- The Computational Biology seminar at Duke University, NC on January 30th, 2006.
- Symbolic Computation Seminar at North Carolina State University, NC on January 26th, 2006.
- The Operations Research colloquium at University of North Carolina, NC, on January 25th, 2006.
- The Seminar Series at the department of statistics, University of Kentucky, Kentucky on January 20th, 2006.
- American Mathematics Society Special Session on Algebraic Statistics in San Antonio, Texas, on January 12th to 13th, 2006.

- The First International Conference Algebraic Biology (AB2005), Computer Algebra in Biology in Tokyo, Japan, on November 28th to 30th, 2005.
- Statistical and Applied Mathematical Sciences Institute Workshop on Random Graphs and Stochastic Computation on June 13th to 14th, 2005.
- Superrobust Computation Project, Tokyo University, Tokyo, Japan on May 25th, 2005.
- Morning Coffee Talks at Statistical Genetics and Bioinformatics, North Carolina State University on December 7th, 2004.
- Geometry, Algebra, and Phylogenetic trees at Harvey Mudd College Claremont, California on October 23rd, 2004.
- Symbolic Computation Seminar at North Carolina State University on September 1st, 2004.
- Computational Algebraic Statistics, December 14th to 18th, 2003 at American Institution of Mathematics, Palo Alto, CA.
- Convex Polytopes Workshop, September 15th 2003 at Mathematical Sciences Research Institution, Berkeley, CA.
- Integer points in polyhedra, Geometry, Number Theory, Algebra, Optimization. Joint summer research conferences American Mathematical Society, Institute of Mathematical Statistics, and Society for Industrial and Applied Mathematics, July 13th 2003 to July 17th 2003 at Snowbird, Utah.
- Stochastic Computation Final Workshop, June 26th 2003 to June 28th 2003, at Statistical and Applied Mathematical Sciences Institution, NC.
- Workshop on Gröbner bases and Statistics VI and the First International School on Algebraic Statistics, February 17th 2003 to February 20th 2003, at Statistique et Traitement Informatique des Données in Menton, France.
- Stochastic Computation, January 23rd 2003, at Statistical and Applied Mathematical Sciences Institution, NC.
- Workshop on Algebraic Statistics, January 14th 2003 to January 15th 2003, at University of California, Berkeley, CA.

Service

- Nomination committee, faculty council member at Naval Postgraduate School.
- Program Committee Member for the SIAM Conference on Applied Algebraic Geometry (AG17) that will take place in Atlanta, Georgia during July 31 – August 4, 2017.
- National Science Foundation Division of Mathematical Sciences; panelist for grant proposal review on mathbio, 2011.
- National Science Foundation Division of Mathematical Sciences; panelist for CAREER grant proposal review on mathbio, November 2010.
- Chairperson search committee member, Statistics Department University of Kentucky, Spring 2011.
- Conferences Organized
  - Program Committee Member for the SIAM Conference on Applied Algebraic Geometry (AG17) Atlanta, Georgia during July 31 – August 4, 2017.
  - Mini-symposium "Geometric Phylogenetics" at the 2016 SIAM Conference on the Life Sciences, Boston MA, July 11–15, 2016.
  - Special Session on "Mathematics of Evolutionary Biology", the AMS meeting in Chicago at Loyola University October 3-4 2015.
  - Local Organizer for SIAM Conference on Applied Algebraic Geometry from August 3rd to 7th 2014 at NIMS Daejeon South Korea.
  - Scientific Committee, NSF/CBMS conference on Mathematical Phylogenetics from June 28th through July 2nd 2014 at Winthrop University.
  - Organizer, Workshop on algebraic statistics from July 14th to 17th, 2014, at NIMS Daejeon, Korea.
  - Organizing committee, Conference on algebraic statistics May 19-22, 2014, Illinois Institute of Technology Chicago, IL.

- Session on Phylogenetics at the 2012 WNAR meeting Colorado State University, Ft Collins Colorado, Sunday June 17- Wed June 20, 2012.
- MBI workshop "Algebraic Methods in Evolutionary and Systems Biology" on May 7th to 11th, 2012 at Mathematical Biology Institution, OH.
- NIMBioS Working Group on Species Delimitation, at National Institute for Mathematical Biological Synthesis at U of Tennessee, Fall 2010 to Summer 2012.
- Minisymposium MS26 and MS39 on "Algebraic Statistics" at 2010 SIAM Annual Meeting (AN10), July 12-16, 2010, Pittsburgh, Pennsylvania. The David L. Lawrence Convention Center.
- Program Committee, the International Conference on Algebraic and Numeric Biology, organized by RISC (Research Institute for Symbolic Computation), Johannes Kepler University of Linz, at the Castle of Hagenberg, Austria, in July 31st to August 2nd, 2010.
- Special Session on "Advances in Algebraic Statistics" at the 2010 Spring Southeastern Sectional Meeting Lexington, KY, March 27th-28th, 2010.
- The Transition Workshop for ALGEBRAIC METHODS IN SYSTEMS BIOLOGY AND STATISTICS at Research Triangle Park, North Carolina, June 18-20, 2009.
- Midprogram workshop on Molecular Evolution and Phylogenetics at SAMSI, NC on April 2nd and 3rd, 2009.
- Program Committee, the international conference on Algebraic Biology (AB'08) at RISC, Castle of Hagenberg, Austria on July 31st to August 2nd, 2008.
- SAMSI Special Year on ALGEBRAIC METHODS IN SYSTEMS BIOLOGY AND STATISTICS at SAMSI, NC.
- Tutorials and Opening Workshop at SAMSI, NC.
- Co-organizer, SAMSI Special Year on ALGEBRAIC METHODS IN SYSTEMS BIOLOGY AND STATISTICS at SAMSI, NC, September, 2008 to August, 2009.
- Organizing committee, AMS 2007 Fall Southeastern Meeting: Special Session on Combinatorial Enumeration, Optimization, Geometry, and Statistic. Middle Tennessee State University, Murfreesboro, TN, November 3rd to 4th, 2007.
- Program Committee, the 2nd International Conference on Algebraic Biology, organized by RISC (Research Institute for Symbolic Computation), Johannes Kepler University of Linz, at the Castle of Hagenberg, Austria, in July 2nd to 4th, 2007.
- Organizing committee, Integer Points In Polyhedra Geometry, Number Theory, Representation Theory Algebra, Optimization, Statistics on Snowbird, Utah, on June 11th to 15th, 2006.
- Organizing and program committee, the First International Conference Algebraic Biology (AB2005), "Computer Algebra in Biology", in Tokyo, Japan, November 28th to 30th, 2005.

◇ Editor-In-Chief for Journal of Algebraic Statistics (since November 2009). `http://www.jalgstat.com/editorial-board`

◇ Associate Editor for Frontiers in Systems Biology `http://www.frontiersin.org/systemsbiology/`

◇ Former Students

- Jing Xi (Mathematics department, NCSU, working with Dr. Seth Sullivant)
- Grady Weyenberg (University of Bristol)

◇ Former Postdoc:

- Peter Huggins (Carnegie Mellon University group affiliated with Google Pittsburgh).
- David Haws (IBM)

◇ Former Masters student: Skyler Speakman (H. John Heinz III School of Public Policy & Management, Carnegie Mellon University).

◇ Thesis Committee

- Kronzilber, Dor
- Aleem, Salman

- Thesis Committee for former students
  - Shu Shen, Statistics Department.
  - Woodrow Burchett, Statistics Department.
  - Zhiheng Xie, Statistics Department.
  - Victoria G. Pook, Entomology Department.
  - Tefjol Pllaha, Mathematics Department.
  - Theodoros Kyriopoulos, Mathematics Department.
  - Neville Fogarty, Mathematics Department.
  - Sema Gunturkun, Mathematics Department.
  - Furuzan Ozbek, Mathematics Department.
  - Stephen Sturgeon, Mathematics Department.
  - Carolyn Troha, Mathematics Department.
  - Sarah Nelson, Mathematics Department.
  - Qian Sun, Entomology Department.
  - Liam Solus, Mathematics Department.
  - Robert Davis, Mathematics Department.
  - Edward Roualdes, Statistics Department.
  - Shaoceng Wei, Statistics Department.
  - Qian Fan, Statistics Department.
  - Sema Gunturkun, Mathematics Department.
  - Elissaveta Arnaoudova, Computer Science Department.
  - Josh Williams, Biology Department.
  - Daniel Wells, Mathematics Department.
  - Tricia Muldoon, Mathematics Department.
  - Jian Zhao, Electrical and Computer Engineering Department.

Collaborators

- Satoshi Aoki (University of Kagoshima, Japan), Matthias Beck (Sun Francisco State University, CA), Miklós Bóna (University of Florida, FL), Yuguo Chen (University of Illinois, Chicago), Jesús De Loera (UC Davis, CA), Ian Dinwoodie (Duke University, NC), Joseph B. Kadane (Carnegie Mellon University, PA), Hyeong-Kwan Ju (Chonnam National University, Republic of Korea), Davis Haws (UC Davis, CA), Peter Huggins (Carnegie Mellon University, PA), Raymond Hemmecke (Fakultät für Mathematik, Germany), Lior Pachter (UC Berkeley, CA), Raazesh Sainudiin (University of Canterbury, NZ), Carla D Savage (NC State University, NC), Bernd Sturmfels (UC Berkeley, CA), Seth Sullivant (NC State University, NC), Akimichi Takemura (University of Tokyo, Japan), Kevin Woods (Oberlin College Oberlin, OH).

Skills

- Computing
  - Unix, Linux, and Windows.
  - Programming, C, C++, Cplex, Mathematica, Maple, Matlab. Extensive HTML Javascript Web design experience with Adobe Photoshop, Illustrator, Pagemaker. Experience with Microsoft Office.
- Languages
  - Native speaker of Japanese. Fluent in English.

Work Experience

- **Associate professor** (Fall 2016 – Present)
  Department of Operations Research, Naval Postgraduate School, Monterey, CA.
- **Visiting associate professor** (Summer 2016 – Summer 2016)
  Institute of Statistical Mathematics, Tokyo Japan.
- **Associate professor on leave** (Summer 2016 – Summer 2017)
  Department of Statistics, University of Kentucky, Lexington, KY.

- **Associate professor** (Summer 2012 – Summer 2016)
  Department of Statistics, University of Kentucky, Lexington, KY.
- **Assistant Professor** (Fall 2006 – Spring 2012)
  Department of Statistics, University of Kentucky, Lexington, KY.
- **Assistant Research Professor** (Fall 2004 – Spring 2006)
  Department of Mathematics, Duke University, Durham, NC.
  Mentor: Mark Huber.
- **Postdoctoral Researcher** (Summer 2004)
  The Center for Pure and Applied Mathematics,
  University of California, Berkeley, CA.
  Mentor: Lior Pachter.
- **Graduate Program in Mathematics** (Fall 2000 – June 2004)
  Department of Mathematics, University of California, Davis, CA.
- **Associate Instructor** (Winter 2004)
  Department of Mathematics, University of California, Davis, CA.
- **Associate Instructor** (Summer 2002)
  Department of Mathematics, University of California, Davis, CA.
- **Research Assistant** (Fall 2001 – Winter 2002)
  Department of Mathematics, University of California, Davis, CA.
  Assisted in the stochastic network interdiction problems on graphs.
- **Research Assistant Award from Graduate Studies** (Summer 2001)
  University of California, Davis, CA.
- **Research Summer Internship** (Summer 1999)
  Haas Business School, Berkeley, CA.
  Supported by a National Science Foundation program called
  "Research Experience for Undergraduates."
- **Teaching Assistant** (January 1999 – June 1999)
  Department of Mathematics, University of California, Berkeley, CA.

Courses I taught

- **A**lgebraic Statistics for Computational Biology, Combinatorics, Linear Algebra, Integral Calculus, Differential Calculus, Phylogenetic Analysis and Molecular Evolution, Multi-Variable Calculus, Vector Calculus, Set Theory, Euclidean Geometry, Abstract Algebra, Number Theory, Numerical Analysis, Linear Programming, Stochastic Processes, Probability, Statistical Methods.

Membership

- American Statistical Association, Institution of Mathematical Statistica, and Mathematical Association of America, Society of Industrial and Applied Mathematics.