

Kevin C. Chen

Title and Address:

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Education

Highest Earned Degree

Ph.D. Computer Science, University of California, Berkeley (2005)

Other Earned Degrees

M.S. Computer Science, University of California, Berkeley (2003)

A.B. Computer Science, Princeton University (2000)

Honors and Awards

Fellowships

NIH Pathway to Independence Award (K99/R00), 2008-2013

NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship (F32), 2007-2008

National Defense Science and Engineering Graduate Fellowship, 2000-2003 (est. \$20K/year)

National Science Foundation Graduate Fellowship, 2000-2003 (declined) (est. \$18K/year)

UC Berkeley MICRO Fellowship, 2000 (declined) (est. \$18K/year)

Professional Awards and Honors

First Prize, AT&T Student Research Competition (masters division)

Employment History

Graduate Program Affiliations

Computer Science

Computational Biology and Molecular Biophysics (CBMB)

Ecology and Evolution

Positions Held

09/2009-ongoing | Assistant Professor, Rutgers University, Department of Genetics and BioMaPS Institute for Quantitative Biology

01/2006-08/2009 | Postdoctoral Fellow, New York University, Advisor: Nikolaus Rajewsky, Co-advisor: Mark Siegal

- 2007 | Assistant Instructor, Applied Genomics graduate course, New York University (Instructors: Mark Siegal and Ken Birnbaum)
- 2006 | Instructor, HHMI Summer Institute for High School Teachers, New York University (Coordinator: Kris Gunsalus)
- 2004-2005 | Research Assistant, UC Berkeley, Advisors: Lior Pachter and Satish Rao
- 2003 | Teaching Assistant, UC Berkeley, Discrete Mathematics for Computer Science (Instructor: Umesh Vazirani)
- 2003 | Teaching Assistant, UC Berkeley, Randomized Algorithms and Probabilistic Analysis (Instructor: Richard Karp)
- 2001 | Research Intern, Google, Mentor: Martin Farach-Colton
- 1998-1999 | Research Assistant, Princeton University, Advisor: Dannie Durand

Publications

Published Conference Proceedings

Kevin Chen and Nikolaus Rajewsky. Deep-conservation of microRNA-target relationships and 3' UTR motifs in vertebrates, flies and nematodes. Cold Spring Harbor Symposium on Quantitative Biology, 71:149-156, 2006.

Kamalika Chaudhuri, **Kevin Chen**, Radu Mihaescu and Satish Rao. On the tandem duplication-random loss model of genome rearrangement. Symposium on Discrete Algorithms (SODA), Miami, FL, 2006. (7 pages)

Abraham Bachrach, **Kevin Chen**, Chris Harrelson, Radu Mihaescu, Satish Rao and Apurva Shah. Lower Bounds for Maximum Parsimony with Gene Order Data. RECOMB Satellite Workshop on Comparative Genomics, Dublin, Ireland, 2005. (10 pages)

Moses Charikar, **Kevin Chen** and Martin Farach-Colton. Finding Frequent Items in Data Streams. 29th International Colloquium on Automata, Languages and Programming (ICALP), Malaga, Spain, 2002. (11 pages)

Kevin Chen, Dannie Durand and Martin Farach-Colton. Notung: Dating Gene Duplications Using Gene Family Trees. The Fourth Annual International Conference on Research in Computational Molecular Biology, Tokyo, Japan, 2000. (11 pages)

Kevin Chen and Vijay Ramachandran. A Space-Efficient Randomized DNA Algorithm for k-SAT. 6th International Meeting on DNA Based Computers, Leiden, The Netherlands, 2000. (9 pages)

Kevin Chen and Erik Winfree. Error-Correction in DNA Computing: Misclassification and Strand Loss. 5th International Meeting on DNA Based Computers, Cambridge, MA, 1999. (15 pages)

Reviews

M. Senthil Kumar and **Kevin Chen**. Evolution of Animal Piwi-interacting RNAs and Prokaryotic CRISPRs. 11:277-288, Briefings in Functional Genomics, 2012.

Kevin Chen and Nikolaus Rajewsky. The evolution of gene regulation by transcription factors and microRNAs. Nature Reviews Genetics 8(2):93-103, 2007.

Kevin Chen* and Lior Pachter. Bioinformatics for Whole-Genome Shotgun Sequencing of Microbial Communities. PLoS Computational Biology 1(2):e24, 2005. (7 pages)

Works in Progress

Matthew L. Kraushar, Kevin Thompson, H.R.Sagara Wijeratne, Barbara Viljetic, Liyang Diao, **Kevin**

Chen, Ronald P. Hart, Mladen-Roko Rasin, Developmental specificity of the neocortical ribosome is regulated by timed WNT3 secretion from in-growing thalamocortical axons. In second round of review, Nature Communications.

Jimin Song and **Kevin C Chen**. Spectacle: Faster and more accurate chromatin state annotation using spectral learning. In review, Nucleic Acids Research.

Philip Macmenamin, Seana Lymer, Takeshi Matsui, Hyosik Jang, **Kevin C Chen** and Ian Ehrenreich. Evolutionary dynamics of *E. coli* strains from five hosts over a one-year interval revealed by whole genome sequencing. In review, J. Bacteriology

Hong-Seok Ha, Jimin Song, Shuoguo Wang, Aurelie Kapusta, Cedric Feschotte, **Kevin C. Chen**, Jinchuan Xing. A comprehensive catalog of piRNAs from adult human testis and their relationship with protein coding genes, long non-coding RNAs and mobile elements. In second round of review, BMC Genomics

Liyang Diao, Antoine Marcais, Scott Norton and **Kevin Chen**. MixMir: MicroRNA motif finding via mixed linear models. In second round of review, Nucleic Acids Research

Jimin Song, Jixia Liu, Sandra Schnakenberg, Hong-Seok Ha, Jinchuan Xing and **Kevin Chen**. Evolution of piRNAs and transposable elements in *Drosophila*. In preparation for resubmission to Molecular Biology and Evolution

B. Viljetic, M. Dutra-Clarke, A. Stillman, M. L. Kraushar, H. M. Arikala, H. R. S. Wijeratne, **K. Chen** and M. R. Rasin PIWIL1 regulates neocortical stem cell cycle, migration and dendritogenesis. In preparation.

Articles in Refereed Journals

Marc R. Friedländer, Esther Lizano, Anna J. S. Houben, Daniela Bezdan, Monica Bañez-Coronel, Grzegorz Kudla, Elisabet Mateu-Huertas, Birgit Kagerbauer, **Kevin C. Chen**, Emily M. LeProust, Eulàlia Martí, Xavier Estivill. Evidence for the biogenesis of more than 1,000 novel human microRNAs, Genome Biology 2014, 15:R57

Liyang Diao and **Kevin Chen**. Local Ancestry Corrects for Population Structure in *S. cerevisiae* Genome-Wide Association Studies. Genetics 192(4):1503-1511, 2012.

David W. Gould, Sergio Lukic and **Kevin Chen**. Selective constraint on copy number variation in human Piwi-interacting RNA Loci. PLoS ONE, 7(10): e46611, 2012.

Rajat Roy, **Kevin Chen**, Anirvan Sengupta and Alexander Schliep. SLIQ: Simple Linear Inequalities for Efficient Contig Scaffolding. Journal of Computational Biology, 19(10): 1162-1175, 2012.

Sergio Lukic, Jody Hey and **Kevin Chen**. Non-equilibrium allele frequency spectra via spectral methods. Theoretical Population Biology, 79:203-219, 2011.

Sergio Lukic and **Kevin Chen**. Human piRNAs are under selection in Africans and repress transposable elements. Molecular Biology and Evolution, 28:3061-3067, 2011.

Jr-Shiuan Yang, Michael D. Phillips, Doron Betel, Ping Mu, Chris Sander, Andrea Ventura, Adam C. Siepel, **Kevin Chen***, Eric C. Lai. Widespread regulatory activity of vertebrate microRNA* species. RNA 17:312-326, 2011.

Kevin Chen*, Erik van Nimwegen, Nikolaus Rajewsky and Mark L. Siegal. Correlating gene expression variation with cis-regulatory polymorphism in *Saccharomyces cerevisiae*. Genome Biology and Evolution 2:697-707, 2010.

Marco Mangone, Arun P Manoharan, Danielle Thierry-Mieg, Jean Thierry-Mieg, Ting Han, Sebastian D Mackowiak, Emily Mis, Charles Zegar, Michelle R Gutwein, Vishal Khivansara, Oliver Attie, **Kevin Chen**, Kourosh Salehi-Ashtiani, Marc Vidal, Timothy T Harkins, Pascal Bouffard, Yutaka Suzuki, Sumio Sugano, Yuji Kohara, Nikolaus Rajewsky, Fabio Piano, Kristin C Gunsalus, John K Kim. The landscape of *C. elegans* 3' UTRs Science. 329:432-435, 2010.

Kevin Chen*, Jonas Maaskola, Mark Siegal and Nikolaus Rajewsky. Reexamining microRNA site

accessibility in *Drosophila*: a population genomics study. *PLoS ONE* 4(5):e5681, 2009. (5 pages)

Kevin Chen and Nikolaus Rajewsky. Natural selection on human microRNA binding sites inferred from single nucleotide polymorphism data. *Nature Genetics*, 38(12):1452-1456, 2006.

Sabbi Lall, Dominique Grün, Azra Krek, **Kevin Chen**, Yi-Lu Wang, Colin Dewey, Pranidhi Sood, Teresa Colombo, Nicolas Bray, Philip MacMenamin, Heuy-Ling Kao, Kristin C. Gunsalus, Lior Pachter, Fabio Piano and Nikolaus Rajewsky. A genome-wide map of conserved microRNA targets in *C. elegans*. *Current Biology*, 16(5):460-471, 2006.

Susannah Green Tringe, Christian von Mering, Arthur Kobayashi, Asaf A. Salamov, **Kevin Chen**, Hwai W. Chang, Mircea Podar, Jay M. Short, Eric J. Mathur, John C. Detter, Peer Bork, Philip Hugenholtz and Edward M. Rubin. Comparative Metagenomics of Microbial Communities. *Science* 308(5721):554-557, 2005.

Moses Charikar, **Kevin Chen** and Martin Farach-Colton. Finding Frequent Items in Data Streams. *Theoretical Computer Science*, 312(1):3-15, 2004.

Kevin Chen, Dannie Durand and Martin Farach-Colton. Notung: A Program for Dating Gene Duplications and Optimizing Gene Family Trees. *Journal of Computational Biology*, 7(3/4):429-447, 2000.

Teaching Activities

Courses Taught

Genome Evolution, 01:447:352:01, Spring 2014

Quantitative Biology and Bioinformatics, 01:447:302:01, Spring 2013. Instructor for 2 classes.

Genome Evolution, 01:447:352:01, Spring 2012.

Topics in Human Genetics (Course Director: Tara Matisse). Guest Lecture, 10/13/11. Non-coding RNAs. 01:447:481.

Seminar in Genetics (Course Director: Derek Gordon). Guest Lecture, 3/29/10.

Genome Evolution, 01:447:479:01, Spring 2011.

Seminars in Computational Biology and Molecular Biophysics (with Daniel Weinstock), 16:696:602, Fall 2010.

Computer Science Light Seminar in Bioinformatics (with Alexander Schliep), 198:500:01, Spring 2010.

Seminars in Computational Biology and Molecular Biophysics (with Daniel Weinstock), 16:696:602, Spring 2010.

Conference Presentations, Lectures, Demonstrations

Other Presentations, Lectures, Demonstrations

August 2010; Rutgers University Cell and DNA Repository Seminar Series
Title: An Overview of Mammalian Small RNAs

Papers, Abstracts, and Lectures

February 2014; Cancer Institute of New Jersey, Systems Biology Seminar
Spectral learning of Hidden Markov Models for Genomic Segmentation

February 2014; Rutgers, Camden
Spectral learning of Hidden Markov Models for Genomic Segmentation

- November 2013; IBM T.J. Watson Research Labs
Spectral Learning of Hidden Markov Models for Genomic Segmentation
- April 2013; Pennsylvania State University
Evolution of piRNAs in humans and *Drosophila*
- January 2013; New York Genome Center
Title: Function and Evolution of Piwi-interacting RNAs
- January 2013; Temasek Life Sciences Laboratory, Singapore
Title: Function and Evolution of Piwi-interacting RNAs
- January 2013; Duke-NUS Medical School, Singapore
Title: Function and Evolution of Piwi-interacting RNAs
- December 2012; Jackson Laboratory for Genomic Medicine, Connecticut
Title: Function and Evolution of Piwi-interacting RNAs
- October 2012; Genome Institute of Singapore
Title: Function and Evolution of Piwi-interacting RNAs
- June 2012; Society for Molecular Biology and Evolution 2012, Dublin, Ireland
Title: Evolution of Piwi-interacting RNAs in humans
- April 2012; New Jersey Institute of Technology, Dept of Computer Science
Title: Computational problems in genome rearrangements
- April 2011; University of California, San Francisco, Institute for Human Genetics
Title: Human piRNAs are under selection in Africans and repress transposable element
- November 2010; Rutgers University, Dept of Statistics
Title: A statistical test for natural selection applied to human Piwi-interacting RNAs
- September 2010; Medical Research Council, Clinical Sciences Center, London, UK
Title: Human piRNAs are under positive selection and repress transposable elements
- February 2010; Rutgers University, Ecology and Evolution Seminar Series
Title: Population genomics of microRNA and transcription factor binding sites
- January 2010; Temasek Life Sciences Laboratory, Singapore
Title: Population genomics of microRNA and transcription factor binding sites
- June 2009; DIMACS, Rutgers University
Title: Population genomics of microRNA and transcription factor binding sites
- March 2009; Institute for Advanced Study, Dept. of Systems Biology, Princeton, NJ
Title: Population genomics of microRNA and transcription factor binding sites
- October 2008; Colgate University, Science Colloquium, Hamilton, NY
Title: The evolution of microRNAs and their binding sites
- October 2008; Princeton University, PICASSO Program Seminar Series, Dept. of Computer Science
Title: The evolution of microRNAs and their binding sites
- June 2008; Albert Einstein College of Medicine, Department of Systems and Computational Biology
Title: Macro- and micro-evolution of microRNA-mediated gene regulation
- May 2008; Medical Research Council Clinical Sciences Centre, London, UK
Title: Macro- and micro-evolution of microRNA-mediated gene regulation
- April 2008; Rutgers University, Department of Genetics
Title: Macro- and micro-evolution of microRNA-mediated gene regulation
- February 2008; Carnegie Mellon University, Ray and Stephanie Lane Center for Computational Biology

Title: Macro- and micro-evolution of microRNA-mediated gene regulation

January 2008; Harvard School of Public Health, Department of Biostatistics

Title: Macro- and micro-evolution of microRNA-mediated gene regulation

November 2007; Columbia University, Department of Biomedical Informatics

Title: Macro- and micro-evolution of microRNA-mediated gene regulation

November 2007; Memorial Sloan-Kettering Cancer Center, Computational Biology Center

Title: Macro- and micro-evolution of microRNA-mediated gene regulation

July 2007; University of Chicago, Institute for Genomics and Systems Biology

Title: Macro- and micro-evolution of microRNA-mediated gene regulation

March 2007; Kavli Institute for Theoretical Physics, UC Santa Barbara

Title: Macro- and micro-evolution of microRNA-mediated gene regulation

January 2006; Symposium on Discrete Algorithms, Miami, FL

Title: On the tandem duplication-random loss model of gene rearrangement

December 2005; Computational Biology Seminar, Columbia University

Title: Evolution of animal microRNA targets, 3' UTR motifs and mitochondrial genomes

September 2005; RECOMB Comparative Genomics Satellite Workshop, Trinity College, Dublin, Ireland

Title: Lower bounds for maximum parsimony with gene order data

November 2001; DIMACS Workshop on Streaming Data Analysis and Mining, Rutgers University

Title: Finding frequent items in data streams

November 2001; Bay Area Theory Symposium, Stanford University

Title: Finding frequent items in data streams

Organizing and Chairing Activities

Participation in Organizing or Chairing Conferences, Workshops, and Organizations

2010 | Organized 7th Annual BioMaPS Summer School, New Direction in Evolutionary and Population Genetics (with Gyan Bhanot, Jody Hey, Alexandre Morozov and Ronald Levy)

Funding

Internally-Funded Research and/or Training Grants

07/2012-05/2014 | (Grant Amount: \$25,000) Busch Biomedical Award. Correlating piRNA and mobile element expression in human individuals, Kevin Chen and Jinchuan Xing

Externally-Funded Research and/or Training Grants

(In review) NIH R01 NHGRI Novel methods for comparative epigenomics of species, populations and disease states. PI: Kevin Chen, Co-PI: Kamalika Chaudhuri (UCSD)

(In review) NIH R01 NHGRI/NIDA Computational and experimental analysis of non-coding SNPs in drug addiction. PI: Kevin Chen, Co-Investigators: Ronald Hart (Rutgers), Jinchuan Xing (Rutgers) and Chad Huff (MD Anderson)

(In review) Army Research Office Mathematical Sciences Directorate, Biomathematics Division. Mathematical techniques for modeling the evolution of molecular networks. PI: Kevin Chen

(In preparation for resubmission) NSF ABI Algorithms for predicting microRNA and RNA-binding

protein motifs PI: Kevin Chen

(In preparation) NIH DP2 NIDA Studying Drug Abuse Genetics with Bioinformatics, Epigenomics and non-coding RNAs. PI: Kevin Chen

09/2009-08/2012 | (Grant Amount: \$747,000) NIH R00 Pathway to Independence Award. Genome-wide analysis of regulatory variation in *S. cerevisiae*
No cost extension until 08/13
Total cost, Kevin Chen

11/2012-11/2014 | (Grant Amount: \$7,500) AWS Education in Research grant. Genome Assembly in a MapReduce Framework, Kevin Chen

Service

Service to Other Public Bodies

03/2014 | Judge for 2014 Preliminary Round of the New York City Science and Engineering Fair

Service to Rutgers University

2012-2012 | BioMaPS Seminar Series Committee (Chair: Wilma Olson)

2010-ongoing | Undergraduate Computational Genetics Major Committee (Former Chair: Jody Hey)

2010-2011 | Biophysics Faculty Search Committee, BioMaPS Institute and Dept of Physics and Astronomy (Chair: Anirvan Sengupta)

2010 | Marco Azaro Reappointment Committee (Chair: Kevin Chen)

2010-2011 | Computational Genetics Faculty Search Committee, Dept of Genetics (Chair: Tara Matisse)

2010 | Evolution Graduate Education Committee (Chair: Jody Hey)

Contributions to the Advancement of the Academic Profession

Editor for Journals:

- PLoS Computational Biology, Guest Associate Editor, 2011-2012; Associate Editor 2012-present

Reviewer for Journals:

2009-present

- Proceedings of the National Academy of Sciences
- PLoS Genetics
- Nature Reviews Genetics
- Genome Research
- Genome Biology
- Bioinformatics
- Molecular Biology and Evolution
- PLoS Computational Biology
- Molecular Systems Biology
- Nucleic Acids Research
- BMC Genomics
- Journal of Molecular Evolution
- Trends in Genetics

- EMBO Reports

2005-2009

- BioSystems
- Journal of Algorithms
- PLoS ONE

Reviewer for Grants:

- National Institutes of Health Molecular Genetics B Study Section, 2013
- National Science Foundation Review Panels, 2008, 2010, 2012
- National Institutes of Health Neurogenesis and Cell Fate Study Section (*ad hoc*), 2014
- National Science Foundation (*ad hoc*), 2006-present
- Israel Science Foundation (*ad hoc*), 2011
- Wellcome Trust/DBT India Alliance (*ad hoc*), 2010
- European Research Council (*ad hoc*), 2009

Reviewer for Peer-Reviewed Conferences

2009-present

- International Colloquium on Automata, Languages and Programming (ICALP)

2004-2009

- Symposium on Discrete Algorithms (SODA)
- Principles of Database Systems (PODS)

Students Supervised

Master's or Doctoral Students by Type of Supervision

Pavel Mahmud, Computer Science PhD student, Doctoral committee (PI: Alexander Schliep) (2012-2014)

Tianyi Yu, CBMB PhD student, qualifying exam committee (PI: Monica Driscoll) (2013)

David Dong, Biomedical Engineering PhD student, Master's committee (PI: Martin Yarmush) (2013)

Anupriya Dutta, Brown University PhD student, Doctoral committee (PI: David Mark Welch) (2012)

Alexander Shanku, CBMB PhD student, Doctoral committee (PI: Andrew Kern) (2012-present)

Rajat Roy, Computer Science PhD student, Doctoral committee (PI: Alexander Schliep) (2011-present)

Michael Manhart, Physics PhD student, Doctoral committee (PI: Alexandre Morozov) (2011-2014)

Martin Calvino, Plant Biology PhD student, Doctoral committee (PI: Joachim Messing) (2011-present)

Julie Tsitron, CBMB PhD student, Doctoral committee (PI: Alexandre Morozov) (2010-2013)

Ariella Sasson, CBMB PhD student, Doctoral committee (PI: Todd Michael and Anirvan Sengupta) (2009-2010)

Amelia White, CBMB PhD student, Doctoral committee (PI: Eduardo Sontag) (2009-2013)

Postdoctoral Trainees

Jixia Liu (1 year, May 2013-May 2014)

Sandra Schnakenberg (<1 year, April 2012-December 2012)

Jimin Song (April 2012-present)

Philip Macmenamin, senior programmer (2 years, Jan 2012-Jan 2014)

Sergio Lukic (1 year, Sept 2009-Sept 2010)

Academic Advisement

CBMB PhD student: Liyang Diao (2009-present)

CBMB Masters student: David Gould (2010-2012)

CBMB PhD rotation student: M. Senthil Kumar (2011)

CBMB PhD rotation student: Douglas Robinson (2010)

CBMB PhD rotation student, Manuel Florez (2009)

CBMB PhD rotation student: Pamela Perez (2009)

DIMACS REU student: Adam Pershan (visiting from UPenn) (2012)

DIMACS REU student: Scott Norton (visiting from University of Connecticut) (2013)

DIMACS REU student: Eli Ben-Michael (visiting from Columbia University)

Undergraduate Thesis Committee: Cory Patrick, Rutgers Genetics Department (Adviser: Maureen Barr)

RiSE REU student: Abigail Ameri (visiting from Ramapo College) (2013)

Undergraduate student: Phillip Ai (visiting from MIT) (2012)