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Curriculum Vitae

Dr. Manuel E. Lladser B.
Department of Applied Mathematics
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Education

1996 Universidad de Chile, Mathematical Civil Engineering Degree
2000 University of Wisconsin, M.A. in Mathematics
2003 The Ohio State University, Ph.D. in Mathematics

Recent Employment

Aug. 1997 - May 2000	Teaching Assistant, Mathematics Dept., The University of Wisconsin
Oct. 2000 - Sep. 2003	Teaching/Research Assistant, Dept. of Mathematics, The Ohio State University
Oct. 2003 - Jun. 2004	Lecturer, Dept. of Mathematics, The Ohio State University
Aug. 2004 - Aug. 2005	Instructor, Dept. of Applied Mathematics, University of Colorado
Aug. 2005 - Aug. 2012	Assistant Professor, Dept. of Applied Mathematics, University of Colorado
Aug. 2012 - present	Associate Professor, Dept. of Applied Mathematics, University of Colorado

Professional Sabbatical

Aug. 2013 - May. 2014 Visiting Scholar, Department of Molecular & Computational Biology
University of Southern California

Awards

1989 *High Academic Performance Fellowship*,
Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile
1996 *Outstanding Student Fellowship*,
Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile
1999 *Excellence in Teaching Award*,
Mathematics Dept., University of Wisconsin at Madison

Honors

2013 NSF IGERT website spotlight for enhancement of statistics and computation IQ Biology course via a hands-on approach - http://www.igert.org/spotlights/4508

Publications*

Most publications are available at http://amath.colorado.edu/faculty/lladser/

[1] M. Lladser, J. San Martín. *Domain of attraction of the quasi–stationary distributions for the Ornstein–Uhlenbeck process*. Journal of Applied Probability, 37(2):511-521 (2000)

[2] M. Lladser. *Mixed powers of generating functions.* Discrete Mathematics and Theoretical Computer Science Proceedings, Vol. AG:171-182 (2006)

[3] M. Lladser. *Uniform formulae for coefficients of meromorphic functions in two variables. Part I.* SIAM J. Discrete Math, 20(4):811-828 (2006)

[4] M. Lladser. *Uniqueness of polynomial canonical representations.* Discrete Mathematics and Theoretical Computer Science Proceedings, Vol. AH:463-470 (2007)

[5] M. Lladser. *Minimal Markov chain embeddings of pattern problems.* Proceedings of the Information Theory and Applications Workshop, pp. 251-255 (2007). University of California at San Diego.

[6] M. Lladser. *Markovian embeddings of general random strings.* Proceedings of the Fifth Workshop on Analytic Algorithmics and Combinatorics (ANALCO), pp. 183-190 (2008). San Francisco, California. Published by SIAM.

[7] A.S. Bijral*, M. Lladser, G. Grudic. *Semi-supervised learning of a Markovian metric.* Proceedings of the 2008 SIAM International Conference on Data Mining, SDM pp. 466-471 (2008)

[8] M. Lladser, M.D. Betterton, R. Knight. *Multiple pattern matching: A Markov chain approach*. Journal of Mathematical Biology, 56:51-92 (2008)

[9] R. Kennedy*, M. Lladser, M. Yarus, R. Knight. *Information, probability, and the abundance of the simplest RNA active sites.* Frontiers in Bioscience, 13:6060-6071 (2008)

[10] M. Oscamou*, D. McDonald, V.-B. Yap, G. A. Huttley, M. Lladser, R. Knight. *Comparison of methods for estimating the nucleotide substitution matrix.* BMC Bioinformatics, 9:511, 11 pages (2008)

[11] M. Lladser. *Prediction of unseen proportions in urn models with restricted sampling*. Proceedings of the Sixth Workshop on Analytic Algorithmics and Combinatorics (ANALCO), pp. 85-91 (2009). New York, New York. Published by SIAM.

[12] S. Chestnut*, M. Lladser. *Occupancy distributions in Markov chains via Doeblin's ergodicity coefficient.* Discrete Mathematics and Theoretical Computer Science Proceedings, AM:79-92 (2010)

[13] R. Kennedy*, M. Lladser, Z. Wu, C. Zhang, M. Yarus, H. De Sterck, R. Knight. *Natural and artificial RNAs occupy the same restricted region of sequence space*. RNA Journal, 16(2): 280-289 (2010)

[14] M. Illangasekare, R. Turk, G. C. Peterson*, M. Lladser, M. Yarus. *Chiral histidine selection by D-ribose RNA*. RNA Journal, 16(12): 2370-2383 (2010)

[15] C. Lozupone, M. Lladser, D. Knights, J. Stombaugh, R. Knight. *UniFrac: an effective distance metric for microbial community comparison.* Multidisciplinary Journal of Microbial Ecology, 5(2):169-172 (2011)

[16] M. Lladser, R. Gouet, J. Reeder. *Extrapolation of urn models via Poissonization: accurate measurements of the microbial unknown.* PloS ONE, 6(6):e21105, 14 pages (2011)

[17] M. Lladser, P. Potocnik, J. Širáň, M. C. Wilson. *Random Cayley digraphs of diameter 2 and given degree.* Discrete Mathematics and Theoretical Computer Science, 14:2, 83-90 (2012)

[18] L. Lhothe, M. Lladser. *Toward the asymptotic count of bi-modular hidden patterns under probabilistic dynamical sources: a case study*. Discrete Mathematics and Theoretical Computer Science Proceedings, AQ: 425-452 (2012)

[19] J. Hampton*, M. Lladser. *Estimation of Distribution Overlap of Urn Models.* PloS ONE, 7(11): e42368, 16 pages (2012)

[20] M. Lladser, S. Chestnut*. *Approximation of sojourn-times via maximal couplings: Motif frequency distributions.* Journal of Mathematical Biology, 69(1):147-182 (2014)

* denotes current and former students

[21] J. Azofeifa*, M. A. Allen, M. Lladser, R. D. Dowell. *FStitch: A fast and simple algorithm for detecting nascent RNA transcripts*. Proceedings of the 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics. ACM, New York, NY, USA, 174-183 (2014)

[22] J. Azofeifa*, M. Allen, M. Lladser, R. Dowell. *An annotation agnostic algorithm for detecting nascent RNA transcripts in GRO-seq*. IEEE/ACM Transactions on Computational Biology and Bioinformatics. DOI 10.1109/TCBB.2016.2520919. (2016)

[23] M. Lladser, J. G. Azofeifa*, M. A. Allen, R. D. Dowell. *RNA Pol II transcription model and interpretation of GRO-seq data*. Journal of Mathematical Biology. DOI 10.1007/s00285-016-1014-4. (2016)

Books

[24] M. Lladser. *Variables Aleatorias y Simulación Estocástica*. (Translation from Spanish: *Random Variables and Stochastic Simulation*). Published by Editorial JC. Sáez, Santiago, Chile, 207 pages. ISBN: 978-956-306-068-3 (2011)

Book Chapter

[25] M. Lladser, R. Knight. *Mathematical approaches for describing microbial populations: practice and theory for extrapolation of rich environments*. In "The Human Microbiota", published by Wiley-Blackwell Publishing, D. Fredricks (editor), ISBN: 978-0-470-47989-6, ISBN-13: 978-0470479896 (2013).

Submitted Papers

- J. Hampton*, M. Lladser. *Allocation of new draws for optimal sampling of urn ensembles with application to the Human Microbiome Project.*

Grants

External: Funded

- NIH supplement 3R01GM048080-13S1 (02/2007 – 01/2010), $252,527
  Title: *Scientific Computation for RNA Catalysis of Translational Reactions*
  Commitment: Collaborator (PI: M. Yarus, MCDB)
- NIH R01 HG004872 (09/2008-07/2011), $762,036
  Title: *New Tools for Understanding the Composition and Dynamics of Microbial Communities in Human Body Habitats*
  Commitment: Co-PI (PI: R. Knight, CHEM)
- NSF DMS-0805950 (07/2008-07/2013), $180,000
  Title: AMC-SS: *Markovian Embeddings for the Analysis and Computation of Patterns in non-Markovian Random Sequences*
  Commitment: PI
- NSF (07/2012-07/2017), $3,000,000
  Title: *IGERT: Interdisciplinary Quantitative Biology Program*
  Commitment: Co-PI (PI: T. Cech, CHEM)
- NSA (07/2013-08/2013), $24,160
  Title: *The 36th Conference on Stochastic Processes and their Applications*
  Commitment: Co-PI (PI: B. Rider, MATH)
- NSF (07/2013-08/2013), $47,500
  Title: *The 36th Conference on Stochastic Processes and their Applications*
  Commitment: Co-PI (PI: J. Englander, MATH)
- W. M. Keck Foundation (01/2013-12/2014), $1,000,000
  Title: *The Earth Microbiome Project*
  Commitment: Co-PI (PI: R. Knight, CHEM)

Presentations

Invited Seminars and Colloquia

Jul. 2005 First Cornell Summer School in Probability, "*Multiple pattern frequencies for Markovian sequences*"

Oct. 2005 Probability and Statistics Seminar, Dept. of Mathematics, University of Colorado at Boulder, "*Distribution of arrival patterns in compound queues*"

Apr. 2006 Mathematics Colloquium, University of Colorado at Colorado Springs, "*Analysis of pattern frequencies in Markovian sequences*"

May 2006 Front Range Probability Day, University of Colorado at Boulder, "*Asymptotic formulae for the coefficients of mixed-powers of generating functions*"

Jul. 2006 XXXVI International Saint Flour Summer School in Probability, "*Asymptotics for the coefficients of mixed-powers generating functions*"

Oct. 2006 Bioinformatics Supergroup, University of Colorado at Boulder, "*Minimal Markov chain embedding techniques for biological sequence analysis*"

May 2007 Frontier Probability Day, University of Colorado at Colorado Springs, "*Minimal Markov chain representation of patterns problems*"

Aug. 2007 Discrete Mathematics Seminar, Centro de Modelamiento Matemático, Universidad de Chile, "*Asymptotic analysis of the coefficients of mixed power generating functions*"

Aug. 2007 Probability Seminar, Centro de Modelamiento Matemático, Universidad de Chile, "*Markovian embeddings of possibly non-Markovian random sequences*"

Sep. 2007 Combinatorics and Probability Seminar, Math Dept., University of Pennsylvania, "*Asymptotic analysis of the coefficients of mixed power generating functions*"

Oct. 2007 Dynamical Systems Seminar, Dept. of Applied Mathematics, University of Colorado at Boulder, "*Markovian embeddings of possibly non-Markovian random sequences*"

Oct. 2007 Electrical Civil Engineering Dept., University of Illinois at Urbana-Champaign, "*Markovian embeddings of possibly non-Markovian random sequences*"

Oct. 2007 AMS Special Session on Algorithmic Probability and Combinatorics, DePaul University, "*Minimal Markovian embeddings of non-Markovian random strings*"

Oct. 2007 Colorado/Wyoming American Statistical Association Fall Meeting, "*Markovian embeddings of possibly non-Markovian random sequences*"

May. 2008 Departamento de Educación Matemática, Universidad Católica Silva Henríquez, Chile, "*Variables aleatorias y simulación estocástica*"

Jun. 2008 Centro Innovo, Universidad de Santiago de Chile, "*Variables aleatorias y simulación estocástica*"

Jun. 2008 Probability Seminar, Centro de Modelamiento Matemático, Universidad de Chile, "*The Markov relation induced by a non-Markovian sequence: a tutorial*"

Oct. 2008 Bioinformatics Supergroup, University of Colorado at Boulder, "*Prediction of unseeing proportions in non-parametric urn models*"

Mar. 2009 Laboratoire d'Informatique, University of Caen, France. "*The Markov relation induced by a non-Markovian sequence*"

Apr. 2009 Applied Mathematics Colloquium, Department of Applied Mathematics, University of Colorado at Boulder, "*A new approach to population diversity: the extrapolation problem*"

Feb. 2010 Combinatorics Colloquium, Laboratoire Bordelais de Recherche en Informatique, Université Bordeaux 1, Bordeaux. "*Poissonization as a mathematical statistics Tool"*

Apr. *2010 Probability and Statistics Seminar, University of Colorado, "Prediction of the uncovered probability of n samples from an urn"*

Jun. 2010 Séminaire d'algorithmique, University of Caen, France. "*Doeblin's coefficient and occupancy distributions*"

Sep. 2010 Combinatorics and Probability Seminar, University of Pennsylvania. "*Doeblin's coefficient and*

occupancy distributions"

Oct. 2010 Bioinformatics Supergroup, University of Colorado. *"What if a motif problem over 10^6 nucleotides could be reduced to one over a dozen or so nucleotides?"*

Dec. 2010 Colorado Initiative of Molecular Biology, University of Colorado. Science Short.

Mar. 2011 Mathematics Colloquium, Iowa State University. "*Doeblin's ergodicity coefficient: lower-complexity approximation of occupancy distributions*"

Feb. 2011 Statistics Seminar, Colorado State University, Fort Collins. "*Doeblin's ergodicity coefficient: lower-complexity approximation of occupancy distributions*"

Jun. 2011 Seminar of Stochastic Modeling, Center of Mathematical Modeling, Chile. "*Extrapolation of urn models via Poissonization*"

Nov. 2011 Laboratoire d'Informatique, University of Caen, France. "*Estimation of urns dissimilarity*"

Oct. 2012 Bioinformatics Supergroup, University of Colorado. "*Overlap of discrete distributions, or: what OTUs are unique or shared between microbial environments?*"

Nov. 2012 Mathematics Colloquium, Bowling Green University. "*Prediction of the Discovery Probability of an Urn Sample — or: how to predict the support of a discrete distribution?*"

Dec. 2012 Biomedical Research Training Center, RISE Program, Universidad de Puerto Rico - Río Piedras, Puerto Rico. "*Coverage of discrete distributions, or: how deep is a given sample from microbial environments?*"

Mar. 2013 School of Engineering Seminar, Universidad Adolfo Ibáñez, Chile. "*Dissimilarity of discrete distributions*"

Sep. 2013 Computational Biology Colloquium, Department of Molecular and Computational Biology, University of Southern California. "*Prediction of the discovery probability of an urn sample*"

Oct. 2013 Probability and Statistics Seminars, Mathematics Department, University of Southern California. "*Prediction of the discovery probability of an urn sample*"

Nov. 2013 Smith Lab Group Presentation, Department of Molecular and Computational Biology, University of Southern California. "*Breaking the memory of a Markov chain*"

Dec. 2013 Probability Seminar, Department of Mathematics, University of California San Diego. "*Breaking the memory of a Markov chain*"

May. 2014 Smith Lab Group Presentation, Department of Molecular and Computational Biology, University of Southern California. "*Towards resolving the fraction of cancer cells in tissues via methylomes*"

May. 2014 Frontier Probability Days 2014. University of Arizona. "*Count of bi-modular hidden patterns under probabilistic dynamical systems*"

Jun. 2014 International Workshop on Applied Probability, Antalya, Turkey. "*Approximation of additive functionals via maximal couplings: pattern frequency distributions"*

Jul. 2014 James Meiss 60th Birthday Conference. University of Colorado at Boulder. "*Count of bi-modular hidden patterns under probabilistic dynamical sources - a case study"*

Mar. 2015 Applied Mathematics Colloquium, University of Colorado at Boulder. "*Non-asymptotic Approximations in Computational Biology via Maximal Couplings"*

Apr. 2015 Applied Mathematics Seminar, Colorado State University, Fort Collins. "*Prediction of the discovery probability of an urn sample and other related problems"*

May 2015 Seminario DIIIO, Department of Operations Research, Universidad Adolfo Ibáñez, Santiago, Chile. *"Non-asymptotic approximations in computational biology via maximal couplings"*

May 2016 *Science Short, BioFrontiers Institute, University of Colorado at Boulder. "Resolving mixtures with an unknown component"*

Conference & Workshop Presentations: Oral

Sep. 2006 Fourth Colloquium on Mathematics and Computer Science: Algorithms, Trees, Combinatorics and Probabilities, Nancy, France, "*Mixed powers of generating functions*"

Jun. 2007 International Conference on Analysis of Algorithms, Juan-les-pins, France, "*Uniqueness of polynomial canonical representations*"

Aug. 2007 Session on Trees, 32nd Conference on Stochastic Processes and its Applications, University of Illinois at Urbana-Champaign, "*Asymptotics of bivariate generating functions: Airy function local limits*"

Aug. 2007 Simulation Session, 32nd Conference on Stochastic Processes and its Applications, University of Illinois at Urbana-Champaign, "*Markovian embeddings of non-Markovian random strings*"

Jan. 2008 Fifth Workshop on Analysis of Algorithms and Combinatorics, San Francisco, "*Markovian embeddings of general random strings*"

Apr. 2008 International Conference of Analysis of Algorithms, Maresias, Brazil, "*Analysis of patterns and minimal embeddings of non-Markovian sequences*"

Jan. 2009 Sixth Workshop on Analysis of Algorithms and Combinatorics, New York,*"Prediction of unseen proportions in urn models with restricted sampling"*

Jun. 2009 20th International Conference on Probabilistic, Combinatorial, and Asymptotic Methods in the Analysis of Algorithms, Fréjus, France. "*A new approach to population diversity: the extrapolation problem*"

Jul. 2010 21st International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms, Vienna, Austria. "*Occupancy distributions in Markov chains via Doeblin's ergodicity coefficient*"

Mar. 2011 2011 Frontier Probability Days, Salt Lake City, Utah. "*Doeblin's ergodicity coefficient: lower-complexity approximation of occupancy distributions*"

May. 2011 15th International Conference on Random Structures and Algorithms, Emory University, Atlanta. "*Doeblin's ergodicity coefficient: lower-complexity approximation of occupancy distributions*"

Jun. 2011 22nd International Meeting on Probabilistic, Combinatorial, and Asymptotic Methods in the Analysis of Algorithms, Bedlewo, Poland. "*Cayley digraphs of given degree and their diameter*"

Jun. 2012 International Workshop on Applied Probability, Jerusalem, Israel. "*Estimation of dissimilarity in urn models*"

Jun. *2012* 23rd International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms, University of Montreal, Canada. "*Toward the asymptotic count of bi-modular hidden patterns under probabilistic dynamical sources: a case study"* (Presented by L. Lothe.)

Jun. 2012 8th International Purdue Symposium on Statistics, Purdue. "*Estimation of dissimilarity in urn models*"

Jul. 2012 RNA Workshop, Benasque, Spain. "*Homology versus Analogy via Motifs*"

Aug. 2012 RNA Workshop, Benasque, Spain. "*Significance of motif frequencies in non-Markovian models of genome sequences*"

May. 2014 Frontier Probability Days, Tuczon, Arizona. "Count of bi-modular hidden patterns under probabilistic dynamical systems"

Jun. 2014 International Workshop on Applied Probability, Antalya, Turkey. "*Approximation of additive functionals via maximal couplings: pattern frequency distributions*"

Jul. 2014 Boulder Dynamics: Conference in honor of Jim Meiss' 60th birthday, Boulder, Colorado. *"Approximation of additive functionals via maximal couplings: pattern frequency distributions"*

May 2016 Frontier Probability Days, University of Utah, Salt Lake City. *"Distilling mixtures with a single characterized component"*

Contributed Presentations: Poster

Aug. 2005 New Directions in Probability Theory, Institute of Mathematics and Its Applications, "*A state machine approach to study pattern frequencies in Markovian sequences"*

Nov. 2005 National Institute of Standards and Technology Fall Symposium, Boulder, "*Distribution of arrival patterns in non-homogeneous Poisson processes*"

Jul. 2006 31st Conference on Stochastic Processes and their Applications, Paris, France, "*Frequency of regular language prefixes in Markovian sequences*"

Nov. 2009 Butcher Symposium on Genomics and Biotechnology, University of Colorado, "*Fairness assessment and extrapolation via Poissonization*"

Nov. 2011 Butcher Symposium on Genomics and Biotechnology, University of Colorado, "*Urn-models for microbial communities: optimal allocation of samples for pair-wise comparisons*"

Contributed Presentations: With students

May 2009 Summer School in Applied Probability, Department of Mathematics, University of Carleton, Canada, "*Branching process representation to certain O.D.E.'s in the complex plane.*" (Presented by grad student J. Hampton)

May 2009 Summer School in Applied Probability, Department of Mathematics, University of Carleton, Canada, "*Decomposition and approximation of Markov chains*." (Presented by grad student S. Chestnut)

May 2009 Summer School in Applied Probability, Department of Mathematics, University of Carleton, Canada, "*Poisson approximation and its application in pattern matching problems.*" (Presented by grad student A. Sen)

Nov. 2009 Bioinformatics Supergroup, University of Colorado, "*Fairness assessment via Poissonization.*" (Presented by grad student G. C. Peterson)

Mar. 2010 SIAM's Graduate Chapter, University of Colorado, Boulder. "*Approximating Markov Chain Occupancy Distributions.*" (Presented by grad student S. Chestnut)

Nov. 2010 CIMBposium Poster Session, University of Colorado, Boulder. "*Beta-diversity Estimation via Urn Models.*" (Presented by grad student J. Hampton)

Mar. 2011 Seventh Annual Front Range Applied Mathematics Student Conference, University of Colorado, Denver. "*Estimation of Distribution Overlap for Urn Models*." (Presented by grad student J. Hampton)

Jun. 2011 22-nd International Meeting on Probabilistic, Combinatorial, and Asymptotic Methods in the Analysis of Algorithms, Bedlewo, Poland. "*Estimation of Distribution Overlap for Urn Models*." (Presented by grad student J. Hampton)

Nov. 2015 Butcher Symposium, University of Colorado at Boulder. *"Predicting Off-Target Effects of CRISPR-Cas9."* (Presented by grad student V. Li)

Nov. 2015 Butcher Symposium, University of Colorado at Boulder. *"Mixture models with uncharacterized components."* (Presented by grad student A. Pearson)

Nov. 2015 Butcher Symposium, University of Colorado at Boulder. *"Robust Transcriptional Data Analysis: Combining RNA- and GRO-Seq."* (Presented by grad student C. Tillquist)

Mar. 2016 SIAM Front Range Student Conference. "Expected fraction of bases in Human Chromosome 21 that may be edited using CRISPR-Cas9." (Presented by undergrad student H. Pielke-Lombardo)

Teaching

University Colorado

APPM 1350 *Calculus I for Engineers* (3 credits)
Fall 04, Spring 05

APPM 3170 *Discrete Applied Mathematics* (3 credits)
Fall 08, Fall 09, Fall 10, Fall 11, Fall 12

APPM 3570 *Applied Probability* (3 credits)
Fall 04, Spring 05, Spring 07, Spring 08, Spring 15, Spring 16

APPM 4/5570 *Statistical Methods* (3 credits)
Fall 05, Spring 06

APPM 4/5720 *Mathematical Computational Biology* (3 credits)
Spring 15

APPM 4/5560 *Markov Chains, Queues, and Monte Carlo Simulation* (3 credits)
Fall 05, Fall 06, Fall 08, Fall 11, Fall 12, Fall 14, Fall 15

APPM 4/5720 *Statistics and Computations of Genomes and Metagenomes* (3 credits)
Cross-listings: CSCI 4830/7000; MCDB 4100/6440; CHEM 4/5921
Spring 2012 (co-taught with R. Dowell)
Spring 2013 (co-taught with R. Knight)

APPM 4/5720 *Special Topics: Mathematical Computational Biology* (3 credits)
Spring 15

APPM 4/5720 *Special Topics: Random Graphs* (3 credits)
Spring 16

APPM 5440 *Applied Analysis 1* (3 credits)
Fall 10

APPM 7400 *Foundations and Applications of Probability Theory*
Fall 06 (3 credits), Spring 07 (1 credit), Fall 09 (3 credits)

Community: Invited International Lectures Series

Nov. 2007 The John Knopfmacher Centre for Applicable Analysis and Number Theory, Dept. of Mathematics, University of Witwatersrand, Johannesburg, South Africa (12 two-hours lectures)

University: Organization of new Inter-disciplinary Seminar

Fall 10-Spring 11 *The Lemmas' meeting*, organized an informal weekly seminar to gather in a somewhat informal atmosphere to learn and discuss mathematics and biology topics of interest to the attendees.

University: Development of new Ph.D. Certificate Program

Fall 10-present *Interdisciplinary Quantitative Biology (IQ Biology) program*, developed with faculty from eight participating departments at the University of Colorado-Boulder a new program to train graduate students in quantitative and computational methods, and to analyze and model complex biological processes at scales ranging from whole populations to single molecules.

University: Development of new Inter-disciplinary Course

APPM 4/5720 *Statistics and Computations of Genomes and Meta-genomes*, developed together with R. Dowell (MCDB) and R. Knight (CHEM), as one of the core-courses for the IQ Biology Ph.D. certificate program. (3 credits)

University: Development of new APPM Special Topic Courses

APPM 4/5720 *Mathematical Computational Biology*, introduces applied mathematicians, mathematicians and engineers to mathematical problems of a probabilistic and statistical nature in the field of molecular biology (3 credits).

APPM 4/5720 *Random Graphs*, introduces and analyzes with rigor various mathematical properties of several fundamental models of random graph theory, including the celebrated Gilbert/Erdös-Renyi model, fixed degree distribution, and preferential attachment models (3 credits).

Student Research Advising

High-school Student Advising

- *Joseph Aicher*, Spring 11

Undergraduate Advising

- *Andrew Ledvina* (APPM/ECON major), Fall 06
- *Geoffrey C. Peterson* (APPP BS/MS thesis, April 2010), Spring 09-Summer 10
- *Joseph Aicher* (MATH, University of Alabama), Summer 12
- *H. Pielke-Lombardo* (APPM), Fall 2015-Spring 2016
- *I. Char* (APPM), Spring 2016
- *J. Pieper* (APPM), Spring 2016-present

Undergraduate co-Advising

- *Ryan Kennedy* (APPM/CS Honor thesis, April 2009), with R. Knight (advisor), Spring 07-Spring 09
- *JaeAnn Dwulet* (APPM/MCDB major), with R. Dowell (co-advisor), Spring 10

Graduate Advising

- *Amrik Sen* (APPM), Spring 09-Spring 10
- *Stephen R. Chestnut* (APPM MS thesis, April 2010), Spring 09-Summer 10
- *Jerrad Hampton* (APPM Ph.D., August 2012), Spring 09-Spring 12
- *Ash Same* (APPM), Spring 13
- *Kathleen Smith* (MATH), Fall 13
- *Victorial Li* (APPM), Fall 14-Fall 15
- *R. Carter* (CS), Summer 15-present
- *A. Pearson* (APPM), Summer 15-present
- *I. Tripodi* (APPM), Fall 15-present

Graduate co-Advising

- *Maribeth Oscamou* (APPM), advisor with R. Knight (co-advisor), Fall 07
- *William Felder* (APPM), advisor with R. Knight (co-advisor), Spring 07
- *Avleen S. Bijral* (CS), co-advised project with G. Grudic (advisor), Spring 07-Spring 08
- *Joseph Azofeifa* (IQ Biology/CS), co-advising project with R. Dowell (advisor), Fall 13-Fall 15

IQ Biology Students Lab Rotations

- *Topher Weiss-Lehman*. Project: *A Markov Chain Embedding Technique Utilizing Intergenic GC- Content in Thermophilic and Mesophilic Bacteria*, Fall 12
- *Sam Way*. Project: *Suspicious similarities in DNA substitution models,* Fall 13
- *Antony Pearson*. Project: *Examining DNA methylation through probabilistic graphical models*, Fall 14

- *Richard Tillquist*. Project: *The Amordad Database for Metagenome Comparison*, Spring 15.
- *Jamie Morton*. Project: *Compositional Data Analysis and Species Extrapolation from Sparse Microbial Data* (present).

Student Awards and Recognitions

- R. Kennedy, *2008-2009 Astronaut Scholarship Foundation*
- S. R. Chestnut, *2009 NSF East Asia & Pacific Summer Institutes for U.S Graduates Fellowship*
- G. C. Colin, *Spring 2010 Colorado Science Scholarship*
- J. Hampton, *2011 University of Colorado Graduate School Summer Fellowship*
- A. Pearson, 2016 NSF Graduate Research Fellowship

Attended Workshops

2004 *Faculty Teaching Excellence Program (FTEP): Integrating research in one's classroom*
FTEP: Integrating electronic library resources into teaching and research
2005 *FTEP: Lectures and interaction for learning*
2006 *FTEP: Getting students to talk*
2007 *FTEP: Teaching in a nutshell*
2008 *Leadership Education for Advancement and Promotion (LEAP): Introductory Leadership Workshop*

Teaching Service

Non-thesis master's committee	Carlos Martino (MECH)
Master's thesis committee	James S. Allen (MATH), Eason Jostad (APPM), Bryan Arguello (MATH), Lledó Esquerra-Ortells (ECEE), Prasanth Prahladan (ECEE)
Honor's thesis committee	Brian Camley (PHYS), Bradley Klingenberg (APPM)
Comprehensive exam committee	Jinyu Li (APPM), Jian Wang (APPM), Wenjin Mao (APPM), Paul VaughanMiller (APPM), Liang Zhang (MATH), Lledó Esquerra-Ortells (ECEE), Sophie Weiss (ChBE), Justin Debelius (ChBE)
Doctoral thesis committee	Hong Liu (APPM), Jian Wang (APPM), Michael J. Daniel (MATH), Jinyu Li (APPM), Erin Byrne (APPM), Kye Taylor (APPM), Dane R. Taylor (APPM), Justin Debelius (CHEM), Sophie Weiss (ChBE), Liang Zang (MATH)

Service

Department

- *APPM/MCDB Dual Master Liaison*, Spring/Fall 06
- *Analysis Prelim Committee*, Fall 10, Spring 11 (chair), Fall 11, Spring 13 (chair)
- *Applied Mathematics Colloquium*, Fall 11-present (chair)
- *Awards Committee, Fall 15-Spring 16*
- *Committee for new Statistics and Applied Probability (SAP) program*, Spring 11-present
- *Graduate Committee*, Spring 05, Fall 07-Spring 08
- *Instructor Search Committee*, Spring 15
- *Mathematical Modeling: Physical/Math Biology Search Committee*, Fall 14
- *New Calculus Textbook & On-line Homework Committee*, Fall 09-Summer 10
- *Post-Tenure Review Committee*, Spring 15 (chair)
- *Probability and Statistics Search Committee*, Spring/Fall 07
- *PUEC* for the reappointment of senior instructors A. Dougherty and M. Nelson, Fall 10
- *PUEC* for the reappointment of instructors S. Bhat and C. Curtis, Spring 11

- *PUEC* for tenure review of assistant professor D. Bortz, Fall 12-Spring 13
- *Statistics and Probability Prelim Committee*, Spring/Fall 05, Spring/Fall 06, Spring 07, Spring/Fall 09 (chair), Spring 13 (chair), Fall 14 (chair)
- *Undergraduate Advising Committee*, Fall 10-Spring 11, Fall 14-Spring 15

University

- *BioFrontiers Task Force (former CIMB)*, Summer 09-present
- *Interdisciplinary Quantitative Biology (IQ Biology) Admissions Committee*, Spring 11
- *IQ Biology Academic Advising Committee*, Summer 11-Spring 13, Fall 14-Spring 15, Fall 15-Spring 16

Community: Edited Volume

M. Lladser, R. Maier, M. Mishna and A. Rechnitzer (editors). American Mathematical Society (AMS) Contemporary Volume 520, *Algorithmic Probability and Combinatorics*, 240 pages (2010)

Community: Journal Referee

Algorithmica (ALGORITHMICA), ACM Transactions on Algorithms (TALG), Bulletin of Mathematical Biology (Bull. Math. Bio.), Central European Journal of Mathematics (CEJM), Discrete Mathematics and Theoretical Computer Science (DMTCS), Electronic Journal of Probability (EJP), Journal of Applied Probability (AP), Journal of Statistical Physics (JOSS), Journal of Discrete Algorithms (JDA), Methodology and Computing in Applied Probability (METHODOL COMPUT APPL), Proceedings of the National Academy of Science (PNAS), SIAM Undergraduate On-line (SIURO), SpringerPlus

Community: Conference Proceedings Reviewer

2014 25th International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms, Paris, France

Community: Grant Proposal Reviewer

- NSF Math Biology Program from the Division of Mathematical Sciences
- NSF Pan-American Advanced Studies Institute Program (PASI)
- Natural Sciences and Engineering Research Council of Canada
- NSA Mathematical Sciences Program

Community: Book Proposal Reviewer

Math/Appl.Math/Stats/Prob. Division of Elsevier

Community: Conference Organizer

Chair of AMS special session *Algorithmic Probability and Combinatorics* at DePaul University, co-chair: Robert Maier (2007), and the University of British Columbia, co-chairs: Robert Maier, Marni Mishna and Andrew Rechnitzer (2008)

Community: Workshop Program Committee

2011 Workshop on Analytic Algorithmics and Combinatorics (ANALCO) sponsored by SIAM

2015 Meeting on Analytic Algorithmic and Combinatorics (ANALCO) sponsored by SIAM

Community: International Conference Session Committee

2012 International Workshop on Applied Probability, Combinatorial Probability Session (co-chair, chair: H. Mahmoud).

Community: Conference Local Organizing Committee

2013 Conference on Stochastic Processes and their Applications (SPA)