Christopher Kauffman

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Education

Ph.D. Computer Science, University of Minnesota, Twin Cities, anticipated graduation Spring 2012. *Dissertation:* Machine Learning for Structural Bioinformatics.

M.S. Computer Science, University of Minnesota, Twin Cities, 2010.

B.S. Computer Science, University of Minnesota, Twin Cities, 2004. Minor in Mathematics. Graduated with High Distinction.

Research Interests

Applications of machine learning to bioinformatics.

Interplay of optimization theory and machine learning.

Protein structure prediction as an optimization/learning problem.

Protein interactions with ligands and nucleic acids.

Teaching Experience

Instructor, CSC 301: Programming and Problem Solving, Fall 2011, Department of Mathematics, Concordia University, St. Paul. Introduced 15 students in second to third year of undergraduate study to basic programming in Java. After building fundamental programming skills, studied methods of modeling and simulating situations via computing. Responsible for complete design and execution of the class. Course homepage: http://www.cs.umn.edu/~kauffman/csc301

Instructor, CSCI 2011: Discrete Structures of Computer Science, Summer 2011, Department of Computer Science, University of Minnesota. Responsible for instruction on mathematical concepts pertinent to computer science including lecture, assignments, and exams for 30 second-year students. Course homepage: http://www-users.cselabs.umn.edu/classes/Summer-2011/csci2011

Teaching Assistant, CSCI 2011: Discrete Structures of Computer Science, Spring 2011, Department of Computer Science, University of Minnesota. Led recitation sections to discuss course material, work problems, designed in class activities to facilitate learning for two sections of 40 second-year students. Instructor: Carl Sturtivant.

Teaching Assistant, CSCI 1901: Structure of Computer Programming I, Fall 2004 - Spring 2005, Department of Computer Science, University of Minnesota. Worked with students learning the Scheme programming language, managed two weekly labs of 35 first-year students, helped to design and grade assignments. Instructors: Maria Gini (2004) and Dan Boley (2005).

Lectures

Codons, Computers, and our Genomic Future, Fall 2011, invited talk for the Sigma Pi seminar series, Concordia University, St. Paul. Discussed how computation enables increased understanding of the genome. This new knowledge will lead to both powerful treatments to make us healthier and difficult ethical dilemmas as portrayed in the film *Gattaca*.

Guest Lecturer on Protein Fold Recognition, CSCI 5481: Computational Techniques for Genomics, Spring 2011, Department of Computer Science , University of Minnesota. Delivered an hour lecture on the application of machine learning techniques to determine the family of new proteins to 20 graduate students in computer and biological sciences.

Guest Lecturer on Parallel Programming, CSCI 5451: Parallel Computing, Spring 2011, Department of Computer Science, University of Minnesota. Delivered a two-hour lecture on theory and practice of parallel computing using the message passing interface to 30 graduate students in computer science.

Guest Lecturer on Machine Learning, CHEN 8754: Systems Biology Course, Spring 2007, Department of Chemical Engineering, University of Minnesota. Prepared and presented computing techniques for two hour lectures to chemistry and biology graduate students with little computing background, emphasized practical use of tools in their discipline.

Awards & Honors

Travel Grant to attend the European Conference on Computational Biology, September 2010, Ghent, Belgium (1200 Euros).

NIH Biotechnology Training Grant Trainee, June 2006 - June 2008 University of Minnesota. Selected graduate students received special training in new biotechnology developments including special lectures on sequencing technology, ethics, and interdisciplinary collaboration.

Japanese University Exchange, November 2007, Nara Institute of Science and Technology, Ikoma, Japan. After hosting several Japanese graduate students in computing and biological sciences, visited their university for one month to facilitate collaboration and idea exchange. `http://bsgcoe.naist.jp/en`

Publications

Journal Papers and Book Chapters

[1] **Chris Kauffman** and George Karypis. Ligand binding residue prediction. In *Introduction to Protein Structure Prediction: Methods and Algorithms*, Wiley Series in Bioinformatics. Wiley, 2010.

[2] **Chris Kauffman** and George Karypis. LIBRUS: combined machine learning and homology information for sequence-based ligand-binding residue prediction. *Bioinformatics*, 25(23):3099–3107, 2009.

[3] Huzefa Rangwala, **Christopher Kauffman**, and George Karypis. svmPRAT: SVM-based protein residue annotation toolkit. *BMC Bioinformatics*, 10:439, 2009.

[4] **Christopher Kauffman** and George Karypis. Computational tools for protein-DNA interactions. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, 2(1):14–28, 2012.

Conference Proceedings

[1] Huzefa Rangwala, **Chris Kauffman**, and George Karypis. A kernel framework for protein residue annotation. In *Proceedings of the 13th Pacific–Asia Conference on Knowledge Discovery and Data-Mining*, 2009.

[2] **Chris Kauffman**, Huzefa Rangwala, and George Karypis. Improving Homology Models for Protein-Ligand Binding Sites. In *LSS Computational Systems Bioinformatics Conference*, Stanford, CA, 2008.

[3] **Chris Kauffman** and George Karypis. An Analysis of Information Content Present in Protein-DNA Interactions. In *Proceedings of the Pacific Symposium on Biocomputing*, pages 477–488, 2008.

[4] Huzefa Rangwala, **Christopher Kauffman**, and George Karypis. A generalized framework for protein sequence annotation. In *Proceedings of the NIPS Workshop on Machine Learning in Computational Biology*, Vancouver, B.C., Canada., 2007.

[5] Sigve Nakken, **Christopher Kauffman**, and George Karypis. Finding functionally related genes by local and global analysis of medline abstracts. In *SIGIR04 Bio Workshop: Search and Discovery in Bioinformatics*, Sheffield, UK, July 2004.

Conferences Attended

European Conference on Computational Biology (ECCB), Ghent, Belgium, 2010. Poster presentation *A Convex Programming Model for Protein Structure Prediction*.

Computational Systems Bioinformatics Conference (CSB), Stanford, California, 2008. Paper presentation *Improving Homology Models for Protein-Ligand Binding Sites*.

Pacific Symposium on Biocomputing (PSB), Big Island, Hawaii, 2008. Poster presentation of paper: *An Analysis of Information Content Present in Protein-DNA Interactions*.

Critical Assessment of Techniques for Protein Structure Prediction (CASP), Pacific Grove, California, 2006. Student participant.

Professional Experience

Cray Inc., Software Development Intern, Summer 2004 and 2005, Mendota Heights, MN. Worked in the parallel compiler development group on implementing a profile feedback mechanism and on process simulator enhancements.

Army High Performance Computing Research Center, Research Intern, Summer 2003. Developed software to handle global contact search for solid body simulations while gaining experience with parallel computing.

Minnesota Supercomputing Institute, Research Intern, Summer 2002, Minneapolis, MN. Extended features of a sparse matrix computations software package.

Service

Graduate student representative on faculty search committee,, Spring 2005, Department of Computer Science, University of Minnesota.

Journal Reviews for Bioinformatics (1 review), Proteins (1 review), Journal of Computational Chemistry (1 review), Theoretical Chemistry Accounts (1 review), Biomed Central Bioinformatics (3 reviews), IEEE Transactions on Knowledge and Data Engineering (2 reviews).

Refereed Conference, full paper reviews for European Conference on Computational Biology (ECCB), ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD), International Conference on Datamining (ICDM), SIAM International Conference on Data Mining (SDM), European Conference on Machine Learning (ECML), International Parallel and Distributed Processing Symposium (IPDPS), Conference on Information and Knowledge Management (CIKM), International Symposium on Bioinformatics Research and Applications (ISBRA), International Conference on Genome Informatics (GIW).

Science Fair Judge, 2010, Minnesota State Science Fair. Judged projects in the chemistry and biology categories. `http://www.fair.mnmas.org`

Volunteer Coach, for SquashScholars youth outreach program, 2007 - 2010, Minneapolis, MN. Taught racquet skills, strategy, and fitness for inner city youth in 6th to 12th grade, chaperon for a weekend squash meet with a similar program in Chicago. `http://squashscholars.net`

President of the UMN Squash Club, Fall 2011 - present. Responsible for organiation of the club, enforcing court usage policies, recruitment of new members, and arrangement of social activities for the club. `http://sua.umn.edu/groups/directory/show.php?id=829`