

Sally R. Ellingson
University of Tennessee
Genome Science and Technology
Knoxville, TN 37996
(865) 405-3659
sellings@utk.edu

Education:

Pursuing PhD in Genome Science and Technology (GST)
Interdisciplinary Graduate Minor in Computational Science (IGMCS)
University of Tennessee, Knoxville (UTK) and Oak Ridge National Laboratory (ORNL)
Expected May 2014 3.86 GPA

BS in Computer Science
BS in Mathematical Sciences
Florida Institute of Technology, Melbourne, FL
Graduated Summa Cum Laude
May 2009 3.96 GPA

Experience:

Oak Ridge National Laboratory, Oak Ridge, TN 8/2010-present

- Graduate Research Assistant at Center for Molecular Biophysics (CMB) under supervision of Dr. Jerome Baudry.

University of Tennessee, Knoxville, TN 5/2009 – 7/2010

- Graduate Research Assistant: Participate in research rotation projects under the supervision of faculty associated with GST

Florida Institute of Technology, Melbourne, FL 3/2005-5/2009

- Technical Editor for Nonlinear Analysis Journals (Elsevier)
- Train reviewers and editors to use the online editorial system.
- Create web applications with database connectivity for various projects in the Mathematical Sciences department.
- Organize conferences.
- Type research papers/monographs using Latex.

Computer Skills:

- Software: Molecular Operating Environment (MOE), HOLE, Visual Molecular Dynamics (VMD), Photoshop, Illustrator, Premier, QuarkXpress, Dreamweaver, Flash,

Director, Contribute, Pctex, MathCad, Mathematica, Matlab, and all Microsoft Office programs.

- Programming: Python, Perl, Java (Hadoop), C++, C (MPI), HTML, XHTML, SQL, PHP, and XML.
- Databases: MySQL, Access
- Platforms: Windows, UNIX/Linux, and Mac OS.

Organizations and Memberships:

- Association for Computing Machinery (ACM): Member
- Phi Theta Kappa: Member
- Upsilon Pi Epsilon (UPE): Member and local chapter Vice-President (2007-2008)
- International Federation of Nonlinear Analysts (IFNA): Director

Honors, Fellowships, and Awards:

- Neustar scholarship to attend the 2012 Grace Hopper Celebration of Women in Computing (GHC 2012)
- Conference sponsored scholarship to attend National Biomedical Computation Resource Summer Institute 2012.
- Advanced track conference participation grant through the SC11 Broader Engagement (BE) Program to attend Supercomputing 2011
- NSF funded scholarship to attend Grace Hopper Celebration of Women in Computing (GHC 2011)
- Research poster accepted in ACM Student Research Competition at GHC 2011
- Invitation to attend Grad Cohort 2011 by Committee on the Status of Women in Computing Research (CRA-W)
- Conference participation grant through the SC10 Broader Engagement (BE) Program to attend Supercomputing 2010
- SCALE-IT (Scalable Computing and Leading Edge Innovative Technologies in Biology) (IGERT/NSF) graduate student training program 2009-2011
- Distinguished Student Scholar Award 2009
- Outstanding Senior Award in Mathematical Sciences 2009
- Outstanding Senior Award in Computer Science 2007
- National Dean's List 2006

Conferences and Workshops:

- Grace Hopper Celebration of Women in Computing (GHC12) October 2012 Baltimore, MD (BOF session)
- 2012 Smoky Mountains Computational Sciences and Engineering Conference September 2012 Gatlinburg, TN (poster session)
- The 7th National Biomedical Computation Resource Summer Institute (NBCR-SI) July 30 – August 3, 2012 La Jolla, CA (poster session)

- 2012 European-U.S. Summer School on HPC Challenges in Computational Sciences (sponsored by PRACE and XSEDE) June 2012 Dublin, Ireland (electronic poster session)
- ACM High Performance Distributed Computing (HPDC12) June 2012 Delft, the Netherlands (workshop talk)
- From Computational Biophysics to Systems Biology (CBSB12) June 2012 Knoxville, TN (poster session)
- JICS/GRS Joint Workshop on Large Scale Computer Simulation April 2012 Oak Ridge National Laboratory Oak Ridge, TN (invited talk)
- Supercomputing (SC11) November 2011 Seattle, WA (Communities Resource Fair)
- Grace Hopper Celebration of Women in Computing (GHC11) November 2011 Portland, OR (ACM-SRC poster session)
- Tennessee Celebration of Women in Computing (TNWiC) October 2011 Pikeville, TN (poster session, talk, BOF session)
- Titan Summit August 2011 Oak Ridge National Laboratory
- ACM High Performance Distributed Computing (HPDC11) June 2011 San Jose, CA (workshop talk)
- CRA-W Grad Cohort 2011 Boston, MA (poster session)
- Supercomputing (SC10) November 2010 New Orleans, LA (Communities Resource Fair)
- SciApps – 10 Challenges and Opportunities for Scientific Applications: learning to sustain the Petaflop with eyes on the Exaflop horizon August 2010 Oak Ridge National Laboratory
- Summer School in Biophysics at ORNL: Computational and Experimental Challenges July 2010 Knoxville, TN
- ACM High Performance Distributed Computing (HPDC10) June 2010 Chicago, IL
- NSF IGERT Project Meeting May 2010 Washington, DC (poster session)
- UT-ORNL-KBRIN Bioinformatics Summit March 2010 Cadiz, KY (poster session)
- Summer School in Biophysics at ORNL: Computational and Experimental Challenges August 2009 Knoxville, TN
- NCUWM: Nebraska Conference for Undergraduate Women in Mathematics February 2008 University of Nebraska
- OurCS: Opportunities for Undergraduate Research in Computer Science October 2007 Carnegie Mellon University. Participated in “A Multi-Robot Choreography: Perception, Cognition, Action, and Coordination” research group, <http://www.cs.cmu.edu/ourcs/presentations/veloso.html>.
- Elsevier Editors’ Conference May 2006 Montreal, Canada

Organized:

- From Computational Biophysics to Systems Biology June 2012 Knoxville, TN (local organizing committee)
- WCNA 2008: Fifth World Congress of Nonlinear Analysts July 2008 Orlando, FL (approx. 1000 in attendance)
- International Conference on Hybrid Systems and Applications May 2006 University of Louisiana, Lafayette (approx. 100 in attendance)

Organized Sessions:

- Are we there yet? Creating an Open Environment for Interdisciplinary Research, Birds of a Feather session at GHC12, October 2012.
- Challenges and Advantages of Interdisciplinary Research, Birds of a Feather Session at Tennessee Celebration of Women in Computing, October 2011.

Posters:

- Sally R. Ellingson and Jerome Baudry. High-throughput Virtual Molecular Docking on High-Performance Computers (CBSB12 Knoxville, TN and NBCR-SI 2012 La Jolla, CA).
- Sally R. Ellingson. High-Throughput Virtual Molecular Docking within the MapReduce Framework of Hadoop (ACM-SRC session at GHC11 Portland, OR and Communities Resource Fair SC11 Seattle, WA)
- Sally R. Ellingson and Jerome Baudry. Screening for potential novel drugs with the power of cloud computing (CRA-W Grad Cohort Boston, MA 2011 and Tennessee Celebration of Women in Computing 2011)
- Sally R. Ellingson and Jerome Baudry. Drug Discovery in a Cloud (Supercomputing New Orleans 2010 “Curriculum Resource Fair and Student Research Projects”).
- Sally Ellingson, Justin Vaughn, Albrecht von Arnim. Determining conserved peptide uORFs by evolutionary signature (GST Orientation Summer 2010).
- Justin N. Vaughn, Sally R. Ellingson, Bijoyita Roy, Byung-Hoon Kim, and Albrecht G. von Arnim. The evolution and mechanics of uORF-mediated translation repression in plants (Gordon Research Conference on Post-Transcriptional Regulation 2010).
- Jin Ha Hwang, Sally R. Ellingson, Won Gyu Choi, and Daniel M. Roberts. Functional analysis of NH₃ and H₂O transport of soybean nodulin 26 and regulation under conditions of flooding and hypoxia (The 21st North American Symbiotic Nitrogen Fixation Conference University of Missouri-Columbia 2010).
- Sally Ellingson, Joe Hughes, Dylan Storey, Rick Weber and Nathan VerBerkmoes. Development of Tools for the Automated Analysis of Spectra Generated by Tandem Mass Spec (Bioinformatics Summit 2010).
- Sally R Ellingson, Charles A Phillips, Randy Glenn, Douglas Swanson, Thomas Ha, Daniel Goldowitz and Michael A Langston. Serendipitous discoveries in microarray analysis (GST Spring Retreat 2010, Bioinformatics Summit 2010, and NSF IGERT Project Meeting 2010).

Talks:

- Accelerating Virtual High-Throughput Ligand Docking: Screening One Million Compounds Using a Petascale Supercomputer at *HPDC12* workshop on Emerging Computational Methods in the Life Sciences
- Virtual high-throughput molecular docking at JICS/GRS Joint Workshop on Large Scale Computer Simulation April 2012
- Running Parallel Tracks: Family and Grad School at Tennessee Celebration of Women in Computing 2011
- High-Throughput Virtual Molecular Docking: Hadoop Implementation of AutoDock4 on a Private Cloud at *HPDC11* workshop on Emerging Computational Methods in the Life Sciences

- Using Digital Technologies in Research and Education at NSF IGERT Project Meeting 2010
- Homology modeling and molecular dynamics using MOE of Nodulin-like intrinsic protein 6 (NIP6;1) at GST colloquium Spring 2010

Publications:

- Limit of detection of *Bacillus anthracis* in complex soil and air samples using next-generation sequencing (submitted).
- Sally R. Ellingson, Sivanesan Dakshanamurthy, Milton Brown, Jeremy C. Smith, and Jerome Baudry. Accelerating Virtual High-Throughput Ligand Docking: Screening One Million Compounds Using a Petascale Supercomputer. Proceedings of the third international workshop on Emerging computational methods for the life sciences (ECMLS '12) (accepted)
- Sally R. Ellingson and Jerome Baudry. High-Throughput Virtual Molecular Docking with AutoDockCloud. Concurrency and Computation: Practice and Experience. (submitted)
- Justin N. Vaughn, Sally R. Ellingson, and Albrecht G. von Arnim. Known and novel post-transcriptional regulatory sequences are conserved across highly diverged plant lineages. *RNA*. March 2012 18: 368-384; Published in Advance January 11, 2012, doi:10.1261/rna.031179.111.
- Sally R. Ellingson and Jerome Baudry. High-Throughput Virtual Molecular Docking: Hadoop Implementation of AutoDock4 on a Private Cloud. In Proceedings of the second international workshop on Emerging computational methods for the life sciences (ECMLS '11). ACM, New York, NY, USA, 33-38. DOI=10.1145/1996023.1996028 <http://doi.acm.org/10.1145/1996023.1996028>.
- Jin Ha Hwang, Sally R. Ellingson, Daniel M. Roberts. Ammonia Permeability of the Soybean Nodulin 26 Channel *FEBS Letters* 22 October 2010 (Vol. 584, Issue 20, Pages 4339-4343, DOI: 10.1016/j.febslet.2010.09.033).
- Ellingson et al.: Development of tools for the automated analysis of spectra generated by tandem mass spectrometry. *BMC Bioinformatics* 2010 11(Suppl 4):P27. (abstract)
- Ellingson et al.: Serendipitous discoveries in microarray analysis. *BMC Bioinformatics* 2010 11(Suppl 4):P24. (abstract)

Reviewer:

- Concurrency and Computation: Practice and Experience (co-reviewer)
- Computers in Biology and Medicine (co-reviewer)
- NCWIT Award for Aspirations in Computing (application reviewer)

Projects:

Computational Molecular Biophysics

- Development and application of high-throughput virtual molecular docking software for high performance and distributive systems (PhD research project).
- Homology modeling and molecular dynamics using MOE of Nodulin-like intrinsic protein 6 (NIP6;1): study gating mechanism of transmembrane protein channel (PhD rotation project).

Computational Proteomics

- Tested existing algorithms and developed new algorithm for quantifying the quality of Tandem Mass Spectrometry data (PhD fellowship, Scale-It group project).
- Development of centralized database and pipeline for proteomics data and tools (PhD fellowship, Scale-It group project).

Bioinformatics

- Serendipitous discoveries in microarray analysis: used paraclique, a graph-based clustering algorithm, Gene-Set Cohesion Analysis Tool (GCAT), ONTO-Pathway Analysis, and Allen Brain Atlas data to find serendipitous relationships in high throughput microarray data (PhD rotation project).
- Determining conserved peptide uORFs by evolutionary signature: used Phylogenetic Analysis by Maximum Likelihood (PAML) to discover protein coding potential of high scoring motif alignments in the 5' untranslated regions in orthologous dicot transcripts (PhD rotation project).
- Identification of genetic variations responsible for antibiotic resistant phenotypes using 454 sequencing reads: used gsMapper and 454 sequence reads to find single nucleotide polymorphisms (SNPs) and insertion/deletions (indels) in a group of isolates displaying a specific phenotype and the parental strain to find the variations responsible for the desired phenotype (PhD rotation project).

Biochemistry

- Purification of Nodulin 26 membrane protein and also calculation of water permeability constant by use of stopped flow experiments (PhD independent study).

Computer Science

- Created a web application to invite and track participants to the Fifth World Congress of Nonlinear Analysts (WCNA 2008) and also keep track of the members of the International Federation of Nonlinear Analysts (IFNA) (Computer Science senior project).
- Implemented a relational database (TPC-H benchmark) by writing a DDL file and loading data. Executed collection of queries to test database (Computer Science class project – Database Systems and Concepts).

Mathematics

- Clustering of microarray data for gene expression using self-organizing maps (SOMs) (Mathematical Sciences senior project).
- MPI-parallelization of axially symmetric heat transfer, explicit finite volume method (Graduate Mathematics course project – Numerical Partial Differential Equations)

Service:

- Help host and guide high school students at Supercomputing 2010, New Orleans.
- Graduate student panel for 2010 summer Research Experience for Undergraduates, National Institute for Mathematical and Biological Synthesis (NIMBioS) Knoxville, TN.
- Student mentor for incoming GST students
- Student host for perspective students during GST Spring Retreat
- Computer Science Help Desk, freshman CS tutoring, and female CS outreach for Upsilon Pi Epsilon (UPE)
- Volunteer tutoring in Calculus, Statistics, Pre-Calculus, and College Algebra