

CURRICULUM VITAE

SCOTT J. EMRICH

CURRENT ADDRESS

Department of Computer Science and Engineering
University of Notre Dame
351 Fitzpatrick Hall, Notre Dame, IN 46556
Phone: (574) 631-0353; Email: semrich@nd.edu
Homepage: <http://www.nd.edu/~semrich>

EDUCATION

2007	Ph.D.	Bioinformatics and Computational Biology	Iowa State University
2002	B.S.	Biology and Computer Science	Loyola College in Maryland

ACADEMIC EXPERIENCE

Academic Appointments

University of Notre Dame

8/2007–present Assistant Professor, Dept. of Computer Science and Engineering

International

Indian Institute of Technology (IIT), Bombay

Fall 2006 Visiting Scholar, Kanwal Rekhi School of Information Technology

HONORS AND AWARDS

2008	Iowa State University Zaffrano Prize for Graduate Research
2007	Iowa State University Research Excellence Award
2006	Electrical and Computer Engineering Research Excellence, Iowa State University
2006	<i>IEEE International Parallel and Distributed Processing Symposium (IPDPS)</i> best paper

AFFILIATIONS

2008-present Teaching and Research Faculty member
Eck Family Center for Global Health and Disease
University of Notre Dame

PUBLICATIONS

Journal

- 2007 Ohtsu, K., Smith, M., **Emrich, S.J.**, Borsuk, L.A., Zhou, R., Chen, T., Zhang, X., Timmermans, M., Beck, J., Buckner, B., Janick-Buckner, D., Nettleton, D., Scanlon, M.J., and P.S. Schnable. Expression of retrotransposons in the shoot apical meristem of maize (*Zea mays* L.). *Plant Journal*, **52**:391–404 (ISI: 15 citations; Google: 26 citations).
- 2007 Barbazuk, W.B.*, **Emrich, S.J.***, Chen, H.D., Li, L., and P.S. Schnable. SNP discovery in maize via 454 transcriptome sequencing. *Plant Journal*, **51**:910–918 (ISI: 26 citations; Google: 38 citations).
- 2007 Kalyanaraman, A.*, **Emrich, S.J.***, Schnable, P.S., and S. Aluru. Assembling genomes on large-scale parallel computers. *Journal of Parallel and Distributed Computing*, **67**:1240–1255 (Google: 2 citations).
- 2007 **Emrich, S.J.***, Barbazuk, W.B.*, Li, L. and P.S. Schnable. Gene discovery and annotation using LCM-454 transcriptome sequencing. *Genome Research*, **17**:69–73 (ISI: 46 citations; Google: 67 citations).
- 2007 **Emrich, S.J.***, Li, L.*, Wen, T.-J., Yandean-Nelson, M.D., Fu, Y., Guo, L., Chou, H.-H., Aluru, S., Ashlock, D.A., and P.S. Schnable. Nearly identical paralogs (NIPs): implications for maize (*Zea mays* L.) genome evolution. *Genetics*, **175**:429–439 (ISI: 11 citations; Google: 19 citations; featured in *Science*, Vol. 315, No. 5810, pp. 302 in Editor’s Choice: Highlights of recent literature).
- 2005 Fu, Y.*, **Emrich, S.J.***, Guo, L., Wen, T.-J., Aluru, S., Ashlock, D.A., and P.S. Schnable. Quality assessment of Maize Assembled Genomic Islands (MAGIs) and experimental validation of predicted novel genes, *Proceedings of the National Academy of Science, USA*, **102**:12282–12287 (ISI: 30 citations; Google: 31 citations).
- 2005 Yao, H., Guo, L., Fu, Y., Borsuk, L.A., Wen, T.-J., Skibbe, D.S., Cui, X., Scheffler, B.E., Cao, J., **Emrich, S.J.**, Ashlock, D.A., and P.S. Schnable. Evaluation of seven *ab initio* gene prediction programs for the discovery of maize genes, *Plant Molecular Biology*, **3**:445–460 (ISI: 10 citations; Google: 19 citations).
- 2004 **Emrich, S.J.**, Aluru, S., Fu, Y., Wen, T., Narayanan, M., Guo, L., Ashlock, D.A., and P.S. Schnable. A Strategy for Assembling the Maize (*Zea mays* L.) Genome, *Bioinformatics*, **20**:140–147. (ISI: 25 citations; Google: 37 citations)
- 2003 **Emrich, S.J.**, Lowe, M., and A.L. Delcher. PROBEmer: A Web-based Software Tool for Selecting Optimal DNA Oligos. *Nucleic Acids Res.*, **31**:3746–3750. (ISI: 31 citations; Google: 46 citations)
- 2002 Lowe, M., Madsen, E. L., Schindler, K., Smith, C., **Emrich, S.**, Robb, F., and R. U. Halden. Geochemistry and Microbial Diversity of a Trichloroethene-Contaminated Superfund Site Undergoing Intrinsic In Situ Reductive Dechlorination. *FEMS Microbiol. Ecol.*, **40**:123–134. (ISI: 22 citations; Google: 20 citations)

* denotes equal contribution

Peer-reviewed Conference

- 2009 Yu, L., Moretti, C., **Emrich, S.**, Judd, K. and D. Thain. Harnessing parallelism in multicore clusters with the All-Pairs and Wavefront abstractions. 18th International Symposium on High Performance Distributed Computing (HPDC2009).

- 2009 Regier, A., Olson, M. and **S.J. Emrich**. Alignment and analysis of closely related genomes, *International Conference on Bioinformatics and Computational Biology (Bi-CoB 2009)*
- 2007 **Emrich, S.J.**, Kalyanaraman, A. and S. Aluru. Massively Parallel EST Clustering. *ISCA 20th International Conference on Parallel and Distributed Computing Systems (ISCA-PDCS'07)*.
- 2006 Kalyanaraman, A.*, **Emrich, S.J.***, Schnable, P.S., and S. Aluru. Assembling genomes on large-scale parallel computers. *IEEE International Parallel and Distributed Processing Symposium (IPDPS'06)* ; Acceptance Ratio: 23%; best paper award).
- 2004 Ashlock, D.A., **Emrich, S.J.**, Bryden, K.M., Corns, S.A., T.-J. Wen, and P.S. Schnable. A Comparison of Evolved Finite State Classifiers and Interpolated Markov Models for Improving PCR Primer Design, *IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology*, 190–197 (Google: 4 citations).

Student Posters and Extended Abstracts

- 2008 Samarakoon, U., Tan, A., Tan, J., Gonzales, J., Emrich, S. and Ferdig, M. Structure and genome wide distribution of Chromosomal Fragile Regions in *Plasmodium falciparum*. 19th Molecular Parasitology meeting, Woods Hole, September 21-25, 2008
- 2008 Olson, M. and S.J. Emrich. Assembly-based comparative validation of related genome sequences. 16th Annual International Conference for Intelligent Systems for Molecular Biology (ISMB '08), Toronto, Canada July 19-23.
- 2008 Regier, A. Emrich, S.J. and N.J. Besansky. Computationally finding inversion breakpoints using mated pairs. 16th Annual International Conference for Intelligent Systems for Molecular Biology (ISMB '08), Toronto, Canada July 19-23.

BOOK CHAPTERS

- 2007 Barbazuk, W.B., **Emrich, S.J** and P.S. Schnable. SNP Mining from Maize 454 EST Sequences. *Cold Spring Harbor Protocols*
- 2005 **Emrich, S.J.**, Kalyanaraman, A and S. Aluru. Algorithms for Large-Scale Sequence Clustering and Assembly of Biological Sequence Data. *Handbook of Computational Molecular Biology*, CRC Press, Chapter 13.

INVITED PRESENTATIONS

- 3/2/09 Sequencing your favorite genome for \$1000
Invited Seminar, Biomedical Research Workshop
University of Notre Dame
- 2/20/09 Recent advances in *An. gambiae* genome analysis
Invited talk, African Virtual Conference on Bioinformatics (Afbix '09)
- 4/10/08 Lean on me: Comparative Anopheles genomics
Invited Seminar, Workshop on Interdisciplinary Biomedical Research
University of Notre Dame and Indiana University School of Medicine
- 3/26/07 Maize Genome Assembly on IBM BlueGene/L
Invited Seminar, Animal Breeding and Genetics
Iowa State University

10/18/06 Massively Parallel Plant Genomics
Invited Seminar, Interdepartmental Plant Physiology
Iowa State University

1/12/04 A Strategy for Assembling the Maize Genome
Plant & Animal Genome XII Bioinformatics Workshop, San Diego CA

EXTERNAL SUPPORT

Current

F. Collins (PI) : VectorBase NIAID Bioinformatics Resource Center
(Emrich, Senior Personnel; 25% effort)

COURSE EXPERIENCE

CSE40532/60532 Bioinformatics Computing, Fall 2008
– developed from scratch

CSE20212 Fundamentals of Computing, Spring 2007 + 2008
– Outcomes based on Prof. Flynn’s previous version but lectures redone

CSE40833/60833 Introduction to Parallel Algorithms and Programming, Fall 2007
– Text based on comprehensive lecture notes by Prof. Aluru at ISU, otherwise redeveloped

CURRENT GRADUATE STUDENTS

Alison Regier PhD in progress; joined 2007 (**Lilly Fellow**)

Shawn O’Neil PhD in progress; joined 2009 (**Schmidt Fellow**)

Irena Lanc M.S. in progress; joined in 2009

Michael Olson M.S. in progress; joined 2007 (**Global Health Fellow**)

Andrew Rider M.S. in progress; joined 2008 (coadvised with Nitesh Chawla)

THESES SUPERVISED

2008 Allison A.P. Regier
”Challenges in working with draft genomes,”
Master’s Thesis, Computer Science and Engineering, University of Notre Dame

CURRENT UNDERGRADUATE RESEARCH ASSISTANTS

Benjamin Drda 2007-present (ND honors student)

UNIVERSITY SERVICE

University

2008-present Director, Bioinformatics Core Facility (BCF)
 Ad hoc Member, Global Health SAPC supervisory committee

Departmental Committees

2007-present Graduate Studies Committee

2008-present Curriculum Committee

Student Committees

CSE: Scott Christley (2008 PhD), Chris Moretti, Ryan Kennedy

Biology: Jenica Abrudan

Outside chair: 1 former student (AME), 2 collaborative (Biology), 1 university request (Theology)

Service at Iowa State University

2006 BCB Graduate Curriculum Committee, which redesigned the PhD core curriculum in bioinformatics and computational biology.

PROFESSIONAL MEMBERSHIPS

International Society for Computational Biology (ISCB)

Association for Computing Machinery (ACM)

Institute of Electrical and Electronics Engineers (IEEE)

EXTERNAL SERVICE ACTIVITIES

Program Committee Member

2008, 2009 IEEE/ACM Supercomputing (SC), Applications

2007, 2009 Parallel Bio-Computing Workshop
International Conference on Parallel Processing and Applied Mathematics

2009 International Conference on Contemporary Computing (IC3 2009), Applications

2009 First International Conference on Bioinformatics and Computational Biology (BiCoB)

2009 Using Emerging Parallel Architectures for Computation Science Workshop
International Conference on Computational Science

2008 HICOMB Workshop, IEEE International Parallel and Distributed Processing Symposium (IPDPS)

2008 ACS/IEEE International Conference on Computer Systems and Applications (AICCSA)

Tutorials

2007 Computational Problems in Maize Genomics
International Conference on Computational Systems Bioinformatics (CSB)

2006 Exploring Computational Biology with a Massively Parallel
 High Performance Computing Environment
 International Conference on Intelligent Systems for Molecular Biology (ISMB)

Professional Committees

 Education Committee
 International Society for Computational Biology (ISCB)

Recent reviewer for the following journals:

Bioinformatics

Nucleic Acids Research

BMC Genomics

Biotechniques

Plant Biotechnology

Plant Genome