Dr. Jennifer Anne Smith

Curriculum Vitae

Contact Information

Department of Electrical and Computer Engineering
College of Engineering
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Education

Ph.D., University of Idaho (Electrical Engineering), 2003.

Dissertation: *A Multiple-clock-domain Bus Architecture Using Asynchronous FIFOs as Elastic Elements.* Advisor: Dr. James F. Frenzel

Ph.D., University at Albany, State University of New York (Economics), 1998.

Dissertation: *Government Finance Variables in Exchange Rate Equations.*
Advisor: Dr. Betty C. Daniel

M.S., University of Connecticut (Electrical Engineering), 1993.

B.S., Rensselaer Polytechnic Institute (Computer and Systems Engineering), 1986.

Book Chapters

Smith, "Covariance-Model-Based RNA Gene Finding: Using Dynamic Programming versus Evolutionary Computing," Chapter 7 in *Computational Intelligence in Bioinformatics*, A. Kelemen, A. Abraham, and Y. Chen eds., Springer-Verlag, 2008.

Refereed Journal Publications

Smith, "RNA Search with Decision Trees and Partial Covariance Models," *IEEE Transactions on Computational Biology and Bioinformatics*, in press, 2009.

Smith, "Efficient Non-coding RNA Gene Searches through Classical and Evolutionary Methods," *International Journal of Computational Intelligence in Bioinformatics and Systems Biology*, Volume 1, No. 1, pp. 42-58, 2009.

Smith and Wiese, "Integrating Thermodynamic and Observed-Frequency Data for Non-coding RNA Gene Search," *Transactions on Computational Systems Biology X*, Corrado Priami ed., pp. 124-142, Springer, 2008.

Smith, "Homology Search with Binary and Trinary Scoring Matrices," *International Journal of Bioinformatics Research and Applications*, Volume 2, No. 2, pp. 119-131, 2006.

Smith and Frenzel, "Bioinformatics Searches Using a Single-Chip Shared-Memory Multiprocessor," *Future Generation Computer Systems*, Volume 22, No. 1-2, pp. 80-87, 2006.

Refereed Conference Publications

Smith, "RNA Gene Finding with Biased Mutation Operators," 2007 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB '07), pp. 268-274, in *2007 IEEE Symposium Series on Computational Intelligence* (SSCI '07).

Smith, "A Fast Approximate Covariance-Model-Based Database Search Method for Non-coding RNA," *2007 International Symposium on Bioinformatics Research and Applications* (ISBRA '07), LNBI 4463, Springer-Verlag, pp. 270-281.

Smith and Wiese, "Improved Covariance Model Parameter Estimation Using RNA Thermodynamic Properties," *Bionetics 2007* (IEEE/ACM sponsored).

Smith, "Covariance Searches for ncRNA Gene Finding," *2006 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB '06), pp. 320-326.

Smith, "A Genetic Algorithms Approach to Non-coding RNA Gene Searches," *2006 IEEE Systems, Man, and Cybernetics Workshop on Adaptive and Learning Systems* (SMCals 2006), pp. 48-53.

Smith, "Accelerated Non-coding RNA Searches with Covariance Model Approximations," *2006 IEEE Congress on Evolutionary Computation* (CEC '06), pp. 9278-9283.

Smith, "Truncated Profile Hidden Markov Models," *2005 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB '05), pp. 257-261.

Smith, "Searching for Protein Classification Features," *2005 IEEE Congress on Evolutionary Computation* (CEC '05), Volume 1, pp. 648-653.

Smith, "Using Hydrophobicity Correlation Measures for Protein Family Classification," *2005 International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences* (METMBS '05), pp. 53-58.

Smith, "Protein Family Classification Using Structural and Sequence Information," *2004 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB '04), pp. 168-174.

Smith, "Performance of a GALS Single-Chip Multiprocessor," *2004 International Conference on Parallel and Distributed Processing Techniques and Applications* (PDPTA '04), Volume 1, pp. 449-454.

Smith, "An Asynchronous GALS Interface with Applications," *2004 IEEE Workshop on Microelectronics and Electron Devices* (WMED '04), pp. 41-44.

Smith and Frenzel, "Bioinformatics Application of a Scalable Supercomputer-on-chip Architecture," *2003 International Conference on Parallel and Distributed Processing Techniques and Applications* (PDPTA '03), Volume 1, pp. 385-391.

Smith and Frenzel, "Low-latency Multiple Clock Domain Interfacing Without Alteration of Local Clocks," *IEEE 15th Biennial University / Government / Industry Microelectronics Symposium* (UGIM '03), pp. 342-343.

Published Reviews

Smith, review of *Bioinformatics* by Andrzej Polanski and Marek Kimmel in *IAPR Newsletter*, International Association for Pattern Recognition, 2008.

Invited Presentations

RNA Search with Decision Trees and Partial Covariance Models, 24 June 2008, Laboratoire Lorrain de Recherche en Informatique et ses Applications (LORIA), Nancy, France.

Covariance Model Parameter Estimation Using RNA Thermodynamic Properties, 13 October 2007, Idaho State University Bioinformatics Workshop.

RNA Gene Finding, 30 September 2006, University of Guelph Biomathematics and Biostatistics Workshop.

Hidden Markov Models, 10 April 2006, Boise State University Bioinformatics Workshop.

Sequence Database Search Algorithms and Acceleration, 09 August 2005, Idaho IDeA Network of Biomedical Research Excellence (INBRE) Conference.

Hardware Acceleration of Sequence Analysis Algorithms, 27 September 2004, Boise State University Bioinformatics Workshop.

Bioinformatics Research at Boise State University, 10 August 2004, Poster, Bioinformatics Showcase, Idaho Biomedical Research Infrastructure Network (BRIN) Conference.

The Middle Path: Globally-Asynchronous Locally-Synchronous (GALS) Design, 21 May 2003, IEEE Computer Society, Boise Section.

Grants

Principle Investigator, *Thermodynamics-inspired Improvement of RNA Search in Genomic Databases*, NIH 1R15GM087646-01, 7/1/2009 to 6/30/2012, $211,500.

Co-Investigator, "A Rapid Response Telescope (RRT) for Gamma Ray Burst (GRB) Acquisition," NASA Idaho EPSCoR/ISGC, 2000-2003, $90,000.

Administrative Positions

Graduate Coordinator for Computer Engineering, Boise State University, 2004-present.

Teaching

Associate Professor 2009-present, Boise State University
Assistant Professor 2000-2009, Boise State University

Courses taught:
- Advanced Computer Architecture (graduate)
- Embedded and Portable Computing Systems (senior / graduate)
- Digital Systems Test and Testable Design (graduate)
- Special Topics: Biological Sequence Analysis and Computation (graduate)
- Microelectronic Circuits
- Introduction to Electric Circuits
- Special Topics: Buses and Interfaces (senior / graduate)
- Microprocessors
- Microprocessors Lab
- Microelectronic Circuits Lab

Adjunct Instructor 1999-2000, Boise State University.

Courses taught: Signals and Transforms Lab
Intermediate Microeconomics
Principles of Microeconomics
Economic Theory and Analysis (MBA)

Visiting Assistant Professor 1998-1999, State University of New York at Plattsburgh.

Courses taught: Economic Statistics II
Econometrics
Principles of Microeconomics
Principles of Economics

Adjunct Instructor 1998, Rensselaer Polytechnic Institute.

Courses taught: Econometrics (graduate)
Managerial Economics

Adjunct Instructor 1997, Siena College.

Course taught: Principles of Microeconomics

Adjunct Instructor 1995-1998, State University of New York at Albany.

Courses taught: Economic Statistics
Computer Applications for Economists
Principles of Macroeconomics
Principles of Microeconomics

Student Research and Project Advising

Master's thesis advisor:

Corey Gates, *Pattern-based Fault Diagnosis Using an Artificial Neural Network Implemented in VHDL* (2006).

Valerie Hatcher, *Fuzzy Conservation-Based Algorithm for Protein Family Classification* (2006).

Brett Davis, *Comparative Study of VHDL Coding Styles as Applied to Finite State Machines* (2005, Co-advisor with Dr. Nader Rafla).

Master's project advisor:

Kenneth Dougal, *Robot Interaction Using Subsumption Architecture* (2006).

Lewis Hall, *Embedded Beowulf Cluster* (2005).

Shakha Gupta, *Programmable Hardware for Bioinformatic Hidden Markov Models* (2004).

Master's committee:

Eric Becker, *Design of an Integrated Half-Cycle Delay Line Duty Cycle Corrector Delay-Locked Loop* (2008)

Tracy Lowder, *Hardware and Software Design for a Large Gas Engine Detonation Simulator* (2008)

Matthew Leslie, *Noise-Shaping Sense Amplifier for Cross-Point Arrays* (2007)

Jonathan Cole, *The Use of a Field Programmable Gate Array in a Compact Ion Mobility Spectrometer Sensor System for Subsurface Volatile Organic Compound Detection* (2007)

Eric Booth, *Wide Range, Low Jitter Delay-Locked Loop Using a Graduated Digital Delay Line and Phase Interpolator* (2006)

Vehid Suljic, *Hardware Implementation of Pseudo-spectra Method for Delayed Differential Equations* (in progress).

David Berry, *Wireless Sensor Network to Monitor Aircraft Cabin Air Quality* (in progress).

Steve Bard, *Pipelining to Reduce Power Consumption in FPGAs* (2005).

David McCarver, *Power Measurement Using Programmable Logic* (2005).

Robert Huot, *Delphinus Roboticus: The Design and Construction of a Passive-Compliant Oscillating Foil Submersible Robot* (2005).

Darin Dutson, *Image Alignment Method for Matching a Telescope Image with a Star Catalog* (2005).

Michael Roth, *Comparison of Asynchronous vs. Synchronous Design Techniques Using a 16-bit Binary Adder* (2004).

Wes Prouty, *Embedded System Design for Multi-Purpose Sensors to Detect and Analyze Environmental Contaminants* (2003).

Jing Plaisted, *Methods for Memory Testing* (2003).

Senior design groups:

ECCO Tester, Travis Kent and Vikram Patel (2008/2009) ECCO sponsor.

Solar Lighting System, Joshua Bohrn, Timothy Golo, and Lance Shores (2007/2008) Ming Solar sponsor.

Fire Pit Control, Joshua Bishop, Jason Durand, Harsh Mantri, and Riley Thomas (2007/2008) Ambernights sponsor.

GSM/GPRS Network Interface, Matthew Nelson and Cory Rache (2006/2007), Telemetric sponsor.

Radio Frequency Identification Pet Door, David Anderson, Chris Curtis, and Aaron Moser (2005/2006), BSU internal project.

GPS Tracking Collar with Sensor Package for Wildlife-Livestock Research, Brad Huttash, Craig McGillivary, Mark Kniep, Kevin Titus, Andrew Wood (2004/2005), United States Department of Agriculture sponsor.

Fast Asynchronous Interface for Multiprocessor Applications, Mark Bussert, Daniel Mathers, Brent Chroniger (2003/2004), BSU internal project.

ASIC for DDR SDRAM Control, Enrique Camarillo, Ting-Ling Kang, Michael Laub, Matthew Nielson (2001/2002), Hewlett-Packard sponsor.

Wafer Flat Aligner, Jake Anderson, Brian Aruskevicus, Jennifer Cheffings (2000/2001), SCP sponsor.

Student Organization Advising

Faculty Advisor, BSU Chapter of Eta Kappa Nu Electrical Engineering Honor Society, 2007-present.

Faculty Mentor, BSU teams in IEEE Micro-mouse competitions, 2003-present.

Committees

Member, BSU Department of Electrical and Computer Engineering, Chair Search Committee, 2006-2007.

Member, BSU College of Engineering, IT Staff Search Committee, 2006-2007.

Member, BSU Department of Electrical and Computer Engineering, Communications Faculty Search Committee, 2005-2006.

Member, BSU College of Engineering and College of Arts and Sciences, Bioinformatics Faculty Search Committee, 2005-2006.

Member, BSU College of Engineering, Computing Committee, 2004-2007.

Member, BSU College of Engineering, Graduate Committee, 2004-present.

Member, BSU College of Engineering, Instruction and Advising Committee, 2001-2003.

Member, BSU College of Engineering, Outreach Committee, 2000-2003.

Member, BSU College of Engineering, Public Relations and Events Committee, 2002-2003.

Non-University Employment

Electrical Engineer, Naval Undersea Warfare Center, 1987-1993.

Designed and tested signal processing subsystems of passive sonar systems for United States Navy submarines.

Electrical Engineer, Singer Company, Kearfott Division, 1986-1987.

Designed a digital control loop for a mechanical gyro used in inertial navigation systems for space and military applications.

Assistant Engineer, Pennsylvania Power and Light Company, 1985.

Created computer models of thermal-hydraulics of a commercial nuclear power reactor.

Professional Activities

Professional Society Service:

Member, Bioinformatics and Bioengineering Technical Committee of the IEEE Computational Intelligence Society, 2004-present.
Arrangements Chair, Boise Section of the IEEE Computer Society, 2001-2008.
Micro-mouse Chair, IEEE Region 6 Northeast Area, 2005-present.

Conference Committee:

General Chair, *2008 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB ’08).

Technical Co-Chair, *2007 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB ’07), with Dr. Kay C. Wiese of Simon Frasier University.

Special Session Co-Chair, Evolutionary Computation in Bioinformatics and Computational Biology at *2007 Congress on Evolutionary Computation* (CEC ’07), with Dr. Madhu Chetty of Monash University.

Track Co-Chair, Bioinformatics Track, *Bionetics 2007*, with Dr. Alioune Ngom of Windsor University.

Program Committee Member, *2007 IEEE Workshop on Formal Methods for Globally Synchronous Locally Asynchronous Design* (FMGALS '07).

Technical Co-Chair, *2006 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB ’06), with Dr. L. Gwenn Volkert of Kent State University.

Finance Chair, *2006 IEEE Non-Volatile Memory Technology Symposium* (NVMTS '06).

Special Session Co-Chair, Evolutionary Computation in Bioinformatics and Computational Biology at *2006 Congress on Evolutionary Computation* (CEC ’06), with Dr. Kay C. Wiese of Simon Frasier University.

Proceedings Chair, *2005 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology* (CIBCB ’05).

Reviewer:

Grant Panels:
National Institutes of Health, *Modeling and Analysis of Biological Systems Study Section*, 2007.
National Institutes of Health, *Biodata Management and Analysis Study Section*, 2007.

Journals:
Nucleic Acids Research
IEEE Transactions on VLSI
IEEE Transactions on Systems, Man, and Cybernetics - Part C
IEEE Transactions on Computational Biology and Bioinformatics
Journal of Supercomputing
Bioinformatics
Journal of Applied Signal Processing

Conferences:
IEEE Workshop on Formal Methods for Globally Synchronous Locally Asynchronous Design
Design Automation Conference
IEEE Congress on Evolutionary Computation
IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology
Inter. Conf. on Parallel and Distributed Processing Techniques and Applications
International Conference on VLSI
IAPR Workshop on Pattern Recognition in Bioinformatics
IEEE International Symposium on Bioinformatics and Bioengineering
International Conference on Machine Learning and Applications

Books:
John Wiley & Sons
Springer Verlag

Professional Society Memberships:

Senior Member of IEEE.
Member of IEEE Electron Devices Society, Computer Society, Engineering in Medicine and Biology Society, and Computational Intelligence Society.
Member of Society of Women Engineers (SWE).

Honor Society Memberships:

Member of Eta Kappa Nu (HKN) Electrical Engineering Honor Society

Professional Licensure

Professional Engineer, State of Idaho, registration number 11158.

Awards

Top Ten Scholar Honored Faculty (selected as most influential faculty member by a student who in turn was chosen as one of the ten top graduating seniors of the year at the University), Boise State University, 2005.

Presidential Distinguished Doctoral Dissertation Award, University at Albany, 1999.

Special Achievement Award, Naval Undersea Warfare Center, 1992.

Languages

Native:	English
Nearly fluent:	German
Studied:	Italian, Spanish, French, Russian