Victoria Anne Smith
Curriculum Vitae

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Present Position
Research Associate
Department of Neurobiology
Duke University Medical Center

Education
<u>Duke University</u> (2001-present)
Courses: Computational Functional Genomics, Program Design and Analysis II, Algorithms in Computational Biology, Gene Expression Analysis, Statistical Methods for Computational Biology
Mini-courses: Perl and BioPerl, Unix/Linux for Bioinformatics

<u>Indiana University</u> (1995-2001)
Ph.D. August 2001, Biology, 3.99 GPA

<u>College of William and Mary</u> (1991-1995)
B.S. May 1995, Biology with Mathematics minor, High Honors, Phi Beta Kappa, 3.97 GPA

Honors and Awards
- Burroughs Wellcome Career Award at the Scientific Interface Finalist (2004)
- International Society for Computational Biology Travel Fellowship (August 2002)
- New England Complex Systems Institute Travel Fellowship (June 2002)
- NIMH Neuroscience Postdoctoral Training Grant (September 2001-August 2002)
- Howard Hughes Medical Institute Predoctoral Fellowship (August 1996-July 2001)
- National Defense Science and Engineering Graduate Fellowship (1996; declined)
- National Science Foundation Graduate Fellowship (1996; declined)
- NSF Research Training Group Research Assistantship (August 1995-July 1996)
- NSF Research Training Group Summer Fellowship (May-July 1995)
- NSF Graduate Fellowship Honorable Mention (1995)
- Marshall Scholarship Finalist (1994)
- Dean's List, College of William and Mary (August 1991-May 1995)
- Virginia Scholarship (August 1991-May 1995)
- James Monroe Scholarship (August 1991-May 1995)

Research Experience
<u>Postdoctoral Research, Duke University</u>
September 2001-present, Supervisor: Dr. Erich D. Jarvis
Developed a novel bioinformatics approach using computer simulation and functional network inference algorithms to understand songbird brain function on multiple levels of biological organization, including behavior, electrophysiology, neuroanatomy, and gene regulation, using high-throughput data such as gene expression from cDNA microarrays and neural electrophysiology from microelectrode arrays.

<u>Dissertation Research, Indiana University</u>
May 1995-August 2001, Supervisor: Dr. Meredith J. West
Title: Social behavior in brown-headed cowbirds: emergence in a complex system.
Performed behavioral experiments in both highly controlled and uncontrolled social situations, applied complexity theory to understand behavioral interactions in a captive flock of cowbirds, and evolved computer simulations with a genetic algorithm to gain insight into self-organized social assortment in cowbirds.

<u>Graduate Research (in addition to dissertation), Indiana University</u>
February 2001-August 2001, Collaborator: Dr. David J. White
Used computer simulation to evaluate methods of measuring association patterns in animals.

Graduate Research (in addition to dissertation), Smithsonian Institution
Winters 1999 and 2000, Collaborator: Dr. Robert C. Fleischer
Optimized PCR for cowbird microsatellites, determined microsatellite genotypes using automatic sequences, and examined relationship between microsatellite heterozygosity and mating success in a captive flock of cowbirds.

Undergraduate Senior Honors Thesis, College of William and Mary
August 1994-May 1995, Supervisor: Dr. C. Richard Terman
Title: A study of kin recognition in *Peromyscus* mice.
Used behavioral choice test to evaluate predictions of kin selection and inclusive fitness theories.

Undergraduate Research, Food and Drug Administration
Summer 1993, Supervisor: Dr. Adorjan Aszalos
Individual projects on multi-drug resistance in mammalian cancer cells and drugs targeting metastasizing cells.

Undergraduate Research, College of William and Mary
Semester projects, August 1991-May 1994
Performed studies on: impact of interspecific competition and insecticide use on purple martin songbird populations, effects of individual experience on dominance hierarchies in chickens, and optimal foraging theory in mixed species flocks of woodland birds.

Instructional Experience
Postdoctoral
•(Arranged for spring 2005) Supervise computational biology graduate student during computational laboratory rotation project

•Participated in training of and worked closely with electrical and computer engineering graduate student on computational biology projects.

•Instructional lectures to laboratory:
    •*Heuristic Search Methods*, April 22, 2002: described various search methods, including greedy search, simulated annealing, and genetic algorithms.
    •*Applying Writing for the Reader Workshop*, May 24, 2004: described methods I used to apply techniques from George Gopen's Writing Workshop, with interactive practice on audience's writing samples. Followed up with individual meetings to help laboratory members apply techniques themselves.

Graduate
•Trained postdoctoral researcher in building computer simulations, in conjunction with collaborative project on using simulations to determine efficacy of different data collection techniques.

•Met individually with students to discuss term papers and graded term papers as Associate Instructor for non-majors writing-intensive class, Biology of Food (fall 1999, supervisor: Dr. Marti Crouch).

•Trained new graduate students in techniques of behavioral observation and handling of animals.

Professional Activities
•Member, Duke Biological Networks Group (since 2004)
•Reviewer, BMC Bioinformatics (since 2003)
•Science Program Chair, Trinoc*con Speculative Fiction Convention (2003)
•Communications Chair, Duke University Postdoctoral Association (2002, 2003)
•Member, International Society for Computational Biology (since 2002)
•Webmaster, Duke University Postdoctoral Association (since 2002)
•Reviewer, Journal of Comparative Psychology (since 2001)
•Member, New England Complex Systems Institute (since 2000)
•Member, Evolutionary Programming Society (1999-2002)
•Member, Animal Behavior Society (since 1996)

Presentations and Workshops

2004 Invited Lecture	*Using computational approaches to investigate complex biological networks*; Department of Biochemistry and Molecular Genetics Seminar Series, University of Alabama, Birmingham, AL.
2004 Invited Meeting	Howard Hughes Fellows Meeting, HHMI Headquarters, Chevy Chase, MD.
2004 Invited Workshop	Symposium on Computational Protein Biology, Duke University, Durham, NC.
2004 Seminar Lecture	*Bird brains and Bayes nets: functional network inference for complex biological systems*; Bioinformatics Research in Progress Seminar Series, Duke University, Durham, NC.
2004 Poster	*Functional network inference algorithm recovers information flow in the brain*; Pacific Symposium on Biocomputing, Kohala Coast, HI.
2003 Poster	*Discrete-time agent-based simulation of interacting neural ensembles*; Duke University Department of Neurobiology Retreat, Wilmington, NC.
2003 Poster	*Influence of network topology and data collection on network inference*; Duke University Postdoctoral Research Day, Durham, NC.
2003 Workshop Lecture	*Bird brains and Bayes nets: evaluating tools for examining complex biological systems*; Annual Bird Song Workshop, Rockefeller University Field Research Station, Millbrook, NY.
2003 Invited Workshop	Mathmatical Modelling in Biology Workshop: Gene Regulation, Duke University, Durham, NC.
2003 Seminar Lecture	*Bird brains and Bayes nets: using simulation to evaluate functional network inference for complex biological systems*; Duke Neurobiology Postdoctoral Seminar, Durham, NC.
2003 Poster	*Influence of network topology and data collection on network inference*; NIEHS/NTA Biomedical Science and Career Fair, Research Triangle Park, NC.
2003 Poster	*Influence of network topology and data collection on network inference*; Pacific Symposium on Biocomputing, Lihue, HI.
2002 Conference Lecture	*Evaluating functional network inference using simulations of complex biological systems*; International Conference on Intelligent Systems for Molecular Biology, Edmonton, Canada.
2002 Conference Lecture	*Examining association patterns in brown-headed cowbirds using computer simulation*; Animal Behavior Society Annual Conference, Indiana University, Bloomington, IN.
2002 Lecture	*Using Bayesian networks to reverse engineer simulated songbird brains*; Duke University Department of Neurobiology Retreat, Durham, NC.
2002 Conference Lecture	*Using Bayesian networks to reverse engineer simulated songbird brains*; International Conference on Complex Systems, New England Complex Systems Institute, Nashua, NH.
2002 Lecture	*Using Bayesian networks to reverse engineer simulated songbird brains*; Duke University Postdoctoral Research Day, Durham, NC.
2002 Invited Workshop	Mathmatical Modelling in Biology Workshop, Duke University, Durham, NC.
2002 Invited Workshop	Ethoinformatics Workshop, Indiana University, Bloomington, IN.

2002 Session Moderator	*Genetic Network Inference*; Joint Conference on Information Sciences, Research Triangle Park, NC.
2001 Invited Lecture	*Social behavior in brown-headed cowbirds: emergence in a complex system*; Department of Zoology Seminar, University of Melbourne, Melbourne, Australia.
2001 Invited Lecture	*Social behavior in brown-headed cowbirds: emergence in a complex system*; School of Computer Science and Software Engineering Seminar, Monash University, Melbourne, Australia.
2001 Conference Lecture	*Female presence in the social context of song in freely-associating captive brown-headed cowbirds*; Animal Behavior Society Annual Conference, Oregon State University, Corvallis, OR.
2000 Conference Lecture	*Self-organized social environments in a freely assorting flock of captive cowbirds, Molothrus ater*; Animal Behavior Society Annual Conference, Morehouse College & Zoo Atlanta, Atlanta, GA.
2000 Poster	*Self-organized social environments in a freely assorting flock of captive cowbirds, Molothrus ater*; International Conference on Complex Systems, New England Complex Systems Institute, Nashua, NH.
1998 Seminar Lecture	*Social influences on development in brown-headed cowbirds*; Evolution, Ecology & Behavior Departmental Seminar, Indiana University, Bloomington, IN.

Peer Reviewed Publications
selected publications available online at: stokesinternet.com/anne/publications.html

J. Yu, V.A. Smith, P.P. Wang, A.J. Hartemink & E.D. Jarvis. *In press*. Advances to Bayesian network inference of causal networks from observational biological data. *Bioinformatics*.

V.A. Smith, E.D. Jarvis & A.J. Hartemink. 2003. Influence of network topology and data collection on network inference. *Pacific Symposium on Biocomputing* 8:164-175.

E.D. Jarvis, V.A. Smith, K. Wada, M.V. Rivas, M. McElroy, T.V. Smulders, P. Carninci, Y. Hayashisaki, F. Dietrich, X. Wu, P. McConnell, J. Yu, P. Wang, A.J. Hartemink & S. Lin. 2002. A framework for integrating the songbird brain. *Journal of Comparative Physiology A* 188:961-980.

V.A. Smith, E.D. Jarvis & A.J. Hartemink. 2002. Evaluating functional network inference using simulations of complex biological systems. *Bioinformatics* 18:S216-S224.

V.A. Smith, A.P. King & M.J. West. 2002. The context of social learning: association patterns in a captive flock of brown-headed cowbirds. *Animal Behaviour* 63:23-35.

V.A. Smith, A.P. King & M.J. West. 2000. A role of her own: female cowbirds (*Molothrus ater*) influence the development and outcome of song learning. *Animal Behaviour* 60:599-609.

Manuscripts submitted and in revision:
V.A. Smith, J. Yu, T.V. Smulders, A.J. Hartemink & E.D. Jarvis. *Submitted*. Bayesian algorithms recover networks of neural information flow from brain electrophsyiology. *Nature Neuroscience*.

D.J. White & V.A. Smith. *In revision*. Testing measures of social association by computer simulation.

V.A. Smith & R.C. Fleischer. *In revision*. Microsatellite heterozygosity and courtship success in brown-headed cowbirds.