

Victoria Anne Smith
Curriculum Vitae

School of Biology
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Present Position

RCUK Academic Fellow in Neuroscience and Computational and Mathematical Biology
School of Biology
University of St Andrews

Degrees

2001 PhD Biology, Indiana University

"Social behavior in brown-headed cowbirds: emergence in a complex system."

1995 BS Biology with Mathematics minor, College of William and Mary

Other Education

2005 Introduction to Grid Computing and the National Grid Service, UK National e-Science Centre
2005 Yeast Genetics and Genomics Course, Cold Spring Harbor Laboratory
2005 Course in Scientific Management, Borroughs Wellcome Fund/Howard Hughes Medical Institute
2001-2005 Selected courses in computing & bioinformatics, Duke University

Professional History

Sep 2009 Visiting Scholar, Interdisciplinary Center for Scientific Computing, Heidelberg University
Jul 2008 Visiting Scholar, Interdisciplinary Center for Scientific Computing, Heidelberg University
Mar 2008 Visiting Scholar, Institute for Mathematics and its Applications, University of Minnesota
2002-2005 Postdoctoral Fellow, Department of Neuroscience, Duke University Medical Center
2001-2002 NIMH Postdoctoral Fellow, Department of Neuroscience, Duke University Medical Center
1996-2001 HHMI Predoctoral Fellow, Department of Biology, Indiana University
1999 Associate Instructor, Department of Biology, Indiana University
1995-1996 NSF Research Training Group Graduate Assistant, Department of Biology, Indiana University
1995 NSF Research Training Group Summer Fellow, Department of Biology, Indiana University
1993 Research Assistant (Summer), United States Food and Drug Administration

Current Research Grants

	<i>Source</i>	<i>Role</i>	<i>Amount</i>	<i>Duration</i>
• Predictive patient selection for ovarian cancer therapy: a systems biology approach	Medical Research Scotland	PI	£148,425	Sep 2010- Aug 2013
• Applying experimental evolution regimes to examine robustness of synthetic biology constructs in yeast (<i>Saccharomyces cerevisiae</i>)	Royal Society	Sole PI	£14,992	Oct 2010- Sep 2011
• Combining dynamical systems modelling with Bayesian networks to identify gene and protein regulation networks related to breast cancer	SULSA Prize Studentships in Systems Biology	PI	£40,077	Oct 2008 – Sep 2011
• Advancing Bayesian network algorithms for inferring gene regulation using an integrative computational-biological approach in a yeast model system	BBSRC	Sole PI	£703,548	Feb 2008 – Feb 2011
• CARMEN: Code analysis, repository, and Modelling for e-Neuroscience	EPSRC	Co-I	£83,318 (of £4.5M)	Oct 2006 – Sep 2010

Past Research Grants

	<i>Source</i>	<i>Role</i>	<i>Amount</i>	<i>Duration</i>
• Application of Bayesian network inference algorithms for foodweb analysis: evaluating the impact of jellyfish predation on Irish Sea plankton	NERC	Co-I	£284,463	Jun 2008 – May 2009
• A biological test of a Bayesian network inference algorithm's ability to recover gene regulatory interactions	St Andrews' Biology	Sole PI	£4,000	May 2006 – April 2007
• A biological validation of functional network inference algorithms for recovery of gene regulatory networks	Royal Society	Sole PI	£14,962	Apr 2006 – Mar 2007

Current Teaching Grants

• The SAINTS: Saint Andrews iGEM Neutralizes Threatening Staphylococcus	Wellcome Trust	Supervisor PI	£12,600	June 2010- Nov 2010
• A St Andrews iGEM Team: enhancing student research, employability and leadership through an international synthetic biology competition	St Andrews' SALTIRE	PI	£4,000	Nov 2010- Nov 2011

Past Teaching Grants

• Enhancing an inquiry-based laboratory practical: student creation of a new teaching strain of yeast	St Andrews' SALTIRE	Sole PI	£710	Oct 2008- May 2009
• Characterisation of single cell variation in protein expression of stress induced proteins in yeast	Nuffield	Supervisor PI	£1,360	Jun 2007 – Aug 2007
• Inquiry-based learning in a first year biology laboratory class: engaging students in the process of science	St Andrews' SALTIRE	Co-I	£931	Feb 2007 – May 2007

Selected Invited Talks

2010	Keynote Speaker, Database Operations and Development Symposium, American University in Dubai, United Arab Emirates
2009	Plenary Talk, Scientific Presentation, BBSRC Systems Biology Roadshow, University of Glasgow
2009	Plenary Talk, Information Transfer and Causal Analysis in Neuroscience Workshop, Mathematical Neuroscience Network, Brighton
2009	Plenary Talk, Aberdeen Systems Biology Symposium & Scottish BioSystems Modelling Network, University of Aberdeen
2009	Plenary Talk, Dynamic Properties of Complex Networks, Institute of Advanced Studies, Glasgow
2008	Seminar Series, Interdisciplinary Center for Scientific Computing, Heidelberg University, Germany
2008	Seminar Series, Consortium for Bioinformatics and Computational Biology, University of Minnesota
2008	Plenary Talk, Organization of Biological Networks Workshop, Institute for Mathematics and its Applications, University of Minnesota
2006	Plenary Talk, Advanced Techniques Lecture, Spike Train Workshop, University of Newcastle

Selected Professional Activities

Decision-Making Bodies

- St Andrews Representative, Scottish Universities Life Science Alliance Systems Biology Directorate
- Advisory Board (Founding Member), Scottish Bioinformatics Forum
- Management Team (Founding Member), Centre for Research in Informatics and Systems Pathology
- St Andrews Representative, Scottish Informatics and Computer Science Alliance SEABIS (Self-organising, Emergent, Adaptive, Biologically Inspired Systems) Organising Committee

Conference Organising Committees

- 2010 International Conference on Bioinformatics and Systems Biology (Chongqing, China)
- 2009 Australian Conference on Artificial Life (Melbourne, Australia)
- 2007 Atlantic Symposium on Computational Biology & Genome Informatics (Salt Lake City, USA)

Reviewing

- Journals: Anatomical Record; Artificial Life; Bioinformatics; Biology Letters; BMC Bioinformatics; IEEE/ACM Transactions on Computational Biology and Bioinformatics; Journal of Comparative Psychology; Journal of Computational Neuroscience; Journal of Neuroscience Methods; PLoS ONE
- Funding Agencies: BBSRC; MRC; Royal Society

Professional Affiliations

- Research Networks: ESRC Genomics Network; Robustness in Synthetic Biology Network; Scottish Biosystems Modelling Network; Spike Train Network
- Research Organisations: Scottish Bioinformatics Forum; Scottish Informatics and Computer Science Alliance; Scottish Universities Life Science Alliance
- Research Centres: Centre for Research in Informatics and Systems Pathology; Scottish Oceans Institute; St Andrews Centre for Evolution, Genes and Genomics; St Andrews Centre for Research into Ecological and Environmental Modelling; St Andrews Institute of Behavioural and Neural Sciences
- Professional Societies: Association for the Study of Animal Behaviour; International Society for Artificial Life; International Society for Computational Biology; New England Complex Systems Institute

Teaching

- First Year • BL1201 Molecular Biology, 3-week laboratory practical (~200 students)
- Second Year • BL2106 Comparative Physiology, tutorials (~16; 2005-06 only)
- Third Year • BL3302 Gene Regulation, 2 lectures (~40)
• BL3312 Pharmacology, computer practical and peer review session (~40; 2009-2010 only)
• BL3320 Practical Statistics for Biologists, workshop (~60)
- Third/Fourth • BL4127 Mechanisms in Animal Behaviour, lecture (~40; 2006-07 only)
- Fourth Year • BL4273 Bioinformatics, computer practical (~5)
• BL4285 Complex Systems in Animal Behaviour, module organiser, all teaching (~12)
• BL4290 Networks in Biology, module organiser & ¾ teaching (planned for 2011-12)
• BL4200/1 SH Project (Literature/Research), supervisor
• Writing Skills, lecture + writing practicals (~40)
- Postgrad • SUPA Physics and Life Science Introduction to Biology, lecture (~10)

Supervision/Examinership

	<u>Postdoctoral</u>	<u>Postgraduate</u>	<u>Undergraduate</u>	<u>Examinership</u>
<i>Current</i>	• 1 BBSRC-funded	• 1 PhD Main Supervisor (+1 Autumn 2010) • 1 PhD Co-supervisor (student at Abertay University)	• 2 Senior Honours • 1 Extracurricular Individual • Main Supervisor iGEM Team	• 4 Internal PhD
<i>Past</i>	• 1 NERC-funded	• 1 PhD (Viva Sep 2009) • 1 MRes	• 5 Senior Honours • 5 Extracurricular Individual	• 1 External PhD (Warwick)

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)

Peer Reviewed Publications

- VA Smith. 2010. Revealing structure of complex biological systems using Bayesian networks. In: *Network Science: Complexity in Nature and Technology* (E Estrada, M Fox, DI Higham, G-L Oppo, eds; Springer) In Press.
- F Matthäus, VA Smith & PJ Gebicke-Haerter. 2010. Some useful mathematical tools to transform microarray data into interactive molecular networks. In: *Systems Biology And Psychiatry* (F Tretter, PJ Gebicke-Haerter, G Winterer, E Mendoza, eds; John Wiley and Sons). In Press.
- I Milns, CM Beale & VA Smith. 2010. Revealing ecological networks using Bayesian network inference algorithms. *Ecology* Online Preprint 23 Feb 2010.
- C Echtermeyer, TV Smulders & VA Smith. 2009. Causal pattern recovery from neural spike train data using the Snap Shot Score. *Journal of Computational Neuroscience* Online First: 31 July 2009.
- F Matthäus, VA Smith, A Fogtman, WH Sommer, F Leonardi-Essmann, A Lourdasamy, MA Reimers, R Spanagel & PJ Gebicke-Haerter. 2009. Interactive molecular networks obtained by computer-aided conversion of microarray data from brains of alcohol-drinking rats. *Pharmacopsychiatry* 42: S118-S128.
- F Matthäus, V.A. Smith, A. Fogtman, W.H. Sommer, F. Leonardi-Essmann, A. Lourdasamy, M.A. Reimers, R. Spanagel, P.J. Gebicke-Haerter. 2009. Interactive molecular networks obtained by computer-aided conversion of microarray data from brains of alcohol-drinking rats. *Pharmacopsychiatry* 42: S118-S128.
- V.A. Smith. 2008. Evolving an agent-based model to probe behavioral rules in flocks of cowbirds. *Proceedings of the Eleventh International Conference on Artificial Life* (MIT Press, Cambridge, MA) pp 561-568.
- D.J. White & V.A. Smith. 2007. Testing measures of animal social association by computer simulation. *Behaviour* 144: 1447-1468.
- L.S. Smith, J. Austin, S. Baker, R. Borisyuk, S. Eglen, J. Feng, K. Gurney, T. Jackson, M. Kaiser, P. Overton, S. Panzeri, R. Quian Quiroga, S.R. Schultz, E. Sernagor, V.A. Smith, T.V. Smulders, L. Stuart, M. Whittington, C. Ingram. 2007. The CARMEN e-Science pilot project: Neuroinformatics work packages. *Proceedings of the UK e-Science Programme All Hands Meeting 2007* (SJ Cox, ed) pp 591-598.
- V.A. Smith, J. Yu, Smith VA, T.V. Smulders, A.J. Hartemink & E.D. Jarvis. 2006. Computational inference of neural information flow networks. *PLoS Computational Biology* 2:e161.
- J. Yu, V.A. Smith, P.P. Wang, A.J. Hartemink & E.D. Jarvis. 2004. Advances to Bayesian network inference of causal networks from observational biological data. *Bioinformatics* 20:3594-3603.
- 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.
- J. Yu, V.A. Smith, P.P. Wang, A.J. Hartemink & E.D. Jarvis. 2002. Using Bayesian network inference algorithms to recover molecular genetic regulatory networks. International Conference on Systems Biology 2002 (ICSB02), December 2002.
- 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.

Other Publications

- D. Adams, S. Arkle, R. Bevan, G. Boachie-Ansah, T. Bradshaw, G. Cameron, A.-M. Campbell, M. Chamberlain, A. Gibson, D. Gowers, M. Hayes, J. Heritage, M. Hollingsworth, H. Hooper, K. Hudson, I. Hughes, N. Lindsey, S. Meskin, J. Park, T. Podesta, J. Rattray, G. Scott, M.C. Shearer, H. Smalley, V.A. Smith, D. Smith, A. Tierney, M. Todd, J. Verran, C. Wakeford, J. Wilbraham, J. Wilson. 2008. *1st Year Practicals: Their Role in Developing Future Bioscientists*. HEA Centre for Bioscience, ISBN: 978-0-0948751-2-1.
- M.C. Shearer, V.A. Smith. 2007. The scientific method: teaching the how of science and not just the what. *Centre for Bioscience Bulletin* 21:8.