

Curriculum Vitae

GULLY BURNS

USC Information Sciences Institute
4676 Admiralty Way,
Suite 1001
Marina del Rey, CA 90292
USA

tel: +1 (310) 448-8712
fax: +1 (310) 823-6714
email: gully@usc.edu

Objective and Mission

To transform the way that life-scientists think, converting the current theoretical approach to biology from qualitative argumentation to a quantitative mathematical discipline.

Education

D.Phil. Oxford University (July 1997): Physiology
B.Sc., 1st class Honors, Imperial College, London (July 1991): Physics

Fields of Study

Biomedical knowledge Engineering

The application of Knowledge Representation, Reasoning and Natural Language Processing to biomedical applications, especially emphasizing approaches that mimic the logical structures used by biologists in their reasoning.

Languages

English (fluent)
French (conversation level)

Honors

Wellcome Prize Scholarship 1992-1996, Only 100 of these were available per year to the British biology graduate student population.
2nd Year Laboratory Interferometry Prize, Physics Department, Imperial College London.

Work Experience

Neuroinformatics Research Scientist / Research Assistant Professor, (May 2006–present),
Information Sciences Institute / USC, Joint appointment.

Research Assistant Professor, (November 1999–May 2006), Research Associate (September 1997–October 1999), College of Letters Arts and Sciences University of Southern California.

Research Assistant (July 1991–July 1997), Department of Physiology, Oxford University. Oxford.

Computer Programmer (January 1991–July 1991), CNRS, Paris

Publications

Journal Articles

1. Burns, G., W.-C. Cheng, R.F. Thompson, and L. Swanson (2006), "The NeuARt II system: a viewing tool for neuroanatomical data based on published neuroanatomical atlases." *BMC Bioinformatics*: 7:531.
2. Burns, G.A. and W.C. Cheng (2006), "Tools for Knowledge Acquisition within the NeuroScholar system and their application to anatomical tract-tracing data". *J Biomed Discov Collab*, **1**(1): p. 10.
3. Khan, A., J. Hahn, W.-C. Cheng, A. Watts, and G. Burns (2006), "NeuroScholar's Electronic Laboratory Notebook and its Application to Neuroendocrinology". *Neuroinformatics*, **4**(2): p. 139-160.
4. Goto, M., N. Canteras, G. Burns and L. Swanson (2005). Projections from the Subfornical Region of the Lateral Hypothalamic Area. *J Comp Neurol* 493(3): p. 412-38.
5. GAPC Burns, A. M. Khan, S. Ghandeharizadeh, M. A. O'Neill and Y.-S. Chen (2003). "Tools and Approaches for the Construction of Knowledge Models from the Neuroscientific Literature." *Neuroinformatics* 1(1): 81-109.
6. GAPC Burns, Fang Bian, Wei-Cheng Cheng, Shyam Kapadia, Cyrus Shahabi and Shahram Ghandeharizadeh (2002), Software engineering tools and approaches for neuroinformatics: the design and implementation of the View-Primitive Data Model framework (VPDMf), *Neurocomputing*, Volumes 44-46, June 2002, Pages 1049-1056.
7. Stephan, K. E., L. Kamper, A. Bozkurt, GAPC Burns, M. P. Young and R. Kotter (2001). "Advanced database methodology for the Collation of Connectivity data on the Macaque brain (CoCoMac)." *Philos Trans R Soc Lond B Biol Sci* 356(1412): 1159-86.
8. GAPC Burns, Klaas Stephan, Bertram Ludäscher, Amarnath Gupta and Rolf Kötter (2002), Towards a federated neuroscientific knowledge management system using brain atlases, *Neurocomputing*, Volumes 38-40, June 2001, Pages 1633-1641.
9. Stephan KE, Hilgetag CC, Burns GAPC, O'Neill MA, Young MP, Kotter R. (2000) "Computational analysis of functional connectivity between areas of primate cerebral cortex." *Philos Trans R Soc Lond B Biol Sci.* 355(1393):111-26.
10. Hilgetag CC, Burns GAPC, O'Neill MA, Scannell JW, Young MP. (2000), "Anatomical connectivity defines the organization of clusters of cortical areas in the

- macaque monkey and the cat.” *Philos Trans R Soc Lond B Biol Sci.* 355(1393):91-110.
11. GAPC Burns (2001) “Knowledge management of the neuroscientific literature: the data model of the NeuroScholar system. “, *Phil Trans R Soc, B*, 356: 1187-1208
 12. GAPC Burns and MP Young (2000) “Analysis of the connectional organisation of neural systems associated with the hippocampus in rats”, *Phil Trans R Soc, B*, 355 (1393) 55-70.
 13. KE Stephan, CC Hilgetag, GAPC Burns, MA O’Neill, MP Young and R Kötter (2000) “Computational analysis of functional connectivity between areas of primate cerebral cortex”, *Phil Trans R Soc, B*, 355 (1393) 37-54. .
 14. CC Hilgetag, GAPC Burns, MA O’Neill, JW Scannell, and MP Young (2000) “Anatomical connectivity defines the organisation of clusters of cortical areas in macaque monkey and cat”, *Phil Trans R Soc, B, B*, 355 (1393) 91-110.
 15. JW Scannell., GAPC Burns, CC Hilgetag, MA O’Neill and M. P. Young (1999). “The connectional organization of the cortico-thalamic system of the cat.” *Cerebral Cortex* 9(3):277-299
 16. GAPC Burns (1999). “NeuroScholar 1.00, a neuroinformatics databasing website.” *Neurocomputing* 26:963-970.
 17. Young MP, JW Scannell, MA O’Neill, CC Hilgetag, GAPC Burns and C Blakemore (1995) “Non-metric multidimensional scaling in the analysis of neuroanatomical connection data and the organization of the primate cortical visual system.” *Phil Trans R Soc, B* 348:281-308
 18. MP Young, JW Scannell, GAPC Burns and C Blakemore (1994) “Scaling and brain connectivity.” *Nature* 369:449-450.
 19. MP Young, JW Scannell, GAPC Burns and C Blakemore (1994) “Analysis of connectivity: Neural systems in the cerebral cortex.” *Review in the Neurosciences* 5:227-250.

Book Chapters

1. Burns, G.A.P.C., D. Feng, and E.H. Hovy (2007), "Intelligent Approaches to Mining the Primary Research Literature: Techniques, Systems, and Examples", in "Computational Intelligence in Medical Informatics", A. Kelemen, et al., Editors, Springer.
2. GAPC Burns (2001). “Knowledge Mechanics and the NeuroScholar Project, a new approach to neuroscientific theory” in “Computing the Brain: A Guide to Neuroinformatics” edited by Arbib, M.A., and Grethe, J. San Diego: Academic Press.
3. A Dashti, GAPC Burns, S Ghandeharizadeh, S Jia, C Shahabi., DM Simmons, J Stone and LW Swanson (2001) “The ‘Neuroanatomical Rat Brain Viewer’ (‘NeuARt’): A system for registering data against brain atlases.” in “Computing the Brain: A Guide to Neuroinformatics” edited by Arbib, M.A., and Grethe, J. San Diego: Academic Press.

Books

1. MP Young, JW Scannell and GAPC Burns (1995) “The analysis of cortical connectivity.” Springer/RG Landes.

Dissertations

1. GAPC Burns (1997) "Neural connectivity of the rat: Theory, methods and applications", Oxford University D.Phil. Thesis.

Conference Proceedings

1. GAPC Burns, B Herr, D Newman, T Ingulfsen, P Pantel, P Smyth (2007) "A snapshot of neuroscience: unsupervised natural language processing of abstracts from the Society for Neuroscience 2006 annual meeting". Society for Neuroscience Annual Meeting, Abstract number: 100.6.
2. Feng, D., G. Burns, and E. Hovy (2007), "Extracting Data Records from Unstructured Biomedical Full Text". in The Joint Meeting of Conference on Empirical Methods in Natural Language Processing and Conference on Computational Natural Language Learning (EMNLP-CoNLL 2007). Prague, Czech Republic.
3. Burns, G. and E. Hovy (2006), "The NeuroScholar system as a Natural Language Processing platform for the neuroscience literature". in Annual Meeting of the Society for Neuroscience. Atlanta, GA.
4. Cheng, W.-C., G.A.P.C. Burns, R.H. Thompson, and L.W. Swanson (2005), "Tools for knowledge representation, acquisition and retrieval of neuroanatomical data mapped onto a standard atlas." in Annual Meeting of the Society for Neuroscience. Washington D.C. p. 571.4.
5. Burns, G. (2005), "Extracting and managing model parameters from the literature." in World Association of Modellers, Biologically Accurate Modeling. San Antonio, TX.
6. Burns, G.A.P.C., A.M. Khan, W.-C. Cheng, and A.G. Watts (2005), "A computational knowledge representation for physiological experiments with direct links to the primary literature and raw data". in Annual Meeting of the Society for Neuroscience. Washington, DC.
7. Burns, G.A.P.C., A.M. Khan, W.C. Cheng, and A.G. Watts (2005), "A 'Stress Management' System: Computational knowledge representation of experiments that delineate neural circuits and histochemical expression patterns based on the primary literature and raw data". in 2005 Workshop on the Neuroendocrinology of Stress. San Diego.
8. Saxena, M., S. Kim, G. Burns, A. Khan, J. Su, Y. Hamadi, and S. Ghandeharizadeh.(2005) "An Overview of Sangam: A System for Integrating Data to Investigate Stress-Circuitry-Gene Coupling". in IVNET 2005, Porto Portugal.
9. Khan, A. M., W. C. Cheng, A. G. Watts and G. A. P. C. Burns (2004). "Histochemical studies of stress-activated paraventricular hypothalamic neuroendocrine neurons: a neuroinformatics-based digital lab notebook to relate the primary literature to raw, unpublished data". Society for Neuroscience Annual Meeting, San Diego.
10. Burns, G. and A. M. Khan (2003). "An example of a neuroinformatics knowledge model derived from the primary literature: Catecholaminergic regulation of hypothalamic paraventricular neuroendocrine neurons". Annual Meeting for the Society for Neuroscience, New Orleans, LA.

11. C Shahabi, AE Dashti, GAPC Burns, S Ghandeharizadeh, N Jiang, LW Swanson (1999) "Visualization of Spatial Neuroanatomical Data", pg 801-808. Proceedings Visual '99 conference, Amsterdam (Springer LNCS volume 1614).
12. C Shahabi, AE Dashti, GAPC Burns, S Ghandeharizadeh, N Jiang, LW Swanson (1999) "Visualization of Spatial Neuroanatomical Data", pg 801-808. Proceedings Visual '99 conference, Amsterdam (Springer LNCS volume 1614).
13. GAPC Burns and MP Young (1998) "Open-ended data-mining of the neural connectivity literature: studies of the rat's visual system." Soc. Neurosci. Abstr. 24, 549.5 (p.1394), Los Angeles 1998.
14. GAPC Burns, LW Swanson and MA Arbib (1998) "NeuroScholar: a knowledge base describing the neuroanatomical connection literature on the world-wide-web." Soc. Neurosci. Abstr. 24, 96.42 (p.248), Los Angeles 1998.
15. GAPC Burns, MA O'Neill and MP Young (1997) "Calculating finely-graded ordinal weights for neural connections from neuroanatomical data from different anatomical studies". In Computational Neuroscience : Trends in Research, 1997 James M. Bower (Editor).
16. GAPC Burns and MP Young (1996) "Neurobase: a neuroanatomical connection database and its use in providing a description of connections in the rat hippocampal system". Brain Research Association Abstracts 13:85, Newcastle upon Tyne.

Invited Presentations

Invited presentations at conferences, meetings, and workshops

1. Speaker at the 2nd International Biocurators meeting, San Jose, Nov 2007.
2. Invited speaker at the 2006 Nordic Network meeting, Copenhagen, Nov 2006.
3. Speaker, PATO meeting, Palo Alto, CA, Nov 2006.
4. Microsoft E-Science meeting 2005, Seattle Washington, <http://research.microsoft.com/workshops/escience2005/>.
5. Invited speaker, Redwood Neuroscience Institute, Nov. 2004.
6. Speaker: Microsoft E-Science meeting 2004, Seattle Washington
7. Workshop Organizer 'Knowledge Engineering in Neuroscience', Winter Conference in Brain Research 2004
8. Speaker at Winter Conference in Brain Research 2001, Program
9. Speaker at National Partnership in Advanced Computing Infrastructure (NPACI), All Hands Meeting, 2000
10. Panelist at Computational Neuroscience mini-symposium at Experimental Biology 2000 meeting

Interviews and popular press

1. Chicurel (2000) 'Databasing the Brain' Nature 406, 822-825. In this news article, one paragraph describes to the NeuroScholar project.
2. Quoted in the Scientist regarding Proceedings of the National Academy paper by Rzhetsky et al. 2006: <http://www.thescientist.com/news/display/23225/>.

3. Online ISI news article concerning publication of NeuARt II paper:
<http://www.isi.edu/news/news.php?story=156>

Computational Work

Larger systems designed and built as part of research

The Knowledge Engineering from Experimental Design (KE-f-ED) demo (2007): an initial demonstration of the KE-f-ED architecture used to represent experimental data, relations and correlations within a very general architecture.

Society for Neuroscience SciMaps demonstration (2007): 'A snapshot of neuroscience', a Google-map of all presentations submitted to the Society for Neuroscience's (SfN) annual meeting. SfN is considering using this method in their official program next year.

BioScholar text mining platform (2006 -): Text mining system geared towards online biocuration based on good user interface design and active learning approaches involving conditional random fields.

NeuroScholar Platform & the View-Primitive-Data-Model framework (1999-): Knowledge management platform developed by my team and I. General framework for knowledge modeling using UML that can be mapped onto a relational database and java API.

NeuroScholar browser (2003 -): Open-source software application developed by my team and I. Browser-like interface for contents of knowledge base. Has plugin interface for the inclusion of third party applications in interface.

NeuARt neuroanatomical data viewer (2001 -): Standalone application or plugin for NeuroScholar that permits users to view and edit neuroanatomical spatial primitives in knowledge model. Primarily used to view atlas-based data maps.

Fragmenter Plugin (2001 -): Plugin for NeuroScholar that allows user to annotate PDF files. Has interface to perform knowledge acquisition within tool.

Diagrammar Plugin (2001 -): Plugin for NeuroScholar that allows user to construct knowledge representation from a vector diagram.

The Neuroscience Analysis Web Service (2001-2005): General web-service wrapper for analysis programs so that a NeuroScholar system could run intensive analysis remotely on a separate machine.

Research Grants

1 R01 LM07061-04 Burns (PI) 5/01/01-04/30/06 NLM Knowledge Management of the Neuroscientific Literature Priority score in the 5.7% percentile

This project involves the construction of a knowledge management system for neuroscientific information contained in the literature. It incorporates ontological work, visualization and analysis development and a study of the neural circuits underlying defensive behavior in the rat. Role: PI

**1-year E-Sciences unrestricted cash gift, Ghandeharizadeh (PI) 01/01/05-31/12/06
Microsoft**

Sangam, a system for integrating data to solve stress-circuitry-gene coupling

Project to perform data integration across multiple sources (one of which being the NeuroScholar system). Role: co-PI

Ph.D. advisor or committee member of:

Committee member: Dong-hui Feng, (Information Sciences Institute, University of Southern California, Los Angeles). Thesis topic: Discovering Knowledge Patterns from Text Corpora.

Committee member: Yi-Shin Chen, (Department of Computer Science, University of Southern California, Los Angeles). Thesis topic: An Adaptive Soft Classification Model.

Professional Activities and Organizations

Professional affiliations

Society for Neuroscience, member since 1998

IEEE, member since 2007

References

Available on request: