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Nathan Burles

Education

PhD in Computer Science
Oct 2010 - Apr 2014
University of York
York, UK

Thesis Title: Pattern Recognition Using Associative Memories
Advisors: Professor Jim Austin and Dr. Simon O'Keefe; examined by Dr. Dimitar Kazakov and Dr. Marc de Kamps

Computer Systems and Software Engineering (MEng)
Oct 2005 - Jul 2010
University of York
York, UK

Grade: First class honours
Thesis Topic: Parallel and superimposed computation using neural networks

Research

My research interests largely focus on non-standard methods of computation and optimisation, including both evolutionary algorithms and neural networks. In particular, I am currently interested in concurrent, parallel, and superimposed computation—both the ways in which these may be used to tackle real-world problems, as well as testing methods that can provide assurances that the computation is correct. I am also focusing on using heuristics to automatically optimise software to reduce its power consumption and developing a number of tools to help with this.

Journal Papers

2014 N. Burles, S. O'Keefe, J. Austin, and S. Hobson. Enamel: A language for binary correlation matrix memories. *Neural Processing Letters*, pages 1–23, 2014

Conference Papers

2015 J. Swan and N. Burles. Templar - a framework for template-method hyper-heuristics. In *Genetic Programming: Proceedings of EuroGP 2015*, pages 205–216. Springer, 2015

2014 N. Burles, S. O'Keefe, and J. Austin. Incorporating scale-invariance into the cellular associative neural network. In *Artificial Neural Networks and Machine Learning–ICANN 2014*, pages 435–442. Springer, 2014

2013 N. Burles, S. O'Keefe, and J. Austin. Improving the associative rule chaining architecture. In *Artificial Neural Networks and Machine Learning–ICANN 2013*, pages 98–105. Springer, 2013

2012 J. Austin, S. Hobson, N. Burles, and S. O'Keefe. A rule chaining architecture using a correlation matrix memory. In *Artificial Neural Networks and Machine Learning–ICANN 2012*, pages 49–56. Springer, 2012

Workshop Papers

2015 N. Burles, J. Swan, E. Bowles, A. E. I. Brownlee, Z. A. Kocsis, and N. Veerapen. Embedded dynamic improvement programming. In *Genetic Improvement Workshop*, pages 831–832, Madrid, 11 July 2015

2015 J. Swan and N. Burles. Hyper-quicksort: energy efficient sorting via the Templar framework for template method hyper-heuristics. In *Measuring, Testing and Optimising Computational Energy Consumption—CREST Open Workshop 39*, UCL, 23–24 February 2015

2013 N. Burles, J. Austin, and S. O'Keefe. Extending the associative rule chaining architecture for multiple arity rules. In *Neural-Symbolic Learning and Reasoning Workshop*, pages 47–51, Beijing, 5 August 2013

Competition Papers

2015 N. Burles, E. Bowles, A. E. I. Brownlee, Z. A. Kocsis, J. Swan, and N. Veerapen. Object-oriented genetic improvement programming for improved energy consumption in Google Guava. In *Symposium on Search-Based Software Engineering Challenge 2015*, pages 255–261, Bergamo, 5 September 2015

2015 N. Burles, E. Bowles, B. Bruce, and K. Srivisut. Specialising Guava's cache to reduce energy consumption. In *Symposium on Search-Based Software Engineering Challenge 2015*, pages 276–281, Bergamo, 5 September 2015

2011 S. Poulding, J. Staunton, and N. Burles. Full implementation of an estimation of distribution algorithm on a gpu. In *GPUs for Genetic and Evolutionary Computation Competition 2011*, Dublin, 2011. *Winning entry.*

Refereeing

2016 2nd International Genetic Improvement Workshop (GI-2016)

2014 24th International Conference on Artificial Neural Networks (ICANN 2014)

Scholarships

2010 EPSRC Doctoral Training Account Scholarship
Approximately £50,000 over three years towards tuition fees and living expenses. Only 4½ of these were awarded by York in 2010.

Book Reviewing

2015 BeagleBone Black Cookbook
Published November 2015 by Packt Publishing

2015 Android for the BeagleBone Black
Published February 2015 by Packt Publishing

Teaching

Teaching Assistant

2015 - 2016 Cryptography Theory & Applications *(with summative marking)*

2013 - 2014 Theory & Practice of Programming

2012 - 2013 Theory & Practice of Programming *(with formative marking)*

2011 - 2012 Numerical Analysis *(with formative marking)*
Real-Time Systems
Theory & Practice of Programming *(with formative & summative marking)*

2010 - 2011 Computer Graphics & Visualisation
Numerical Analysis *(with formative marking)*
Real-Time Systems
Theory & Practice of Programming *(with formative & summative marking)*
Theory of Computation *(with formative marking)*

Professional Development

2012 - Present Associate Fellow of the Higher Education Academy (AFHEA)

2011 - 2012 Preparing Future Academics Programme
HEA Accredited course offered by York's Researcher Development Team

Administration

Administrative Roles

2012 - 2013 Research Student Representative on the *Computer Science Board of Studies*
Committees Attended: Board of Studies; Research Studies Committee; Safety, Health, Environment & Fire Committee; Staff Student Forum

2011 - 2012 Postgraduate Teaching Assistant Representative on the *Computer Science Board of Studies*
Committees Attended: Board of Studies; Research Studies Committee; Departmental Teaching Committee; Masters Teaching Committee 1

Employment History

Software Engineer
Jan 2016 - Present
IBM
York, UK

Software Engineer on the *TM1 Server* product working largely in C++ and C, in addition to Java, Python, and JavaScript
Job description: As well as general maintenance and feature development on this very large codebase, I 'own' the Domain Specific Language parsing in-product—moving from a recursive descent parser to a GLR parser

Postdoctoral Researcher
May 2015 - Dec 2015
University of York
York, UK

Continued working on the *Dynamic Adaptive Automated Software Engineering* project, with a focus on testing of multicore systems and automatically optimising software
Research: The project is researching and developing methods and tools to effectively test concurrent code, particularly for multicore embedded CPUs, as well as developing tools and frameworks to monitor and optimise the energy efficiency of software

Postdoctoral Researcher
May 2014 - Apr 2015
University of York
York, UK

Fixed term contract working on the *Dynamic Adaptive Automated Software Engineering* project, with a focus on testing of multicore systems and automatically optimising software
Research: The project is researching and developing methods and tools to effectively test concurrent code, particularly for multicore embedded CPUs, as well as developing tools and frameworks to monitor and optimise the energy efficiency of software

Research Developer
Jan 2014 - Mar 2014
University of York
York, UK

Fixed term contract working on the *Birth, Life, & Death of Semantic Mutants* project on mutation testing with concurrency
Research: The project researched and developed a tool to perform mutation testing on concurrent code written for the multicore P4080 embedded CPU

Research Developer
Jul 2010 - Sep 2010
University of York
York, UK

Fixed term contract working on the *Software Engineering By Automated SEarch* project on parallelisation using general purpose GPU hardware
Research: The project researched and developed an Estimation of Distribution Algorithm that scales well on common GPU hardware using CUDA; the resulting paper won the *GPUs for Genetic and Evolutionary Computation* competition at the 2011 Genetic and Evolutionary Computation Conference

Website Developer
Jul 2008 - Present
NaManet
York, UK

Self-employed, developing websites and web applications for clients
Portfolio Sample: www.soronc.org; www.hhwnc.org; www.shs69.com; www.chrismarriottphotography.com

Website Developer
Jul 2008 - Aug 2008
University of York
York, UK

Fixed term contract working on the EPSRC-funded TRANSIT project, porting the TRANSITweb website from Drupal 5 to Drupal 6, and developing a number of requested features

Description: As part of a team of 18 we updated the TRANSITweb website and incorporated additional features, including developing custom modules that were contributed back to the Drupal community

Various
Oct 2005 - Jul 2008
Various
Swindon, UK

Various short-term, temporary jobs during the University's Christmas, Easter, and Summer holidays, ranging from factory and warehouse work to receptionist and administrator roles

Administrator and IT/Accounts Manager
Jun 2004 - Oct 2005
Parks and East Walcot Neighbourhood Renewal Company
Swindon, UK

Working as administrator and receptionist, as well as managing the IT and accounts for the company

Specific tasks: Designed and developed a web-based system with a Java management utility to replace the unwieldy paper system previously used for "projects" (companies, charities and other groups in receipt of a grant from SWERDA, managed by P&EWNRC) to do quarterly returns

Warehouse operator
Jun 2001 - May 2004
Exel / Gist
Swindon, UK

Operating cranes and picking stock

Other Information

Programming Experience	Java, Python, C++, C, MATLAB, PHP, HTML, CSS, JavaScript, SQL, LaTeX, Ada, Prolog, Haskell, Scheme
Current Open Source Contributions	Maintainer of 433MHz library for Arduino, Maintainer of Google Closure Compiler module for Drupal
Achievements	Languages for All Level 1 Italian, Grade 8 Piano, Grade 6 Trumpet, Grade 6 Singing
Languages	Native English Speaker
A-Levels	Maths (A), Computer Science (A), Physics (A), Chemistry (A), Music (A), Music Technology (B)
AS-Levels	Biology (A), Further Maths (B)
Other	Full UK driving licence

References

Prof. John Clark
Non-Standard Computation Group
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Prof. Jim Austin
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