D A N N Y H U G H E S
CURRICULUM VITAE

PERSONAL DETAILS

Formal Title: Dr. Daniel Roy Hughes *BSc (Hons) MSc PhD*

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RESEARCH INTERESTS

My interests are in the field of *distributed systems*, including network monitoring, wireless sensor networks, peer-to-peer systems and grid computing. My research interests also include *software engineering*, particularly middleware and component based approaches. I am currently employed by Katholieke Universiteit Leuven on the STADiUM project. Previously I was employed by Lancaster University on the NERC-funded FREE project, the EPSRC-funded Isis project, and the NWDA-funded North West Grid project. I was also a visiting scholar at the Sensor and Actuator Centre of the University of California, Berkeley.

As a post-doctoral Research Fellow on the STADiUM (Software Technology for Adaptable Distributed Middleware) and FREE (Flood Risk from Extreme Events) projects, my work is concerned with the development of middleware support for wireless sensor networks. As co-investigator of the Isis project, my work focused on the use of advanced network monitoring techniques to protect children from child-predators in digital communities and online social networks. I have an active interest in the commercialization of academic research. To that end, in 2007 I co-founded Isis Forensics, a security consultancy firm which specializes in securing business networks against P2P applications.

TEACHING STATEMENT

I consider teaching to be one of the most important and rewarding aspects of my role as an academic as it provides me with the opportunity to challenge and motivate students while reinforcing my own knowledge of the fundamentals. I have found that using real-world issues arising from my research in the fields of wireless sensor networks and peer-to-peer networking is an excellent way to excite students about the numerous applications of modern computing.

My teaching experience ranges from undergraduate-level courses to graduate dissertation projects from subjects including: computing, distributed interactive systems and environmental informatics. I have also supervised a number of visiting interns in my capacity as a researcher and also as director of Isis Forensics. Furthermore, I have hosted a number of ‘school taster days’ designed to give school-age children a better understanding of computer science.

PUBLICATIONS, GRANTS AND AWARDS

I have published more than 35 papers in internationally-recognized books, journals, conferences and workshops. A complete list of my publications is provided in appendix A. Selected papers are listed below:

Selected Publications:

- *"An Experiment with Reflective Middleware to Support Grid-based Flood Monitoring"*, Hughes D., Greenwood P., Coulson G., Blair G., Pappenberger F., Smith P., Beven K., in the Wiley Inter-Science Journal on Concurrency and Computation: Practice and Experience, vol. 20, issue 1, pages 1303-1316, November 2007.
- *"A Framework for P2P Application Development"*, Walkerdine J., Hughes D., Rayson P., Simms J., Gilleade K., Mariani J., Sommerville I., in the Elsevier Journal of Computer Communications, special edition on the Foundations of Peer-to-Peer Computing, vol. 31, issue 2, pages 387–401, March 2008.
- *"Is Deviant Behaviour the Norm on P2P File Sharing Networks?"*, Hughes D., Gibson S., Walkerdine J., Coulson G., published in IEEE Distributed Systems Online, vol. 7, no. 2, February 2006.
- *"Free Riding on Gnutella Revisited: the Bell Tolls?"*, Hughes D., Coulson G., Walkerdine J., published in IEEE Distributed Systems Online, vol. 6, no. 6, June 2005.
- *"Experiences with Open Overlays: A Middleware Approach to Network Heterogeneity"*, Grace P., Hughes D., Porter B., Blair G., Coulson G., Taiani F., to in the proceedings of the European Conference on Computer Systems (EuroSys'08), March 2008.

Grants and Funding:

- 2008: co-investigator and co-author of the EPSRC-funded Isis project with a total value of **£800,000**.
- 2006 – 2008: recipient of various Faculty of Science and Technology (FST) travel and training grants with a total value of **£1,000**.
- 2007: co-author of a European Regional Development Fund (ERDF) business grant with a value of **£1,400**.
- 2006: co-author of an FST Research Grant for further developing our research into P2P monitoring with a value of **£1,000**.
- 2002 – 2007: recipient of an EPSRC PhD scholarship.
- 2001 – 2002: recipient of an EPSRC MSc scholarship.

Awards & Recognition:

- Recipient of the best paper award at the 2nd International Conference on Internet and Web Applications and Services (ICIW'07).
- Recipient of the best paper award at the 5th All Hands Meeting (AHM'06).
- Invited speaker at the Sensors for Water Interest Group (SWIG), Manchester UK and USGS Water Sciences Centre, Baltimore, USA.
- My work has been featured in several magazines including: Slashdot, The New Scientist, Scientific American, Wired News, IEEE Internet Computing, The Engineer, ACM Tech News and Highlights of e-Science.

Academic Service:

- Chair of the 3rd International Workshop on Middleware for Sensor Networks (MidSens'08).
- Chair of the 2nd International Workshop on Entertainment Systems (ENSYS'07).
- Program committee member for: MidSens'08, ENSYS'07, MiNEMA'07, Sensornet'07, P2PSA'07, ICIMIP'07 and IRP'07, ComP2P'08.
- Primary reviewer for journals including: IEEE Transactions on Parallel and Distributed Systems, Elsevier Concurrency and Computation: Practice and Experience, Springer Peer-to-Peer Networking and Applications and Child Abuse and Neglect. I also review for several conferences including: P2P'04, P2P'05, P2P'06 and P2P'07.

EDUCATION

2002–2007 PhD in Adaptive Peer-to-Peer Systems Lancaster University
My PhD was supervised by Prof. Geoff Coulson and Prof. Ian Sommerville. My work focused on the use of resource awareness and adaptation to enhance the performance of peer-to-peer systems. This was accomplished through the design and implementation of the AdaP2P middleware framework, which provides support for advanced networking and multiple levels of adaptation. Papers describing AdaPtP (formerly known as RaDP2P) can be found in the appendix.

2001–2002 MSc Distributed Interactive Systems Lancaster University
This course was intended for the future designers of distributed systems. The core modules cover: advanced interactive system design, systems engineering and advanced distributed computing. I specialized in multimedia systems. My M.Sc. dissertation project: "AGnuS – the Altruistic Gnutella Server" resulted in a number of papers, which can be found in appendix A.

1998–2001 BSc Computer Science Lancaster University
I achieved a second class honors degree in Lancaster's BCS-accredited Computer Science course. My dissertation involved the development of a visualization toolkit for Microsoft Excel which allows users with no formal programming experience to develop bug-free extensible spreadsheets.

EMPLOYMENT HISTORY

2009 onwards Post Doctoral Researcher, STADiUM Katholieke Universiteit Leuven
As a post-doctoral researcher on the STADiUM project, my work focuses upon the development of end-to-end middleware support for wireless sensor networks.

2007 - 2009 Co-Investigator, Isis Lancaster University
As a co-author and co-investigator of the £800K EPSRC-funded Isis project, my work focuses upon applying my previous research in network monitoring to the problem of preventing child abuse in digital communities such as chat, P2P and social networking systems.

2007 - 2009 Senior Research Associate, FREE Lancaster University
I am a senior research associate on the NERC-funded FREE project, my work builds on the flood monitoring and modeling work conducted during NWGRID. In collaboration with the UK Environment Agency and Lancaster's Environmental Science Department, our GridStix flood monitoring and warning platform has been extended and re-deployed on the River Dee in North Wales, where we will evaluate the use of on-site modeling and dense sensor deployments for providing advanced warning of extreme flood events.

2007 – 2008 Director and Co-founder Isis Forensics
In April 2007, I co-founded Isis Forensics, a P2P consultancy firm based in Lancaster, UK. Isis Forensics offers a range of consultancy services centered on P2P security, tracing and law enforcement. Isis works with both public institutions as well as private organizations. As the company has now established its core business model and moved beyond the initial start-up phase, I have curtailed my active involvement, returning to focus upon my research work.

2007 – 2008 Visiting Scholar U.C. Berkeley
From November 2007 to February 2008, I was a visiting scholar in the Berkeley Sensor and Actuator Center (BSAC) where I worked closely with researchers in Prof. Kris Pister's group. My role was to analyze how their work could be applied to problems encountered in the FREE project while disseminating the results of research performed at Lancaster University.

2005 – 2007 Research Associate, NW-GRID Lancaster University
From October 2005 to October 2007 I was a research associate on the NWDA-funded NWGRID project. During NWGRID, I co-developed a powerful platform for Grid-attached wireless sensor networks, called 'GridStix'. GridStix provide support for diverse sensors and in-network computation as well as standard wireless sensor network functionality. In collaboration with Lancaster's Environmental Science department, the GridStix platform was successfully deployed and evaluated in a flood monitoring and warning scenario on the River Ribble in the Yorkshire Dales.

TEACHING EXPERIENCE

Guest Lecturer: I have given a number of guest lectures on Lancaster University's undergraduate computing courses as well as the e-business and innovation MSc. I have also given guest lectures to outside groups including the USGS water sciences center and the Sensors for Water Interest Group (SWIG).

Postgraduate Project Supervision: I have suggested and co-supervised graduate projects in the fields of environmental informatics and distributed systems as well as supervising a postgraduate management intern in my capacity as director of Isis Forensics.

Undergraduate Project Supervision: I have suggested and co-supervised several undergraduate projects from students at Lancaster University as well as visiting international students.

Undergraduate Tutorials: as an undergraduate tutor, I provided support and reinforcement for all aspects of the undergraduate computer science course. This includes Java programming, data structures & algorithms, systems architecture, computational fundamentals and web technologies (more information on my teaching activities can be found in the following section).

Demonstrating: I was a practical class supervisor for courses including Java programming, Web Technologies (HTML, CSS, XML, XHTML, JavaScript, Servlets and SOAP), Assembly Language Programming (MIPS R1000) and Software Testing (using J-unit). My duties included helping students with written work, programming and also marking assignments and coursework.

SKILLS

Throughout the course of my work, I have developed strong project management, writing, presentation, teaching, programming and commercialization:

- **Project Management**: as senior research associate on the FREE project, I am responsible for many aspects of project management. This includes developing research deliverables,

planning hardware purchases, eliciting requirements from partners and local stakeholders, supervising undergraduate and postgraduate research students and managing the dissemination of project outputs to a range of international audiences.

- **Writing/Dissemination**: I have co-authored more than 35 articles in internationally recognized books, journals, conferences and workshops and received two best paper awards. My paper "Free-riding on Gnutella Revisited" has been cited in more than 80 articles and my work has been featured in popular press including: The New Scientist, Scientific American, Wired Magazine and Slashdot.
- **Presentation**: I have presented my work to a range of academic, business, industrial and governmental audiences in more than 10 countries. I have also been invited to speak by several organizations including the USGS Water Science center, the Sensors for Water Interest Group (SWIG) and others.
- **Programming**: I am an experienced programmer with skills in Java, BASIC, HTML, CSS and several other languages. I have a good understanding of modern programming concepts such as object-orientation and an interest in emerging paradigms such as Aspect-Oriented Software Development and Component Based Software Engineering. I have direct experience developing systems based upon middleware including: OpenCOM, CORBA, COM and JXTA.
- **Electronics and Hardware Prototyping**: During the course of my work in the field of Wireless Sensor Networks I have developed significant experience in embedded systems development, from electronics prototyping to circuit fabrication and enclosure development.
- **Commercialization**: I am always interested in how my academic research can be applied to problems in the real world, and particularly in a business arena. This is reflected by my foundation of Isis Forensics and a number of guest lectures on commercialization.

MISC. RESPONSIBILITIES AND PERSONAL INTERESTS

Throughout the course of my employment and postgraduate studies, I have participated fully in the academic and social life of the University including the following responsibilities:

- **PhD Student Representative:** from 2004–2005, I was the computing department's PhD student representative. In this role, it was my responsibility to represent the interests of PhD students at staff/student meetings and to liaise between PhD students and academic staff.
- **Organizer of the 'CAKES' Seminar Series:** between 2003 and 2004, I co-organized the intra-department 'CAKES' seminar series, during this period, I co-organized 34 seminars including 3 external speakers.
- **Organizer of the PhD Away Day:** I also co-organized the 2004 PhD Away Day, a yearly workshop, in which PhD students present their work and get to know each other in a non-departmental setting – in this case in Douglas on the Isle of Man.
- **Schools Outreach Activities:** I regularly act as a guide for prospective students and their parents at University open days. I have also spoken a number of times at meetings for prospective students and organized the computing section of school 'taster days' which give college students a 'taste' of studying computer science at degree level.

Personal Interests: I enjoy live music and visit as many gigs, concerts and music festivals as time will allow. I'm a keen snowboarder and try to get away to the slopes as often as I can. I also enjoy traveling and exploring new places and cultures. Fortunately, during the course of my academic career I have been able to travel extensively. If you would like to find out more about me and my interests, the best way is through my personal webpage: http://www.dannyhughes.org

APENDIX A – FULL PUBLICATION LIST

JOURNALS

[39] “AdaPtP: a Framework for Building Adaptable P2P Systems”, Hughes D., Coulson G., Warren I., to appear in the International Journal of Parallel, Emergent and Distributed Systems, May 2008.

[38] “Towards the Provision of Site Specific Flood Warnings using Wireless Sensor Networks” Smith P., Hughes D., Beven K., Cross P., Tych W., Coulson G., Blair G., to appear in the journal of Meteorological Applications.

[37] “An Experiment with Reflective Middleware to Support Grid-based Flood Monitoring”, Hughes D., Greenwood P., Coulson G., Blair G., Pappenberger F., Smith P., Beven K., in Wiley Inter-Science Journal on Concurrency and Computation: Practice and Experience, November 2008.

[36] “A Framework for P2P Application Development”, Walkerdine J., Hughes D., Rayson P., Simms J., Gilleade K., Mariani J., Sommerville I., in the Elsevier Journal of Computer Communications, Volume 31, Issue 2, March 2008.

[35] “Is Deviant Behaviour the Norm on P2P File Sharing Networks?”, Hughes D., Gibson S., Walkerdine J., Coulson G., in IEEE Distributed Systems Online, vol. 7, no. 2, February 2006.

[34] “Free Riding on Gnutella Revisited: the Bell Tolls?”, Hughes D., Coulson G., Walkerdine J., in IEEE Distributed Systems Online, vol. 6, no. 6, June 2005.

BOOK CHAPTERS / MAGAZINES

[33] “Overlay-based Middleware for the Pervasive Grid”, Paul Grace, Danny Hughes, Geoff Coulson, Gordon S. Blair, Barry Porter, Francois Taiani., published in the Handbook of Research on P2P and Grid Systems for Service-Oriented Computing: Models, Methodologies and Applications, to appear Spring 2009.

[32] “The Evolution of P2P Network Architectures”, Hughes D., Coulson G., Walkerdine J., to appear in the Handbook of Research on P2P and Grid Systems for Service-Oriented Computing: Models, Methodologies and Applications, to appear Spring 2009.

[31] “P2P File Sharing and the Life and Death of Gnutella”, Hughes D., Walkerdine J., in the Handbook of Research on Computer Mediated Communication, Idea Group Reference, 2008.

[30] “Intelligent Flood Warning Breakthrough”, Hughes D., Blair G., Ellis P., Parker C., published in the winter edition of STEPS, the Lancaster University Alumni Magazine.

CONFERENCES

[29] “Exploiting Extreme Heterogeneity in a Flood Warning Scenario using the Open Overlays Middleware”, Hughes D., Bencomo N., Blair G., Coulson G., Grace P., published in the proceedings of the international conference on Middleware (Middleware 2008), December 2008.

[28] “Supporting IPv6 Interaction with Wireless Sensor Networks Using NP++”, Jakeman M., Hughes D., Coulson G., Lee K., Pink S., in the proc. of the 1st International Conference on Wireless Algorithms, Systems and Applications (WASA’08), Dallas, Texas, October 2008.

[27] "The Provision of Site Specific Flood Warnings Using Wireless Sensor Networks.", Paul Smith, Keith Beven, Wlodek Tych, Danny Hughes, Gordon Blair, in the proc. of the European Conference on Flood Risk Management (FloodRisk’08), Oxford, UK, September 2008.

[26] "Genie: Supporting the Model Driven Development of Reflective, Component-based Adaptive Systems", Bencomo N., Grace P., Flores C., Hughes D., and Blair G., in the proc. of the 30th International Conference on Software Engineering, ICSE 2008, Leipzig, Germany, May 2008.

[25] “Experiences with Open Overlays: A Middleware Approach to Network Heterogeneity”, Grace P., Hughes D., Porter B., Blair G., Coulson G., Taiani F., In the proc. of the European Conference on Computer Systems (EuroSys’08), March 2008.

[24] "Goal-Based Modeling of Dynamically Adaptive System Requirements", Goldsby H. J., Sawyer P., Bencomo N., Hughes D., Cheng B. H. C., in the proc. of the 15th Conference on Engineering of Computer-Based Systems (ECBS 08), Belfast, Northern Ireland, March 2008.

[23] “The Effect of Viral Media on Business Usage of P2P”, Walkerdine J., Hughes D., Lee K., in the proc. of the 7th international IEEE conference on peer-to-peer systems (P2P’07), May 2007.

[22] “On the Penetration of Business Networks by P2P File Sharing”, Lee K., Walkerdine J., Hughes D, in the proc. of the 2nd International Conference on Internet Monitoring and Protection (ICIMP’07), Santa Clara, California, USA. July 2007.

[21] “Using Grid Technologies to Optimise a Wireless Sensor Network for Flood Management”, Greenwood P., Hughes D., Porter B., Grace P., Coulson G., Blair G., Taiani F., Pappenberger F., Smith P., Beven K., in the proc. of the 4th ACM Conference on Embedded Networked Sensor Systems, Boulder, Colorado, USA. November 2006.

[20] “An Intelligent and Adaptable Flood Monitoring and Warning System”, Hughes D., Greenwood P., Coulson G., Blair G., Pappenberger F., Smith P., Beven K., in the proc. of the 5th UK E-Science All Hands Meeting (AHM’06), Nottingham, UK, September 2006. ***RECIPIENT OF THE BEST PAPER AWARD***

[19] “Monitoring Challenges and Approaches for P2P File Sharing Systems”, Hughes D, Walkerdine J., Lee K., in the proc. of the 1st International Conference on Internet Surveillance and Protection (ICISP’06), August 2006, Cap Esterel, France.

[18] “Intelligent Dependability Services for Overlay Networks”, Porter B., Coulson G., Hughes D., in the proc. of the 6th Conference on Distributed and Interoperable Systems, Bologna, Italy, June 2006.

[17] “Exploiting P2P in the Creation of Game Worlds”, Hughes D., Gilleade K., Walkerdine J., Mariani J., in the proc. of the 3rd annual ACM conference on Computer Game Design and Technology (CGDT ’05), Liverpool, UK, November 2005.

[16] “Exploiting Diversity in Peer-to-Peer Systems”, Hughes D., Coulson G., Warren I., in the proc. of the 5th Dependability Interdisciplinary Research Collaboration Conference (DIRC ’05), Edinburgh, UK, March 2005.

[15] “A Framework for Developing Reflective and Dynamic Peer-to-Peer Networks (RaDP2P)”, Hughes D., Coulson G., Warren I., in the proc. of the 4th Conference on Peer-to-Peer computing (P2P’04), Zurich, Switzerland, August, 2004.

[14] “A Framework for Testing Distributed Systems”, Hughes D., Greenwood P., Coulson G., in the proc. of the 4th Conference on Peer-to-Peer computing (P2P’04), Zurich, Switzerland, August, 2004.

[13] “AGnuS: The Altruistic Gnutella Server”, Hughes D., Warren I., Coulson G., in the proc. of the 3rd Conference on Peer-to-Peer computing (P2P’03), Linköping, Sweden, September, 2003.

WORKSHOPS

[12] “Supporting Law Enforcement in Digital Communities through Natural Language Analysis”, Hughes D., Rayson P., Walkerdine J., Lee K., Greenwood P., Rashid A., May-Chahal C., Brennan M., in the proc. of the 2nd Workshop on Computational Forensics (IWCF’08), Washington D.C., USA.

[11] “The Evolution of the GridStix Wireless Sensor Network Platform”, Coulson G., Hughes D., Blair G., Grace P., published in the proceedings of the International Workshop on Sensor Network Engineering (IWSNE 08).

[10] “AdaPtP - a Framework for Building Adaptable Peer-to-Peer Systems”, Hughes D., Coulson G., Warren I., in the proceedings of the 1st International Workshop on Performance for Peers (P4P2P’08), Warwick, UK, 2008.

[09] “Managing Heterogeneous Data Flows in Wireless Sensor Networks Using a ‘Split Personality’ Mote Platform”, Hughes D., Daude M., Coulson G., Blair G., in the proc. of the 2nd International Workshop on SensorWebs (SWDMNSS 2008), Turku, Finland, March 2008.

[08] “Visualizing the Analysis of Dynamically Adaptive Systems Using i* and DSLs”, Sawyer P., Bencomo N., Hughes D., Grace P., Goldsby H. J., Cheng B. C. H., in the proc. of the 2nd Workshop on Requirements Engineering Visualization (REV'07), Delhi, India, October, 2007.

[07] “An Open Tracing System For P2P File Sharing Systems”, Hughes D., Lee K., Walkerdine J., published in the proceedings of the 2nd International Workshop on P2P Systems and Applications (P2PSA ’07), Morne, Mauritius, May 2007. ***RECIPIENT OF THE BEST PAPER AWARD***

[06] “Dynamic Reconfiguration in Sensor Middleware”, Grace P., Coulson G., Blair G., Porter B., Hughes D., in the proceedings of the first International Workshop on Middleware for Sensor Networks (MidSens'06), Melbourne, Australia, November 2006.

[05] “GridStix: Supporting Flood Prediction using Embedded Hardware and Next Generation Grid Middleware”, Hughes D., Greenwood P., Coulson G., Blair G., Pappenberger F., Smith P., Beven K., in the proceedings of the 4th International Workshop on Mobile Distributed Computing (MDC'06), Niagara Falls, USA, June 2006.

[04] “Improving QoS for Peer-to-Peer Applications through Adaptation”, Hughes D., Warren I., Coulson G., in the proceedings of the 10th IEEE International Workshop on Future Trends of Distributed Computing Systems (FTDCS’04), Suzhou, China, May 2004.

PHD THESIS

[03] “AdaPtP - a Framework for Building Adaptable Peer-to-Peer Systems”, Hughes D, Lancaster University, August 2007.

TECHNICAL REPORTS

[02] “Improving Quality of Service on Gnutella”, Hughes D., Warren I., Coulson G., published as Technical Report COMP-005-2004, Computing Department, Lancaster University, 2004.

[01] “A P2P Network with Inherent Support for Adaptation”, Hughes D., Coulson G., Warren I., published as Technical Report COMP-006-2004, Lancaster University, 2004.