

Christopher D. S. Power

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Citizenship

Canadian

Research Interests

My research is focused on the design and implementation of human-centered interactive technologies for all users, with emphasis on personalized access for people with disabilities and older adults. My research focuses in the areas of user requirements elicitation and traceability within participatory design and in evaluation methodologies for interactive systems. This research is applied in environments ranging from the home to large-scale enterprises.

Research Topics

Accessibility for people with disabilities and older adults, evaluation methodologies, requirements methodologies

Education

Ph.D. (Computer Science) **2002-2006**

University of Western Ontario
Supervisor: Helmut Jürgensen

Master of Science (Computer Science) **2000-2002**

University of Western Ontario
Supervisor: Helmut Jürgensen

Bachelor of Science (Hons) (Computer Science) **1995-2000**

University of Western Ontario

Research Experience

Lecturer, Department of Computer Science, University of York, UK

2009-2011

- Funding held: Inclusive Futures Project: £500 000; European project on accessibility of Web 2.0 technologies
- Undertake innovative research in the areas of human-computer interaction and software engineering
- Modules taught at graduate and undergraduate level
- Contribute to administration in departmental committees such as recruitment and research advisory groups

Research Fellow, Department of Computer Science, University of York, UK

2006-2009

- Research lead on the European Unified Approach for Accessible Lifelong Learning (EU4ALL), an international, interdisciplinary project on provision of e-learning services to students with disabilities; funded by European Commission, Information Society Technologies 6th Framework Programme (FP6-IST-034778, £5.6 million).
- Research lead on the European Project on Benchmarking Tools and Methods for the Web (BenToWeb), an international, interdisciplinary project on the provision of tools for website accessibility checking; funded by the European Commission, Information Society Technologies 6th Framework Programme (FP6-IST-004275, £1.6 million).
- Mentor and motivate an international team of researchers with a range of skills and backgrounds including computer science, psychology and education.
- Supervise research students in contributions to team projects and in dissertation preparation.

Visiting Lecturer

2009

Universidad Nacional de Educación a Distancia, Madrid, Spain

- Invitation extended by Dr. Jesús G. Boticario for spring 2009.
- Prepare and conduct lectures on human-computer interaction at a graduate level.
- Conduct research on user modeling for e-learning applications.

Visiting Researcher

2005

University of Saskatchewan, Saskatoon, Canada

- Collaborate on research into haptic interaction techniques and tactile graphics.
- Contribute to the pending ISO standard on tactile graphics.
- Mentor and conduct research with an undergraduate student on CASE tools for people with visual disabilities.

Research Associate

2000-2005

University of Western Ontario, London, Canada

- Conduct collaborative research into tactile graphics interactions.
- Supervise undergraduate students in research activities.

Related Experience

Consultant

2008

Origin Consulting; York, UK

- Consult on improvements to existing agile/RUP software engineering processes.
- Consult on agile software engineering processes to safety critical systems.
- Consult on agile software engineering processes to outsourcing environments.
- Prepare research driven reports regarding strategic direction of agile environments for multi-national enterprises in a variety of product domains.

Web Engineer

1998-2000

London Life Insurance Company; London, Canada

- Team lead for large-scale group benefit customer benefit applications.
- Requirements elicitation and management from business partners and end-users.
- Interactive system design, software architecture design and website implementation.

Publication Record

Journal Publications

- Power, Christopher, & Jürgensen, Helmut. (2010). Accessible presentation of information for people with visual disabilities. *Universal Access in the Information Society*, 9, 97-119.
- Paige, Richard, Drivalos, Nikolaos, Kolovos, Dimitrios, Fernandes, Kiran, Power, Christopher, Olsen, Goran, & Zschaler, Steffen. (2010). Rigorous identification and encoding of trace-links in model-driven engineering. *Software and Systems Modeling*, 1-19.
- Brooke, Phillip J., Paige, Richard F., & Power, Christopher. (2010). Document-centric xml workflows with fragment digital signatures. *Software Practice and Experience*, 40, 655--672. doi: <http://dx.doi.org/10.1002/spe.v40:8>
- Power, Christopher, Freire, André Pimenta, & Petrie, Helen. (2009). Integrating accessibility evaluation into web engineering processes. *International Journal of Information Technology and Web Engineering (IJITWE)*, 4(4), 54-77.

Conference Publications

- Swallow, David, Petrie, Helen, & Power, Christopher. (2010). *Understanding and supporting the needs of educational professionals working with students with disabilities and mature age students*. Paper presented at the Proceedings of the 12th international conference on Computers helping people with special needs: Part I, Berlin, Heidelberg. <http://portal.acm.org/citation.cfm?id=1886667.1886757>
- Power, Christopher, Petrie, Helen, Sakharov, Vasily, & Swallow, David. (2010). *Virtual learning environments: Another barrier to blended and e-learning*. Paper presented at the Proceedings of the 12th international conference on Computers helping people with special needs: Part I, Berlin, Heidelberg. <http://portal.acm.org/citation.cfm?id=1886667.1886762>
- Power, Christopher, & Petrie, Helen. (2010). *An experience report in requirements elicitation for accessible e-learning systems*. Paper presented at the Proceedings of the 2010 15th IEEE International Conference on Engineering of Complex Computer Systems, Washington, DC, USA. <http://dx.doi.org/10.1109/ICECCS.2010.11>
- Petrie, Helen, Power, Christopher, Velasco, Carlos A., & Boticario, Jesus G. (2010). *Accessibility of blended and e-learning for mature age and disabled students and staff: Introduction to the special thematic session*. Paper presented at the Proceedings of the 12th international conference on Computers helping people with special needs: Part I, Berlin, Heidelberg. <http://portal.acm.org/citation.cfm?id=1886667.1886756>
- Othman, Kamal, Petrie, Helen, & Power, Christopher. (2010). *Understanding visitors' experiences with multimedia guides in cultural spaces*. Paper presented at the Proceedings of Transforming Culture in the Digital Age (International Conference in Tartu, April 14 -- 16), Tartu, Estonia.
- Power, Christopher, Petrie, Helen, & Swallow, David. (2009). *Who supports the support workers? E-learning for*

support workers of students with disabilities. Paper presented at the ICTA 2009 - Proceedings of the Second International Conference on Information and Communication Technologies and Accessibility, Hammamet, Tunisia, May 7-9, 2009.

- Power, Christopher, Petrie, Helen, & Mitchell, Richard. (2009). *A framework for remote user evaluation of accessibility and usability of websites*. Paper presented at the Proceedings of the 5th International Conference on Universal Access in Human-Computer Interaction. Addressing Diversity. Part I: Held as Part of HCI International 2009, Berlin, Heidelberg. http://dx.doi.org/10.1007/978-3-642-02707-9_67
- Power, Christopher, & Paige, Richard. (2009). *Content personalization for inclusive education through model-driven engineering*. Paper presented at the Proceedings of the 5th International Conference on Universal Access in Human-Computer Interaction. Part III: Applications and Services, Berlin, Heidelberg. http://dx.doi.org/10.1007/978-3-642-02713-0_11
- Petrie, Helen, Power, Christopher, & Song, Wei. (2009). *Internationalization and localization of websites: Navigation in english language and chinese language sites*. Paper presented at the Proceedings of the 3rd International Conference on Internationalization, Design and Global Development: Held as Part of HCI International 2009, Berlin, Heidelberg. http://dx.doi.org/10.1007/978-3-642-02767-3_33
- Petrie, Helen, Papadofragkakis, George, Power, Christopher, & Swallow, David. (2009). *Navigational consistency in websites: What does it mean to users?* Paper presented at the Proceedings of the 12th IFIP TC 13 International Conference on Human-Computer Interaction: Part I, Berlin, Heidelberg. http://dx.doi.org/10.1007/978-3-642-03655-2_46
- Freire, Andre P., Power, Christopher, Petrie, Helen, Tanaka, Eduardo H., Rocha, Heloisa V., & Fortes, Renata P. (2009). *Web accessibility metrics: Effects of different computational approaches*. Paper presented at the Proceedings of the 5th International Conference on Universal Access in Human-Computer Interaction. Part III: Applications and Services, Berlin, Heidelberg. http://dx.doi.org/10.1007/978-3-642-02713-0_70
- Sannia, Monia, Petrie, Helene, Power, Christopher, & Swallow, David. (2008). *Supporting the support workers: Training and supporting support workers for students with disabilities through e-learning, online resources and communication*. Paper presented at the In Proceedings of Conference on Interactive Computer Aided Learning (ICL 2008).
- Power, Christopher, McQuillan, Ian, Petrie, Helen, Kennaugh, Peter, Daley, Mark, & Wozniak, Geoff. (2008). *No going back: An interactive visualization application for trailblazing on the web*. Paper presented at the Proceedings of the 2008 12th International Conference Information Visualisation, Washington, DC, USA. <http://portal.acm.org/citation.cfm?id=1439280.1440135>
- <http://dx.doi.org/10.1109/IV.2008.64>
- Petrie, Helen, Power, Christopher, & Weber, Gerhard. (2008). *Web accessibility - automatic/manual evaluation and authoring tools*. Paper presented at the Computers Helping People with Special Needs. http://dx.doi.org/10.1007/978-3-540-70540-6_49
- Petrie, Helen, Power, Christopher, Swallow, David, & Bostick, Sharon L. (2008). *Supporting students with disabilities in further and higher education through virtual learning environments*. Paper presented at the Proceedings of ICIE 08 (International Conference on Excellence in Education), Paris, 1-4 July 2008.
- Petrie, Helen, Power, Christopher, Swallow, David, & Bostick, Sharon L. (2008). *Requirements for e-services in libraries to support students and staff with disabilities in higher and further education*. Paper presented at the Proceedings of LIDA 08 (Libraries in the Digital Age, Dubrovnik), 2-7 June 2008.
- Petrie, Helen, Power, Christopher, Swallow, David, & Bostick, Sharon L. (2008). *Requirements for e-services for disabled and older students in further and higher education*. Paper presented at the In Proceedings of Accessible Design in the Digital World 2 (ADDW2), York, UK.
- Petrie, Helen, Power, Christopher, & Swallow, David. (2008). *Awareness of tactile graphics amongst students and educational professionals*. Paper presented at the Tactile Graphics 2008: Proceedings of the 4th International Conference on Tactile Diagrams, Maps and Pictures.
- Petrie, Helen, Power, Chris, Adams, Ray, Hwang, Faustina, Weber, Gerhard, Darzentas, Jenny, & Velasco, Carlos A. (2008). *Innovations in measuring accessibility: Theoretical and practical perspectives*. Paper presented at the Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, Interaction - Volume 2, Swinton, UK, UK. <http://portal.acm.org/citation.cfm?id=1531826.1531887>
- Paige, Richard F., Olson, G. K., Kolovos, Dimistrios, Zschaler, S., & Power, Christopher. (2008). *Building model-driven engineering traceability classifications*. Paper presented at the Proceedings of ECMDA Traceability

Workshop.

- Daley, Mark, Gill, Dawn., Jürgensen, Helmut, & Power, Christopher. (2008). *Prediction of tactile targets*. Paper presented at the Workshop: Accessible Media.
- Power, Christopher, & Petrie, Helen. (2007). *Accessibility in non-professional web authoring tools: A missed web 2.0 opportunity?* Paper presented at the Proceedings of the 2007 international cross-disciplinary conference on Web accessibility (W4A), New York, NY, USA. <http://doi.acm.org/10.1145/1243441.1243468>
- Carey, Kevin, Gracia, Rosaria, Power, Christopher, Petrie, Helen, & Carmien, Stefan. (2007). *Determining accessibility needs through user goals*. Paper presented at the Universal Access in Human Computer Interaction. Coping with Diversity. http://dx.doi.org/10.1007/978-3-540-73279-2_4
- Power, Christopher, Gill, Dawn, & Daley, Mark. (2006). *Voronoi diagrams, vectors and the visually impaired*. Paper presented at the CHI '06 extended abstracts on Human factors in computing systems, New York, NY, USA. <http://doi.acm.org/10.1145/1125451.1125684>
- Power, Christopher. (2006). *On the accuracy of tactile displays*. Paper presented at the Proceedings of the 10th International Conference on Computers Helping People with Special Needs (ICCHP 2006). http://dx.doi.org/10.1007/11788713_167
- Subramanian, S., Gutwin, C., Sanchez, M. N., Power, C., & and Liu, J. (2005). *Haptic and tactile feedback in directed movements*. Paper presented at the Proceedings of the Workshop on Guidelines for Tactile and Haptic Interfaces 2005 (GOTHI 2005).
- Jürgensen, Helmut, & Power, Christopher. (2005). *Information access for the blind - graphics, modes, interaction*. Paper presented at the Proceedings of the Workshop on Guidelines for Tactile and Haptic Interfaces 2005 (GOTHI 2005).
- Jürgensen, Helmut, Li, Haibo, & Power, Christopher. (2002). *Towards talking tactile diagrams*. Paper presented at the Second International Conference on Tactile Diagrams, Maps and Pictures, Hatfield, UK, 19-21 June, 2002.

Tutorials and Invited Presentations

- Power, C. (2010) Digital Inclusion for Disabled People Seminar Series. September 22-24, 2010. Associated with The Jodi Mattes Trust and CyMAL, Wales.
- Power C. (2010). Accessible culture: reaching broader audiences through technology. Keynote lecture at the conference *Physical Digital: Understanding and engaging audiences*, The Public, West Bromwich.
- Power, C. and Petrie H. (2009). Accessibility for museums and libraries. Keynote lecture at the Jodi Awards, sponsored by The Jodi Mattes Trust and the Museum Computer Group.
- Petrie, H., **Power, C.**, Weber, G., Brajnik, G. (2009). Techniques for evaluation of accessibility on the web. Tutorial, World Wide Web Conference, Madrid, Spain.
- **Power, C.** (2009): Visiting Lecturer, Universidad Nacional de Educación a Distancia, Madrid, Spain
- Petrie, H. and **Power, C.** (2008). Gulfs of accessibility, gulfs of usability in the use of websites. Innovations in measuring accessibility: theoretical and practical perspectives, *Accessibility Workshop at the BCS HCI Conference 2008*, Liverpool UK, (invited to submit paper based on this presentation for a Special Issue of Universal Access in the Information Society)
- **Power, C.** (2008). Data data everywhere and not a drop to drink: Experiences in validating accessibility guidelines. *University of York*. Invited Speaker, Departmental Seminar Series, Department of Computer Science.
- Petrie, H., **Power, C.**, and Weber, G. (2007). Techniques for evaluation of accessibility on the web. *Tutorial, World Wide Web Conference*, Banff, Canada.
- **Power, C.** (2005). An architecture for multi-modal document presentation. *University of Western Ontario Research in Computer Science Conference*. (Award: Best Presentation)
- **Power, C.** (2004). Computing and people with visual disabilities. *University of Saskatchewan*. Invited Speaker, Graduate Student Seminar Series, Department of Computer Science.
- **Power, C.** (2004). An introduction to computing and the visually impaired. *University of Western Ontario Research in Computer Science Conference*. (Award: Best Presentation)

Other Publications

- Power, Christopher, Yuan, Xue, & Fang, Li. (2004). The mobile movie database: An experiment in location context

- accuracy: University of Western Ontario.
- Power, Christopher. (2004). Wearable computing: A primer: University of Western Ontario.
- Power, Christopher. (2000). An implementation of talking diagrams for the visually impaired: University of Western Ontario.

Teaching Experience

University of York, York, UK

Human Factors for Software Engineers (graduate)
 Human Factors for Safety Critical Systems (graduate)
 User-Centred Design (graduate)
 Requirements Engineering (graduate)
 Design of Interactive Systems (undergraduate)
 Human Factors for Safety (professional development)
 Creating Usable Websites (professional development)
 Creating Accessible Websites (professional development)

University of Western Ontario, London, Canada

Data structures and algorithms (undergraduate)
 Introduction to Software Engineering (undergraduate)

Doctorate Student Supervision

- Andre Freire (PhD; Year 2; Co-Supervised with Helen Petrie):
 - Measurement and characterization of accessibility problems encountered by people with disabilities on the web.
- Mohd Kamal Othman (PhD; Year 2; Co-Supervised with Helen Petrie):
 - User Experiences with Technology in Museums
- Sorachai Kamollimsakul (PhD; Year 1; Co-Supervised with Helen Petrie):
 - Cross cultural web design and requirements for older adult users.
- John Precious (PhD; Year 1; Helen Petrie):
 - Understanding of the relationship between emotional experiences and interactive technologies.
- Frank Soboczenski (PhD; Year 1; Co-Supervised with Richard Paige):
 - Understanding interactive systems for health informatics.
- David Swallow (PhD; Year 1; Co-Supervised with Helen Petrie):
 - Accessibility tools for web developers.

Graduate and Undergraduate Student Supervision

MSc Social Informatics and Information Technology

- Pomona Feng (2008): Accessibility Techniques with Flash

MSc. Information Technology

- Jinyi Zhao (2008): An Environment for Usability and Accessibility Experiment Authoring, MSc.
- Victor Tsitakis (2008): On the Accessibility of Automated Teller Machines, MSc. (joint supervision with Helen Petrie)
- Odette Murland (2007): Putting Users on the Menu: A study of technology use in the kitchen environment, MSc. (joint supervision with Helen Petrie)

MSc. Safety Critical System Engineering

- Andy Rignall (2011): Methodologies for migration of safety investigation processes
- David Gorrige (2008): Integration of Human Factors Assessments into Safety Case Analysis(joint supervision with Helen Petrie)

MEng Students

- Luke Galloway (2011): Wayfinding for People with Visual Disabilities
- Andrew Izatt (2010): Comic Reviews through your iPhone

BEng Students

- Richard Mitchell (2008): The Web Remote Evaluation Tool (joint supervision with Helen Petrie)
- David Huscroft (2008) Accessibility of Web Authoring Tools (joint supervision with Helen Petrie)

Professional Activities and Affiliations

Conference Committees

- ASSETS, International ACM SIGACCESS Conference on Computers and Accessibility (2010, 2011), Programme Committee
- INTERACT, *12th IFIP conference on Human-Computer interaction 2009*, Programme Committee
- W4A 2009, *International Cross-Disciplinary Conference on Web Accessibility 2009*, Programme Committee.
- BCS HCI2008 Culture, Creativity, Interaction, *Workshop: Innovations in measuring accessibility: theoretical and practical perspectives*, Programme Committee
- ADDW 2008, *Accessible Design in the Digital World*, Organizing/Programme Committee, University of York
- User Modelling 2008, *Workshop: Towards User Modelling and Adaptive Systems for All (TUMAS-A)*, Sydney, Australia, Programme Committee
- User Modelling 2007, *Workshop: Towards User Modelling and Adaptive Systems for All (TUMAS-A)*, Corfu, Greece, Programme Committee
- *Descriptive Complexity and Formal Systems 2004*, University of Western Ontario, London, Canada, Organizing Committee

Affiliations

- British Computing Society (BCS), 2008-2011
- British Standards Institute (BSI), 2008-2011

Standards Participation

- W3C: Ubiquitous Computing; (external expert, 2008)
- ISO/IEC 24751: Access for All; (invited co-editor, 2008)
- SVG in DAISY; (steering board member)

Internal Activities

- Departmental Research Committee (2010-2011)
- Undergraduate Recruitment Officer (2010-2011)