David McGregor SQUIRE B.Sc., B.E. Hons., Ph.D.

Australian citizen.

Last updated: March 31th, 2022.

Academic experience

2019-present: Research Fellow In Statistical Genomics, Melbourne Integrative Genomics, The University of Melbourne, Melbourne, Australia.

2007–2018: Senior Lecturer, Clayton School of Information Technology, Monash University, Melbourne, Australia.

2006: On sabbatical. Visiting the Department of Statistics at The University of Oxford and the Machine Intelligence Laboratory at The University of Cambridge.

2005: Associate Head, Caulfield School of Information Technology, Monash University, Melbourne, Australia.

2004–2006: Senior Lecturer, School of Computing Science and Software Engineering, Monash University, Melbourne, Australia.

2000–2003: Lecturer, School of Computing Science and Software Engineering, Monash University, Melbourne, Australia.

April 1998–1999: Maître-assistant (Senior Researcher), founding member of the *Viper* group, Computing Science Centre, University of Geneva, Switzerland. Switzerland.

1996-March 1998: Post-doctoral research fellow, Vision Group, Computing Science Centre, University of Geneva, Switzerland.

Research interests

Statistical Genomics

- imputation of alleles for Human Leukocyte Antigen (HLA) genes
- imputation of alleles for non-classical HLA genes in the Major Histocompatibility Complex, including the development of the tool MHC*IMP
- imputation of copy number and alleles for Killer Immunoglobulin-like Receptor (KIR) genes
- development of tools for inexact matching of sequencing-by-synthesis data, providing robustness under PCR errors (insertions, deletions, and substitutions)

Image processing and computer vision

- application of independent component analysis (ICA) to the learning of texture features
- invariant pattern recognition, including the development of rotation and scale invariant texture features
- metric learning for image and object recognition

Content-based retrieval of multimedia data (CBMR)

- understanding, and learning from, human similarity judgments in CBMR
- performance evaluation and benchmarking of CBMR systems
- software engineering aspects of the design of a distributed CBMR system. Co-developer of the GNU Image Finding Tool
- protocols for querying multimedia database systems. Founding team member for the MRML (Multimedia Retrieval Mark-up Language) project
- combining textual and visual cues for multimedia similarity

Text similarity and matching

- text similarity detection, applied to large corpora of medieval Latin texts in the Factotum project, as well as English texts
- text retrieval and web mining for automated plagiarism detection, including development of Damocles system, used over a decade at Monash University and Monash College in hundreds of subjects in faculties including Information Technology, Arts, Law, Business and Economics, and Engineering

Digital Signatures

- fine-grained signing and distribution of digital documents, especially in the context of the XML digital signature

Major Grants

- **2021–2025: NHMRC Ideas Grant APP2004262**
  Immune-associated genetic variation and autoimmune disease.
  Chief Investigators: Prof. Stephen Leslie, Prof. Wilson Liao, Dr Paul Norman, Dr David Squire
  Value: $A 1.3M
- **2010–2012: ARC Discovery Grant DP1093716**
  Ethics and encyclopaedic culture in 13th century France: adaptation, diffusion and contexts of innovation in the Speculum morale and its sources.
  Chief Investigators: Prof. Constant Mews, Dr David Squire
  Value: $A 248K
- **2004–2007: ARC Linkage Grant LP0455105**
  Formal context analysis in rapidly evolving knowledge webs (4CARE-K).
  Chief Investigators: Prof. Heinz Schmidt, Dr David Squire
  Value: $A 230K (ARC), $A 222K (industrial partner)
- **2000–2002: Swiss National Science Foundation 2000–059152**
  Image archival and retrieval for multimedia databases based on exploratory statistics and geometrical invariants.
  Chief Investigator: Prof. Thierry Pun, Co-investigator: Dr David Squire.
  Value: CHF 265K
- **1998–2000: Swiss National Science Foundation 2000–052426**
  Image archival and retrieval for multimedia databases based on exploratory statistics and geometrical invariants.
  Chief Investigator: Prof. Thierry Pun, Co-investigator: Dr David Squire.
  Value: CHF 166K

Selected Publications

Richard Ahn, Damjan Vukcevic, Allan Motyer, Joanne Nititham, David McG. Squire, Jill A. Hollenbach, Paul J. Norman, Eva Ellinghaus, Rajan P. Nair, Lam C. Tsoi, Jorge Oksenberg, John Foerster, Wolfgang Lieb, Stephan Weidinger, Andre Franke, James T. Elder, Eric Jorgenson, Stephen Leslie and Wilson Liao, **Large-Scale Imputation of KIR Copy Number and HLA Alleles in North American and European Psoriasis Case-Control Cohorts Reveals Association of Inhibitory KIR2DL2 with Psoriasis**, *Frontiers in Immunology*, 12, 684326, p. 1798, 2021.

David McG. Squire, Allan Motyer, Richard Ahn, Joanne Nititham, Zhi-Ming Huang, Jorge R. Oksenberg, John Foerster, Wilson Liao and Stephen Leslie, **MHC*IMP - Imputation of Alleles for Genes in the Major Histocompatibility Complex**, *bioRxiv*, 2020. (preprint).

Tomas Zahora, Dmitri Nikulin, Constant J. Mews and David Squire, **Deconstructing Bricolage: Interactive Online Analysis of Compiled Texts with Factotum**, *Digital Humanities Quarterly*, 9, 1, 2015.

Nabeel Mohammed and David McG. Squire, **An evaluation of sparseness as a criterion for selecting independent component filters, when applied to texture retrieval**, *Proceedings of the International Conference on Digital Image Computing: Techniques and Applications (DICTA 2014)*, Wollongong, Australia, November 25–27 2014.

Nabeel Mohammed and David McG. Squire, **Efficient and Accurate Independent Component Filter-based Features for Texture Similarity**, *Proceedings of the 20th IEEE International Conference on Image Processing (ICIP)*, Melbourne, Australia, pp. 2887–2891, September 15–18 2013.

Nabeel Mohammed and David McG. Squire, **ICFSIFT: Improving collection-specific CBIR with ICF-based local features**, *Proceedings of the International Conference on Digital Image Computing: Techniques and Applications (DICTA 2013)*, Hobart, Australia, pp. 351–358, November 26–28 2013.

Nabeel Mohammed and David McG. Squire, **Improved Texture Features for CBIR using Response Scaling and Locally Normalised Convolution**, *Proceedings of the 11th International Workshop on Content-Based Multimedia Indexing*, Veszprém, Hungary, pp. 143–148, June 17–19 2013.

Tomas Zahora, Dmitri Nikulin, Constant Mews and David Squire, **Decompiling the Speculum morale. Uncovering Franciscan voices in an encyclopedia of ethics with the aid of Factotum software**, *In Maria José Muñoz, Patricia Cañizares and Cristina Martin eds., La compilación del saber en la edad media. La compilation du savoir au moyen age. The compilation of knowledge in the Middle Ages*, No. 69 in Textes et Etudes du Moyen Âge (TEMA), pp. 557–575, Brepols Publishers, 2013. (Porto: FIDEM: Fédération Internationale des Instituts d'Etudes Médiévales, 2012).

Robyn A. McNamara, Ann E. Nicholson and David McG. Squire, **Improving Student Engagement in Software Engineering with Computer-supported Groupwork**, *Proceedings of the 3rd Annual International Conference on Computer Science Education: Innovation & Technology and Software Engineering & Applications*, Singapore, pp. 117–124, Global Science and Technology Forum, November 19–20 2012.

Nabeel Mohammed and David McG. Squire, **Effectiveness of ICF features for collection-specific CBIR**, *Proceedings of the 9th International Workshop on Adaptive Multimedia Retrieval*, Barcelona, Spain, July 18–19 2011.

Nabeel Mohammed and David McG. Squire, **An improved method for choosing effective Independent Component Filters for CBIR**, *Proceedings of the 26th International Conference on Image and Vision Computing New Zealand*, Auckland, New Zealand, November 29-December 1 2011.

Constant J. Mews, Tomas Zahora, Dmitri Nikulin and David Squire, **The Speculum morale (c. 1300) and the study of textual transformations: a research project in progress**, *Vincent of Beauvais Newsletter*, 35, pp. 5–15, 2010.

Nayyar Abbas Zaidi and David McG. Squire, **SVMs and Data Dependent Distance Metric**, *Proceedings of the 25th International Conference on Image and Vision Computing New Zealand*, Queenstown, New Zealand, November 8–9 2010.

Nayyar Abbas Zaidi and David McG. Squire, **Local Adaptive SVM for Object Recognition**, *Proceedings of the International Conference on Digital Image Computing: Techniques and Applications (DICTA 2010)*, Sydney, Australia, December 1–3 2010.

Nayyar Abbas Zaidi, David McG. Squire and David Suter, **A Gradient-based Metric Learning Algorithm for k-NN Classifiers**, *Proceedings of the 23rd Australasian Joint Conference on Artificial Intelligence*, Adelaide, Australia, No. 6464 in Lecture Notes in Computer Science, pp. 194–203, Springer-Verlag, December 7–10 2010.

Nayyar Abbas Zaidi, David McG. Squire and David Suter, **BoostML: An Adaptive Metric Learning for Nearest Neighbor Classification**, *Proceedings of the 14th Pacific-Asia Conference on Knowledge Discovery and Data Mining*, Hyderabad, India, No. 6118 in Lecture Notes in Computer Science, pp. 142–149, Springer-Verlag, June 21–24 2010.

Jens Kötters, Heinz Schmidt and David McG. Squire, **Context Graphs - Representing Formal Concepts by Connected Subgraphs**, *Proceedings of the 7th International Conference on Formal Concept Analysis*, Darmstadt, Germany, No. 5548 in Lecture Notes in Computer Science, pp. 178–193, Springer-Verlag, May 21–24 2009.

Walter ten Brinke, David McG. Squire and John Bigelow, **The Meaning of an Image in Content-Based Image Retrieval**, *2nd International Workshop on Philosophical Foundations of Information Systems Engineering (PHISE 2006)*, Luxembourg, pp. 710–719, June 5 2006.

Denny and David McG. Squire, **Visualization of Cluster Changes by Comparing Self-Organizing Maps**, *The Ninth Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD '05)*, Hanoi, Vietnam. No. 3518 in Lecture Notes in Computer Science, pp. 410–419, Springer-Verlag, 18–20 May 2005.

Laurence Bull, David McG. Squire and Yuliang Zheng, **A Hierarchical Extraction Policy for Content Extraction Signatures**, *International Journal on Digital Libraries (Special issue on Security)*, 4, 3, pp. 208–222, 2004.

Laurence Bull and David McG. Squire, **XML Signature Extensibility Using Custom Transforms**, *Proceedings of the Fifth International Conference on Web Information Systems Engineering (WISE 2004)*, Brisbane, Australia. No. 3306 in Lecture Notes in Computer Science, pp. 102–112, Springer-Verlag, 22–24 November 2004..

Henning Müller, Patrick Ruch, David McG. Squire, Christian Lovis and Antoine Geissbuhler, **Using open source software for medical image retrieval**, *Proceedings of the 11th World Congress on Medical Informatics (MEDINFO 2004)*, San Francisco, CA, USA, September 7–11 2004.

Henning Müller, David McG. Squire and Thierry Pun, **Learning from user behaviour in image retrieval: Application of market basket analysis**, *International Journal of Computer Vision*, 56, 1–2, pp. 65–77, 2004.

Walter ten Brinke, David McG. Squire and John Bigelow, **Supervenience in Content-Based Image Retrieval**, *International Conference on Formal Ontology in Information Systems (FOIS 2004)*, Torino, Italy, November 4–6 2004.

Laurence Bull, Peter Stanski and David McG. Squire, **Content Extraction Signatures using XML Digital Signatures and Custom Transforms On-Demand**, *Proceedings of the 12th International World Wide Web Conference (WWW2003)*, Budapest, Hungary, pp. 170–177, 20–24 May 2003.

Henning Müller, Wolfgang Müller, Stéphane Marchand-Maillet, David McG. Squire and Thierry Pun, **A Framework for Benchmarking in Visual Information Retrieval**, *International Journal on Multimedia Tools and Applications*, 21, 1, pp. 55–73, September 2003.

Andre Oboler, David McG. Squire and Kevin B. Korb, **Why don't we practice what we teach? Engineering Software for Computer Science Research in Academia**, *Proceedings of the First International Conference on Software Engineering Research and Applications (SERA'03)*, San Francisco, USA, pp. 25–30, 25–27 June 2003.

Henning Müller, Wolfgang Müller, Stéphane Marchand-Maillet, David McG. Squire and Thierry Pun, **A web-based evaluation system for content-based image retrieval**, *Proceedings of the 3rd International Workshop on Multimedia Information Retrieval (in conjunction with ACM Multimedia 2001)*, Ottawa, Canada, pp. 50–54, October 5 2001.

Henning Müller, Wolfgang Müller, David McG. Squire, Stéphane Marchand-Maillet and Thierry Pun, **Performance Evaluation in Content-Based Image Retrieval: Overview and Proposals**, *Pattern Recognition Letters*, 22, 5, pp. 593–601, 2001.

Wolfgang Müller, Stéphane Marchand-Maillet, Henning Müller, David McG. Squire and Thierry Pun, **Evaluating image browsers using structured annotation**, *Journal of the American Society for Information Science and Technology (JASIST)*, 52, 11, pp. 961–968, September 2001.

Henning Müller, Wolfgang Müller, Stéphane Marchand-Maillet, Thierry Pun and David McG. Squire, **Strategies for positive and negative relevance feedback in image retrieval**, *Proceedings of the 15th International Conference on Pattern Recognition (ICPR 2000)*, Barcelona, Spain, September 3–8 2000.

Wolfgang Müller, Henning Müller, Stéphane Marchand-Maillet, Thierry Pun, David McG. Squire, Zoran Pecenovic, Christoph Giess and Arjen P. de Vries, **MRML: A Communication Protocol for Content-Based Image Retrieval**, *Fourth International Conference On Visual Information Systems*, Lyon, France, November 2–4 2000.

David McG. Squire and Terry M. Caelli, **Invariance Signatures: Characterizing contours by their departures from invariance**, *Computer Vision and Image Understanding*, 77, 3, pp. 284–316, March 2000.

David McG. Squire, Wolfgang Müller, Henning Müller and Thierry Pun, **Content-based query of image databases: inspirations from text retrieval**, *Pattern Recognition Letters*, 21, 13–14, pp. 1193–1198, 2000.

David McG. Squire, **Learning a similarity-based distance measure for image database organization from human partitionings of an image set**, *Fourth IEEE Workshop on Applications of Computer Vision (WACV'98)*, pp. 88–93, Princeton, NJ, USA, October 1998.

David McG. Squire and Thierry Pun, **Assessing agreement between human and machine clusterings of image databases**, *Pattern Recognition*, 31, 12, pp. 1905–1919, 1998.

Thierry Pun and David McG. Squire, **Statistical structuring of pictorial databases for content-based image retrieval systems**, *Pattern Recognition Letters*, 17, pp. 1299–1310, 1996.

Terry M. Caelli, David McG. Squire and Tom P.J. Wild, **Model-based neural networks**, *Neural Networks*, 6, pp. 613–625, 1993.

University Teaching and Supervision

Supervisor of PhD, Masters and Honours students working in the fields of statistical genomics, text similarity, computer vision, multimedia retrieval, machine learning, and content extraction signatures, 1998-present. Nine PhD, and more than 20 masters/honours/diplôme students successfully completed.

Listed below are subjects I was directly involved in developing, delivering, and coordinating. I have also been Chief Examiner and/or coordinator of multiple units delivered at the Monash campuses in South Africa, Malaysia, and Gippsland campuses., others continuing.

Subjects taught

Developer and Lecturer, *Research Methods Mini Course (RMMC) for commencing Master of Science students,* School of Mathematics and Statistics, The University of Melbourne, 2021–2022.
Chief Examiner and Coordinator, 4th year capstone project *FIT4002 Software Engineering Studio Project,* Monash University, 2014–2018.
Chief Examiner and Lecturer, 3rd year subject *FIT3077 Software Engineering: Architecture and Design,* Monash University, 2008–2018.
Chief Examiner and Teaching Team Member, 3rd year project-based learning subject *FIT3170 Software Engineering Practice* , Monash University, 2018.
Chief Examiner and Lecturer, 2nd year subject *FIT2099 Object-Oriented Design and Implementation* , Monash University, 2018.
Chief Examiner and Lecturer, 2nd year subject *FIT2024 Software Engineering Practice* , Monash University, 2007–2016.
Lecturer, masters subject *FIT5136 Software Engineering* , Monash University, 2015, 2017.
Lecturer, 2nd year subject *FIT2001 Systems Development* , Monash University, 2016.
Lecturer, 2nd year subject *FIT2043 Technical Documentation for Software Engineers,* Monash University, 20011–2012.
Chief Examiner and Lecturer, 3rd year subject *CSE3308 Software Engineering: Analysis and Design,* Monash University, 2000–2005, 2007.
Chief Examiner and Lecturer, Masters subject *CSE5230 Data Mining,* Monash University, 2000–2004.
Lecturer on LaTeX and BibTeX, Honours subject *CSE417 Communication and Research Skills,* Monash University, 2000–2005.
Responsible for subject *Projets Informatiques* (3rd year software engineering project), University of Geneva, 1998–1999.
Assistant for the undergraduate subjects *Algorithmique* and *Structures de données,* University of Geneva, 1996–1998.
Developer and co-lecturer of the subject *Neural Networks* in the Master of Cognitive Science program at The University of Melbourne and the Graduate Diploma of Knowledge-based Systems at the Royal Melbourne Institute of Technology, 1992.

Other

Group supervisor, 4th year subject *FIT4002 Software Engineering Studio Project,* Monash University, 2007, 2012, 2016, 2017.
Group supervisor, 3rd year subject *CSE3200 Industrial Experience Project,* Monash University, 2000–2005.
Coach, Monash teams for ACM Programming Competition, 2000-present.
Resident Physics Tutor, Queen's College, The University of Melbourne, Australia, 1991–1992.
Numerous tutoring positions at The University of Melbourne in the physics, mathematics, and computer science departments, 1990–1993.

University Administration Experience

2013–2014 Honours and Masters Minor Thesis Coordinator, Clayton School of Information Technology, Monash University, Melbourne, Australia.

2008–2009 Higher Degree by Research Coordinator, Clayton School of Information Technology, Monash University, Melbourne, Australia.

2007: Deputy Course Leader, Bachelor of Software Engineering, Monash University, Melbourne, Australia.

2005: Associate Head, Caulfield School of Information Technology, Monash University, Melbourne, Australia.

2005: Chair, Scholarships Subcomittee, Faculty of Information Technology, Monash University, Melbourne, Australia.

2001–2004 School Postgraduate Research Coordinator (CSSE Caulfield), Monash University, Melbourne, Australia.

2004 Member of *Decanal Structure* team for strategic review of the Faculty of Information Technology, Monash University.

2003 Convenor of *Research Output* working group for the CSSE Five Year Plan, Monash University.

University Education

1992–1995: Doctoral student, Computer Science Department, The University of Melbourne, then School of Computing, Curtin University.

David McG. Squire, **Model-based Neural Networks for Invariant Pattern Recognition**, *Ph.D. Thesis*, School of Computing, Curtin University of Technology, Perth, Western Australia; conferred the 19th of March, 1997.

Undergraduate

Bachelor of Science (Physics), The University of Melbourne, 1987–1991.

Bachelor of Engineering (Electrical and Electronic) (First Class Honours), The University of Melbourne, 1987–1990.

Miscellany

Languages

- English (mother tongue)
- French (Alliance française diplôme de langue, 1997)
- Latin (Higher School Certificate)

Sport

- Life member, Curtin University Touch Rugby Club
- First VIII Rowing Crew, Queen's College, The University of Melbourne, 1987–1990
- Coach, Men's Second VIII, Queen's College, 1992–1993

Contact

Email:
david.mcg.squire.professional@gmail.com
Web page: http://squizz.net/
Hypertext version of this CV (lots of links):
http://squizz.net/cv/

Note

There is an obvious gap in my research output after 2015. The explanation is as follows. I went on Long Service Leave in the first half on 2015, and had wound down my research supervision in anticipation of this. Soon after returning I suffered a series of major health incidents, requiring months of high doses of opiates, multiple hospitalisations, operations, and months of recuperation. This commenced in the second half of 2015 and continued into 2017. I was unable to resume my research activities during that period. Thankfully there are no continuing issues, and I was able to return to a heavy teaching load in 2018, and start picking up research activities again.