

Dr David Geelan

Curriculum Vitae

Contact and Personal Information

Name: David Robert Geelan

Citizenship: Australian

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Scholarships and Awards

2009 Australian Educational Publishing Award for 'Science Ways' textbook series

2009 University of Queensland SBS and ISSR Innovation award

2005 Carnegie Scholarship – the Carnegie Foundation for the Advancement of Teaching

1995-97 Curtin University Postgraduate Scholarship

Educational Qualifications

PhD (Curtin), MEd (Melbourne), BEd(Chem) (Avondale)

Employment History

2006-present Senior Lecturer, Science Education, and Program Director, Middle Years of Schooling teacher education – University of Queensland, Australia

2001-2006 Assistant/Associate Professor of Science Education – University of Alberta, Canada

2000-2001 Postdoctoral researcher – Edith Cowan University

1998-1999 High school science/mathematics teacher – Armadale Christian College

1995-1997 PhD student (Curtin)

1993-1994 Teacher educator – Pacific Adventist College, Port Moresby

1992 High school science/mathematics teacher – Northern Beaches Christian School

1991 MEd student (Melbourne)

1989-1990 High school science/mathematics teacher – Lilydale Adventist Academy

Publications

Books

Ferrett, T. & Geelan, D.R. (Eds.) (in press). *Connected Science*. Indiana University Press.

Geelan, D.R. et. al. (2009). *Science Focus (2ed) 1, 2 & 4*. Melbourne: Pearson Education Australia.

Rickard, G. & Geelan, D. (2008). *Science Ways 1, 2 & 3*. Melbourne: Pearson Education Australia.

Geelan, D.R. (2006). *Undead Theories: Constructivism, Eclecticism and Research in Education*. Rotterdam: Sense Publishers.

Geelan, D.R. (2004). *Weaving Narrative Nets to Capture Classrooms: Multimethod Qualitative Approaches for Research in Education*. Dordrecht: Kluwer Academic Publishers.

Major Reports

- Sigurdson, S., & Geelan, D.R. (2005). *Summative Report on "The Alberta Professional Development Model: Short Course for Mathematics and Science Educators from South Africa"*. Agriteam Canada.
- Geelan, D.R. (2004). *Canada-South Africa Teacher Development Program - Summative Report of Physical Science Activities, Mangaung (2004) Project, Free State Project*. Agriteam Canada.
- Geelan, D.R. (2002). *Falling Through The Cracks: A Summary of What We Heard About Teaching and Learning Conditions in Alberta Schools* (1st ed., vol. ISBN 1-894552-19-9). Alberta Teachers' Association.
- Rowell, P., Oberg, D., McClay, J., Nocente, N., & Geelan, D. (2002, August). *Scientists 2010: Final Report*. Edmonton, Alberta: Faculty of Education, University of Alberta.

Book Chapters

- Geelan, D.R. (2010). Teacher Explanations. In B. Fraser, K. Tobin & C. McRobbie (Eds.), *Second International Handbook of Science Education*. Dordrecht: Springer.
- Geelan, D.R. (2010). Science, Technology and Understanding: Teaching the Teachers of Citizens of The Future. In R. Nowacek, M. Smith & J. Bernstein (Eds.), *Citizenship Across the Curriculum*. Indiana University Press.
- Geelan, D.R. (in press). Linking Integrated Middle-School Science with Literacy in Australian Teacher Education. In T. Ferrett & D. Geelan (Eds.), *Connected Science*. Indiana University Press.
- Geelan, D.R. (2007). Songs of innocence and of experience: impressionist tales and secret stories of life in classrooms. In P. Taylor and J. Wallace, (Eds.), *Contemporary Qualitative Research: Exemplars For Science And Mathematics Educators*. Dordrecht: Springer.
- Geelan, D.R. (2005). Using webs of narrative to explore negotiation of meaning and practice. In W-M. Roth (Ed.), *Auto/Biography and Auto/Ethnography: Praxis of Research Method*. Rotterdam: Sense Publishers.
- Geelan, D.R., Larochelle, M. & Lemke, J.L. (2002). The laws of science. In J. Wallace & W. Loudon (Eds.), *Dilemmas of Science Teaching: Perspectives on Problems of Practice*. (pp. 22-35) London and New York: RoutledgeFalmer.

Papers in Refereed Journals

- Geelan, D.R. (in press). Technological and methodological challenges of using classroom video to analyse physics teachers' explanations. *International Journal of Multiple Research Approaches*.
- Geelan, D.R., Rivera Maulucci, M., Moore, F. & Rahm, J. (2010). Forum: Navigating role forces and the aesthetic/authentic caring dialectic: A novice urban science teacher's developmental trajectory. *Cultural Studies in Science Education*. DOI 10.1007/s11422-009-9247-9
- Geelan, D.R. (2008). Teaching teachers to use technology. *International Journal of Disability, Development and Education*, 55(3): 283-284.
- Hirschhorn, M. & Geelan, D. (2008). Bridging the research-practice gap: research translation and/or research transformation. *Alberta Journal of Educational Research*, 54(1): 1-13.
- Geelan, D. (2007). Rumours of theory's death and resurrection greatly exaggerated: Response to Perla and Carifio. *Education Review*, 10(2).
- Geelan, D.R. (2006). Assessing what matters. *Delta-K: Journal of the Mathematics Council of the Alberta Teachers Association*, 43 (2), 6.
- Geelan, D.R., Wildy, H., Loudon, W., & Wallace, J. (2003). Teaching for understanding and/or teaching for the exam in high school physics. *International Journal of Science Education*, 26(4), 447-462.
- Geelan, D.R. (2003a). 'Actually, it's not quite like that': how should we develop a plan for teaching chemistry? *Alberta Science Education Journal*, 36(1), 38-44.
- Geelan, D.R. (2003b). Teacher expertise and explanatory frameworks in a successful physics classroom. *Australian Science Teachers Journal*, 49(3), 22-32.
- Geelan, D.R., & Hopkins, S.L. (2002). Multimethod Approaches for Research in Science and Mathematics Education. *Alberta Science Education Journal*, 34(2), 3-14.

- Geelan, D.R. (2001a). The empty centre: Power/knowledge, relationships and the myth of 'student centred teaching' in teacher education. *Australian Journal of Teacher Education*, 26(2): 27-37.
- Geelan, D.R. (2001b). Feyerabend revisited: Epistemological anarchy and disciplined eclecticism in educational research. *Australian Educational Researcher*, 28(1): 129-146.
- Geelan, D.R. & Taylor, P.C. (2001a). Writing our lived experience: Beyond the (pale) hermeneutic? *Electronic Journal of Science Education*, 5(4): 6,007 words.
- Geelan, D.R. & Taylor, P.C. (2001b). Embodying our values in our teaching practices: building open and critical discourse through computer mediated communication. *Journal of Interactive Learning Research*, 12(4): 375-401.
- Bodner, G.M., Klobuchar, M. & Geelan, D.R. (2001). The many forms of constructivism. *Journal of Chemical Education*, 78(8), 1107.
- Geelan, D.R. (2000). Sketching some postmodern alternatives: Beyond paradigms and research programs as referents for science education. *Electronic Journal of Science Education*, 5(1): 10,164 words.
- Taylor, P.C., Geelan, D.R., Dawson, V.M. & Stapleton, A. (1999). Can teaching in a virtual classroom enhance real learning? *FID Review* 1(2-3): 121-127.
- Geelan, D.R. (1997a). Epistemological anarchy and the many forms of constructivism. *Science & Education*, 6(1-2): 15-28.
- Geelan, D.R. (1997b). Weaving narrative nets to capture school science classrooms. *Research in Science Education*, 27(4): 553-563.
- Geelan, D.R. (1997c). Prior knowledge, prior conceptions, prior constructs: What do constructivists really mean, and are they practicing what they preach? *Australian Science Teachers Journal*, 43(3): 26-28.
- Geelan, D.R. (1996a). Learning to communicate: developing as a science teacher. *Australian Science Teachers Journal*, 42(1): 30-34.
- Geelan, D.R. (1996b). The empty centre: Does student-centred learning imply abdication or role redefinition for educators? *Research and Development in Higher Education*, 19: 263-265.
- Geelan, D.R., Taylor, P.C. & Day, B. (1996). Teaching as a moral activity: Critical reflections in teacher education. *Research and Development in Higher Education*, 19: 258-262.
- Geelan, D.R. (1995). Matrix technique: A constructivist approach to curriculum development in science. *Australian Science Teachers Journal*, 41(3): 32-36.

Papers in Refereed Conference Proceedings

- Geelan, D.R. & Mukherjee, M. M. (2010). Measuring the effectiveness of computer-based scientific visualisations for conceptual development in Australian chemistry classrooms. *Global Learn Asia Pacific 2010*, Penang, Malaysia, May 17-20, 2010.
- Geelan, D.R., Mukherjee, M. M., Martin, B. & Mahaffy, P. (2010). Effectiveness of Scientific Visualizations for Supporting Conceptual Development in High School Physics and Chemistry. *Annual Conference of the National Association for Research in Science Teaching (NARST)*, Philadelphia, USA, March 20-24, 2010.
- Geelan, D.R. (2009). Explaining Topics in Physics: an International Video Study. *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2009*.
- Geelan, D.R. & Mukherjee, M. (2009). One Approach to Finding Evidence for the Effectiveness of Scientific Visualisations in High School Physics and Chemistry Education. *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2009*.
- Geelan, D., Fiege, K., & Peacock, K. (2004). Learning Together, Virtually Present: Teacher Professional Development in the RACOL Project. *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2004*(1), 3316-3320. [Online]. Available: <http://dl.aace.org/15912>
- Fiege, K., Peacock, K., & Geelan, D. (2004). Professional Development: A Rural School District's Experience with Videoconferencing. *Society for Information Technology and Teacher Education International Conference 2004*(1), 2150-2157. [Online]. Available: <http://dl.aace.org/14659>
- Geelan, D.R. (2003, October). The death of theory in educational research. In B. Davis (Ed.), *Proceedings: Proceedings Of The First Conference On Complexity Science And Educational Research* (pp. 169-185). Edmonton, AB: University of Alberta.

- Geelan, D.R. (2003a). Canadian stories of distant cases: Audiographics teaching and learning of high school physics in the RACOL project. In C. McNaught & D. Lassner (Eds.), *Proceedings: World Conference of Multimedia, Hypermedia and Telecommunications (ED-MEDIA 2003)*, Honolulu, HI (pp. 2924-2926). Norfolk, VA: Association for the Advancement of Computing in Education.
- Geelan, D.R. (2003b). Video analysis of physics teachers' explanatory frameworks. In C. McNaught & D. Lassner (Eds.), *Proceedings: World Conference of Multimedia, Hypermedia and Telecommunications (ED-MEDIA 2003)*, Honolulu, HI (pp. 2096-2100). Norfolk, VA: Association for the Advancement of Computing in Education.
- Geelan, D., Taylor, P.C. & Dougiamas, M. (2000, November). Developing distance education students' skills in critically self-reflective practice using computer mediated communication. Proceedings of the 1st Working for E-business Conference, Edith Cowan University, Western Australia.
- Geelan, D.R., Taylor, P.C.S., Fox, B., Herrmann, A., Stapleton, A. & Dawson, V.M. (1999, Feb) Arcs, braids and webs: Exploring constructed narratives in a web-based distance education unit. Proceedings of the 1999 Teaching and Learning Forum, University of Western Australia, Perth, Western Australia.
- Taylor, P.C.S., Dawson, V.M., Geelan, D.R., Stapleton, A., Fox, B., Herrmann, A. & Parker, L. (1999, Feb) Virtual teaching or virtually teaching: Does Internet-based teaching require multiple metaphors of mind? Proceedings of the 1999 Teaching and Learning Forum, University of Western Australia, Perth, Western Australia.
- Geelan, D.R., Taylor, P.C. and Day, B. (1998, Feb). Representing critical reflections in teacher education. Proceedings of the 1998 Teaching and Learning Forum, University of Western Australia, Perth, Western Australia.
- Taylor, P.C. & Geelan, D.R. (1997, Dec). Words for the boys: Gender and connected knowing in webbased distance education. Proceedings of the Australasian Joint Regional Conference of Gender and Science and Technology (GASAT) and the International Organisation for Science and Technology Education (IOSTE), Curtin University of Technology, Perth, Western Australia.
- Taylor, P.C., Geelan, D.R., Fox, R. & Herrmann, A. (1997, Dec). Perspectives and possibilities: Electronic interactivity and social constructivist teaching in a science, mathematics and technology teacher education program. Proceedings of the Australian Society for Computers in Learning in Tertiary Education (ASCILITE) Conference, Curtin University of Technology, Perth, Western Australia.
- Geelan, D.R. (1996a, November). Anyone can teach science: an old argument revisited. Proceedings of the Western Australian Science Education Association (WASEA) conference, Perth, Western Australia.
- Geelan, D.R. (1996b, November). Prior knowledge, prior conceptions, prior constructs: what do constructivists really mean, and are they practicing what they preach? Proceedings of the Western Australian Science Education Association (WASEA) conference, Perth, Western Australia.

Courses Taught

At the University of Queensland

- EDUC6855 – Specialist teaching field: Physics
- EDUC6550 – Teaching Science in the Middle Years of Schooling
- EDUC7041 – Qualitative Research Methods
- EDUC7305 – Topics in Science Education
- EDUC6510 – Professional Issues in Middle School Education
- EDUC6500 – Pedagogical Issues in Middle School Education

At the University of Alberta

- EDSE460 – Advanced Professional Term, Physical Sciences
- EDSE566 – Philosophy of Science: Implications for Teaching (I developed this course)
- EDSE510 – Research Methods in Secondary Education
- EDSE565 – Current Issues in Science, Mathematics and Technology Education (I co-developed this course)

At Edith Cowan University

EDU4102 – Research methods for beginning teachers

At Curtin University

SMEC612 – Curricula in Science, Mathematics and Technology Education

CSE612 – Curricula in Science, Mathematics and Technology Education (taught in conjunction with National Kaohsiung Normal University, Taiwan)

SMEC501 – Foundations and Issues in Science, Mathematics and Technology Education

Research Grant Funding

Granting Agency: Australian Research Council - Discovery

Title of Project: Evaluating the effectiveness of scientific visualisations in physics and chemistry education

Total Amount Received: **\$444,000** Period Covered by Grant: 2010-2012

Principal Investigator: Martin Mills

Co-Principal Investigators: David Geelan, Peter Renshaw, Pam Christie and Amanda Keddie

Granting Agency: Australian Research Council - Discovery

Title of Project: Evaluating the effectiveness of scientific visualisations in physics and chemistry education

Total Amount Received: **\$190,000** Period Covered by Grant: 2008-2010

Principal Investigator: David Geelan

Co-Principal Investigators: Brian Martin and Peter Mahaffy, King's University College, Canada

Granting Agency: National Science Foundation (USA)

Title of Project: Creating Cognitive Dissonance in a Computer Game Environment to Promote Student Conceptual

Change in Relation to Force Concepts

Total Amount Received: US**\$5,000** Period Covered by Grant: 2007, 2008

Principal Investigator: Mike Stieff (University of California, Davis)

Co-Principal Investigators: David Geelan (University of Alberta), Brian Martin (King's University College), Peter Mahaffy (King's University College), Karl Harrison (Oxford University)

Granting Agency: The University of Queensland

Title of Project: Video analysis of teacher expertise and explanatory frameworks in Year 11 Chemistry Education

Total Amount Received: **\$12,000** Period Covered by Grant: 2006, 2007

Principal Investigator: David Geelan

Granting Agency: Alberta Education

Title of Project: Impact of SuperNet on the K-12 Education System in Alberta

Total Amount Received: CN**\$70,000** Period Covered by Grant: 2006, 2007

Principal Investigator: Stanley Varnhagen, Learning Solutions

Co-Principal Investigators: Myra Sears, Learning Solutions, Brad Arkison, Learning Solutions

Other Investigators: David Geelan, University of Alberta

Role: Adviser/Consultant

Granting Agency: CRYSTAL Alberta

Title of Project: Global Climate Change: Development of Visualization Prototypes in Science 10, Unit D Energy Flow in Global Systems

Total Amount Received: CN**\$23,190** Period Covered by Grant: 2005, 2006

Principal Investigator: David Geelan, University of Alberta

Co-Principal Investigators: Brian Martin and Peter Mahaffy, King's University College; Mike Stieff, University of California (Davis); Rob Simmon, NASA Goddard Space Flight Centre

Granting Agency: CRYSTAL Alberta
Title of Project: Seeing a World in a Grain of Sand: Visualizing the Unseen
Total Amount Received: CN\$27,010 Period Covered by Grant: 2005, 2006
Principal Investigator: Brian Martin (King's University College)
Co-Principal Investigators: Brenda Gustafson and Linda Phillips, Department Elementary Education, University of Alberta; David Geelan, Department Secondary Education, University of Alberta; David Visser, Harry Ainlay High School; Wytze Brouwer, Professor Emeritus - Physics and Secondary Education, University of Alberta

Granting Agency: National Science Foundation (USA)
Title of Project: Addressing Misconceptions in the Understanding of Global Climate Change Through Visualization
Total Amount Received: US\$5,000 Period Covered by Grant: 2005, 2006
Principal Investigator: Mike Stieff (University of California, Davis)
Co-Principal Investigators: David Geelan (University of Alberta), Brian Martin (King's University College), Peter Mahaffy (King's University College), Robert Simmon (NASA Goddard Space Flight Centre)

Granting Agency: Learning Enhancement Envelope, Alberta Learning
Title of Project: Rural Advanced Community of Learners Project Evaluation
Total Amount Received: CN\$20,000 Period Covered by Grant: 2003
Principal Investigator: T. Craig Montgomerie
Co-Principal Investigators: David Geelan

Granting Agency: Learning Enhancement Envelope, Alberta Learning
Title of Project: Best Practices in Synchronous/Asynchronous Distance Learning Environments
Total Amount Received: CN\$35,000 Period Covered by Grant: 2003
Principal Investigator: T. Craig Montgomerie
Co-Principal Investigators: David Geelan

Granting Agency: Support for the Advancement of Scholarship Fund (U of A)
Title of Project: Explanatory frameworks and teacher expertise in secondary school physics education
Total Amount Received: CN\$5,000 Period Covered by Grant: 2003
Principal Investigator: David Geelan

Granting Agency: Alberta Learning
Title of Project: Scientists 2010 Project Investigation
Total Amount Received: CN\$30,000 Period Covered by Grant: 2001, 2002
Principal Investigator: Pat Rowell
Other Investigators: Dianne Oberg, Norma Nocente, Jill McClay, David Geelan

Granting Agency: Endowment Fund for the Future, Capital Fund
Title of Project: Explanatory Frameworks And Teacher Expertise In Secondary School Physics Education
Total Amount Received: CN\$8,594 Period Covered by Grant: 2002
Principal Investigator: David Geelan

Granting Agency: Imperial Oil National Centre for Mathematics, Science and Technology Education
Title of Project: Explanatory Frameworks And Teacher Expertise In Secondary School Physics Education
Total Amount Received: CN\$24,673 Period Covered by Grant: 2002, 2003
Principal Investigator: David Geelan

Granting Agency: Imperial Oil National Centre for Mathematics, Science and Technology Education
Title of Project: Physics Applets Project Implementation
Total Amount Received: CN\$22,000 Period Covered by Grant: 2002, 2003
Principal Investigator: Wytze Brouwer
Other Investigators: Brian Martin, David Geelan

Granting Agency: Curtin University of Technology
Title of Project: School Stories: Weaving narrative nets to capture science classrooms:
Total Amount Received: AU\$45,000 Period Covered by Grant: 1995-1997
Principal Investigator: David Geelan

Consultancies

Canada-South Africa Teacher Development Project (CSATDP) – 2003-2004

Canadian International Development Agency (CIDA) funded project, administered through Alberta Learning (Alberta Ministry of Education) and Agriteam Canada, for capacity building in teacher professional development in South Africa. I was involved in the section of the project in Free State province, working with colleagues at the University of the Free State, the Free State provincial Education Department and the Motheo District (Bloemfontein and area) Education Department. The project involved planning, delivering and evaluating three one-week workshops to teachers in disadvantaged schools in the former townships of Botshabelo (2003) and Mangaug (2004), and included approximately 70 days of work each calendar year, including three 2-week trips to South Africa.

Rural Advanced Community of Learners (RACOL) Project – 2003-2004

The RACOL project is focused on delivering high school courses to students in rural areas of Alberta (initially the Fort Vermilion School Division in northern Alberta) to which they would not otherwise have had access. The project uses high speed, broadband networks (the Alberta Supernet), videoconferencing and a suite of other synchronous and asynchronous technologies to allow a single teacher to be 'virtually present' in up to four classrooms across the school division. During 2003 I taught a Physics 20 (Grade 11 Physics) course to 16 students in four schools in Fort Vermilion School Division, from Edmonton, over 800 km away. During 2003 and 2004 I was contracted to oversee the teacher professional development facet of the RACOL project, and worked through both face-to-face and videoconferenced meetings and workshops to equip teachers to teach in the virtual presence environment.

University of Fort Hare Teacher Development Project – 2002

Canadian International Development Agency (CIDA) funded project offering teacher professional development workshops for teachers in the former township of Mdantsane, outside East London in the Eastern Cape Province of South Africa. Involved planning and delivering, in consultation with colleagues at the University of Fort Hare, two 3-day workshops in schools in East London and Mdantsane on a single visit in March 2002.

Alberta Teachers' Association (ATA) Consultation Report on Learning Conditions – 2002

In the context of an industrial dispute related to provincial funding of education in Alberta, the Alberta Teachers' Association conducted hearings in a number of rural and urban centres throughout the province, and collected almost 1200 written submissions on conditions in schools. I was commissioned to read these submissions and, within one month (July 2002), produce a written report that would be submitted to the Commission on Learning that was set up by the Alberta government. I produced the report '*Falling Through The Cracks: A Summary of What We Heard About Teaching and Learning Conditions in Alberta Schools*', which was published by the ATA and presented to the Commission.

Service on Committees

School of Education Teaching and Learning Committee, University of Queensland
Program Director's Committee, Ipswich Campus, University of Queensland
UQ Ipswich IT Consultative Committee, University of Queensland
Undergraduate Program Review Committee, Faculty of Education, University of Alberta
Facilities Development Committee, University of Alberta
Research Ethics Board, Faculties of Education and Extension, University of Alberta
Faculty Executive Council, Faculty of Education, University of Alberta
Council for Technology in Education, Faculty of Education, University of Alberta
Faculty of Education representative on Faculty of Science Council, University of Alberta
Graduate Studies Committee, Department of Secondary Education, University of Alberta
Board Member, Imperial Oil National Centre for Mathematics, Science and Technology Education

Supervision of Graduate Students

Supervised or co-supervised 14 doctoral students and 9 MEd students. Three MEd students have completed their programs, two PhD students have completed their programs and one more will complete before the end of 2009.

Editorial and Research Reviewing Responsibilities

Served on the editorial boards and/or reviewed papers for the following journals:

- Journal of Technology and Teacher Education
- Journal of Computers in Mathematics and Science Teaching
- Canadian Journal of Education
- Alberta Journal of Educational Research
- Research in Science and Technology Education
- Science Education
- International Journal for the Scholarship of Teaching and Learning

Reviewed two book manuscripts for Springer Academic Publishers

OZReader for ARC grant applications

Reviewed grant applications for the Canadian Social Sciences and Humanities Research Council (SSHRC)