

SCIENCE & TECHNOLOGY EDUCATION



CONTACT DETAILS

<http://cster.waikato.ac.nz/>

Centre for Science & Technology
Education Research
University of Waikato
Private Bag 3105
Hamilton 3240
New Zealand

Departmental Administrator

Raewyn Oulton
Room: KPG.29
Phone: +64 7 838 4035
Fax: +64 7 838 4272
Email: r.oulton@waikato.ac.nz

INTRODUCTION

The Centre for Science & Technology Education Research (CSTER) is an interdisciplinary centre jointly administered by the Faculty of Science & Engineering and the Faculty of Education. It is known throughout New Zealand and internationally for its research and scholarship, and for the use of its research in the development of policy, practice, curriculum, resources, assessment and professional development.

The Centre offers opportunities for professional growth for people working in science, technology, environmental and computing education. Our students include practicing teachers, teacher educators and curriculum developers in New Zealand and from a range of countries in the Pacific Islands and Asia. Most are graduates seeking mid-career professional development through advanced study for higher qualifications. Staff and students work together as colleagues in a co-operative and friendly way.

The academic programmes we offer are flexible. Full-time and part-time options are available. They allow students to specialise in their particular area of interest, to undertake interdisciplinary study, and to learn to conduct research. Excellent facilities are available in the Centre and at the University. Most courses are available online, such that you could complete a qualification at your own location.

CSTER ACADEMIC STAFF

Associate Professor P. John Williams – Director

MA, PhD *Andrews University, USA*, Dip Sec Teaching *Waikato*

Email: pj.williams@waikato.ac.nz

Research interests: Mentoring beginning teachers and electronic assessment of performance.

Dr Chris Eames

BSc, MSc, PhD *Waikato*

Email: c.eames@waikato.ac.nz

Research interests: Environmental education; biotechnology education; learning in science and technology through cooperative education work placements; tertiary science/biology education; and science and technology human capital development.

Dr Mike Forret

BSc *Aberdeen*, DPhil *Waikato*, DipT

Email: m.forret@waikato.ac.nz

Research interests: Involved in pre-service training of both primary and secondary teachers, teaching curriculum classes in science, technology and physics. Development of effective learning environments for technology and science education through a clearer understanding of the ways learners engage with learning situations.

Dr Kathrin Otrell-Cass

Mag.rer.nat. *Salzburg*, PhD *Waikato*

Email: kathrino@waikato.ac.nz

Research interests: Geo-science education and environmental education, and learning environments that support conceptual changes (ICT, LEOTC).

ASSOCIATE STAFF

Professor Richard K Coll

BSc *Canterbury*, MSc, PhD *Canterbury*

Email: rcoll@waikato.ac.nz

Research interests: Learners' mental models for scientific conceptions along with aspects of cooperative education including assessment and improving learning for students on work placements.

Beverly Cooper

BSc, MSc *Waikato*, DipT *Waikato*

Email: bcooper@waikato.ac.nz

Research interests: Science education, chemistry education, teacher education and assessment for learning.

Dr Bronwen Cowie

MSc, PhD *Waikato*

Email: bcowie@waikato.ac.nz

Research interests: Classroom interactions, assessment (particularly formative assessment), teacher professional development, and student views of assessment, teaching and learning.

Dr Garry Falloon

AdDipT *Christchurch College of Ed*, MEd *Massey*, EdD *Curtin*

Email: falloong@waikato.ac.nz

Research interests: Technology-supported school-scientist partnerships, the use of synchronous virtual classrooms in supporting postgraduate students, online learning environment design, and the design and use of digital learning objects in schools.

Dr Anne Hume

BSc *Auckland*, DipT, MEd *Waikato*

Email: annehume@waikato.ac.nz

Research interests: Science and chemistry education, teacher reflection and development of teacher pedagogical content knowledge.

Professor Alister Jones – Deputy Vice- Chancellor, University of Waikato

MSc(Hons), DPhil *Waikato*, DipT

Email: a.jones@waikato.ac.nz

Research interests: Aspects of science and technology education, including teacher development in science and technology education, teaching and learning of physics and curriculum development. Assessment in technology education.

ASSOCIATE STAFF

Dr Elaine Khoo

BEd (Hons), MA *Vanderbilt*, PhD *Waikato*

Email: ekhoo@waikato.ac.nz

Research interests: Pedagogical strategies in technology-based and technology-supported learning environments.

John Lockley

BSc, MSc *Waikato*, DipT *Hamilton Teachers College*

Email: johnl@waikato.ac.nz

Research interests: Design education; knowledge in technology and education for sustainability; and curriculum and pedagogy development.

Dr Kathy Saunders

BSc, DipT *Auckland*, MSc *Curtin*, Sci EdD *Curtin*

Email: kathy@waikato.ac.nz

Research interests: Teaching and learning about controversial science issues, bioethics, and nature of science understandings.

Dr Karsten Zegwaard

BSc, MSc(Tech)(Hons) PhD *Waikato*

Email: karsten@waikato.ac.nz

Research interests: Work-integrated learning, graduate competencies, student development of professional self-identity, workplace value systems and ethics, preparation for the professional workplace, and student learning of the nature of science.

CSTER PAPERS

DSOE557-12A (HAM), 12B (NET) & 12C(HAM) Educational Research Methods

30 Points

This paper introduces students to the major educational research paradigms, methodologies appropriate to collecting data in schools (including interviews, observations, surveys, case studies), action research, literature reviews, critiquing research, and report writing. It includes consideration of ethical issues in research.

Assessment: Internal assessment

Required text(s): C. Mutch. *Doing Educational Research: A Practitioner's Guide to Getting Started* (NZCER Press), L. Cohen, L. Manion and K. Morrison *Research Methods in Education* 6th edition (Routledge/Falmer)

Co-ordinator(s): Associate Professor Lise Claiborne

Time(s): 12A (HAM), 12B online, 12C (HAM) – Various times of the year

Note (s): DSOE557-12C (HAM) is taught partially online. Enrolment in DSOE557-12C (HAM) should be completed two weeks prior to the paper commencing.

STER508-12A (NET) – Science Education

30 Points

This paper aims to provide an overview of current research and development in learning, teaching and assessment in science education in New Zealand and internationally. The synthesis of research findings with classroom practice is a goal of the paper and so it is expected that students will participate in debate and discussion. The modules within the course examine current purposes and aims for science education, views of the nature of science, views of learning in science education, the nature of effective pedagogies for science education and current issues in science education.

Topics include:

- » **Purposes of Science Education**
The paper will begin by considering past and present purposes for science education in New Zealand and internationally.
- » **The Nature of Science and Science Education**
This module focuses on debates about the nature of science itself through an introduction to the work of past and current philosophers of science, such as, Bacon, Popper, Kuhn and Feyerabend with a view to considering how their perspectives are reflected in science education. The use of material from the history of science for teaching will be discussed.
- » **Views of Learning Informing Science Education**
This module builds from the notion that students come to class with their own ideas about the natural world to explore current theories about how they might go about learning science.
- » **Effective Pedagogies in Science Education**
This module examines the ways in which students may be helped to more effectively learn science, to learn about the nature of science and to develop scientific skills and attitudes. It also examines the merits of a variety of ways in which that learning can be assessed.
- » **Current Issues in Science Education**
This module focuses on current issues in science education. Examples include the use of ICT, informal science education, culture and gender in science and science education.

Assessment: The course is fully internally assessed by means of three assignments

Required text(s): Students will be provided with references and extensive course material

Co-ordinator(s): Dr Kathrin Otrell-Cass (Room: KPG.25; Phone: +64 7838 4512)

Time(s): Online in Semester A

STER511-12A (NET) – Technology Education*30 Points*

This paper aims to provide an understanding of the current issues in technology education research and development. The course consists of three modules:

Module 1: The nature of technology and technology education. The history and philosophy of technology will be considered in relation to technology education. Different views of technology and technology education will be examined, including teacher and student perceptions. The aims and goals of technology education will also be considered.

Module 2: Learning and curriculum in technology education. Learning theories and their implications for learning in technology education will be considered. The interaction of knowledge, processes and skills will be explored related to research on technological awareness and knowledge, and problem solving in technology education. The social construction of knowledge and its relationship with learning in technology will be emphasised. Current curriculum discussions about technology education in New Zealand and internationally will be related to a historical perspective of curriculum development, as well as recent technology curriculum innovations.

Module 3: Issues in technology education. The implications of technology education will be considered in terms of implementation, management at department and school level educational settings, inclusiveness, and teacher development. Included in this will be issues related to subcultures and innovation. Issues related to assessment in technology education are considered.

Assessment: The course is fully internally assessed by means of three assignments
Required text(s): Students will be provided with references and extensive course material
Co-ordinator(s): Associate Professor John Williams (Room: KPG.26; Phone: +64 7 838 4357)
Time: Online in Semester A

STER512-12B (NET) – Innovations in Science, Technology or Environmental Education*30 Points*

This paper aims to help teachers of science, technology or environmental education to develop their knowledge of science, technology or the environment and to consider how this knowledge might be integrated into educational activities. Students will develop an understanding of the wider issues of curriculum and assessment innovation.

The paper is taught online by a combination of set readings, online discussions and assignment completions.

This paper consists of three parts:

- » Whole class exploration of current ideas about educational innovation, particularly in regard to curriculum and assessment. This will involve reading set texts and participating in online discussion with the tutors and classmates.
- » Individual independent research on a topic of your choice in a knowledge area in science, technology or environment/sustainability. You will be assigned a tutor to work one on one with through this part.
- » Individual work to design an educational innovation using your new found knowledge in your topic area. This part will again be mentored by your individual tutor.

Assessment: The course is fully internally assessed by means of assignments
Required text(s): Students will be provided with references and extensive course material
Co-ordinator(s): Associate Professor John Williams (Room: KPG.26; Phone: +64 7 838 4357)
Time: Online in Semester B

CSTER PAPERS

STER513-12C (HAM) – Environmental and Sustainability Education

30 Points

This paper aims to provide an opportunity for in-service and pre-service teachers, and community educators to enhance their knowledge and skills in environmental/sustainability education. During this paper students will have an opportunity to:

- » Develop an understanding of the links of environmental education/education for sustainability with other bodies of knowledge (eg indigenous knowledges, gender ideas, philosophy/values etc);
- » Develop a critical understanding of the Guidelines for Environmental Education in NZ Schools;
- » Develop knowledge of national and international research, policy and practice in environmental education/education for sustainability;
- » Develop an awareness of the principles and theoretical ideas which underpin environmental education/education for sustainability practice in schools and/or the community; and
- » Develop an understanding of the teaching and learning approaches that are appropriate to environmental education/education for sustainability practice.

Assessment: The course is fully internally assessed by means of assignments.

Required text(s): Students will be provided with references and extensive course material at the beginning of the paper.

Co-ordinator(s): Dr Chris Eames (Room: KPG.26; Phone: +64 7 838 4357)

Time: 9-13 January 2012, 9am – 3pm followed by online supported learning at your place until early June 2012.

STER541 – Research Methods in Science, Mathematics and Technology Education

30 Points

This paper will not be offered in 2012.

STER543 – Development Project

30 Points

This paper will not be offered in 2012.

STER590-12C/D (HAM) – Directed Study*30 Points*

This paper aims to provide students with an opportunity to work one-to-one with a supervisor to undertake a research study in an area of interest to them, within the areas of science, technology, environmental or ICT education or a closely related area. This study will normally take the form of a small-scale research project involving data collection, but could take the form of an extensive review of the research literature on a particular topic, or the trial and evaluation of an aspect of education.

During the paper, students will have opportunities for some or all of the following:

- » Develop an understanding of an area of educational research
- » Frame a research question to be investigated
- » Develop skills in reviewing and critiquing educational research literature
- » Develop skills in the use of one data generation method
- » Analyse data
- » Construct an argument based on data that has been collected and analysed
- » Discuss research findings or the problem of interest in relation to relevant literature.

This paper can be taken completely online, completely face-to-face or through a mix of these modes.

Students at a distance to the University will typically work with a supervisor through email and telephone calls, with possible but not essential occasional face-to-face sessions.

Assessment:

The directed study report will normally comprise a document in report format. The exact nature of the product of the directed study should be negotiated and agreed with the CSTER supervisor of the study. Typically, the study will be a small-scale research project or an in-depth literature review. The word limit for the report is between 8- 10,000 words.

Co-ordinator(s):

First contact should be with Associate Professor John Williams (Room: KP.G.26; Phone: +64 7838 4357)

Time:

All Centre staff are available for the supervision of projects. Times may be negotiated.

CSTER PAPERS

STER593-12C and STER594-12C – Masterate Theses

The Centre offers theses equivalent to three (eg STER593) or four (STER594) papers at the masterate level, in accordance with the calendar regulations. In exceptional circumstances, smaller dissertations equivalent to one paper (STER591) or two papers (STER592) may be offered.

Thesis work involves study over one year (full-time) or two years (part-time) on a research topic of interest. The topic is negotiated with, and supervised by, at least one member of the Centre staff.

Co-ordinator(s): *First contact should be with Associate Professor John Williams
(Room: KP.G.26; Phone: +64 7838 4357)
All Centre staff are available for the supervision of projects.*

STER600-12C – MPhil Thesis

The Centre offers an MPhil thesis option over one year (full-time) or two years (part-time) for study on a research topic. This option is suitable to those students who already hold an Honours degree (masters or bachelors degree with honours) who wish to undertake a short research study, rather than a PhD. Students may be encouraged to enrol in the MPhil option and subject to satisfactory performance upgrade to a PhD. Approval to undertake this programme is required from Centre staff. The research topic is negotiated with, and supervised by, at least one member of the Centre staff.

Co-ordinator(s): *Initial contact should be with Associate Professor John Williams
(Room: KP.G.26; Phone: +64 7838 4357)
All Centre staff are available for the supervision of projects.*

STER792 – Diploma in Scientific Investigation

This paper will not be offered in 2012.

STER900-12C – PhD Thesis

The Centre offers a PhD thesis option over three years (full-time) or five-six years (part-time) for study on a research topic. This option is open to those students who already hold an Honours degree (masters or bachelors degree with honours) who wish to undertake an original research study. Approval to undertake this programme is required from Centre staff and the University Postgraduate Studies Committee. The research topic is negotiated with, and supervised by, at least two members of the Centre staff.

*Co-ordinator(s): First contact should be with Associate Professor John Williams
(Room: KP.G.26; Phone: +64 7838 4357)
All Centre staff are available for the supervision of projects.*