

Best research thesis prizes 2009/10 Citations

Faculty of Arts: Tehyun Ma (Department of Historical Studies):

'Total mobilization: Party, state and citizen on Taiwan under Chinese Nationalist rule, 1944-55'

This thesis examines the initial development of the Chinese Nationalist (Kuomintang) rule on Taiwan, when the island was restored in 1945 to Chinese rule after 50 years of Japanese colonial occupation, and when it became the last bastion of the Kuomintang government in the face of Chinese Communist victory in the civil war in 1949.

Based on extensive fieldwork in archives in Taiwan and China, Tehyun Ma provides a highly revisionist account of Chinese Nationalist governance, which is a question of relevance not just to the period of the early Cold War, but to continuing accounts of Chinese statecraft today. She argues convincingly that the Kuomintang used its status as a 'vanguard party' to gain control over the people and to remake the party, so that these two parts could combine in a quest for total mobilisation for the ultimate task: recapturing the mainland.

While fully acknowledging the flaws and brutality of the regime, Ma argues that, far from being a simple dictatorship, the Kuomintang used a variety of techniques and strategies to establish a 'developmental state' whose path of modernization deserves serious examination today.

Professor Ronald Hutton, Head of Historical Studies, praised the thesis as 'a sharply revisionist study of one of the most notorious failed regimes of modern times, which subsequently managed to construct one of the most successful modern nations.'

Faculty of Engineering: Alberto Politi (Department of Electrical and Electronic Engineering):

'Integrated Quantum Photonics'

No citation submitted.

Faculty of Medical and Veterinary Sciences: Kara Van Aelst (School of Biochemistry):

'A new Logic for Directional Long-range Communication on DNA'

Kara van Aelst's thesis examines the molecular mechanisms underlying how proteins move on genomes. An in-depth description of such long-range DNA-protein interactions is essential in understanding genetic function.

Kara studied a class of enzymes, the helicases, which are usually assumed to consume significant amounts of chemical energy in the form of ATP during directional motion. Her research approach was to use both ensemble and single molecule kinetics assays to monitor a class of helicases which travel thousands of base pairs on DNA with the consumption of relatively few ATP molecules. Her work revealed the surprising outcome that the movement of these enzymes was actually random, driven by thermal energy, yet could still allow the communication between distant sites in a specific manner. The role of the ATP was during the initiation of motion, not during motion itself.

This work establishes a new logic for long-range interactions which is likely to have an impact on studies of a wide range of other genetic processes, such as DNA mismatch repair and the establishment of antibody diversity, where directional communications also occur without the expenditure of large amounts of ATP.

(Professor Leo Brady, Head of School of Biochemistry)

Faculty of Medicine and Dentistry: Nicola Jeal (School of Social and Community Medicine):
'The Health Needs and Service Use of Women Selling Sex in Bristol'

Dr Nikki Jeal is a Consultant Community Gynaecologist who works for Bristol Sexual Health Services. Through her clinical work she recognised that women who sell sex on the street are a marginalised group who experience a wide range of health problems, and she was committed to doing something about this situation. Previous research had focused on the sexual health of these women, but Nikki realised that a much broader perspective was needed in order to understand the processes that led to their poor health and how to improve health care for them.

For her MD thesis, she conducted a survey of 71 women selling sex on the street and the same number of sex workers in massage parlours in order to identify and compare their health needs. This was challenging work, requiring her to recruit women from the street, parlours and drop-in centres and to gain their trust so that she could involve them in the research. In order to identify ways to improve the health and health care of street sex workers she also conducted in-depth qualitative research based on interviews with 22 sex workers and 22 health service providers. She conducted her research on a part-time basis while continuing a substantial commitment to her clinical work for the NHS.

Her research demonstrated that street-based sex workers' lives are dominated by an unrelenting cycle of selling sex, buying drugs and using them, and then going straight back to work. The women placed themselves at risk on a daily basis, from sexually transmitted infections, rape, physical assault and verbal abuse. Some women gave accounts of sleeping in crack houses, on friends' floors or in car parks, and most participants mentioned that they did not regularly eat, drink or sleep. This self-neglect led to weight loss and physical and mental ill-health. Many of the women had experienced serious illnesses, but they often neglected them because they needed to keep working. The research suggested that because the poor health of SSWs is the result of multiple factors that are not just related to selling sex, addressing just one factor in isolation is unlikely to be successful. The qualitative research helped to identify ways in which health care for these women might be improved.

Dr Jeal's research provides a powerful and moving account of the health needs of street sex workers, and it also shows the relevance of empirical research to address an important health problem. Her work has led to a number of highly cited publications, and has influenced national policy in relation to prostitution. Perhaps most importantly, her findings have enabled provider organisations to attract funding to help them to improve health care for this very vulnerable and needy group of women.

(Professor Chris Salisbury, Professor of Primary Health Care, School of Social and Community Medicine.)

Faculty of Science: David Attewell (Department of Experimental Psychology):
'The Natural Reflectance Signal and its Implications for Vision and Behaviour'

Traditionally people studying vision have looked at how we understand and represent images. In his recent award-winning thesis, David Attewell instead proposed that animals do not care about images, only the physical world that generated them: in order to understand vision, you need to understand the statistics of our visual world and how it was created.

Rather surprisingly, despite vision science having been around for over one hundred years, no one had got around to measuring why our visual world looks the way it does (probably because it is quite labour-intensive). A large part of the empirical component of the thesis was therefore based on measuring: measuring the spatial structure of surface reflectance; how light changes over the day, how it changes over space, and how lighting and reflectance change in different environments.

This solid empirical work then allowed vision to be viewed in a very different way: the ill-specified problem of 'describing' images was replaced by the highly specific problem of estimating physical properties of the world from the pattern of light we receive. This change in perspective unlocked a number of fundamental problems in the study of human vision.

Properties of the visual systems such as 'why we only have three lightness terms in English'; 'why going from a dark room to a light room is different than going from a light room to a dark'; to the details of the neurophysiology of our early visual system. Many of the characteristics that were previously seen as arbitrary and irrelevant, from the new perspective, could clearly be seen as evidence of the system being exquisitely optimised to extract the physical properties of the world we care about from noisy and ambiguous images we see of this world.

(Dr Roland Baddeley, Supervisor, Experimental Psychology)

Faculty of Social Sciences and Law: Lawrence Cattermole (Graduate School of Education):
'Teachers, Students and Ideas Caught in the Tangled Webs of School Physics Knowledge'

The overall aim of this study was to contribute to the debate on how to improve the teaching and learning of school physics. The research interrogated the role of teachers as primary providers of meaning for students. Investigating teachers' interactions with 'ideas in physics' led to a study built around self-contained teaching sequences, where each teacher was video-recorded teaching approximately six lessons as well as being interviewed about those lessons.

The starting point for Lawrence Cattermole's analysis was what teachers do and say in the classroom, and the multimodal resources they use to communicate meaning (for example diagrams, pictures, experiments, explanations). In all of the lesson sequences analysed, problematic meaning-making resources were identified as being offered to students. For example, simplifying and confusing Newton's Laws and representing the force of gravity as both a push and a pull, using simplified language and visual representations. The study showed that very often simplifications in school physics can lead to complications. For example, the use of the phrase 'just speeding up', as a simplification of the concept of

acceleration, can complicate the meaning of related concepts such as resultant forces.

The research also showed that the physics curriculum, policy instruments, the assessment structure and textbooks all contribute to a tangled web of school physics knowledge in which many of the fundamental ideas of physics are lost. The research approach of representing in diagrammatic form the potential scientific meanings offered to students and using this as a basis of developing teacher's awareness of the problematic scientific knowledge they are offering to students could be readily transformed into a valuable tool for teacher training.

(Professor Rosamund Sutherland, Graduate School of Education)