
The Leverhulme Trust

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Website: www.leverhulme.ac.uk

Philip Leverhulme Prizes 2006

The Leverhulme Trustees are pleased to announce the results of the 2006 competition for Philip Leverhulme Prizes

The Philip Leverhulme Prizes were established to reward outstanding young scholars of substantial distinction and promise; the Prizes commemorate the Third Viscount Leverhulme, who died in 2000. The fields of research covered by this year's awards are:

➤ **Earth, Ocean and Atmospheric Sciences**

Dr Lucy Carpenter
Department of Chemistry, University of York

Lucy Carpenter has already become an international leader in the study of the chemistry of atmospheric bromine and iodine compounds. Her work has shown that in the unpolluted atmosphere, a wide range of volatiles containing these compounds are given off by natural sources such as algae and seaweed. These trace gases are present at very low concentrations, but can have a major impact on the oxidizing capacity of the atmosphere and the production of fine aerosol particles. Not only has she made pioneering measurements, but she has also contributed substantially to the interpretation of the observations to shed light on the underlying chemistry. These results are of great significance in understanding the Earth's climate and how minor components of the atmosphere interact with one another.

<http://www.york.ac.uk/depts/chem/staff/ljc.html>

Dr Daniel Feltham
Department of Earth Sciences, University College London

Daniel Feltham has made major contributions to our understanding of the formation of ice in polar seas. This plays an important role in the interaction between the polar oceans and the overlying atmosphere and has a long-term effect on climate. He has developed theoretical models, confirmed by laboratory experimentation and tested against data from field experiments, of the mechanical and thermodynamic properties of sea ice. Of particular importance is his model, one of the very first in this area, of the evolution of melt-water ponds which form on the surface of ice during the summer. These melt ponds can considerably lower the albedo, which is a measure of the reflectivity and hence the degree of input solar radiation that is reflected, rather than captured, of the Earth's surface. Dr Feltham has already established himself as one of the scientific leaders in this field, building a group tackling central problems in this

area. His future research will focus on the interactions between polar oceans, sea ice and ice shelves and the processes that drive the global redistribution of heat by the ocean.

Dr Nathan Gillett

School of Environmental Sciences, University of East Anglia

Nathan Gillett's key interests are in changes in the atmospheric circulation and in the detection and attribution of climate change, and his research has already made a large impact in the high profile climate change arena. Using data analysis and experiments with idealised atmospheric models he has detected trends in a number of aspects of surface climate, and he has shown that they can be attributed to human activity which has led to the ozone hole in the Southern Hemisphere and increasing atmospheric carbon dioxide levels. His research has driven forward the debate on the causes of these trends and our ability to simulate them. He has contributed to the latest international assessment of the stratospheric ozone problem and taken a leading role in the high profile assessment of climate change to be published next year.

<http://www.cru.uea.ac.uk/~nathan/>

Dr Rachael James

Department of Earth Sciences, The Open University

Rachael James' research in marine geochemistry has made a significant contribution to quantifying geological processes using trace elements and isotopes. She is an expert in the immensely difficult task of measuring the isotopic composition of the chemical element lithium, which occurs in minute amounts in rocks, water and organisms. From measurements on meteorites she showed that liquid water must have been present when the planets were forming. From sediment in the River Ganges she demonstrated that lithium isotopes reflect the rate of rock weathering, which links to carbon dioxide levels in the atmosphere. Applying these ideas to fossil shells preserved in sediments in the deep oceans, she constructed a history of lithium isotopes in the oceans, and hence a history of rock weathering over millions of years. This work has helped improve our understanding of Earth and planetary processes both now and in the past, and her future work will extend to the study of new areas, such as water pollution.

Dr Timothy Wright

School of Earth and Environment, University of Leeds

Dr Wright uses satellite images of the Earth's surface to describe and understand how the crust deforms in regions where earthquakes are commonplace. The technique involves successive radar images from satellites acquired over a period of time from which movements are reconstructed using new methods of analysis. Timothy Wright is an acknowledged leader in this field having deployed space-based techniques in Turkey, Ethiopia and Tibet. These are all regions of active earthquakes and continental deformation where dense networks of ground-based instruments do not exist. In the next few years Dr Wright proposes to extend these new and exciting methods to much

larger geographical areas such as Tibet. From this he expects to gain new insights into the collision of India into Asia, which produced the Tibetan plateau.

➤ **History of Art**

Dr Vicky Coltman

History of Art, University of Edinburgh

Vicky Coltman has done remarkable work on the ways that the British collecting of antiquities during the Grand Tour in the eighteenth and nineteenth centuries helped to construct a notion of antiquity and an antiquarian tradition of education that was fundamental to the invention of Neoclassicism. From the architecture of country and town houses to their decoration and furnishing, from the appropriation of antiquity by the likes of Josiah Wedgwood in mechanical production to the place of ancient statuary in portrait paintings and 'conversation pieces', Dr Coltman has charted an extraordinary phenomenon of social competition and self-fashioning among the British upper class. Her work is based on deep research and an unrivaled knowledge of a series of unpublished archives coupled with assiduous study of the first hand visual materials and objects. Her book, *Fabricating the Antique*, is a major achievement and the future development of her research into the history and reception of Classical sculpture in England as well as into the artistic elements of the Scottish Enlightenment show exceptional promise and interest.

<http://www.arthistory.ed.ac.uk/Contacts/Profile/VColtman.htm>

Dr Donal Cooper

Department of History of Art, University of Warwick

Donal Cooper's work is outstanding as a result of several distinctive features, which happily complement one another. He is a close reader of archival material, possessing the palaeographic skills, and the necessary patience, to sort through the most intractable manuscript materials. In this process, he has developed the ability to be able to single out the telling detail. He then excels in his ability to interpret his findings creatively within a broader context. Aided by his graceful writing style, he has already made it possible for readers to see some of the most well-known works of the Italian Renaissance in a new light. His continuing research on the liturgical arrangements and disposition of space in Italian churches is full of promise.

<http://www2.warwick.ac.uk/fac/arts/arthistory/staff/staffco/>

Dr Jason Edwards

Department of Art History, University of York

Jason Edwards is an innovative, original young scholar whose influential and exciting work is charting new directions in the study of sculpture. His publications are indicative of the breadth of his interests, and these include a major monograph on the Victorian sculptor Alfred Gilbert and numerous scholarly essays on aestheticism, the late-Victorian

statuette, and the history of Victorian sexuality. His forthcoming book on the theorist Eve Sedgwick promises to extend his contribution to the latter, and to be of consequence to literary scholars and historians, as well as those in the visual arts. His work is characterised by exacting archival research alongside a sophisticated deployment of critical theory. With the award he plans to curate a major exhibition on Victorian sculpture in 2010, accompanied by a linked conference and catalogue.

Dr Maria Loh

Department of History of Art, University College London

Maria Loh's research demands that we treat with great caution the simple hierarchical categories of "original" and "copy" and reveals that such terms were not at all understood in simple ways in early modern Italy. Taking as her test case the reputation of the great sixteenth-century Venetian painter Titian amongst his immediate successors, especially the little-known north Italian painter nick-named Il Padovanino, she shows that one painter might pay homage to another by quoting or repeating motifs or ideas from his work without impairing the status of his own originality, or that of his forebear. Noting the relative modernity of the term "original", Dr Loh draws our attention to the early-Modern importance of terms such as "imitation", "pastiche" and "emulation" in a scholarly programme that not only throws fascinating light on the working lives of old master painters and on the prejudices and interests of their audiences but is also deeply thought-provoking about the cultural priorities of our own troubled times. A key future project will examine the myth of the "Old Master" in Renaissance and post-Renaissance art, literature and film.

➤ **Medieval, Early Modern and Modern History**

Dr Donald Bloxham

School of History and Classics, University of Edinburgh

Donald Bloxham has achieved international recognition in both Holocaust studies and the policies of genocide pursued in the late Ottoman Empire. His work explores the deliberate cover-ups made possible by the mechanisms of studied international diplomatic policies and the conscious omissions in legal questioning procedures serving the political agendas of the dominant powers. The manipulation of law to serve diplomatic interests emerges in his first book, *Genocide on Trial: War Crimes Trials and the Formation of Holocaust History and Memory*, which shows how at Nuremberg the Jews were denied identification as the primary target of the Nazi-driven holocaust through judicial procedures which served the political concerns of the Allies. His second study on the Armenian genocide examines how the deliberate obliteration or expulsion of this Christian population was tolerated from without because of apprehensions as to the consequences of intervention. The breadth and themes of Dr Bloxham's interests are therefore of relevance not only to historians but also to sociologists and political scientists working in these fields.

http://www.shc.ed.ac.uk/profiles/donald_bloxham.htm

Dr Holger Hoock

School of History, University of Liverpool

In his path-breaking book, *The King's Artists. The Royal Academy of Arts and the Politics of British Culture, 1760-1840*, Holger Hoock explores the relationships between the state, cultural patronage and nationalism, and the place of the arts in the politics of the eighteenth and nineteenth centuries. His work has enabled him to offer new insights on how arts reform projects resonated with socio-political reform agendas, and his research links the history of institutions to the history of the imagination in a creative and scholarly way, based on exhaustive archival work. Dr Hoock has thereby contributed to the reshaping and refocusing of debate on the history of Britain in this period in its wider European context. His current and future research has two main strands: he is considering the themes of history, commemoration and memory with particular reference to Nelson, Napoleon and Trafalgar, and to British, French and German memories of the American Revolutionary war; and he will also widen the scope of his work on the visual and performing arts in Britain and the Empire in the eighteenth and nineteenth centuries.

http://cis.liv.ac.uk/pls/portal30/tulwwwmerge.mergepage?p_template=hist&p_tuliprocc=staff&p_params=%3Fp_func%3Dteldir%26p_hash%3DA200610%26p_url%3DHI%26p_template%3Dhist

Dr William O'Reilly

Faculty of History, University of Cambridge

William O'Reilly is perhaps unique in combining two areas of research, one on Atlantic empires and the other on Central Europe. More importantly, he is trying to link these two areas with an original and exciting project in comparative history, concerned with the influence of the Spanish American experience on the way in which Habsburg emperors viewed their new European territories. A polyglot, whose languages include Hungarian and Croat as well as German and Irish, Dr O'Reilly has published a number of articles ranging from specialized studies in the history of migration - including migration from Transylvania to North America - to general reflections on the idea of the Atlantic world. His work is characterized by both intellectual ambition and a firm basis in archives, a combination as unusual as it is fruitful.

<http://www-histecon.kings.cam.ac.uk/william.htm>

Dr Senia Paseta

St Hugh's College and Faculty of History, University of Oxford

Modern Irish history is a vigorous field, and Dr Senia Paseta is an outstanding young practitioner in this discipline, whose research spans the history of education, religion and constitutional nationalism. She has worked on the growth of a professional Catholic middle class élite in the Home Rule era, Ireland's experiences in the Great War, and women and gender issues in the 1920s and 1930s. Her book *Before the Revolution: Nationalism, Social Change and Ireland's Catholic Elite, 1879-1922* revealed the contention between different varieties of pre-1914 nationalism, contrary to earlier

republican-dominated interpretations. Dr Paseta's current work on women in modern Ireland, particularly their role in politics, places women's experiences in a broad political context and will explore the complexity and diversity of these using a wide range of sources.

Dr Derek Peterson

Faculty of History, University of Cambridge

Derek Peterson is one of the most outstanding and productive African historians of his generation. His monograph, *Creative Writing: Translation, Bookkeeping and the Work of Imagination in Colonial Kenya*, is a highly original and methodologically exciting work, which harnesses the use of language and literature to comprehend 'the intimate history of African political discourse'. A sensitive understanding of linguistic shifts in the Kikuyu language underpins his exploration of the way in which a variety of Kenyan entrepreneurs transformed texts to serve their diverse political, religious, legal and cultural purposes. A distinctive and novel feature of his work is the way in which he has successfully integrated literature and history, which has allowed him to show how extensively texts were used. His current research project focuses on the social history of the Christian Revival Movement in East Africa in the mid-twentieth century, and promises to be a groundbreaking study of a, as yet, largely unexplored area.

http://www.hist.cam.ac.uk/academic_staff/further_details/peterson.html

➤ **Mathematics and Statistics**

Professor Ben Green

Centre for Mathematical Sciences, University of Cambridge

Professor Green has made outstanding contributions to the area where combinatorics, analysis and number theory meet. The result which has made him world-famous is his proof, jointly with Terence Tao, that the primes contain arbitrarily long arithmetic progressions. This involves analyzing the primes by embedding them in a larger "highly pseudorandom" set. Powerful new techniques are introduced, which promise a major extension of the Hardy-Littlewood method in analytic number theory. Future exciting work will build on these techniques and aim to provide more precise statements about progressions of primes and related objects.

<http://www.dpmms.cam.ac.uk/~bjg23>.

Dr Marc Lackenby

Mathematical Institute, University of Oxford

Marc Lackenby has established himself as a world leader in low-dimensional topology. His early papers were concerned with the very classical concept of Dehn surgery on three-manifolds. By a highly original and unexpected combination of techniques, he was able to obtain strong finiteness and uniqueness from surgery results, some of this work being done with Daryl Cooper. Connections with geometric group theory were already

becoming apparent in this work. He now focusses on two related areas: one of the big remaining open conjectures in 3-dimensional topology, the virtually Haken conjecture, and a branch of geometric group theory which he brought to the fore. The connection between the two areas has been considerably sharpened by his novel approach to the virtually Haken conjecture, and by an important paper in which he laid the foundations of the theory concerned with finite index subgroups. His work on these areas is considered to be one of the most exciting things happening in these areas of mathematics.

Dr Pierre Tarrès

Mathematical Institute, University of Oxford

Stochastic Analysis, the area of mathematics concerned with high dimensional stochastic systems, is an exciting area which has attracted many young stars. A current objective is to understand processes that evolve within a random environment - and some of the most subtle problems arise in the situation where the environment changes (or learns) as a result of the exploration. Reinforced random walks form a fundamental class of uncluttered mathematical models that capture features of learning processes and at the same time expose clear and substantial mathematical challenges. Apparently simple problems have remained intractable. Pierre Tarrès is an extremely promising young mathematician who has already achieved highly significant results on a very exciting interface between rigorous mathematics and learning. Dr Tarrès has introduced new methods for analysing vertex reinforced behaviour and has achieved the definitive results for one dimensional vertex reinforced random walks.

<http://www.maths.ox.ac.uk/~tarres/>

Dr Peter Topping

Department of Mathematics, University of Warwick

Peter Topping's work sits at the interface of nonlinear PDE, differential geometry, and the calculus of variations. He specialises in geometric flows - one of which, Ricci flow, was used by Perelman to solve the Poincaré Conjecture - and on geometric inequalities of various types. He has often found extremely elegant solutions to formerly difficult problems, including a famous one-line proof of the isoperimetric inequality for curves in the plane and a number of new isoperimetric inequalities. He has done important work on the Willmore conjecture, one of the classical open problems in geometric analysis. He established a number of important results for harmonic map flow and also showed, contrary to widely held belief, that weak solutions are not unique. The phenomenon has since been observed in the Ricci flow. Having fairly recently turned his attention to Ricci flow, a field which has received a lot of attention, he has already obtained some important results and is making rapid advances towards becoming one of the leaders in the quest to understand the formation of singularities.

<http://www.maths.warwick.ac.uk/~topping/>

Dr Andrei Yafaev

Department of Mathematics, University College London

Dr Yafaev has been recognised for his work on Shimura varieties, particularly on the proof of the André-Oort conjecture. A Shimura variety is a geometric object with intrinsic group-theoretic and arithmetic structures. Many of the deepest connections between algebraic geometry, number theory and representation theory can be translated into problems concerning Shimura varieties. Among the greatest of mature mathematicians have contributed to their study. The André-Oort conjecture proposes a concrete characterization of certain sub-structures of a Shimura variety in terms of its defining group, and this has important implications and applications in several directions. Dr Yafaev has pursued the conjecture in a series of papers with collaborators, bringing exceptional insights and new, unexpected methods to the study. International referees regard the novelty and power of his most recent work as amongst the very best presently being carried out by a young pure mathematician in the UK.

➤ **Zoology**

Dr Angus Buckling

Department of Zoology, University of Oxford

Angus Buckling uses a combination of theory and experiments to tackle fundamental questions in evolutionary ecology, such as the factors influencing speciation, the relationship between habitat 'patchiness' and the stability of ecosystems, the evolution of virulence in parasites, and the effect of habitat disturbance on species diversity. Experimental studies of such complex ecological and evolutionary phenomena are understandably difficult, but the outstanding aspect of Dr Buckling's research is how he has used bacterial communities, and their associated viral parasites, to create whole ecosystems in a test-tube. These are then amenable to the experimental manipulation and replication needed to test his theoretical models. This very much represents a paradigm shift in the field, a field in which Dr Buckling is seen to be taking a leading role.

Dr Rebecca Kilner

Department of Zoology, University of Cambridge

Rebecca Kilner has made major contributions to our understanding of how parent-offspring relations are shaped by natural selection. Her work has focussed on communication and social conflict and how these conflicts are resolved. Her research has studied conflicts at two levels: within individual families and between species. She has carried out remarkable studies of the interactions between parent birds and their nestlings, demonstrating in particular the conflicts that both parties face in communicating and responding to needs in a way that balances costs and benefits. She has also shown how these subtle communication systems can be exploited by parasitic birds such as cuckoos. Her work is widely recognised as providing important new insights into the evolution of signalling systems. Her current research focuses on how mothers influence the behaviour of their offspring, so that offspring demands are suited to maternal quality.

<http://www.zoo.cam.ac.uk/zoostaff/bbe/Kilner/Rebecca1.htm>

Dr Loeske Kruuk

School of Biological Sciences, University of Edinburgh

Most of what we know about the two essential ingredients of how evolution operates, natural selection and genetic heritability, has come from experimental or agricultural situations, not nature. This is because of the fundamental problem of separating genetic and environmental effects in natural populations: are individuals big because of their genes or because they ate well when young? Dr Kruuk has opened up a completely new approach to evolutionary ecology by providing the tool box to separate these effects. She pioneered the use of statistical methods developed by animal breeders for the analysis of wild populations. This has made it possible to address fundamental evolutionary issues in natural populations in a way not previously possible. Dr Kruuk has explained several problematic observations, for example, that natural selection usually favours better body condition, yet average body condition in natural populations often goes down. Louise Kruuk resolved this apparent paradox: she showed in a wild bird population that even when selection is generating genetic improvements in condition, average condition can decline if the environment everyone experiences gets worse. Her work on red deer, wild sheep, and wild bird populations will undoubtedly continue to provide more novel insights, not only in evolutionary ecology and but also in areas such as conservation genetics and the biological response to climate change.

<http://homepages.ed.ac.uk/loeske/>

Dr Gilean McVean

Department of Statistics, University of Oxford

In principle, DNA sequence data generated in the last few years provides the raw material for novel insights into the evolutionary process and disease, but making sense of the deluge of novel data poses enormous analytical challenges. Dr McVean has developed mathematical and statistical methods for analysing molecular genetic variation data, and these have provided fundamental insights. Much of his work involves the analytical component in large collaborative consortia. One of the key advances has been his analysis of recombination rates at a fine scale across whole genomes, including those of humans, chimpanzees and the pathogens causing meningitis and malaria. His work has shown that recombination hot spots were ubiquitous, extremely common (25,000) and tended not to be in genes. Moreover, he identified the DNA motifs associated with recombination. He is also making fundamental contributions to the International HapMap Consortium, which involves the analysis of over one million mutations screened from 300 individuals worldwide. In these data, he identified a variety of genes which diverged between human populations because of divergent selection pressures. This includes a gene for skin pigmentation and another for obesity.

<http://www.stats.ox.ac.uk/~mcvean>

Professor Stuart West

School of Biological Sciences, University of Edinburgh

Stuart West is an outstanding evolutionary biologist who has carried out pioneering research on the evolution of co-operative behaviour. He has addressed this at many different levels, and in a remarkably broad range of organisms ranging from bacteria to humans. He has shown how, despite the selfish interests that drive natural selection, co-operative behaviour can still evolve under certain circumstances; he has further shown how it can be blocked by competition for resources. Professor West is also well known for his work on the factors that shape optimal offspring sex ratios. He combines breadth and depth in his work, whether theoretical or empirical, and brings together different biological disciplines to study the same problem.

<http://westgroup.biology.ed.ac.uk>