



UCL Grand Challenges

Over 10 years of
Developing Solutions





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Foreword

For more than a decade, UCL Grand Challenges has brought researchers from across UCL together to tackle myriad issues the world faces. From non-communicable diseases, energy and structural inequalities, the Grand Challenges initiative itself and its funded projects have shone a light on the critical importance of cross-disciplinary perspectives and expertise in effectively addressing challenges from the local to the global level. More recently, the importance of this approach has been made clear by the COVID-19 pandemic, with the need to include a broad range of expertise in decision-making highlighted as the only effective way forward.

I am immensely proud of the work that the Grand Challenges team and the researchers involved in Grand Challenges projects have undertaken over the last decade; from the creation of the Global Disability Innovation Hub and the Centre for Behaviour Change to the Lancet Lecture series, our work on structural inequalities, and the Connected Curriculum at UCL Academy, Grand Challenges work has resulted in lasting collaborations that will generate impact and catalyse positive change well into the future.

Through the UCL Grand Challenges programme, our funding has enabled researchers to create lasting partnerships, sowing the seeds of ideas and projects that can grow and flourish - and go on to achieve great things, from developing apps to informing government policy.

Grand Challenges has enjoyed tremendous success in embedding its cross-disciplinary approach across the institution, helping to create systemic change whilst itself continuing to grow and adapt. We have also been successful in crossing both internal and external boundaries, working closely with UCL Public Policy, UCL Culture, Innovation & Enterprise, and most recently with the Office of the Vice Provost (International)/Global Engagement Office on UCL's approach to the UN Sustainable Development Goals.

UCL Grand Challenges is unique in its ability to connect, inspire, and prepare for the unexpected. While the challenges COVID-19 presents us with may seem overwhelming at present, these challenges are no different in nature to those that UCL researchers have been tackling for the



Professor David Price
Vice-Provost (Research)

past decade, albeit on a much larger scale. As a result, UCL as a whole is better equipped to help the world recover from this crisis and prepare to take the first steps towards a more equitable, inclusive, sustainable and resilient world. UCL Grand Challenges will continue its work in bringing together those with the necessary skills and ideas to help address the immediate and longer-term issues that the virus both highlights and exacerbates.

While attention is currently focused on addressing the pandemic and its effects, we are acutely aware that this will not be the only complex problem facing humanity in the coming years, as we look to 2030 and the deadline for achieving the SDGs. Only through an interdisciplinary lens can we hope to adequately address both current and future pressing societal problems - and move towards 2030 with a clearer plan of the world we must create, learning from our experiences, and sharing expertise required to create a better, more equitable and sustainable future. Through adopting Grand Challenges' collaborative, cross-disciplinary, cross-boundary approach we will move forward and recover, together.

As we reflect on 10 years of UCL Grand Challenges, we extend our thanks to all who have engaged with the programme and whose work has helped to make it the success it has been to date. We look forward to continuing this work, building new collaborations, and igniting yet more ground-breaking research in the years ahead.

Foreword

Now into its second decade, UCL's Grand Challenges programme has become part of our university's institutional fabric. Supported by the Provost, Deans of faculties and Heads of academic departments, Grand Challenges has helped to foster and sustain a creative and productive culture of cross-disciplinary collaboration at UCL. Researchers know how their expertise can be useful outside their own field, and they are comfortable with the idea of sharing their ideas with colleagues in other disciplines and faculties.

UCL Grand Challenges grew from an idea that Professor David Price had when he became Vice-Provost (Research) in 2007, making the initiative a key component in the university's first institutional Research Strategy, 'Maximising Our Potential'.

Professor Price recognised that researchers needed to be encouraged and supported to collaborate across academic disciplines, if UCL was to achieve the best possible impact from its research output for the benefit of society and the planet. Grand Challenges' first major output, from its Global Health strand, was a Lancet Commission report on managing the health impact of climate change (June 2009) – initiating a series of influential health-focused Lancet reports framed by other strands. Reviewed in 2015, Grand Challenges grew from its inaugural four strands of Global Health, Sustainable Cities, Intercultural Interaction (now Cultural Understanding) and Human Wellbeing, to six, with the addition of Transformative Technology and Justice & Equality.

Since its inception, hundreds of researchers, from doctoral students to full professors, have participated in the Grand Challenges programme through activities supported by annual grass-roots small grants schemes, and through strategic special initiatives. The examples in this compendium of Grand Challenges- stimulated activities illustrate the value of giving bright people with different scholarly skillsets a small institutional incentive to join forces. Seed corn support from Grand Challenges has helped to develop ideas and produce the insights and recommendations that practitioners



Dr Ian Scott

Director, Grand Challenges & Cross-Disciplinary Development UCL Office of the Vice-Provost (Research)

and policymakers need. Our case studies also highlight the value of cross-disciplinary interaction to individual researcher's own scholarly work, showing that this more generous way of pursuing academic enquiry, in terms of benefits to society, doesn't have to be only altruistic in motivation.

Our globally interconnected world has complex problems that require joined-up thinking to solve – from the UN's Sustainable Development Goals to acute threats such as COVID-19 and other pandemic disease outbreaks. The role of universities in addressing this and future global crises is crucially important, and opportunities to work co-creatively with research users in civil society are crucial in finding pathways to sustainable solutions. That's why the UCL Grand Challenges crossing boundaries (between disciplines and sectors) approach is needed now more than ever. Looking to the next decade, the world will undoubtedly be very different after the current pandemic has run its course, perhaps with COVID-19 as an endemic world-wide reality with no return to 'normal service'. Grand Challenges looks forward to playing a strong and resolute role.

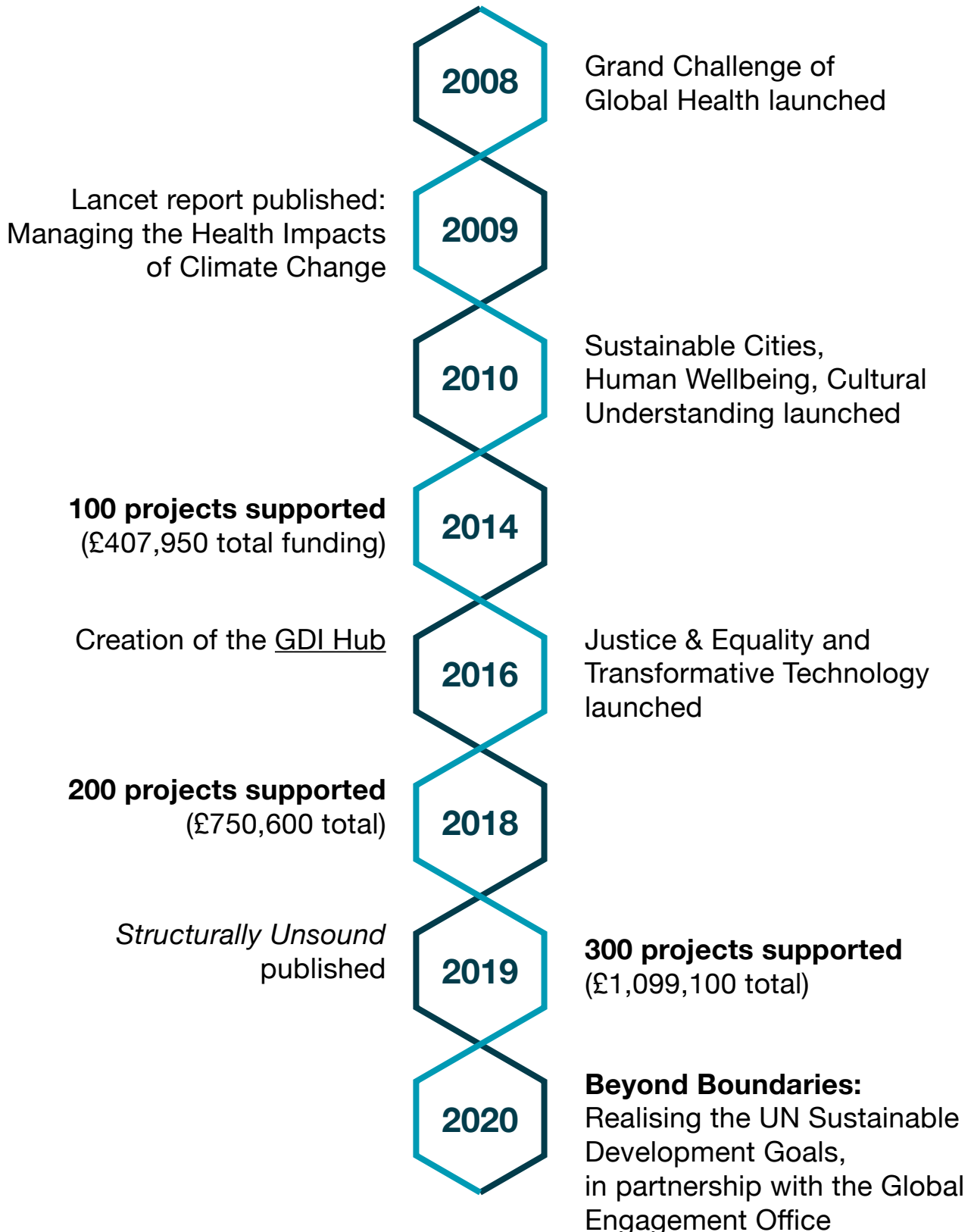
About UCL Grand Challenges

The need for cross-disciplinary attention to health-related problems motivated the first major Grand Challenges output – the 2009 report of the UCL-Lancet Commission on managing the health impacts of climate change – started the GC programme's Global Health strand. By UCL's Spring Term in 2010 the four major strands of the inaugural Grand Challenges programme were active: Global Health, Sustainable Cities, Human Wellbeing and Intercultural Interaction, now known as Cultural Understanding.

Following a major review of the programme in 2015, Grand Challenges expanded in 2016 through the introduction of two new major strands - Justice & Equality and Transformative Technology, which have substantially increased the initiative's reach and relevance across a rich and diverse landscape of distinctive academic faculties.



UCL Grand Challenges: A Timeline



UCL Grand Challenges in Numbers*



*Figures in this brochure are under-estimates based on reported data only.

UCL Grand Challenges programme academic leads

Chairs and Co-Chairs of the Grand Challenges Executive and Working Groups, 2009-2020

GC strand

**Global Health
2009-20**

Chairs / Co-Chairs

Professor Anthony Costello
Professor Dame Anne Johnson
Professor Nora Groce
Professor Megan Vaughan

Faculty

Population Health Sciences
Population Health Sciences
Population Health Sciences
Social & Historical Sciences

**Sustainable Cities
2009-20**

Professor Matthew Gandy
Professor Jane Holder
Professor Yvonne Rydin
Professor Ben Campkin
Professor Adrienne Allen
Professor Michele Acuto
Professor Peter Jones OBE
Dr Barbara Lipietz

Social & Historical Sciences
Laws
The Bartlett
The Bartlett
The Bartlett
Engineering Sciences
Engineering Sciences
The Bartlett

**Intercultural
Interaction / Cultural
Understanding
2010-20**

Professor Nicola Miller
Professor Maria Wyke
Professor Doug Bourn
Dr Helene Neveu Kringelbach
Professor Audrey Prost

Social & Historical Sciences
Arts & Humanities
Institute of Education
Arts & Humanities
Population Health Sciences

**Human Wellbeing
2010-20**

Professor Nick Tyler CBE
Dr Jacob Stougaard-Nielsen
Professor Helene Joffe
Dr Luiza Campos

Engineering Sciences
Arts & Humanities
Brain Sciences
Engineering Sciences

**Transformative
Technology
2016-20**

Professor Marc-Olivier Coppens
Professor Jon Agar
Dr Jack Stilgoe
Professor Patty Kostkova

Engineering Sciences
Mathematics & Physical Sciences
Mathematics & Physical Sciences
Mathematics & Physical Sciences

**Justice & Equality
2016-20**

Professor Margaret O'Brien
Professor Colm O'Conneide

Institute of Education
Laws

UCL Grand Challenge of
**Global
Health**

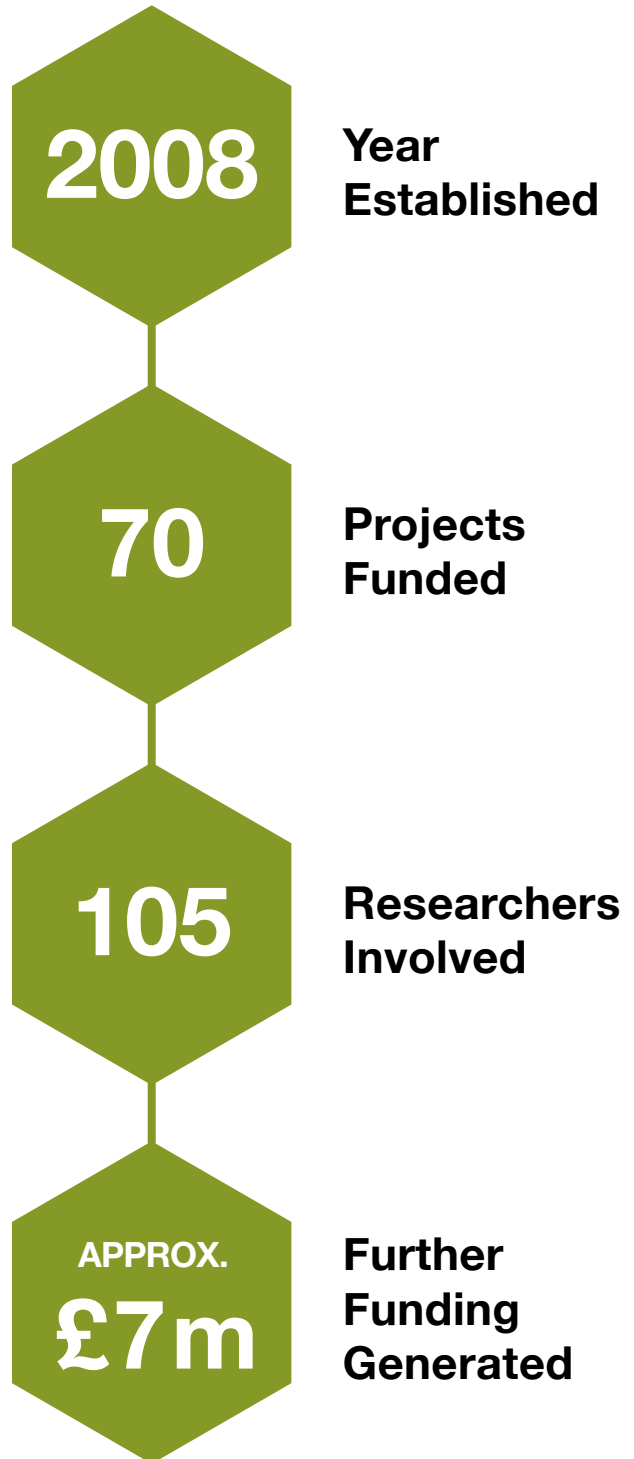


Overview and Key Stats

The Grand Challenge of Global Health brings together a wealth of intellectual capital from across all disciplines to find innovative, workable solutions to global health problems. Since the programme was established in 2009, it has created and facilitated novel collaborations on topics such as non-communicable diseases, the health effects of climate change and the health of migrants and refugees.

Global Health has funded almost £200,000 in Small Grants to UCL researchers, hosted events in London and around the world - including roundtables, seminars and public events - and has collaborated closely with the [UCL Institute of Global Health](#).

GLOBAL HEALTH STATS



Key Highlights: Lancet

Over the past decade, UCL Grand Challenges has established a strong partnership with The Lancet, spearheading several innovative initiatives on a range of health-related topics.

Grand Challenges has convened and facilitated worldwide collaboration between academics on a number of Lancet Commissions:

- Managing the effects of climate change: The UCL Lancet Commission (2009)
- UCL-Lancet Healthy Cities Commission (2012)
- Culture and Health (2014)
- Health and climate change: policy responses to protect public health (2015), which directly led to The Lancet Countdown: Tracking Progress on Health and Climate Change (2018)
- Lancet Commission on Stem Cells and Regenerative Medicine (2018)
- Lancet Commission on Migration and Health (2018).

The Lancet Commissions have provided cross-disciplinary evidence and recommendations, setting the foundations for researchers, policy makers, international agencies, and communities, to deliver health improvements.

In addition, UCL Grand Challenges and the UCL Institute for Global Health jointly deliver the annual UCL-Lancet Lecture. The Lecture is open to the public and addresses topics of concern to the global health community, from child mortality to global governance.

The 2020 Lecture was delivered by UCL alumnus Dr Muhammad Ali Pate, Global Director for Health, Nutrition & Population at the World Bank, speaking on 'Global Health Preparedness in the Face of Emerging Infections'. For the first time the Lecture was pre-recorded and streamed online with responses from leading UCL researchers, some of whom are currently active in advising the UK Government in its response to the COVID-19 pandemic.

HEALTH, CLIMATE CHANGE, AND THE UCL GRAND CHALLENGES

"The UCL Grand Challenges are ambitious, they span disciplines and cultures and continents, and they connect cutting-edge science with real-world impact. It's no surprise that the Lancet Countdown on Health and Climate Change found its origins in the Grand Challenge for Global Health, and that a partnership that began between UCL and The Lancet has grown into a collaboration that spans 35 academic institutions and UN agencies across 18 countries. Now with offices in London, Beijing, and Lima, the platform tracks the health impacts of climate change, and the global health response to the defining challenge of the 21st century.

The Lancet Countdown brings together 85 climatologists, physicists, geographers, economists, engineers, development experts and political scientists, public health professionals, and yes, even medical doctors. Spanning so many disciplines comes with its own difficulties – we rarely reach consensus, and meetings are filled with impassioned discussion and frequently over-run. And yet, it's our greatest strength, and the payoff is always worth the investment."

Dr Nicholas Watts
Executive Director
Lancet Countdown

UCL-LANCET LECTURES

[2020 Lancet Lecture](#): Dr Muhammad Ali Pate (Global Director for Health, Nutrition and Population at the World Bank Group) - “Global Health Preparedness in the Face of Emerging Epidemics”

[2019 Lancet Lecture](#): Dr Rachel Nugent (Vice-President for Global Non-Communicable Diseases, RTI International) - “NCDs as a Global Emergency”

[2017 Lancet Lecture](#): Ms Lilianne Ploumen (MP and former Development Cooperation Minister, Netherlands) - “She Decides - Filling the sexual and reproductive health funding gap left by Trump’s global gap rule”

[2016 Lancet Lecture](#): Ms Christiana Figueres (Executive Secretary, UN Framework Convention on Climate Change) - “Action on climate change for a healthier world”

[2015 Lancet Lecture](#): Ms Amina J. Mohammed (Minister of Environment, Nigeria) - “The new universal Sustainable Development Goals for 2030”

[2014 Lancet Lecture](#): Ms Arundhati Roy (Novelist and Political Activist) - “The Half-Life of Caste: The ill-health of a nation”

[2013 Lancet Lecture](#): Dr Agnes Binagwaho (Minister of Health, Rwanda) - “Charity does not rhyme with development”

[2012 Lancet Lecture](#): Mr Michel Sidibé (Executive Director, UNAIDS) - “Health Justice and the Future of Development”

[2011 Lancet Lecture](#): Professor Jayati Ghosh (Development Economist) - “Economic growth and women’s health outcomes”

[2010 Lancet Lecture](#): Ms Helen Clark (Administrator of the UNDP and former Prime Minister of New Zealand) - “Overcoming Public Health Challenges: Meeting the Millennium Development Goals”

[2009 Lancet Lecture](#): Professor Lord May (Government Chief Science Adviser and former President of the Royal Society) - “Climate Change and Global Health”

[2008 Lancet Lecture](#): Professor Michel Kazatchkine (Executive Director, Global Fund to Fight AIDS, Tuberculosis and Malaria) - “Health, Equity and Globalisation”

[2007 Lancet Lecture](#): Professor Adenike Grange (Minister of Health, Nigeria) - “Health Reform in Nigeria”

[2006 Lancet Lecture](#): Mr Jens Stoltenberg (Prime Minister, Norway) - “Our children: The key to our future”



“Of all our relationships with universities around the world, the one we have with UCL represents our deepest relationship. We have been very fortunate to work with colleagues there, to support the utterly innovative Grand Challenges programme. We’ve been delighted to work with colleagues to develop one of the Grand Challenges projects on climate change, which has then become the Lancet Countdown, an accountability mechanism. This is a uniquely different role for a university, plunging UCL into a very challenging political space, and making the university an instrument not just for generating knowledge, but also for provoking social and political change. ”

Dr Richard Horton
Editor-In-Chief of The Lancet

Essential Diversions: Urine Diversion Toilets in Durban, South Africa

Since the 19th century, western models of public health engineering have led to a global preference for water-borne sanitation, even in situations where it is neither economically or ecologically viable or culturally appropriate. Serious attempts have been made only relatively recently to introduce new methods of waste removal and management, including dry sanitation and ecological sanitation. This was a particular focus for eThekweni Municipality in Durban, South Africa; between 2003 and 2009, 90,000 urine diversion toilets were installed in the region as part of a strategy to improve sanitation provision in peri-urban and rural areas, with potential for dry sanitation technology to be transferred to other African municipalities, other developing countries, and possibly developed countries.

In 2010, UCL's Dr Barbara Penner (Bartlett School of Architecture) and Professor Sarah Bell (Civil, Environmental and Geomatic Engineering), along

with Mary Galvin from Civil Society Organization Umphilo waManzi, won a Grand Challenges Small Grant to host a workshop to study sanitary provision from all angles and develop a model for future global health and sanitation initiatives.

Their project aimed to promote collaboration between scholars in architecture, engineering, and development, as well as NGO, Civil Society Organisation workers, and communities. By improving dialogue between the people who design sanitary technologies, those who plan and implement them, and the communities that use and benefit from them, the researchers hoped to encourage more effective feedback and provide an evaluation framework.

The two-day workshop was held in Durban in August 2010, with attendees from University of KwaZulu-Natal, eThekweni Water and Sanitation, and other local bodies, to learn from the eThekweni experience, with the aim of informing future engagements with sanitation issues.

The event comprised of one day of site visits and one of presentations and discussion, and helped to establish important questions that the sanitation field needed to address. It highlighted a tension between technical solutions to sanitation issues and their social acceptability, and asked how the development of new technology can be supported to promote greater ownership among communities. It posed the question: if the future of sanitation is 'dry', how can societal expectations be shifted so that flush systems are no longer automatically treated as preferable?

The workshop findings have since fed back into Dr Penner's teaching and research, as well as a scholarly article. The workshop also led to a related project several years later 'New Loos for London?', supported by the Grand Challenge of Sustainable Cities.



Small Grant 2009-2010
Awarded £5,000

Professor Barbara Penner
Bartlett School of Architecture
The Bartlett

Professor Sarah Bell
Bartlett School Environment,
Energy & Resources
The Bartlett

Dr Mary Galvin
Umphilo waManz

Essential Diversions: Urine Diversion Toilets in Durban, South Africa (continued)

Along with the Bartlett's Dr Tse-Hui The, Professor Sarah Bell went on to co-organize UCLoo Festival in November 2013, a £25,000 two-week festival launched on World Toilet Day 2013, that sought to highlight sanitation issues globally. Events included a film festival, loo tours, make-a-thon, exhibition, lectures, and a comedy night. Its centerpiece was a working ecological public toilet in the UCL Main Quadrangle. The event was covered in [Time Out](#) and [BBC Radio 4's "Costing the Earth: A Toilet for the 21st Century"](#). The event was later named *Winner of UCL Communication and Culture's Best Public Event of 2013*.



Outputs and Impact:

- "[Flush with Inequality: South Africa's Toilet Wars](#)" Places, 18 November 2010
- Numerous conference papers and media interviews
- Grand Challenges project, [New Loos for London?](#) held in November 2012
- UCLoo Festival



Decreasing Case fatality rates of newborns through E-health, Audit and Supportive Education

Worldwide, every year, 3 million babies die before they reach one month of age. It is estimated that 70% of these deaths could be avoided if simple, known, low cost interventions were implemented. This is especially true in the hospital setting in rural or developing areas where more women are delivering their babies but where the system, the resources and the training of staff are inadequate to deal with these babies when they are sick or vulnerable.

Dr Michelle Heys (Institute for Global Health) and Dr Patty Kostkova (Department of Computer Science) identified a key area of need – too many babies die before one month of age in Bangladesh, coupled with rising numbers of mothers giving birth in rural hospital settings with insufficient capacity or ability to provide quality care. Combining their sets of expertise, they developed for the first time ever an educational and ehealth package to reduce newborn deaths.

The prototype mobile clinical decision tree enabled prompt identification, diagnosis, and treatment of at risk newborns, and included dynamic configurability to reflect the needs and capacity of specific healthcare settings.

Following the pilot, the team collaborated with colleagues in Malawi to replicate and further develop [Neotree](#), a mobile app that provides healthcare workers with guidance on neonatal care and diagnosis in areas with limited access to resources. Dr Heys has been working on co-development and feasibility in Malawi and Zimbabwe, and the app is being rolled out to several other countries in Africa.

The NeoTree app has been featured as one of UCL's #MadeatUCL stories: [learn more here](#).

Dr Heys and her team also published a recent paper on the app in the British Medical Journal: [you can read this here](#).



Small Grant 2014-2015
Awarded £4,000

Dr Michelle Heys
UCL GOS Institute of Child Health
Population Health Sciences

Professor Patty Kostkova
Institute for Risk & Disaster Reduction
Maths & Physical Sciences



Africa Voices

In early 2016, a series of events funded by the Grand Challenge of Global Health was held to formally launch the African Studies Research Centre, housed within the UCL Institute of Advanced Studies. The Africa Voices series touched on medicine, politics, archaeology and architecture along with the continuing impact of colonialism. It emphasized the goal of co-producing knowledge about Africa with African colleagues on the continent and in the diaspora. Researchers came from universities in Uganda, Nigeria, Senegal, South Africa and Kenya, and were joined by others with knowledge and expertise across the continent, to help nudge the public narrative on Africa in the UK in more positive directions.

- Dr Ibidun Adelekan (University of Ibadan, Nigeria) presented data on some of the initiatives for improving access to good public transport in urban Africa.
- Dr Ibrahima Thiaw (University Cheikh Anta Diop, Senegal) outlined the ways in which gold mining can interact with archaeology to preserve stories of historic population mobility thereby addressing the social issue of preserving cultural heritage.
- Professor Adam Habib, (University of Witwatersrand, South Africa), addressed the volatile political situation in South Africa and passionately defended the cause of the 'Rhodes Must Fall' protests as part of the social issue of access to higher education.
- Dr Caroline Wanjiku Kihato (University of Johannesburg, South Africa) presented data from a project looking at urban growth in sub-Saharan Africa. She addressed the social issue of poor urban management, and used her data to argue for stronger research on city-scale governance and mayors.



- Finally, Dr Peter Waiswa, (Makerere University, Uganda) demonstrated not only what path-breaking medical research is already being undertaken in Africa, but how effective collaboration with European (in his case Swedish) partners can be addressing the social issue of effective public health policy in Africa.

Several of these partners have continued collaborations with colleagues at UCL. The African Studies Research Centre is now an important part of the Institute for Advanced Studies and this event series brought it into the spotlight, as well as showing how researchers can co-create knowledge with those outside UCL.

In my own work and as co-Chair of the Grand Challenge for Global Health I have seen how the kind of open, exploratory and interdisciplinary academic research encouraged by UCL can shift our perspective on pressing global issues, and provide the critical insights we need in order to solve them.



Professor Megan Vaughan

Professor of African History & Health
Deputy Director of the UCL Institute of Advanced Studies
Social & Historical Sciences

I'm a firm believer that improving the health of populations is an all-of-society responsibility, no one sector has a monopoly of good ideas on how to keep people healthy, and that collaboration, co-operation and collegiality lie at the heart of good public health programmes. The Grand Challenge of Global Health encompasses all of those principles for me.

The Grand Challenge of Global Health was formed around the time I joined UCL, and coming into the interdisciplinary environment of the Grand Challenge, I felt like I had found my academic home. Working with colleagues from across Faculties and disciplines in UCL has been a real eye-opener for my understanding of how to think about, analyse and address the complex global challenge of keeping people healthy.

As a grant recipient from the Grand Challenge I've worked on a number of cross-faculty projects that have brought new ideas, new methodologies, new colleagues and new friends into my working life. From organising a colloquium on the legal aspects of global health and co-editing a book on the same topic with the incomparable and indefatigable Michael Freeman (champion of children's rights, upholder of social justice for all), to getting to grips with the challenges of promoting systems of accountability within the global governance system for health (with the erudite, articulate and extraordinary Tom Pegram), the Grand Challenge of Global Health has brought to life all the positive aspects of how to promote academic partnership.

Moving forward, the Grand Challenge will be supporting our forthcoming Lancet Commission on Gender and Global Health. I'm very excited to have an opportunity for UCL to co-host a global Commission that aims to find solutions to gender equality and health inequities that are sustainable, politically-relevant, intersectional, feminist and global – features that I think will also characterise the Grand Challenge as it is moving in to the next decade of its work across the global community in UCL.



Professor Sarah Hawkes

Professor of Global Public Health
Director of the UCL Centre for Gender and Global Health
Population Health Sciences

I have always felt strongly that universities afford a unique environment to bring together knowledgeable experts to work on many of society's most pressing problems. It's not just that people have expertise but that this expertise is held in trust to make a difference. For that reason, I was delighted to be asked to join the Grand Challenge of Global Health group shortly after I came to UCL to direct what is now the UCL International Disability Research Centre. I am now fortunate to serve as co-chair of this Global Health group along with Professor Megan Vaughan.

Over the years, the Grand Challenge of Global Health, working both independently and in collaboration with other Grand Challenges groups, has provided an important platform for UCL students and faculty to start new research and pursue further interdisciplinary projects. With the emphasis not just on funding starter grants that bring together graduate students and faculty from across UCL who otherwise might not work together but also by including members of community groups and advocates beyond UCL, the Grand Challenges programme broadens UCL's commitment to meaningful change both locally and globally.

There are dozens of really interesting projects funded over the years I have been part of Grand Challenges that come to mind – but let me give two examples here. The first is the support Grand Challenges provided for the 2015 project on Forced Marriage which brought scholars and advocates from throughout the UCL community to not only set up an on-going Research Network but also foster a large symposium on central campus ('Force Marriage: Health, Wellbeing, Community and Law') which brought together several hundred participants from throughout the London area and beyond to discuss issues of forced marriage in the UK. Collaborations from this project continue as does regular teaching to in various medical and graduate courses at UCL. Forced marriage and its impact on young people continues as well in the more recently Grand Challenges funded project (2018-2019), where Dr Rochelle Burgess from the UCL Global Health Institute, with colleagues, have set up a Global Network on Mental Health and Child Marriage.

The second example is the seed funding given for a 'Pop Up Disability Innovation Hub' granted to Dr Maria Kett (UCL), Vicki Austin (London Legacy Development Cooperation) and Dr Catherine Holloway (UCL) to bring together expertise from around UCL in engineering, design and innovation to improve the lives of people with disabilities. Building continually on their initially work, UCL's Global Disability Innovation Hub, now based at UCL East under the direction of Dr Holloway with £20 million pounds in funding and a global presence brings together dozens of faculty and students to address issues related to improving the lives of people in both high and low and middle-income countries. The project collaborates with many researchers, advocates, universities, NGOs and UN agencies around the world. As someone who works on global research on vulnerable populations, including people with disabilities – I often find myself at a global meeting or international conference where someone will say to me 'oh, you're from UCL – do you know the Global Disability Innovation Hub.' I'm always pleased to say 'actually, yes I do' – and I know that part of its success can be traced to the initial funding it received from Grand Challenges.



Professor Nora Ellen Groce
UCL International Disability Research Centre
Department of Epidemiology
Population Health Sciences

UCL Grand Challenge of
**Sustainable
Cities**

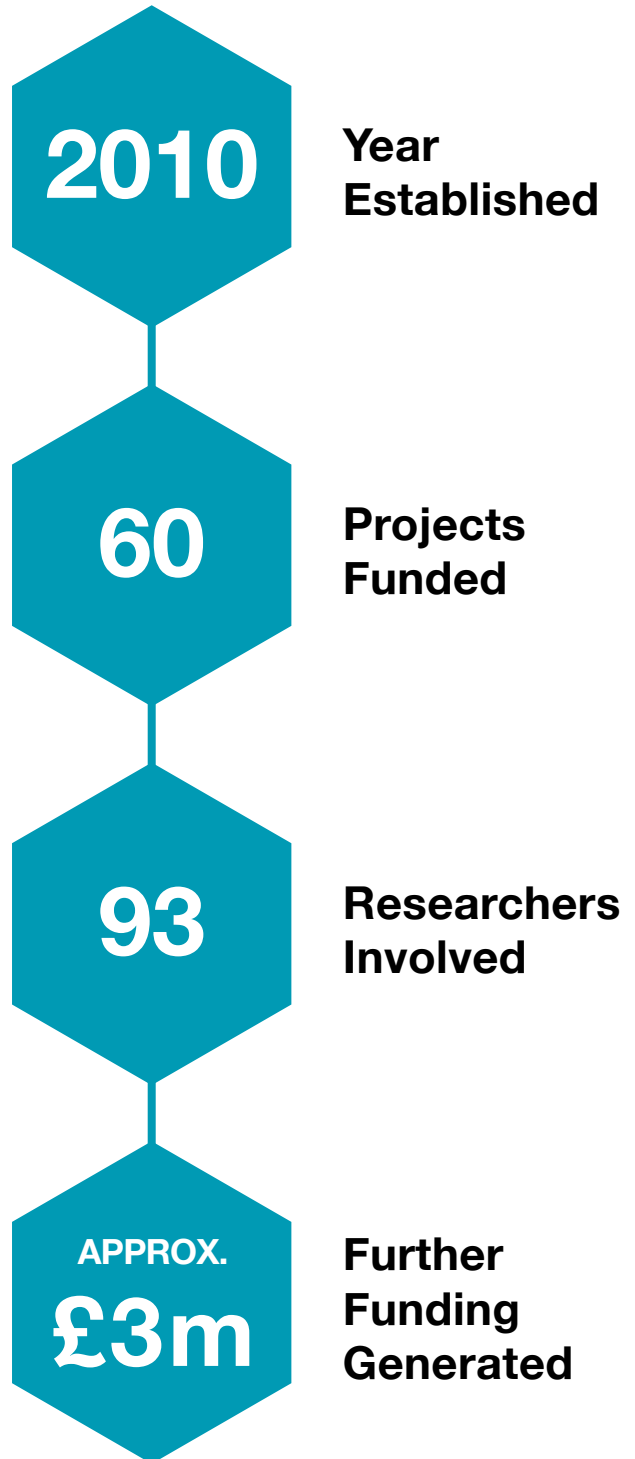


Overview and Key Stats

The Grand Challenge of Sustainable Cities examines one of the most urgent issues facing the world today: increasing and relentless urbanisation.

Since 2010, Sustainable Cities has awarded over £257,000 in funding, supporting 60 research projects on a range of topics including creating healthy cities, finding solutions to urban water shortages, protecting a city's heritage and understanding the impacts of graffiti.

SUSTAINABLE CITIES



Key Highlights: Re-thinking Housing



Neil May MBE

Principal Research Associate at
the UCL Institute for Environmental
Design and Engineering

The Re-thinking Housing project built upon a partnership between the late Neil May MBE (Bartlett Institute for Environmental Design and Engineering) and Professor Nick Gallent (Bartlett School of Planning).

The initiative drew on contributions from across the university with comment from individuals working in departments as diverse as Development Planning, Philosophy, Economics, Archaeology and Science Technology Engineering and Public Policy.

The starting point of the work was a challenge to the orthodoxy that supply-side measures, in short simply building more houses, can solve the current housing crisis. The analysis revealed that in focusing on supply the demand side of the equation often gets lost.

The initiative resulted in a number of outputs, including [a joint paper](#) that questions the assumption that we can build our way out of the housing crisis. In collaboration with UCL Public Policy, the Grand Challenge of Sustainable Cities also commissioned the team and a number of other prominent UCL academics to present their thinking on the issue:

- [Whose Housing Crisis?](#) By Professor Nick Gallent
- [Thinking small to think big, addressing London's housing crisis](#) by Professor Matthew Carmona, UCL Bartlett School of Planning
- [Building more houses cannot solve the housing crisis](#) By Neil May
- [Demolition or refurbishment of social housing in London](#) By Dr Sarah Bell, UCL Civil, Environmental & Geomatic Engineering
- [Why do we keep on thinking that building more houses will solve the housing crisis?](#) By Neil May
- [What are the consequences of the misdiagnosis of the housing crisis?](#) By Neil May

The City in Urban Poverty

Urban poverty is a key challenge for Sustainable Cities, especially as cities with the fastest growing urbanisation rates are frequently also those with the highest rates of urban poverty. The aim of this project by Dr Charlotte Lemanski, (UCL Geography) and Dr Colin Marx (Development Planning Unit) was to run a small workshop where invited speakers would discuss the absent role of 'The City' (in a spatial sense) from popular analyses of urban poverty.

A two-day workshop was held at UCL in November 2011 that aimed to explore how approaching the 'spaces of poverty' from multiple perspectives could contribute towards more effective and just poverty reduction policies.

Invited speakers from a wide range of disciplinary and institutional backgrounds gave presentations reflecting on their research and approach from the perspective of the workshop theme. Speakers were from the universities of Cape Town, Amsterdam, Newcastle, Oxford, Manchester and LSE, as well as from the International Institute for Environment and Development (IIED) and the Department for International Development (DFID).

By bringing together scholars from different disciplines, including geographers, planners and economists, as well as development policy experts, the workshop facilitated wide discussion regarding the role of urban space in the theory and practice of urban poverty.

The workshop confirmed that the ways in which we think about space in relation to urban poverty must be critiqued in order to broaden the everyday politics of urban poverty and scope for effective poverty reduction policies, concluding that this needed to be revisited rather than extended.

Outputs and Impact:

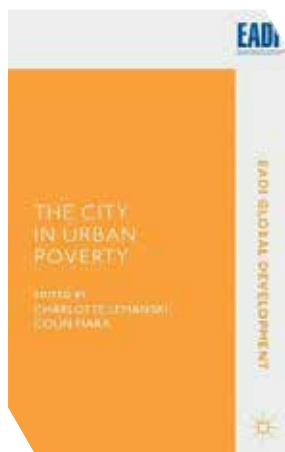
- An edited book, [The City in Urban Poverty](#), comprising papers developed at the workshop.
- DFID invited Dr Lemanski and Dr Marx to present their ideas on 'The city in urban poverty' at a DFID seminar in September 2012



Small Grant 2010-2011
Awarded £5,025.70

Dr Charlotte Lemanski
Social & Historical Sciences
(now University of Cambridge)

Dr Colin Marx
Development Planning Unit
The Bartlett



The Centre Cannot Hold: Trans-Centric Urbanism in the ‘Fringe City’

This grant supported a major international conference, held at London’s Calvert 22 Gallery, in June 2016. The idea for this conference emerged from a smaller international symposium (also sponsored by Grand Challenges) devoted to the radical Soviet architectural concept of the “social condenser”, organised by Professor Jane Rendell and Dr Michal Murawski at SSEES in May 2015 (which itself later resulted in the publication of a special issue of *The Journal of Architecture*, edited by Rendell and Murawski, marking the centenary of the Bolshevik Revolution in 2017). Building on the energy and conceptual impetus of the social condensers project, “The Centre Cannot Hold” brought together a transdisciplinary, international group of scholars, artists, architects and scholars; and included papers exploring new forms of architectural monumentality and urban centrality in Ukraine, Russia, Eastern and Western Europe, Mexico, India and North Africa. It was integrally connected to a contemporary art and photography exhibition “Power and Architecture”, which ran concurrently at the Calvert Gallery; and resulted in the

publication of edited versions of seven papers as articles in the *Calvert Journal*, the premier popular resource for visual culture in the post-socialist world; and in the publication of the book, *Re-Centring the City: Global Mutations of Socialist Modernity*, edited by Michał Murawski and Jonathan Bach and featuring twenty contributions (the majority of them written by conference presentees) by UCL Press in March 2020.

By supporting a research collaboration between Rendell of the Bartlett School of Architecture (BSA) and Dr Murawski (School of Slavonic and Eastern European Studies (SSEES)), the grant nurtured a new relationship between the BSA and SSEES. Murawski’s introduction to the BSA has evolved into lecture invitations, dissertation supervisions, and an off-shoot project translating key architectural theory texts of the early 20th-century from Russian into English for the first time, funded by the BSA; he is currently working on a new collaboration with Dr David Roberts, a BSA ECR. Meanwhile for Rendell, the collaboration meant making connections with researchers fluent in the Russian language, so deepening the primary research associated with her own book *The Architecture of Psychoanalysis*, and the possibility of producing a new co-edited research volume something which she would not have had time to do working solo, as well as introducing her work on critical spatial practice to a Russian audience. In short, the opportunities provided by this Grand Challenge grant have sprouted myriad of diverse offshoots in the form of exhibitions, seminar series and funded research projects; and have helped to coalesce a dynamic set of collaboration and ever-expanding global research network encompassing several dozen scholars and practitioners of art and architecture interested in the pasts, presents and futures of socialist urbanism.



Small Grant 2015-2016
Awarded **£3,815**

Professor Jane Rendell
Bartlett School of Architecture
The Bartlett

Dr Michal Murawski
School of Slavonic and
Eastern European Studies

Accelerating the Uptake of Sustainable Urban Transport Policies and Land Use Planning in the Global South

In academic year 2017-18, Dr Clemence Cavoli, Research Associate at the Centre for Transport Studies (UCL Civil, Environmental, Geomatic Engineering), and Professor Caren Levy, Development Planning Unit (The Bartlett), were awarded £5,000 for their project on car-oriented urban development and mobility.

This project later became T-SUM: Transitions to Sustainable Urban Mobility in Sub-Saharan Africa, securing over £800,000 from the UK Government's Global Challenges Research Fund.

T-SUM is an interdisciplinary and cross-sector collaborative project that aims to identify the conditions under which sustainable and inclusive transport and land use development can be accelerated in growing cities in the Global South.

The project works with partners in Maputo in Mozambique and Freetown in Sierra Leone to explore the ways in which growing urban economies in the developing world can 'leapfrog' car-oriented mobility and go straight to more sustainable and liveable solutions.

A workshop hosted at UCL brought together project partners and government officials from Maputo and Freetown to consider how rapidly growing cities in the Global South can make the transition to sustainable urban mobility.

A Policy Note summarising the first T-SUM participatory workshops held in Freetown was published in June 2020 and highlights the key findings that emerged from the policy workshop. This note, and accompanying reports, aim to serve as a reference for policymakers and planners in Sierra Leone, and is the first of the written policy outputs will produced as part of the T-SUM project.

► [Watch the video overview of the workshop.](#)

► [Learn more about T-SUM on their website.](#)



Small Grant 2017-2018
Awarded **£5,000**

Dr Clemence Cavoli
Civil, Environmental & Geomatic
Engineering
Engineering Sciences

Professor Caren Levy
Development Planning Unit
The Bartlett



I was co-chair and chair of Sustainable Cities between 2010 and 2012; this put me in touch with many researchers working on sustainability issues, and stimulated my research on environmental sustainability, focusing on environmental justice. Working on this Grand Challenge encouraged me to collaborate with colleagues in other disciplines, most notably with Muki Haklay and Sarah Bell, on air pollution and community engagement projects. This interdisciplinary work helped me develop case studies, such as the Somers Town Environmental Justice Inquiry, funded by Sustainable Cities, which has contributed greatly to my research, but also to teaching, campaigning and policymaking.

Grand Challenges reaches throughout the university, impacting on teaching and community engagement as well as research. The programme has opened many doors for me - into different disciplines, encouraging different ways of seeing problems and thinking about solutions, as well as helping to conceptualise these for students. Grand Challenges has also been encouraging in supporting a wide range of projects and research. For example, the Planet U(CL) series of seminars I convened shone a light on sustainability issues in UCL and helped to encourage inquiry about the need for more far-reaching activity in this area, and which has since been taken up and developed in a very positive way.

The Grand Challenge of Sustainable Cities supported research and practice on the LLM (Masters) course on legal activism (LARCS - Legal Action and Research for Communities and Sustainability). This was a progressive and unusual course in which students worked alongside environmental law NGOs (Capacity Global and Environmental Law Foundation) to research and present legal advice to community groups on a range of subjects relating to sustainability. The lessons I learnt from teaching this (at the time unusual) course have shaped all my environmental law teaching and research since (problem based, community focused, oriented towards environmental justice). The course outputs (step-by-step guides to environmental law) have formed the basis of published research, as well as broadening the students' environmental and educational experience.

The Somers Town and Euston Area Environmental Justice Inquiry (co-convened with Muki Haklay) was a major research project directed by local community groups such as the Somers Town Neighbourhood Forum and Voluntary Action Camden. This Inquiry elicited responses from local people affected by the scale (spatial and temporal) of major development in the area and has led to important academic work on (a) cumulative impact assessment, (b) the application of the Equalities Act 2010 to major infrastructure development; and (c) the impact of loss of green space on air pollution. The results of the Inquiry on cumulative impact assessment fed directly into Camden's Clean Air Action Plan. I've attached a statement of impact derived from this work. This includes supporting research and some detail about the links between this project at the Camden CAAP.

The genius of Grand Challenges is that it provides the institutional scaffolding and incentives to encourage connections to be made - between concepts, subjects, and disciplines. In turn, this supports working relations and partnerships between researchers, who might otherwise have remained located in their disciplinary and subject-based academic homes. I have found Grand Challenges to be a creative, curious and proactive entity within the university. As such, it is a very good reflection of the university and reinforces many of the very best things about working at UCL.



Professor Jane Holder
Professor of Environmental Law
Laws

UCL Grand Challenge of
**Cultural
Understanding**



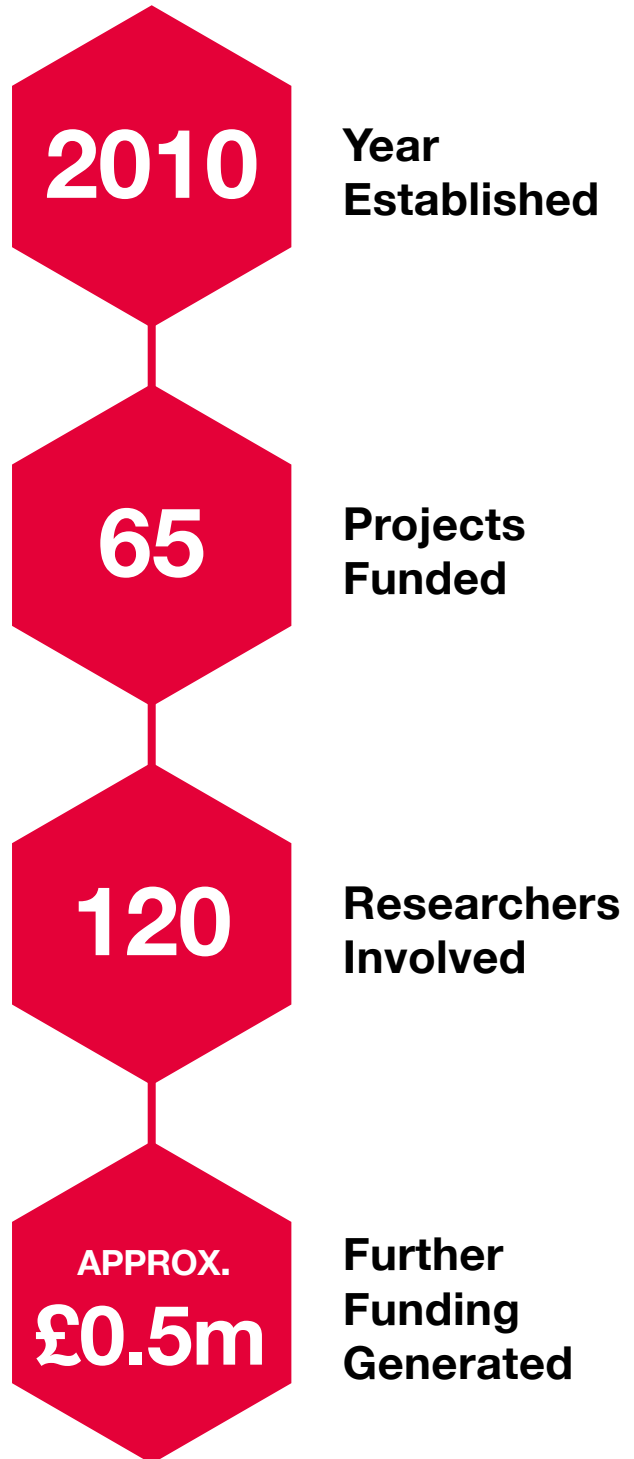
Overview and Key Stats

As the world becomes ever more interconnected, the way we understand each other's religions, politics and heritage will determine how well we adapt to future challenges.

The Grand Challenge of Cultural Understanding looks at the differing, complex and evolving relationships between people, communities and culture, and supports UCL researchers to make new and intense collaborations across a range of disciplines and with external partners to achieve real-world influence.

£230,000 has been awarded to over 60 projects, generating over half a million pounds in further funding.

CULTURAL UNDERSTANDING



Key Highlights

INDIA VOICES

Throughout 2017 and 2018, UCL's Grand Challenge of Cultural Understanding worked on a number of initiatives under the heading of India Voices. The programme was cross-disciplinary in scope while being grounded in disciplinary excellence. Through community engaged research, public and academic discourse and policy engagement, the aim of India Voices was to effect social impact.

The programme of activities included film screenings, live music performances, lectures, photography exhibitions, dance workshops, a panel discussion on health and gender, and a conference on Mahatma Gandhi in the 21st Century - covering Gandhian perspectives on justice, education, nonviolence, and health, as well as a focus on village India and how innovations can help to reduce inequalities in society.

The India Voices season closed with a celebration event featuring presentations and discussion with student and academic speakers addressing a range of topics including - challenging gender inequality, catastrophe prevention; using architecture to create healthier communities, engineering innovations for wheelchair-accessible cities, and other innovative studies tackling some of the most intractable problems facing India today.

Further details of the numerous events which took place as part of the India Voices season are available [on the Grand Challenges website](#).

DYNAMICS OF GLOBALISATION

Globalisation has long presented both challenges and opportunities to societies, communities and economies around the world with the increased flow of peoples across national boundaries, the free movement of capital, and the exponential growth of global communication technologies.

In 2019, the Grand Challenge of Cultural Understanding's [Dynamics of Globalisation](#) initiative supported seven projects aimed at facilitating cross-disciplinary discussion and scholarship to shed light on how the processes of globalisation interact, and on how we may improve our ability to live with difference in meaningful and sustainable ways. Each project generated significant impact, new scholarship and thinking on globalisation. For example, Dr Avril Keating was awarded £2,400 to examine globalisation in coastal communities in the UK - identifying new theories and methods of researching youth attitudes towards migration. This project led to Dr Keating being awarded follow on funding of £60,000 under the UCL Institute of Education's collaborative seed funding scheme.



UK Voter Survey on Brexit and the Legitimacy of Suspending Parliament

In September 2019, the Grand Challenge of Cultural Understanding funded a survey of 3,000 representative UK voters (with YouGov) around the legitimacy of the Prime Minister blocking or suspending parliament. Respondents were presented with two scenarios: one where the Prime Minister suspends Parliament (or take other measures) to ensure we leave with No-Deal against Parliament's wishes, and one where the Prime Minister suspends Parliament (or takes other measures) to revoke Article 50 and force the UK to remaining in the EU against Parliament's wishes. For each scenario, voters were asked with which of the PM's actions were acceptable. Crucially, we randomised the order in which respondents saw the scenarios.

The survey found that the country is very evenly split between those who think it is acceptable to suspend Parliament (or take other measures) to ensure we leave with No-Deal, and those who do not. Respondents were asked to imagine the reverse scenario in which a Remain-supporting Prime Minister was trying to force through a

revocation of Article 50 against the wishes of MPs and found that this was deemed unacceptable by both Leavers and Remainers.

The research also showed that the order in which the scenarios are presented makes a statistically significant difference to whether Leave voters think the suspension of Parliament for No-Deal is acceptable or not. Leave voters who saw the "Revoke" scenario first were less likely to think the "No-Deal" scenario was acceptable. In other words, reminding Leave voters that measures such as the suspension of Parliament could be used to engineer outcomes they don't like caused some of them to think again about whether this was a good idea. The research demonstrates that reminding people that the constitution limits the powers of all sides to do what they want, results in a more positive attitude to those constitutional limits.

► [Listen to Professor Pagel and Ms Cooper discuss the findings of the project in a Grand Challenges podcast.](#)



Small Grant 2019-2020
Awarded £5,280

Professor Christina Pagel
Clinical Operational Research Unit
Maths & Physical Sciences

Christabel Cooper
Data Analyst and Director
Sensible Analytics



UCL Bi/Multilingualism Information and Education Service

In academic year 2016-17, the Grand Challenge of Cultural Understanding awarded a small grant to UCL BiLingo - a UCL-based Bilingualism/Multilingualism Education and Information Service that aims to provide the community and key agencies with the most up-to-date research-based advice, information, support and training on childhood bilingualism/multilingualism and learning English as an Additional Language.

Developed by Dr Froso Argyri (UCL Institute of Education), Dr Merle Mahon (UCL Psychology and Language Sciences), and Professor Wei Li (UCL Institute of Education), the project's activities have included:

- Conducting a UCL staff language survey, showing the incredible linguistic diversity at UCL
- Curating stories and songs from multilingual Londoners

- Organising an event exploring multiculturalism in London at UCL's Festival of Culture.

The project has led to new collaborations between disciplines, public engagement through work with parents and teachers of bilingual and multilingual children, and community and business links, with parents' networks, schools, local authorities and speech and language therapists, among others.

UCL BiLingo is now well-established with the initiative benefiting extensively from its members' ability to work across disciplines.. This interdisciplinary initiative has led to new collaborations with UCL colleagues in different disciplines and the formation of successful links to the community.

Following the small grant, Dr Argyri and Professor Li were recently awarded a grant of £305,000 from the Leverhulme Trust to examine the effects of early childhood bilingualism on the brain function and brain structure, in conjunction with the UCL Institute of Child Health. This idea was born after a UCL BiLingo session.

- ▶ [Watch Dr Argyri and Dr Mahon talk about the project here.](#)



Small Grant 2016-2017
Awarded £4,000

Dr Froso Argyri
Culture Communication & Media
Institute of Education

Dr Merle Mahon
Psychology & Language Sciences
Brain Sciences

Professor Wei Li
Culture Communication & Media
Institute of Education

Crisis Translation in Multilingual Settings

In 2016, UCL Centre for Translation Studies' Dr Federico M. Federici and UCL Institute for Risk and Disaster Reduction's Professor David Alexander received a Grand Challenge of Cultural Understanding Small Grant to fund a pilot study identifying fundamental problems of multilingual communications affecting disaster settings. The study aimed to explore whether cognitive and emotive load would trigger different behaviour in translators when operating in crisis settings, and took place in parallel to early activities of the EU-funded **INTERACT** Crisis Translation Network project (led by Dublin City University Professor Sharon O'Brien, with Dr Patrick Cadwell, also from Dublin City University, and Associate Professor Minako O'Hagan of University of Auckland).

The researchers examined participants' emotional and cognitive responses to the English translation of authentic crisis-related messages, measuring cognitive stimuli such as eye-tracking. The study allowed the team to identify why and how source message can pose problems of communicative efficiency – and whether the team's changes, driven by the analysis of the biometric

measurements of the participants' responses, led to any improvement. The preliminary findings of the project helped to refine their research questions and led them to prioritise various forms of support to enhance crisis communication through translation. One of these priorities was preparing future translators to serve in crisis settings, explained in more detail in the team's recently published [open-access journal article](#), *Crisis Translation Training: Challenges Arising from New Contexts of Translation*.

From consultation on the initial pilot project to full collaboration through the years of activity on the INTERACT network, the team has continued working on multilingual communication in crisis settings, with Dr Federici undertaking a secondment with INTERACT in New Zealand, and Dr O'Hagan receiving [Global Engagement seed funding](#) from UCL's Global Engagement Office for a secondment to UCL in 2017, helping to further cement their research partnership. Most recently, the INTERACT Crisis Translation team offered advice on providing multilingual, effective and trustworthy information regarding COVID-19 to the crisis communication teams that put together the first set of multilingual information available on the [WHO website](#) in January 2020.

For Dr Federici, these activities were all kick-started through the Grand Challenges Small Grant. Dr Federici said: "The Grand Challenge award allowed us to conduct a really meaningful pilot study that led to many new questions and enabled us to reconsider our intuitions and identify more marked parameters for data collection."

"Our continued work on multilingual communication in crisis settings, accelerated through grant, has allowed the INTERACT Crisis Translation team to offer advice to on-going crises. The Small Grant award really allowed me to jump start my participation in these activities, and for this I am very grateful to the reviewers who saw its potential, and the funding stream."



Small Grant 2016-2017
Awarded **£3,995**

Professor Federico Marco Federici
Centre for Translation Studies
Arts & Humanities

Professor David Alexander
Institute for Risk and Disaster Reduction
Maths & Physical Sciences

My involvement with Grand Challenges has brought home to me what a wonderful community UCL is. I have really enjoyed meeting colleagues from many different departments and getting insights into some of the exciting work being done across UCL. This has also given me a fresh view of how different disciplines conceive of questions of culture and cultural understanding, and as an anthropologist this is truly stimulating. From a practical perspective, being on panels for small grant applications has probably made me better equipped to write my own applications. But for all the genuine institutional commitment behind Grand Challenges, trying to foster cross-disciplinary work in an academic world structured along the lines of disciplines and departments is no easy task, and the fact that financial accountability lies squarely with departments sometimes doesn't help.

My involvement with Grand Challenges has given me new ideas about making my own research more cross-disciplinary. This is something I am trying to put into practice, now that I am working on a book on migration, transnational marriage and family practices between Senegal and Europe. I no longer feel bound to rely exclusively on ethnographic material; I am also using novels, songs, TV series, photographs and personal archives, and it is liberating.

In future, I would like to see the Grand Challenges programme grow and become more solidly embedded in the work of departments; perhaps connecting more with students. The application workshops and various events organized around specific themes are a good step, and I hope that Grand Challenges can become even better embedded in the UCL community. There is also more work to be done in pushing questions of Equality, Diversity and Inclusion into mainstream research practices across UCL, and I would like to see Grand Challenges take a lead on this.



Dr H el ene Neveu Kringelbach

Associate Professor in African Studies
Vice-Dean Equality, Diversity and Inclusion
Arts & Humanities

UCL hosts academics across many disciplines, in many institutes and departments, but it is often a challenge to reach outside one's own area to find creative and innovative partners who are willing to work on complex problems from different perspectives together.

When I first heard the name, I was a little unsure what UCL Grand Challenges was trying to achieve and how the promise of a small amount of funding could actually create a valuable output. However, I have worked with Grand Challenges for a few years now and have had the honour of being a member of a working group as well as a recipient of funding.

Grand Challenges provided me with a mechanism and the support to catalyse relationships across UCL so that I could engage with colleagues from engineering, education, arts and urban planning among others. This enabled cross fertilisation of ideas, sharing of methods and approaches and an opportunity to learn the language used by other disciplines. The cross disciplinary approach has been responsible for ideas generation, new collaborations, new projects and has led to more cross disciplinary publications than I would have achieved alone, whilst also giving me the opportunity to be visible and invited as a guest speaker to conferences outside my own discipline of child health. I sometimes humour my colleagues by calling myself the honorary engineer!

Going forwards I know that the only way we will be at the forefront of addressing the SDGs, such as clean water and sanitation, no hunger, reduced inequalities and many more, is by following the vision of Grand Challenges - and to continue to consider the linkages across the SDGs, bringing together experts from relevant disciplines to discuss, debate, and find solutions in partnership to build a better world for the communities we serve. I look forward to UCL's October 2020 SDG virtual conference as an important step in the process.



Professor Monica Lakhanpaul

Professor of Integrated Community Child Health
UCL GOS Institute of Child Health
Population Health Science

In more ways than one, my time at UCL would be unthinkable without the Grand Challenges. I joined the team in the very early days to set up what is now the Grand Challenge of Cultural Understanding. From the beginning, I was taken by the ambitious cross-disciplinary ambitions of the programme – to paraphrase C. Geertz, it sought not only to “change the way we think about the way we think”, but also the way we go about doing such thinking. More recently, this ambition found its expression in the term disruptive thinking: describing a research culture that is not afraid of rupture, but instead actively seeks to break with seemingly self-evident ways of doing and thinking.

These principles, in any case, I sought to carry over to my new institutional home, the UCL European Institute, which I co-founded under the auspices and with the phenomenal encouragement of the Grand Challenges. That both the Grand Challenges and the European Institute are celebrating their tenth anniversary this year – of all years – may therefore even be appropriate. After all, as Hannah Arendt once wrote, crisis, “which tears away facades and obliterates prejudices”, also provides the opportunity “to explore and inquire into whatever has been laid bare of the essence of the matter”. Happy Anniversary, Grand Challenges!



Dr Uta Staiger

Co-founder and Executive Director of the UCL European Institute
Laws

UCL Grand Challenge of

Human Wellbeing



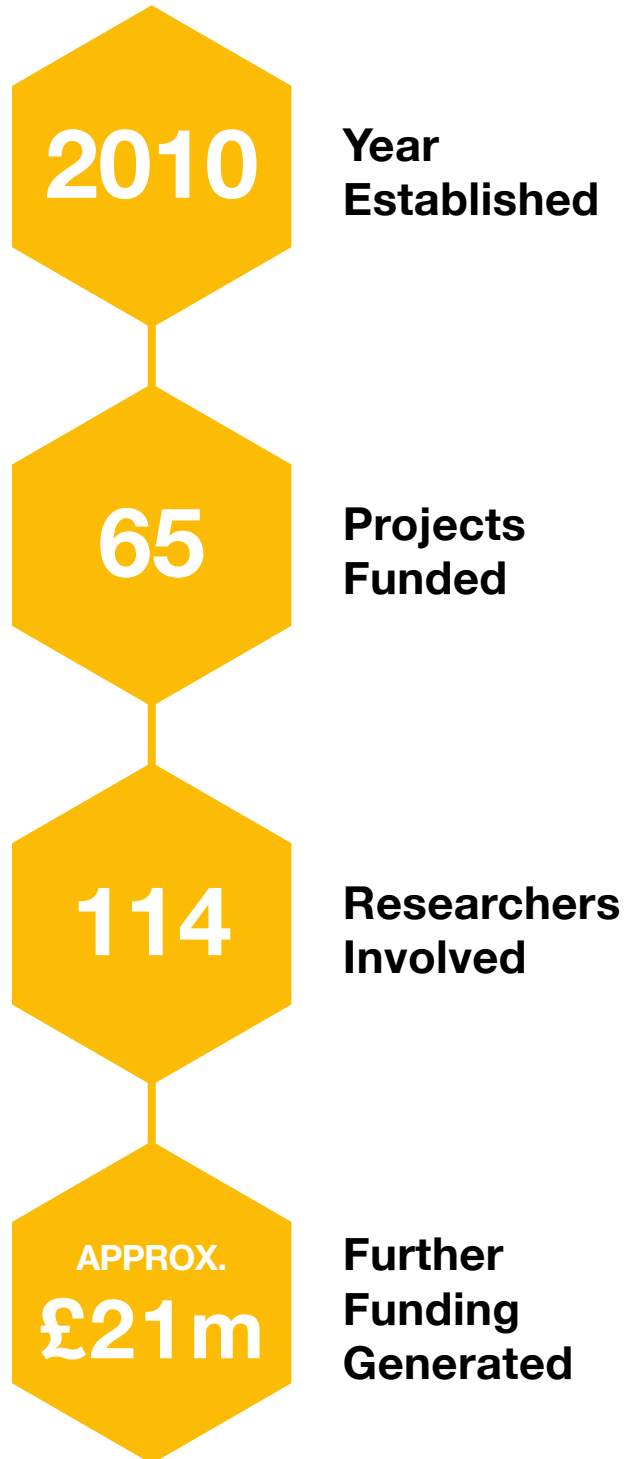
Overview and Key Stats

The Grand Challenge of Human Wellbeing looks beyond traditional definitions of health and examines the wide range of disciplines that contribute to our sense of wellbeing.

Since 2010, Human Wellbeing has funded over £235,000 in grants to 65 projects and has generated more than £19m in further funding from the UK's Department for International Development and the Ageing Better in Camden Network.

Human Wellbeing also facilitated the UCL Festival of Ageing, a series of events looking at issues affecting older people, work examining the links between cultures and health systems, disability, and the relationship between environment and wellness. Furthermore, it was a key driver in the creation of the [UCL Centre for Behaviour Change](#), following UCL Behaviour Change Month, a period of intense collaborations and creative thinking held in 2012.

HUMAN WELLBEING



Key Highlights

CENTRE FOR BEHAVIOUR CHANGE

Behaviour change is increasingly recognised as central to human wellbeing, social cohesion and sustainability. Changing behaviour is a challenging and complex process, requiring theories, methods and evidence from many academic disciplines. The Grand Challenge of Human Wellbeing played a key role in supporting the creation of the [UCL Centre for Behaviour Change](#), which harnesses the breadth and depth of academic expertise in behaviour change at UCL to address key challenges facing society.

Since then, the Centre has been involved in several Grand Challenges projects on increasing healthy and environmentally friendly behaviours. It is also represented in the Human Wellbeing steering committee, which informs Grand Challenges strategic priorities and activities.

GDI HUB

In 2016, UCL Grand Challenges funded eight projects under an initiative to support UCL's 2034 strategy, and in particular Principal Theme on 'Addressing global challenges'.

Amongst them was a £10,000 award for a pop-up Global Disability Hub. Building on the 2012 Paralympic legacy of sustainability and accessibility, Dr Maria Kett (UCL International Disability Research Centre) with Paul Brickell, Executive Director of Regeneration & Community Partnerships at the London Legacy Development Corporation (which provided matched funding), endeavoured to show that the Queen Elizabeth Olympic Park could continue to be an exemplar of inclusivity.

'Paralympicopolis: A Pop-Up Global Disability Innovation Hub' was held in May 2016, in collaboration with many partners including the V&A and the Royal College of Art, and involving disabled people in all activities. It attracted over 100 participants across five cross-disciplinary sessions on the following topics:



- Navigation of QEOP for people with visual impairment
- 3D printing wheelchairs
- Post-skins and interfaces
- How disabled children get to school in Zimbabwe
- The future of GDI Hub

The workshops and discussions led to the creation of the UCL Global Disability Innovation Hub, formally launched by Mayor Sadiq Khan later that year. The Hub brings together UCL researchers, and local and international partners, to explore topics such as inclusive design, assistive technologies, participation and active citizenship, human computer interaction for community wellbeing, and disability arts, sports and inclusive culture.



THE UCL FESTIVAL OF AGEING AND RECOMMENDME

In 2014, the Grand Challenge of Human Wellbeing convened a Festival of Ageing in response to a House of Lords report, [Ready for Ageing](#), warning that the UK is 'woefully underprepared for ageing'. The Festival included exhibitions, lectures and symposia, and concluded with a research prize workshop that awarded £10,000 to a cross-disciplinary team of early career researchers from the Bartlett, Computer Science, Ear Institute, Eastman Dental Institute and the School of Life & Medical Sciences.

The team's winning project, [RecommendMe](#), is an innovative digital platform that targets and tailors services to support healthy ageing. It provides a unique solution to a growing problem among ageing people in the UK and other developed countries: social isolation and physical inactivity amongst older adults.

Loneliness is not only an emotional experience, but research shows that loneliness and social isolation are harmful to our health: lacking social connections is a comparable risk factor for early death as smoking 15 cigarettes a day, and is worse for us than well-known risk factors such as obesity and physical inactivity.

RecommendMe can offer personalised recommendations based on factors that include physical, mental and social capacity, personal interests, geographical location and the activities undertaken by their peer group. RecommendMe's active partnership with a huge breath of organisations, such as AgeUK, Camden Council, Holborn Community Centre and OurCamden, gives it an advantage over other standalone wellbeing apps.

The project subsequently secured additional funding from UCL Bright Ideas Award and the Ageing Better in Camden Big Lottery bid.

Enhanced Wellbeing and Resilience in Junior Doctors

The iWARDS (Individualised Wellbeing and Resilience for Doctors) project aimed to develop interventions to improve junior doctors' wellbeing. To do so, the project team ran a series of two-hour workshops with postgraduate medical trainees, exploring how to enhance resilience and improve well-being. The workshops included developing self-care strategies and guiding participants in creating microboundaries to support work-life balance through their use of technology. In total, six evening workshops were held at three London hospitals: Royal Free, Whittington and UCLH.

Following the success of the project, the project team also delivered the workshops at a UCL NHS well-being conference (September 2018) and to a primary care centre (May 2018), reaching an additional 65 participants, mainly comprising of doctors, but also medical students and nurses.

Additionally, the project team developed a number of materials, including a website, video and 45 page booklet. The project also led to the development of new teaching materials including reflection cards, PowerPoint Presentation and a mindfulness visualisation exercise which was used in the workshops. The intervention itself is innovative in that it combines mindfulness training, self-care instruction and training on microboundaries.

To explore the possibility of scaling up the face-to-face workshops, the project team also developed a digital version of the intervention through online workshops. The researchers created a series of short videos on the research behind the intervention to be published within a closed group on Facebook. The reflective activities took place on Trello, a project management tool, which simulates moving post-it notes around and allows to leave comments and upvote others' notes. Future work will continue to explore in more depth how to design digital interventions for work-life balance.



Small Grant 2017-2018
Awarded £4,000

Dr Antonia Rich
UCL Medical School
Medical Sciences

Professor Anna Cox
Psychology & Language Sciences
Brain Sciences

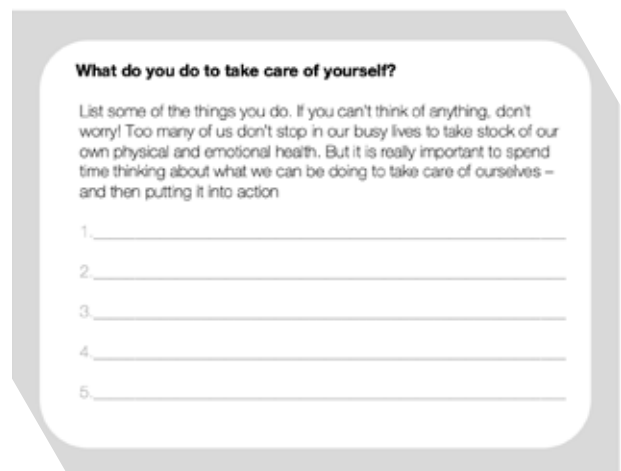
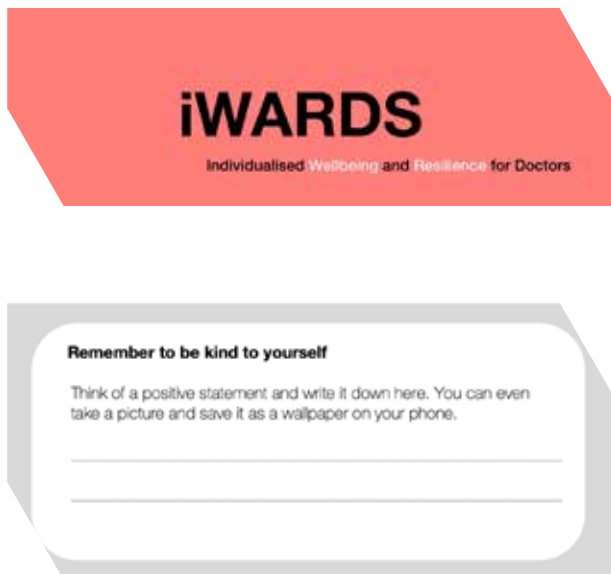


Enhanced Wellbeing and Resilience in Junior Doctors (continued)

The project also generated policy impact. The project team met with the Senior Coaching Advisor at Health Education England (HEE), the national education and training body responsible for overseeing doctors training. The advisor distributed details of the project to all coaching advisors at HEE who work with trainees. Doctors' well-being has been shown to have a direct influence on patient care, including patient satisfaction, adherence to treatment and interpersonal aspects of care. Further, the NHS is suffering a recruitment and retention crisis. This project demonstrates that a brief two-hour intervention focusing on self-care strategies and micro-boundaries can improve doctors' well-being, which helps not only the doctor, but all of us as patients.

Outputs and Impact:

- Creation of [iWards website](#).
- Presented at Annual Conference of the European Health Psychology Society in September 2019.
- Resource for junior doctors, [Individualised Wellbeing and Resilience for Doctors. Research-informed Strategies](#).



My UCL Grand Challenges small grant has been the start of an exciting journey marked by many highlights along the way. This journey started in 2016 when I joined the Department of Mechanical Engineering. As a soft material roboticist, one of my research interests covers the creation of haptic feedback interfaces, one way that allows humans to interact with robotic systems through receiving tactile and force stimuli. Prominent examples are mobile phone vibrations through which information is communicated to the user. These haptic systems are usually integrated in technology that is not accessible for the many.

At UCL Mechanical Engineering, I came across the e-NABLE community – an international group of volunteers who make 3D printed upper limb prostheses available to amputees in need. As these body-powered devices are purely mechanical, no electronic sensors are integrated at the fingertips that feedback sensation to the forearm, for instance. With my background in soft materials, I proposed small rubber cavities embedded in the fingertips of the prosthetic hands filled with fluid; when fingertips interact with objects, the rubber deforms and hydraulic pressure is fed back to a membrane mounted on the forearm. This innovation has many advantages including being robust, lightweight, and cost-effective.

For my project application to UCL Grand Challenges, multidisciplinary collaboration with Dr Rui Loureiro of the Aspire CREATE Centre for Rehabilitation Engineering and Assistive Technology seemed ideal. His group has extensive expertise and knowledge in how to make and test assistive technology for people in need – which is key to create a solution to this global-scale societal challenge. I imagined Aspire CREATE to be the translating connector between UCL Mechanical Engineering and the e-NABLE community. Hence, the cross-disciplinary collaboration was essential to guarantee the expected impact.

Shortly after my team developed the first viable prototype, the UCL Grand Challenges team featured our work on their website resulting in an overwhelming response: The Science Museum invited us to exhibit the prototype at one of the Museum's biggest events called Lates. TechXLR8, the flagship event of London Tech Week, offered a booth at their annual fair. And UCL Grand Challenges organised a stand at UCL's It's All Academic Festival and hosted us at the Grand Challenges Showcase 2018. At the same time, I became an active member of the working group for the Grand Challenge of Human Wellbeing. I feel privileged to be a recognised academic among many long-standing colleagues with extensive expertise on creating solutions for global challenges resulting in long-lasting positive impact and to advise on developing and delivering strategic initiatives.

The scientific work has evolved since: Dr Mehran Moazen and I teamed up with Professor Shervanthi Homer-Vanniasinkam and researchers from Columbia, Brazil and India to develop partial-hand, body-powered upper limb prostheses funded by the Royal Academy of Engineering. Professor Homer-Vanniasinkam and I are working with plastic and hand surgeons Dr Joseph Hardwicke and Dr Matthew Venus from the University of Warwick on the integration of our haptic feedback system in prosthetic fingertip digits for UK patients. The work has resulted in a number of journal papers published in the IEEE Transactions on Haptics and in Prosthetics & Orthotics International.

The highlight of all highlights was when I received the UCL email that our haptic feedback system has been shortlisted as one of 100 disruptive discoveries to be part of #MadeAtUCL. And what a great start to the year 2021 when UCL shared the amazing news with us that we had received the highest number of votes in the #MadeAtUCL engagement campaign - my small grant project has grown big!

A massive thank you to Ge Shi and Andrea Palombi who have been the lead researchers, as well as my collaborators at UCL and across the world. Special thanks to the volunteers involved in the research, people who voted for our #MadeAtUCL project and the UCL Grand Challenges team who truly believed in our work and supported us over many years now!



Dr Helge Wurdemann
Lecturer in Medical Devices
Department of Mechanical Engineering
Engineering Science

UCL's Grand Challenges create opportunities to bring together academics, policymakers and all those with an interest in addressing challenges across disciplines, sectors and places to enable the translation of inter-disciplinary thinking and activities to those who can make change happen on the ground.

UCL's Centre for Behaviour Change was enabled by the Grand Challenge of Human Wellbeing, starting as a month of activities involving many parts of UCL and attracting a wide range of interest from outside as well as inside UCL. With the support of a Provost's strategic award and the Office of the Vice-Provost for Research five years ago, it has grown to a vibrant hub of activity, embracing the agendas of many of UCL's Grand Challenges, attracting engagement from a wide range of people across the world and across society. With a varied programme of research, consultancy, teaching and training, and public-facing events, the Centre is also able to react agilely to circumstances as they arise.

Human behaviour lies at the heart of the causes of and solutions to many of the world's pressing, even existential, problems – the two most salient in 2020 being pandemic infectious disease and the climate emergency. Within weeks of the emergence of Coronavirus, members of the Centre for Behaviour Change were: part of three funded COVID-19 research projects; providing behavioural science consultancy on COVID-19 to the World Health Organization; contributing to national academic and professional networks; and giving advice to Government, being part of the Government's Scientific Advisory Group in Emergencies and its behavioural science sub-committee and a member of the complementary Independent SAGE.

The social, psychological and economic consequences of COVID-19 have raised fundamental questions about how we live our lives, what we value and the kind of society we would like to live in. Related to these are the questions of how we invest in the future and how wealth is distributed across society. The scale of deaths and hardship is beyond what most of us expected to witness in the UK in our lifetimes.

Within this bleak picture, there is also opportunity and hope. We have seen communities coming together with often unprecedented levels of cohesion and generosity, the end of long commutes that can take a toll on health and wellbeing, and we have seen air pollution levels fall. Restructuring environments can enable wide-ranging behavioural change, including how we travel. We could regenerate communities so that they have local hubs for people to come together to work in where home-working was not an option or not desirable, including shared spaces, cafes and events to support social mixing and support. We have the possibility of investing in new green jobs and expanding the public health and social care sectors to employ those losing their previous jobs, of building houses and communities that are more resilient to future existential threats and creating a kinder, fairer society in which wealth is distributed with individual, community and society-wide need at its heart.

To achieve these sorts of changes, communities of all sorts need to be engaged in the dialogue and the action. We need to include young people, workforces, neighbourhoods and civil society organisations. Collective organisation and solidarity that made the initial response to COVID-19 so effective, could now be harnessed to pressurise and support national and local government to do this. New behaviours, new ways of organising and new visions for the future have the potential to 'build back better' with the realisation that not only is another world possible, but it is necessary.



Professor Susan Michie

Professor of Health Psychology and Director of the Centre for Behaviour Change Brain Sciences

UCL Grand Challenge of

Justice & Equality



Overview and Key Stats

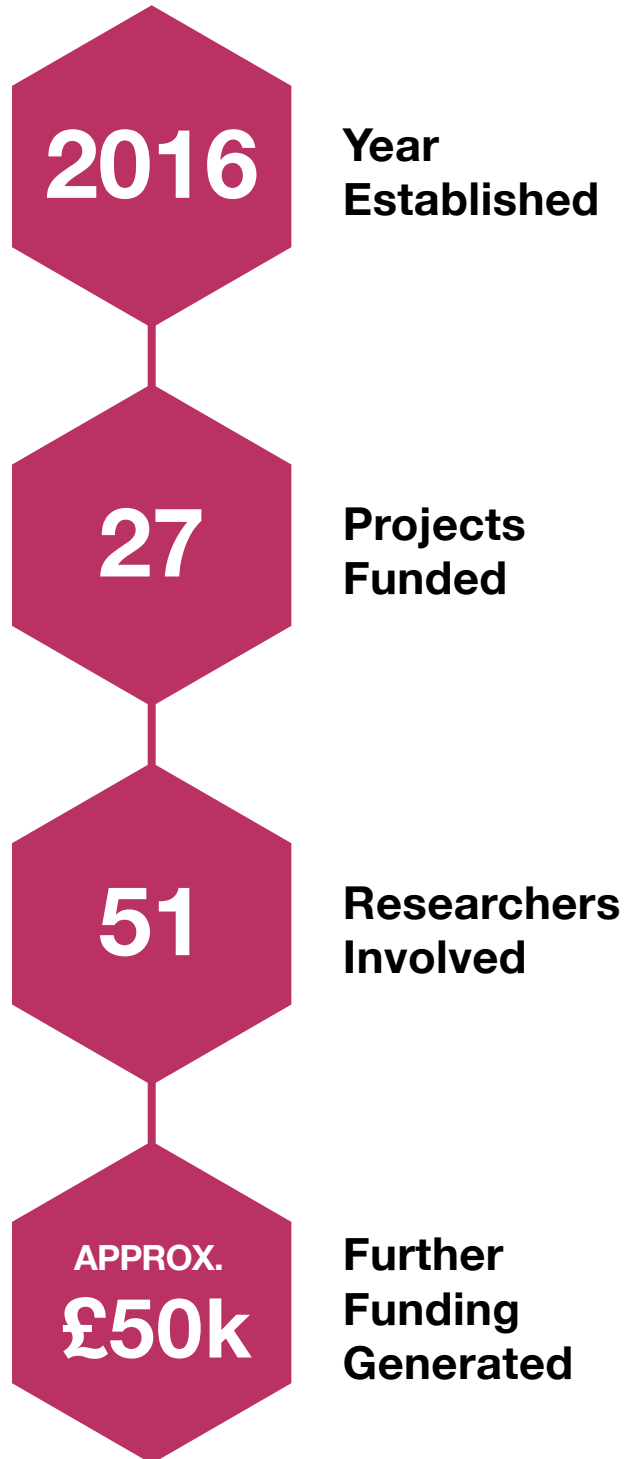
The Grand Challenge of Justice & Equality fosters cross disciplinary research from UCL, examining the barriers that people face to justice and how societal structures perpetuate and sustain inequalities.

Since its launch in 2016, Justice & Equality's work has considered radical solutions to tackle inequalities and change the status quo, producing new research and collaborations on subjects including access to education, torture, asylum and more.

Justice & Equality also examines inequality, exclusion and displacement, cultural heritage and diversity and barriers to democratic participation. The programme encompasses academics from across the university and supports researchers to make new and innovative collaborations across a range of disciplines. At the same time, the programme's purpose is to see knowledge generated by research and scholarship at UCL achieve real-world influence.

It has awarded over £100,000 in funding to cross-disciplinary teams, generating over £50,000 in further funding.

JUSTICE & EQUALITY



Key Highlights: Structurally Unsound

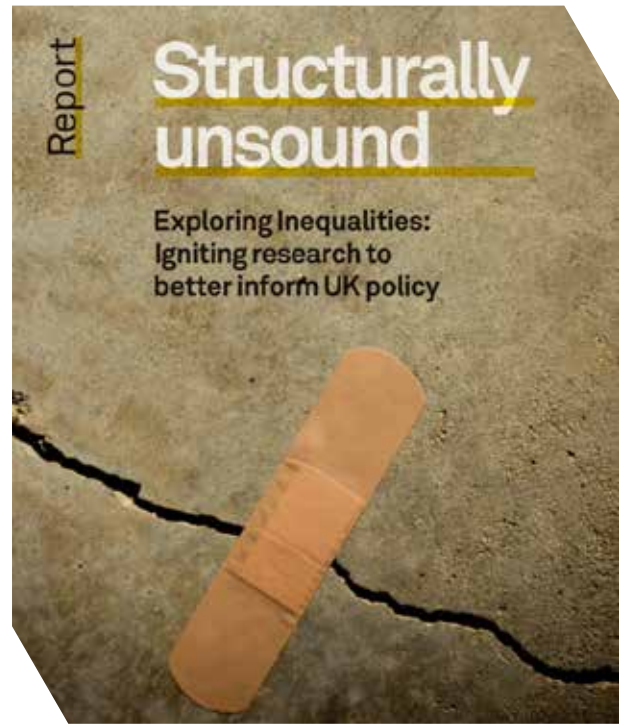
In academic year 2018-19, the Grand Challenge of Justice & Equality and UCL Public Policy partnered with the Resolution Foundation on the project, [Exploring Inequalities: Igniting research to better inform UK policy](#).

The project, funded through UCL's HEIF Knowledge Exchange Fund and with support and resource from Resolution Foundation, set out to cut across standard research and policy boundaries to review, synthesise, and deepen understandings of intersectional inequalities in the UK.

Through a series of roundtable workshops, the project brought together a range of experts from academia (both from UCL and beyond), with senior figures, directors, chief executives and leaders in third sector organisations, business, charities, and policy spheres. Alongside this the project conducted 20 in-depth expert interviews in areas of specific interest. In total, over 50 organisations drawn from different sectors and from across the UK took part – exchanging knowledge, sharing insights, building partnerships, and co-creating new research agendas.

The project generated significant outputs and impact, including:

- Publication of major report, [Structurally Unsound](#).
- Report launch at Resolution Foundation's headquarters in Westminster attended by over 100 people and live streamed to more.
- Coverage in the national press as well as publications in sector leading media outfits, including [Times Higher Education](#), [The Conversation](#), [Wonkhe](#), and [CBI Ideas Forum](#).
- Report referenced during Income Equality and Sustainability debate in the House of Lords by Lord Bilimoria.
- Submissions to policy consultations, including the European Commission, Department of Work and Pensions, Regulator of Social Housing, and Women and Equalities Select Committee.



- Eight podcasts produced with project partners exchanging insights and knowledge from across different sectors. To date, these have been downloaded over 3,000 times.
 - Invited to present findings to government departments; at academic conferences and workshops; third sector policy forums; and business groups.
 - Delivering webinars with Whitehall & Industry Group and Wales Centre for Public Policy.
- ▶ [Listen to the Grand Challenges podcast series exploring inequalities in the UK.](#)
- ▶ [Watch the launch of the Structurally Unsound report at the Resolution Foundation.](#)

Police Response to Runaway Adolescents

With 3,000 missing children found annually on Mumbai's rail network, this project studied the response of railway police in Mumbai to runaway adolescents, and how it was trying to safeguard their rights in the process, through undertaking a range of interviews with key stakeholders from the police, child welfare officials and NGOs working in the field.

A key finding from the project was that there was disagreement among the stakeholders on whether it was always in the best interests of a runaway child to be reunited with their family. It was also found that the police often find it challenging to keep track of the children once they have entered into the state's care - this causes delays in reuniting them with their families. In conjunction with partners, the project explored the possibility of developing an app to support them in this task.

The preliminary results of the study were presented as part of an Experts' Engagement Panel at the prestigious World Conference for Transport Studies Research, alongside the Commissioner of Mumbai Rail Police, Founder of

NGO Pratham & Chair of Mumbai's Child Welfare Committee. The project was also covered in India's largest newspaper, *The Times of India*.

Other notable outcomes include a strengthening of the project team's relationship with police in Mumbai, which has subsequently led to the project collaborators receiving follow on funding to organise expert engagement workshops, a seminar and develop an app to track missing children. Both researchers have also used material from the project in their teaching and are collaborating on an interdisciplinary journal article.

Outputs and Impact:

- [Mumbai railway cops footing food, transport bills of runaway kids, study finds](#) - Times of India
- Presentation at World Conference for Transport Studies
- Awarded follow on grant from UCL Public Policy (£2,000)
- Awarded UCL Knowledge Exchange 'HEIF' funding (£15,000)
- ▶ [Watch Dr Kartikeya Tripathi talk about related work in a UCL Lunch Hour Lecture.](#)
- ▶ [Listen to a Grand Challenges podcast discussing this work as well as next steps for the project.](#)



Small Grant 2018-2019
Awarded **£3,900**

Dr Kartikeya Tripathi
Security & Crime Science
Engineering Sciences

Mr Julian Walker
Development Planning Unit
The Bartlett

Routes to Opportunity

In 2017, UCL’s [Grand Challenge of Justice & Equality](#) Equality commissioned a report on access to vocational and technical education for the over-25s in England. The report, [Routes to Opportunity: Addressing the non-university skills gap in England](#), was authored by Institute of Education Doctoral candidate Aly Colman. It was launched at a reception at UCL’s Institute of Education in December 2017, with speakers including Professor Becky Francis, Sir Vince Cable MP, and report author Aly Colman.

The report documented a growing skills gap in England, with a critical shortage of skilled trades in the existing workforce. The findings indicated that those who would benefit the most from upskilling or retraining, such as low paid workers in unskilled jobs (the so-called “missing middle”), are often unable to do so because insufficient opportunities and funding are available. Even where support and funding is available, such as advanced learner loans, many potential learners are unaware of it.

The report states that ‘vulnerable and disadvantaged groups have much to gain and much to offer from further retraining that could lead to undertaking more skilled employment. The “missing middle” too, have the potential to play a significant role in the critical skills shortages currently being faced.

The report also warned that the Brexit vote is discouraging EU workers in medium skilled occupations from staying in the UK or moving to the UK. Should hiring EU workers with mid-level skills become more difficult in future, this could exacerbate the problems currently faced.

The launch event brought together a wide range of disciplines and skills areas. As the report’s author, [Aly Colman](#), noted, “The Routes to Opportunity Report has enabled, through Grand Challenges, the opportunities to disseminate my research in really quite a big way...At the end of the launch event, a lot of people came up to me and spoke about their roles and the ways in which their particular job may interact with what I had done through the Grand Challenges report. So that was really useful and I’ve been able to develop those links.”



Small Grant 2018-2019
Awarded £3,900

Dr Alyson Colman
 IoE Learning & Leadership
 Institute of Education (Visiting staff)/
 University of Brighton

Rebecca Taylor
 Former Coordinator UCL Grand
 Challenges (Global Health and
 Justice & Equality), 2016-18
 Office of the Vice Provost (Research)



Working with the Grand Challenges team since 2016 in my role as Co-Chair of the Grand Challenge of Justice & Equality with Professor Colm O’Cinneide has been immensely stimulating. We have drawn on our own disciplines of child and family social policy and constitutional law and reached out to the wider UCL cornucopia of expertise, paradigms and creativity.

At the outset, we framed justice and equality as intersectional and multi-layered. An early focus was on “Access and Participation” with popular roundtables on education, workers’ rights and citizenship. Cross-party political party interest has been keen with contributions from party leaders, including Sir Vince Cable and Sir Keir Starmer. The interconnectedness of inequality continues to be a key theme shaping our 2020 partnership with the Resolution Foundation and our most recent “Place-based Inequalities” call that attracted such excellent proposals.

I have appreciated the flexibility we’ve had to rapidly respond to events and crises, so important in COVID-19 times. Over the past few years we’ve been able to contribute small but significant amounts for instance to an international interdisciplinary UCL seminar celebrating the anniversary of the adoption of the Convention on the Rights of the Child (CRC).

On a personal level I really value the informal networking and intelligence sharing across UCL that the Grand Challenges programme nurtures - so important given the sheer enormity of UCL as an institution.

A highlight for me was being part of UCL’s India Difficult Dialogues convention in 2018 on Gender Equality with its focus on men and fathers, my own research field. The event created interdisciplinary space for Grand Challenge scholarship and influence from Justice and Equality, Cultural Understanding and Global Health.



Professor Margaret O’Brien

Professor of Child and Family Policy and Director of the Thomas Coram Research Unit
IOE - Social Research Institute
Institute of Education

Grand Challenges has been a much-valued collaborator of the UCL Global Governance Institute since our launch (and my arrival as the Deputy Director) in 2013. Awards have been a major support in our efforts to undertake in-depth, cross-disciplinary study of pressing global public policy concerns, in collaboration with research colleagues and students across UCL and elsewhere.

Together, we have facilitated major policy-research workshops and public speaker events on themes as diverse as Business and Human Rights, Climate Governance After the Paris Agreement, Torture Prevention, Global Health and Non-Communicable Diseases, and Global Governance of Anti-Microbial Resistance. Such activities have made it possible to position UCL as a world leader in this important new field of scholarship, as well as cement our links between academic researchers, leaders in the wider society, and the general public.

In my capacity as a member of the Grand Challenge of Justice and Equality working group I have also had the pleasure of discovering the incredible diversity of important work going on at UCL, beyond the confines of my own department. I look forward to continuing to put the Grand Challenges collaborative ethos into practice, applying our collective expertise to advance impactful public policy research and promote informed public debate on solutions to the major global challenges of our age.



Dr Tom Pegram

Associate Professor in Global Governance, Department of Political Science/School of Public Policy and Deputy Director of the UCL Global Governance Institute Social & Historical Sciences

Colleagues from many parts of UCL have been undertaking ground-breaking research across the different dimensions of housing, employment, education and health inequality. A great many fruitful collaborations, within the institution and beyond it, are helping to bring new evidence to the attention of policy makers.

The value added offered by UCL Grand Challenges is to provide a context for making new connections, to seed-corn new partnerships and projects, and – in collaboration with UCL Public Policy – to bring together research expertise with a public policy focus. That is a short-hand description of my own recent experience with the Exploring Inequalities project. Led by Siobhan Morris and involving both the Resolution Foundation and UCL Public Policy, that work provides an excellent example of the critical role the Grand Challenges plays in brokering partnerships and facilitating real world impact. Working with a long list of organisations – government departments, external research centres and key charities – the project was able to assemble many of the lessons that researchers and policymakers ought to consider when thinking about how to better approach the study and treatment of structural inequalities, wherever they arise. Understanding the scars those inequalities leave on individuals, communities and society as a whole will remain critically important in the years ahead.

Our research has a huge contribution to make as we (hopefully) emerge from the current global pandemic. As a member of two UCL Grand Challenges working groups – Justice & Equality and Sustainable Cities – I have been able to connect with colleagues from across UCL, escape from my housing bunker, and see first-hand the value of all of the above. UCL Grand Challenges are well worth getting involved with.



Professor Nick Gallent
Professor of Housing and Planning
The Bartlett School of Planning
The Bartlett

UCL Grand Challenge of
**Transformative
Technology**



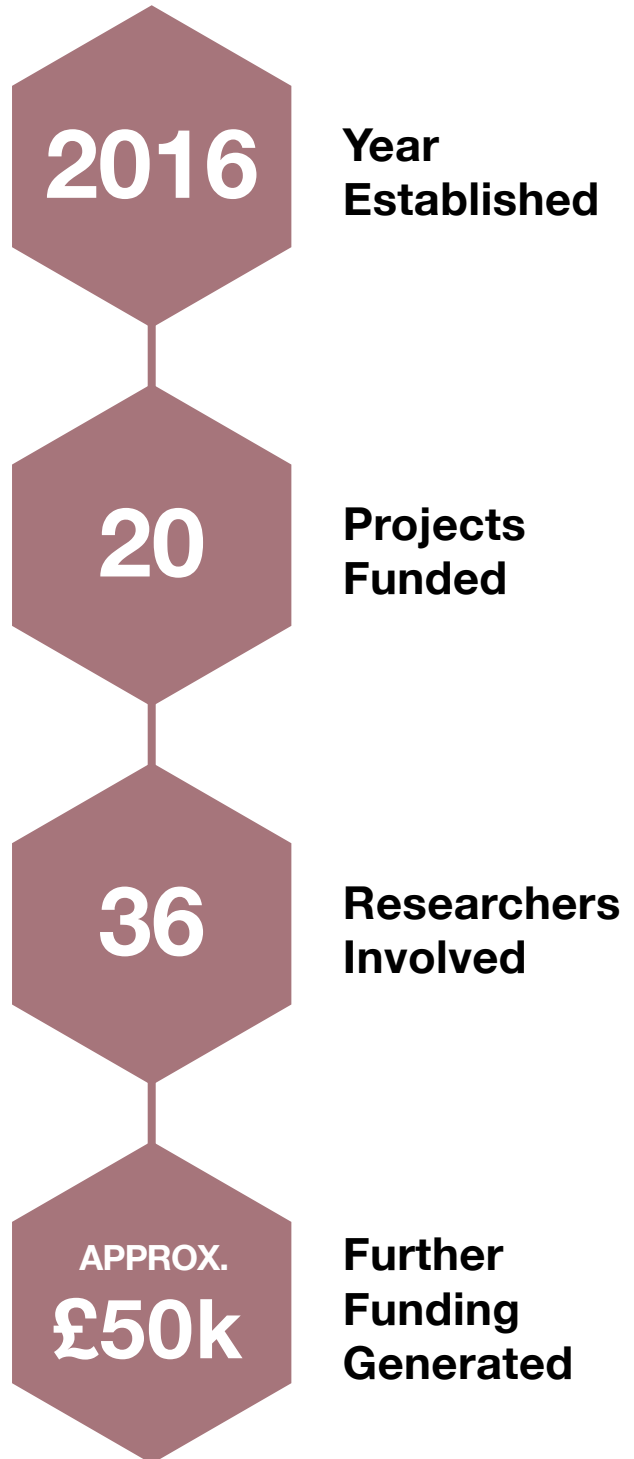
Overview and Key Stats

Launched in 2016, the Grand Challenge of Transformative Technology looks at how innovation and technology can have far-reaching benefits for society and the planet.

Transformative Technology funds cross-disciplinary work at UCL and with partner organisations, with a focus on priority themes of food, disability innovation, social impacts of new technology, data for good, and nature-inspired engineering. Led by scholars from UCL's Engineering and Science & Technology departments, it aims to foster engagement from across the university and create new collaborations that produce real-world impact.

So far, Transformative Technology has awarded over £50,000 in funding to 20 projects.

TRANSFORMATIVE TECHNOLOGY



Key Highlights

HYDROGEN - FUEL OF THE FUTURE? THE CALTHORPE PROJECT

In 2017-18, a £2,00 grant for 'An art/science collaboration in renewable hydrogen energy for public events' was awarded to Nicholas Laessing (PhD student, UCL Slade School of Fine Art) and Dr Tom Heenan, a Research Fellow in the Electrochemical Innovation Lab (UCL Chemical Engineering).

In June 2018, the researchers held the event 'Hydrogen - fuel of the future?'. Questions such as 'What happened to the hydrogen economy? Will the hydrogen energy paradise ever become reality?' were explored during an afternoon of talks and demonstrations on hydrogen as a sustainable energy carrier.

Demonstrations of fuel cells and electrolyzers (that decompose water into hydrogen) were held, and the group discussed the myths, potentials and pitfalls of hydrogen for both decentralised and wider energy infrastructures. Activities also included assembling a prototype low-cost electrolyser that decomposes water into hydrogen and oxygen gas.

The workshop was led by UCell, the public engagement group of PhD researchers from the Electrochemical Innovation Lab at UCL, with Nick Laessing presenting his research into locally produced solar-hydrogen.

Listen to a UCL Grand Challenges podcast on the project here: <https://soundcloud.com/uclsound/voices-from-grand-challenges-hydrogen-energy-artscience-collab-nick-laessing-josh-bailey?in=uclsound/sets/ucl-grand-challenges>

In this episode, James Paskins and Siobhan Morris, UCL Grand Challenges, interview Nick Laessing (Slade School of Arts) and Josh Bailey (UCell).



Algorithms and Fairness - What Are the Limits of Predictive Algorithms in Public Policy?

The public have had little say as private businesses have utilised big data and machine learning. Algorithms already set insurance premiums, approve or deny mortgage applications and filter job applications. These techniques are increasingly being adopted by the public sector, with implications for decisions about healthcare, benefit claims and even decisions in the criminal justice sector. The widespread use of algorithms to make decisions that affect people's livelihoods and freedom raises important questions about fairness. How can we ensure that machine-generated decisions are fair towards different population groups? Is their increasing use widening existing social inequalities? Does over-reliance on machine learning breach laws on equality?

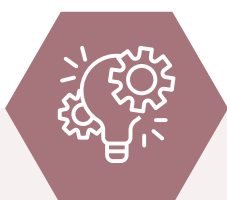
To answer these, and other questions, the Grand Challenges supported a wide-ranging and multidisciplinary workshop at UCL in June 2018. This well-attended and well-received event was conceived by Dr Julie George (Institute

of Health Informatics) and Professor Sofia Olhede (Department of Statistical Science). It explored the technical, ethical and legal issues around the use of predictive algorithms. The attendees came from within and beyond UCL and included academics, policy makers and doctoral students. The event featured invited talks and group discussion on algorithms and fairness. The workshop identified areas of pressing research need and the attendees discussed the implications for own areas.

The collaboration not only provided Dr George with an improved knowledge of the area, but also raised her recognition in the field. This is supporting funding applications in applied settings and is informing future research directions. Dr George has since collaborated with a colleague in the Department of Philosophy on a successful bid to investigate ethics of natural language processing of adult social care records.

Dr George and Professor Olhede provided a well-received an informal seminar with staff from the BMJ publishing group on issues relating to predictive algorithms and their business.

Professor Olhede was part of a Law Society commission on '[Algorithms in the Criminal Justice System](#)'.



Small Grant 2017-2018
Awarded £4,000

Dr Julie George
Institute of Health Informatics
Population Health Sciences

Honorary Professor Sofia Olhede
Statistical Science
Maths & Physical Sciences
(Now École polytechnique fédérale
de Lausanne)

CASE STUDY

Exploring HEXAI (Human Centred Explainable Artificial Intelligence)

This collaboration brought together the faculties of Arts & Humanities and Engineering Sciences to

study 'Human-Centred' Artificial Intelligence (AI), an area that has seen a surge of interest in recent years. Explainable AI (XAI) is concerned with increasing trust in artificially intelligent systems by providing explanations, and in some cases justifications, for what are often opaque processes. The HEXAI workshop, held in July 2019 at UCL, brought a much-needed human-centred viewpoint to a topic that has been most often viewed from technical and computational standpoints.

The workshop was designed to encourage listening and cross-disciplinary dialogue from the start. Participants had presented position papers in advance (all of which are available online at blogs.ucl.ac.uk/hexai/participants/), providing alternative perspectives on the area. The discussion covered the need to humanise AI and highlighted the need to change the language used to explain it. For instance, descriptions of AI often use the metaphor of a black box, the

workshop participants suggested that the image of an iceberg, where so much is hidden from view, offered more explanatory potential. With this metaphor it was felt the attention shifted from the AI inside the box to our human need for explanation and insight at specific moments and in specific contexts; for this reason it was also suggested that the language should shift from XAI to Why-'Y'AI.

The participants also discussed the process of designing explanations of AI as a contextual human behaviour which plays an important role in cementing social cohesion and trust.

The workshop was received positively and was described by one participant as a "fantastic meeting of interdisciplinary minds", with others commenting "very provoking", and "my next workshop will be modelled on this one". The workshop also helped to strengthen the research relationship between UCL and The National Archive, with plans for further collaborative activity in the area.



Small Grant **2017-2018/2016-2017**
Awarded **£4,000/£3,348**

Dr Jenny Bunn
Information Studies
Arts & Humanities

Professor Yvonne Rogers
Computer Science
Engineering Science



CASE STUDY

Exploring HEXAI (Human Centred Explainable Artificial Intelligence) (continued)

Following the session, a leaflet summarizing the participants' discussions was created and circulated amongst and by all those involved: [From Black Box to Tip of the Iceberg: Creative Engagement with the Emergence of XAI \(Explainable Artificial Intelligence\)](#).

The workshop also led to [a paper](#) in Records Management Journal: Bunn, J. (2020), "Working in contexts for which transparency is important:

A recordkeeping view of explainable artificial intelligence (XAI)", Records Management Journal, <https://doi.org/10.1108/RMJ-08-2019-0038>

Currently, Professor Rogers is exploring grant funding opportunities with a workshop participant from Imperial College London.



In February 2019, along with my colleague Dr Ine Steenmans, I applied for a Grand Challenge of Transformative Technology small grant for the project: Digital Ethics Forum: Coordinating UCL's Interdisciplinary Strengths. At the time, there were discussions being had across the university on this topic, but we were greatly in need for a focal point from which to create a network. The support from Grand Challenge helped to generate interest and gave us a reason to reach out to interested colleagues; this made the process of creating a network from which to drive activity much easier and quicker. Soon after we received the funding, we started working towards our first workshop.

The UCL Digital Ethics Forum, funded by the grant, was held on May 1st, 2019, by UCL Computer Science and UCL STEaPP. The forum participants comprised of high-level representation from UCL's various faculties, and I really enjoyed that we were able to bring a such an engaged and unique group of people together from across the institute, from Deans to Heads of Department to PhD students, as well as the now Pro-Vice-Provost for Artificial Intelligence (AI), Professor Geraint Rees. At the time, everyone remarked on how rare it is to have such a mix of people, and it paid off really well; we were exposed to new ways of looking at the digital ethics conversation, and there were so many different viewpoints to consider following the workshop. It was also great to see that there was such a need for this discussion, which everyone found very exciting, as there previously wasn't the medium to act upon this. The Grand Challenges grant enabled us to have one. The workshop was impactful in many ways, and we have been able to achieve a great deal with within in a relatively short space of time; the grant meant that we had foundations from which to build a case for further internal support, and the workshop proved the extent of the interest in the topic. Thus, the Digital Ethics Forum had a snowball effect, due to the new suggestions from representatives, and we were able to obtain follow on funding from UCL Innovation & Enterprise, as they could see it was a topical piece of research with the right people involved. Additionally, we secured further funding from Cisco for one of our finishing PhD students to continue for post-doctoral research on this topic.

Now, the Digital Ethics Forum is connected to UCL's AI strategy, as well as the UCL Centre for AI Centre. For me personally, I was recently invited to join the AI and Policy Roundtable Series, an initiative by Professor Rees, helping to carry on the conversation with a range of external participants. Based in the computer science department, expectations can often be limited in terms of the real applications and impact of our work in the real world; however, this project opened up opportunities and exposed me to ways of engaging with the digital ethics space, and allowed us to reach beyond our department and connect with others across UCL.

In future, I would like to see the Grand Challenges become more than just a financial resource - for it to also act as a support and coordination function for researchers, and to take on greater ownership of and responsibility for the projects it funds. The small grants are a great way to get a project going, and can lead to some very impactful outcomes, as well as on to larger grants, but being able to continue with the same project through the Grand Challenges programme is important for many researchers. Furthermore, to keep projects as cross-UCL initiative, continuous and sustainable support and funding is key to fully integrating the programme across the university. The programme as a whole has huge potential to be a strong, strategic UCL initiative; with more resources, the Grand Challenges will be better able to support researchers on their cross-disciplinarily journey and generate further real-world impact.



Dr Zeynep Engin
Senior Research Associate
Department of Computer Science
Engineering Science

Reflections on UCL Grand Challenges and the Future



Professor Nick Tyler CBE
Chadwick Chair of Civil Engineering
Department of Civil, Environmental
& Geomatic Engineering
Engineering Science

The Grand Challenges were initially proposed by Professor David Price as four great questions posed by society about its survival: what do we think/know/do about global health, intercultural interactions, sustainable cities and human wellbeing? I had the honour to chair the Grand Challenge of Human Wellbeing at the outset of this mission. The key for this approach was that each of these challenges was expressed in an interdisciplinary way: this was not about how physics or psychology would make the world better, but about how the arbitrary disciplinary schisms which had been increasingly deepening in academia since the latter part of the nineteenth century. UCL had to be the place to explore the world in this way – it was founded on the basis of breaking the hegemony of classical thinking that existed in universities up to that time. Even in such a bastion of open thinking, however, disciplines soon encroached. For example, the

first Professor of Engineering in England was appointed in 1827 as one of the first professors at UCL, the title was “Professor of Engineering and the Application of Mechanical Philosophy to the Arts”. It did not take too long for this panopticon of learning to crack, as different lines of engineering sought to distinguish themselves from this overarching principle. So, the Grand Challenges created a sort of riposte to that trend: now there was a need, indeed an encouragement, to look at the challenges posed by society, rather than the disciplines that might be brought to bear on them.

I wondered about the title of ‘human wellbeing’: broad and comprehensive as it was, wasn’t it a bit species-ist? So, we took the view that ‘human wellbeing’ was just an indicator: if the wellbeing of the rest of the planetary environment was not strong, then human wellbeing would founder. As a result, the scope of the Grand Challenge of Human Wellbeing was – and is – huge. The immensity of the task we would be proposing was vast and as a result, human wellbeing was the last of the original Grand Challenges to be launched. The approach we took was that of a catalyst: we had to enable others to generate a change in thinking in themselves in order to foster a response to the Challenge, rather than to set out what responses we should be proposing. This brought into being the approach of creating workshops in which people from multiple disciplines were brought together to create responses which we would then support. The responses had to be interdisciplinary, and fundamental, a challenge in themselves to the ‘normal way of doing things’. This meant changing the people who would be involved – not just senior researchers, but early career researchers, students, technical and administrative support staff. In principle, as a member of the human species, everybody has the capability and a responsibility to contribute in some way to responding to the Challenge, and the Grand Challenge of Human Wellbeing had a responsibility to enable them to do so.

I believe this approach has led to transformations in many people, but it also resulted in a number of initiatives that now seem to be established as though they had always been in existence:

- The Festival of Ageing set out to explore what ageing actually meant, and how this was being missed by academic research at the time – an issue that stimulated take up by the Population and Health Research Domain a few years later – but also one that stimulated the emergence of new ways of supporting hearing assistance technology, which was subsequently spun out in the form of a company, ‘EAVE’, which won the British Safety Industry Federation award for Product of the Year in 2018.
- The Centre for Behaviour Change emerged from a Grand Challenge of Human Wellbeing Behaviour Change Month, in which we brought provocateurs to stimulate thoughts in researchers to create an approach to the study of behaviour change, and thus supported Professor Susan Michie in her initial start-up proposal for the Centre.
- The Disability theme enabled Professor Catherine Holloway to set up the Global Disability Innovation Hub, now promoting a highly innovative approach to enabling disabled people all over the world to create their own solutions to wellbeing.

Perhaps more important than any of these great outcomes are the transformations inspired in the wide range of researchers who have been supported by Human Wellbeing over the years: the realisation of working with people from wildly different disciplinary histories to create new thinking about a problem that had sometimes been realised but thought to be impossible to research, or sometimes not even realised at all: fine art and dentistry, civil engineering and genetics, law and general practice – and many

more. How the experience of these researchers in such multidisciplinary projects has transformed their subsequent research and teaching careers is immeasurable, but very profound.

So, what of the future? One of the issues that the panoply of ideas emerging from the UCL community was that Human Wellbeing spanned so many issues that we took the opportunity to spin out some more Grand Challenges – Justice and Equality and Transformative Technology were both themes that had previously arisen within the Human Wellbeing frame. Even so, the breadth and depth of coverage of challenges to Human Wellbeing will be profoundly important in the coming years.

Right now, the world has been plunged into a massive crisis as a result of the Coronavirus pandemic, and the impacts of this on society as a whole are, and will continue to be, massive. What about its impacts on poor people, people of different ethnicities, disabled people, people of all ages, education and learning, culture, ways of life, poverty alleviation in different parts of the world, and so on. These are all Grand Challenges that are emerging from just one calamity in the world – what about all the others that affect the wellbeing of human beings and their surrounding environment?

The Grand Challenges have, as a whole, taken an explicit approach to the 2030 Sustainable Development Goals – a kind of “Grand Grand Challenge” that recognises that these aims cannot be resolved by single-minded thought and action, but by the coming together of thinking – in people, minds, culture, sciences, arts, humanities, engineering – to create new topologies of thought, ideas and actions. The Grand Challenges have been helping researchers head into this Challenge in a suitably transdisciplinary way over the past 10 years, and will continue to do so into an uncertain, variegated, distributed, multiscalar future. Changing minds and mindsets may well be still the grandest grand challenge of all!



Professor Anthony Costello
Chair of Global Health and Sustainable
Development
Institute for Global Health
Population Health Sciences

In 2006, Malcolm Grant, the former UCL Provost, invited 20 UCL professors to discuss a new cross-disciplinary approach to global health, as one of four new university “Grand Challenges”. I knew only two of my colleagues in the room. We were typical ivory tower academics, in our cosy boxes, studying “more and more about less and less”. But Malcolm encouraged us to think and act across disciplines and, soon after, we set up a virtual Institute for Global Health involving Sir Michael Marmot, Professor Dame Anne Johnson and my own department.

A few months later, I took a call from the Editor of *The Lancet*, Dr Richard Horton, asking if UCL would lead its first Commission on Climate Change and Health. “But Richard, I know nothing about climate change,” I said. “Yes, but UCL does. *The Lancet* wants a cross-university perspective”. So, for the next two years, I traversed our campus, meeting with geographers, ecologists, physicists, lawyers, mathematicians, economists, philosophers, engineers and leaders from energy and public health. Our team discussions were lively, creative and uninhibited. Everything was voluntary, devoid of research grants and deadlines.

These early activities reflect UCL’s commitment and involvement in cross-disciplinary endeavours – recognised by peers and external collaborators as a pioneer. This was crystallised by the official creation of the first UCL Grand Challenge, Global Health, in 2008.

In 2009, we published our first Lancet Commission with the strapline “Climate change is the greatest threat to global health in the 21st century”. It received worldwide media coverage and led on to two further Commissions and the establishment of a *Lancet* Countdown to Climate Action and Health network. This is now one of many UCL-Lancet collaborations, including several other Commissions and a prestigious series of annual public lectures, held in collaboration between the UCL Grand Challenge of Global Health, the Institute of Global Health and *The Lancet*.

Over the last decade, cross-disciplinary thinking has become embedded in UCL's research ethos - from the Research Domains, cross-disciplinary centres and initiatives, to the UCL Grand Challenges programme. Due to this focus, UCL is uniquely placed among European universities to take on large scale cross-disciplinary programmes. Its size and breadth of expertise, history of radical free-thinking, location in the centre of London close to policymakers and professional bodies, and its comparatively decentralised management structure, enables flexibility and a speed of response. UCL top management have incentivised the importance of being policy-relevant and engaged with the public, rather than simply focusing on citation indices and grant income. It's no coincidence that UCL provides more academic media stars than any other university.

While different disciplines have different cultures, philosophies and traditions, cross-disciplinary research takes us out of our comfort zone, challenges the tenets of our beliefs, and introduces us to new methods and ideas for academic inquiry. For students, cross-disciplinary courses are exciting and energising. Yes, we need

specialists and experts - but we also want to find solutions that bring people together to solve the global challenges of the 21st century. The greatest of which - sustainable development, a future for our children, inequality of opportunity, pandemics and racism - require thought and action across all our faculties.

In October 2020, UCL Grand Challenges and the Global Engagement Office will host a cross-university, international online conference over two weeks looking at UCL's approach to the UN Sustainable Development Goals. This conference marks the start of an institutional focus on the SDGs, and I very much look forward to seeing this grow.

Work is also being undertaken across the university to address the other key global challenges. While progress has been made, we recognise that we have a long way to go; UCL can and should lead the way in creating a truly equal opportunity and decolonialised university. Only by working across boundaries can we ensure these challenges are adequately addressed. UCL Grand Challenges – and all of us at UCL – have a vital role to play in this.



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