



# UCL

The background of the lower half of the page is composed of several overlapping, tilted geometric shapes in various colors: teal, olive green, yellow, magenta, red, grey, and dark blue. These shapes create a dynamic, layered effect.

## UCL Grand Challenges

### Developing solutions

# UCL Grand Challenges Foreword

The Grand Challenges programme is a distinctively UCL way of working, helping to maximise our university's effectiveness in generating new knowledge and insights for the benefit and future wellbeing of humankind and the planet. It is a crucial part of UCL's Research Strategy, and I am delighted to see it go from strength to strength.



Universities are under increasing pressure to prove their value to society. Grand Challenges shows how centres of learning and research can be greater than the sum of their parts, and that research informed by cross-disciplinary attention to societally complex issues can have a big impact.

UCL is committed to cross-disciplinary working: supporting researchers to work with colleagues in other fields, using their collective knowledge to solve the Grand Challenges facing our world. With such powerful expertise at UCL across so many subject areas, it is something that we are distinctly well placed to do.

**Professor David Price**  
UCL Vice Provost (Research)

UCL Grand Challenges provides a strong impetus for UCL researchers to pursue novel cross-disciplinary approaches to societally complex problems of global importance, through researcher-proposed grass root projects and responses to strategic initiatives.



Since 2009, the programme has awarded more than 200 small grants. A cross-section of notable projects made possible by small grants appears in this brochure. Crucially for UCL researchers, Grand Challenges support for testing cross-disciplinary attention to globally serious issues has strengthened applications for major research grants from UK Research Councils and other funders.

Academic staff and researchers are free to contact the programme at any time – not only when there is a special call for small grant or strategic initiative proposals. The Grand Challenges team are keen to assist in harnessing UCL's great diversity of expertise through collaborations motivated by the need to solve the Grand Challenges facing our world in the 21st Century.

Grand Challenges is grateful to UCL's President and Provost for base-line core support. Funding has also been provided by the Vice-Provost (International), UCL alumni, philanthropic trusts, the UK Research Councils and the French Embassy. With additional funds, the encouragement that this programme gives researchers to transgress traditional disciplinary boundaries will result in many more powerful outputs and outcomes for society.

**Dr Ian Scott**  
Director, UCL Grand Challenges and  
Cross-Disciplinary Development



# UCL Grand Challenges

## Our highlights

Since the Grand Challenges programme began in 2009, we have helped UCL researchers make connections across the disciplines, start up meaningful research initiatives and make a valuable contribution to solving the world's most pressing problems. Many of the small projects funded by the Grand Challenges have become catalysts for bigger and more expansive research endeavours. We plan to continue giving UCL researchers the freedom to pursue original, thoughtful and exciting cross-disciplinary research ideas, as we strive towards solving the Grand Challenges facing our world.

### Centre for Behaviour Change

Behaviour Change Month was held at UCL in 2012, led by the Grand Challenge of Human Wellbeing and followed up with a series of events. The initiative challenged researchers to answer such questions as 'What shapes human behaviour?', 'What stands in the way of long-term, positive behaviour change?', 'How can research inform the design of effective interventions to change behaviour?' and 'How do we measure behaviour change?' Following Behaviour Change Month, the Grand Challenges helped to support the establishment of the UCL Centre for Behaviour Change, an academic unit that harnesses the breadth and depth of expertise in behaviour change at UCL to address key challenges facing society.

The Centre for Behaviour Change offers a range of services to both academic researchers and external practitioners: cross-disciplinary taught courses throughout the year, including a third year BSc module on Behaviour Change, a range of training courses, a popular summer school, a consultancy service, and monthly Behaviour Change Clinics where UCL academics meet teams of policymakers, practitioners and researchers working in behaviour change, to discuss their current work and proposals for future projects.



### App aims to support healthy ageing

As part of the Grand Challenges convened Festival of Ageing at UCL in 2012, £10,000 was awarded 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 project team developed RecommendMe, 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. Since the app was launched, the project has also secured £70,000 of additional funding from the Ageing Better in Camden network. As RecommendMe develops there will be potential for further policy stakeholder engagement and policy-focused activity.



## Global Disability Innovation Hub leads groundbreaking research

A £10,000 Grand Challenges grant in 2016 saw the creation of a Pop-Up Global Disability Innovation Hub at the Queen Elizabeth Olympic Park, in place for one week before the Olympic Games in Rio. The Hub brought together a range of partners to break new ground in thinking



around the themes of disability and innovation, showcasing live, practical case studies from East London and beyond, bringing the latest research on disability issues and innovation to life. This was just one of the initiatives of the permanent Global Disability Innovation Hub, based at the new UCL East campus on the site of the old Olympic Park. The Hub now offers taught MSc programmes, runs major events and research programmes and has just been awarded a £10 million grant from the UK's Department for International Development for work on assistive technologies.

## The Lancet Commissions

In 2007 academics from across UCL were brought together to address health and climate change. The result of this initiative was a 2009 report in The Lancet medical journal on "Managing the Health Effects of Climate Change".

The UCL Grand Challenge of Global Health provided funding and staff resources to support this initiative, which then grew into the first Lancet Commission on Climate and Health. The second Lancet Commission on Climate and Health brought together more than 45 European and Chinese academics and experts including from UCL, Tsinghua University, Umea University and the University of Exeter.

The work started by the second Lancet Commission now continues with the Lancet Countdown: Tracking Progress on Health and Climate Change, which is supported by Wellcome and other funders.

## £5,000 small grant turns into £800,000 research project

A small grant on sustainable transport in Africa has provided the basis for a successful bid to the ESRC for an £800k project grant. T-SUM is an interdisciplinary and cross-sector collaborative project that aims to identify the conditions under which pathways to sustainable and inclusive transport and land use management can be accelerated in growing cities in the Global South. Led by academics from UCL's Centre for Transport Studies and Development Planning Unit, it will improve urban governance processes and institutional capacity-building in Maputo, Mozambique and Freetown, Sierra Leone.

## Event series translated into senior research fellowship

Professor Stephen Hart from UCL Spanish, Portuguese & Latin American Studies expanded horizons in current thinking about translations through an event series in 2013. Gained in Translation included a focus on the mechanics of translation and an examination of how ideas are translated across cultures. The series led to a first translation into English of a contemporary Peruvian novel, the creation of two films and a Leverhulme Trust Senior Research Fellowship for Prof Hart, worth over £97,000.





# UCL Grand Challenges

## Regional Projects

Showcasing our impact....



IV

### India Voices

Throughout 2017 and 2018 the UCL community, led by the Grand Challenge of Cultural Understanding, celebrated contemporary India through a series of cross-disciplinary events. Lectures, film screenings, conferences, dance demonstrations and interviews with leading scholars and cultural icons brought the study of the subcontinent to life.

As well as events here at UCL, scholars took part in Difficult Dialogues, an annual forum examining issues of contemporary relevance in South Asia, held in Goa. UCL has been the knowledge partner for the last two years.

The work will be continued through the UCL Centre for the Study of South Asia and the Indian Ocean World, a growing centre within the Institute for Advanced Studies which seeks to bring researchers together from across disciplines to examine the wider Indian subcontinent.

AV

### Africa Voices

In early 2016, a series of events were held to formally launch the African Studies Research Centre, housed within the Institute of Advanced Studies.

The Africa Voices series touched on medicine, politics, archaeology and architecture along with the continuing impact of colonialism. They 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.

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.



# Grand Challenge of Sustainable Cities



sc

## Earthquake preparedness first aid kit

Strong earthquakes in central Italy between August 2016 and January 2017 caused around 300 casualties, with large destruction of both cultural heritage sites and critical infrastructure.

Levels of earthquake preparedness tend to be consistently low across countries and people are generally not ready for action in emergency situations, even in high-risk areas like central Italy. This project combined field research with public education, producing a video series aiming to improve disaster preparedness, by disseminating technical knowledge clearly and effectively. Doctoral students from Brain Sciences, Engineering and the Institute for Risk and Disaster Reduction collaborated to produce the video series, with a Grand Challenges grant of just £2000. The series explains key engineering concepts in an effective, engaging and informative way, using psychologically effective techniques. It aims to reduce feelings of fatalism and empower communities to take action.

The project has already provided material for potential interventions aimed at increasing earthquake preparedness, including work developed by the EPICentre, an interdisciplinary centre for natural hazards resilience at UCL.

sc

## Does red make you hot?

This project tested the Hue-Heat-Hypothesis: Does exposure to 'warm' appearing light make you feel warmer than exposure to 'cold' appearing light?

The project combined expertise on buildings and energy consumption from the Energy Institute, with sensors designed and calibrated by Computer Science which measure environmental conditions.

The study supported the hypothesis, meaning that potentially the colour of ambient light in buildings could be used as a tool to save energy, by reducing the need for space heating and cooling. This work has led to a number of academic publications and has been presented to the Department for Energy and Climate Change.



# Grand Challenge of Cultural Understanding

cu

## BiLingo: Exploring multilingualism

A new service has been established at UCL providing research-based advice, information, support and training on childhood bilingualism and multilingualism. BiLingo is the result of a collaboration between Institute of Education experts and researchers specialising in language sciences. The team have carried out new research into linguistic diversity within the UCL community, working with parents and teachers of bilingual and multilingual children, while fostering community and business links, with parents' networks, schools, local authorities and speech and language therapists, among others.

UCL BiLingo is now well-established and has benefited extensively from its members' ability to work across disciplines. Cross-disciplinary interaction is highly valued in the team and continues to inspire, shape and nurture the work. This interdisciplinary initiative has led to new collaborations with UCL colleagues in different disciplines, a research funding success and the formation of successful links to the community.

cu

## Refuge in a moving world

A £4000 Grand Challenges grant led to an installation and symposium event initially erected within the Baqa' refugee camp in Jordan, subsequently exhibited in London.

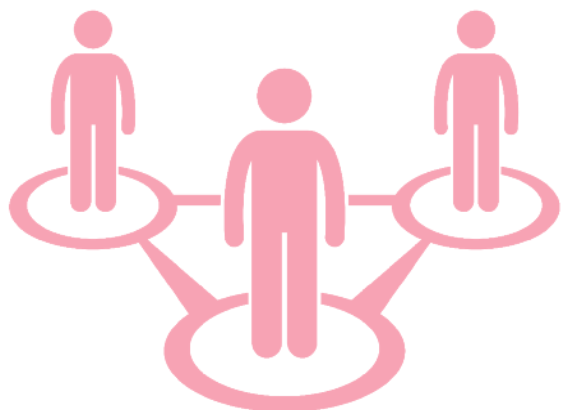


The work asked difficult questions about space in a 'host country' and offered fascinating insights into the changes that took place in these 'temporary' camps over decades. This included discussions of conflict, resolution, protracted refugee status, host country policies, relationships between refugees and host countries, spatial production within refugee camps, socio-economic behaviour and cultural practices.

The installation proved to be a great success, and was attended by a large group of visitors with diverse backgrounds from around London, and even beyond. The visitors vigorously engaged with the installation itself, challenging their own perceptions of space and movement, as well as pondering over the visual and audio pieces to be able to better situate their experience of the installation and materials within the real spatiality of the refugee camp.

There will be several academic publications from the project team, including a UCL Press edited volume, *Refuge in a Moving World: Interdisciplinary Conversation*.

One of the team, Elena Fiddian-Qasmiyeh said, "We very much look forward to continuing to support the UCL Grand Challenges work on Human Displacement, both through our ongoing collaborations and of course through our respective networks, including the UCL Refuge in a Moving World network."





# Grand Challenge of Human Wellbeing



HW

## Improving the resilience and wellbeing of junior doctors

The iWARDs (Individualised Wellbeing and Resilience for Doctors) project developed interventions to improve junior doctors' wellbeing. The work stemmed from a collaboration between experts in how medical training affects junior doctors and researchers from UCL Brain Sciences who had worked on the impact of smartphones on work-life balance.

The project team ran a series of workshops with postgraduate medical trainees, exploring how to enhance resilience and improve wellbeing. The workshops included self-care strategies and guided participants to create 'microboundaries' to support work-life balance, using the lived experiences of junior doctors. The feedback so far was positive and attendees said they would recommend these workshops to friends and colleagues.

The team has also developed a website containing useful resources for junior doctors, including a booklet with exercises and advice based on the latest peer-reviewed research. Future plans include developing interactive web-based interventions for PC, tablet and smartphones to support health behaviour change (e.g. physical activity support, improving sleep, stress management).

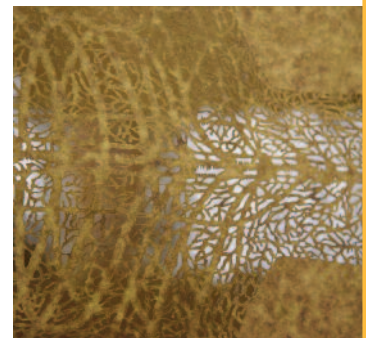
HW

## The science and culture of sleep and sleeplessness

This project tackled the fascinating and little-understood world of sleep and sleep disorders, bringing together the disparate disciplines of neurology and art and literature. Artist Andrew Carnie, who specializes in art on a scientific theme, created a series of pieces, discussed at a symposium in January 2018.

Further events have been held around the UCL campus, exploring sleep with a wide audience of all ages.

The project team are also producing an academic paper, developing a model of sleep and sleeplessness which draws on theory from both the sciences and the humanities.



This work saw expertise come together from two of the most disparate parts of UCL seen in the Grand Challenges. Matthew Beaumont a Professor in English Literature and Kimberley Whitehead, an early career researcher in Neuroscience, were brought together by the Grand Challenges and their work together has already led to the co-creation of intellectual models, engagement approaches, new collaborations and new funding ideas.





# Grand Challenge of Global Health

GH

## New research on intellectual disability stigma around the world

This project set out to discover what discrimination people with intellectual disabilities face around the world and what efforts are made by governments to combat it.

What was initially intended as a fairly modest scoping review, became a much larger and more comprehensive review of attitudes to people with intellectual disabilities around the globe as a result of securing partnership with Inclusion International, and support from Special Olympics and IASSID, three key international organisations in the field. Accordingly, the final report presented the findings from a review of UN States Parties reports relating to the UN Convention on the Rights of Persons with Disabilities, and survey responses from 667 informants pertaining to 88 countries and covering all main world regions.

Within UCL, the two leads have forged much closer links; they have collaborated on grant applications for further funding, and have provided mutual input to a range of projects. Externally, the partnership has developed further links with international contributors to the project and have developed plans for follow-on work with colleagues in Nigeria and Kenya.

Thanks to the final project report presented to the UN, there is now intellectual disability representation on the United Nations Committee on the Rights of Persons with Disabilities. The first member with an intellectual disability was elected to the committee, as the Grand Challenges project report went some way towards breaking down boundaries.

GH

## New app developed to save newborn babies

The aim of this research project was to carry out the first systematic literature review on health worker led interventions to reduce the number of babies who die in the first few days of their lives in hospital, in low and middle-income countries.

An initial literature review demonstrated the limited evidence on the topic, which led to the development of the Neotree app, an intervention developed and tested in Malawi. The app is suitable for all healthcare workers, producing a suggested diagnosis and management plan according to national neonatal guidelines. It aims to improve the quality of newborn care and reduce newborn mortality.

This has been a truly collaborative project and co-creation has been key to the further development and testing of the application in Malawi. Alongside strengthening the relationships within UCL – between the Institute for Global Health and Computer Science, the project team have worked with industry partners to take this project forward and will continue to do so.

The work, kick-started by a Grand Challenges small grant of just £4,000, has led to successful larger funding applications being made, to increase the scope of the work.



# Grand Challenge of Transformative Technology

TT

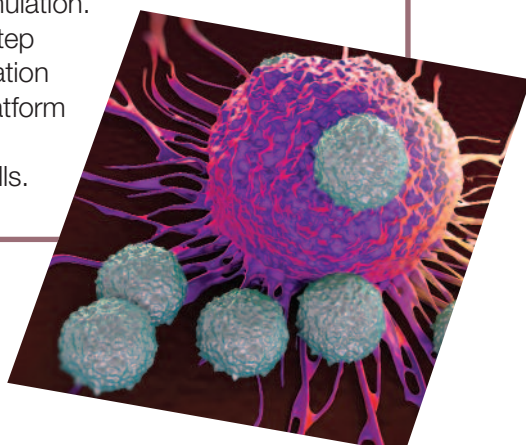
## Using nature inspired engineering to 're-educate' cancer cells

The objective of this project was to employ nature-inspired engineering to tackle manufacturing challenges in a cancer treatment known as adoptive T cell therapy. The therapy is designed to "re-educate" cancer patients' T cells (a type of immune cell) to fight cancer.

However, it is very expensive and requires multiple time-consuming steps for processing. Taking clues from how T cells naturally respond to different stimuli inside the human body, the project team designed a processing platform that can improve the efficiency of the therapy. They also aim to communicate such work to the public by making a website.

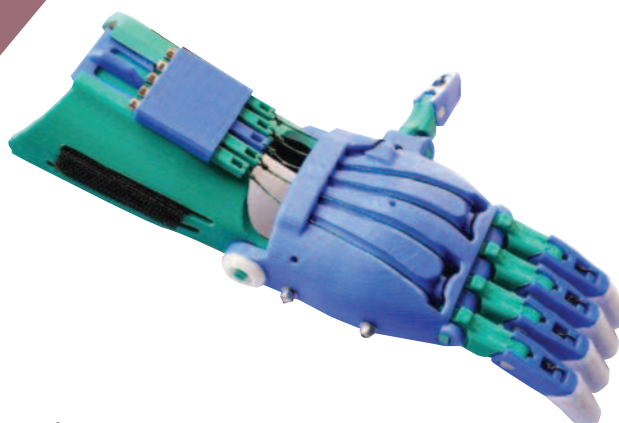
The team, made up of two doctoral students who received Grand Challenges funding under a new scheme run with the UCL Doctoral School, have successfully embedded a nature-inspired biomaterial into a prototype device for immune cell stimulation.

This is the first step towards the creation of a low-cost platform for manipulating therapeutic T cells.



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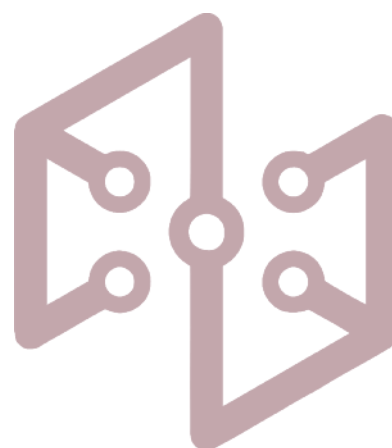
## Creating prosthetic hands with haptic feedback



This project developed 'haptic feedback' – touch feedback similar to the technology in modern smartphones – for 3D printed body-powered prosthetic hands. An initial prototype of the new hand was 3D printed and exhibited at tech conferences around the world.

This technology could well be an affordable, accessible, and appropriate haptic feedback solution for people who have lost fingers or hands, to give them feeling in their hands again.

Work to develop this project has received Royal Academy of Engineering funding and a PhD student has begun investigating how to use the haptic feedback for a single digit prosthesis.





# Grand Challenge of Justice & Equality

JE

## Creating a UK Network on the Prohibition of Torture

This project established a network of practitioners, policymakers, and researchers brought together by a professional and/or scholarly interest in actively contributing to torture prohibition. The inaugural workshop, held in London in November 2017, aimed to offer cross-disciplinary insight on torture prohibition and to draw on the complementary strengths of the assembled participants spanning diverse sectors, organisations and disciplines from all over the country.

The wide range of participants in the workshop combined analytical expertise on torture prohibition with deep substantive knowledge on specific domains, sectors, and developments at all levels.

After the workshop a report was published and disseminated – it is available to download on the Grand Challenge of Justice and Equality website. The workshop's report contains concrete proposals for input to and collaboration with the UK National Torture Prevention Mechanism established as part of the UK's international obligations under the Optional Protocol to the Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment (OPCAT).



JE

## Routes to Opportunity report launched to political audience

The Grand Challenge of Justice & 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", was authored by Institute of Education Doctoral candidate Aly Colman. It was launched in UCL's Institute of Education (IoE) at a reception in December 2017, with speakers including the IoE Director Professor Becky Francis, Sir Vince Cable MP, leader of the Liberal Democrats and report author Aly Colman.

The findings of the report indicate 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.



## About us

The UCL Grand Challenges programme is a key part of UCL's Research Strategy. The Grand Challenges convene and cultivate cross-disciplinary collaborations that explore joined-up solutions in six areas related to matters of pressing societal concern: Global Health, Cultural Understanding, Sustainable Cities, Human Wellbeing, Justice and Equality and Transformative Technology.

UCL Grand Challenges aims to bring researchers together at our university and set the agenda for future research, while building bridges with many external partners.

We do this by awarding small grants to UCL researchers, funding major projects and supporting events led by our academics.



## Contact us

This booklet was published in September 2018. On the Grand Challenges website you'll find the latest examples of how the programme works, what we have done and how researchers at UCL can propose and get involved in cross-disciplinary initiatives.

[ucl.ac.uk/grand-challenges](http://ucl.ac.uk/grand-challenges)  
[twitter.com/UCL\\_GC](https://twitter.com/UCL_GC)

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