



innogen

Innogen Institute Annual Report 2019-2020



THE UNIVERSITY *of* EDINBURGH



1 Background

Innogen was established in 2002 as the ESRC Centre for Social and Economic Research on Innovation in Genomics, a collaboration between the University of Edinburgh (UoE) and the Open University (OU). As part of the ESRC Genomics Network, Innogen's goal was to build an internationally respected centre to enable social scientists and the ESRC to take a leading role in policy, public and innovation related debates on the social aspects of the life sciences.

In its first 12 years, the Innogen Centre received £7M core funding from the ESRC, £3M in institutional support, and £14M in external funding for 140 projects with international collaborations in 30 countries, resulting in over 900 publications, over 200 media reports and 400 knowledge facilitation activities.

Building on the success of the ESRC Innogen Centre, in 2014 the two host universities supported the establishment of the Innogen Institute (Institute for Innovation Generation), developing new methods and approaches to match the evolving opportunities arising from new scientific discoveries across an expanding array of advanced innovative technologies.

This document covers the Institute's activity from April 2019 to March 2020 and demonstrates how Innogen continues to develop and ensure long-standing sustainability and growth, both academically and financially.

1.1 Mission

The Innogen Institute is a collaboration between the University of Edinburgh and the Open University that aims to produce high quality research to support the delivery of innovation that is profitable, safe, inclusive and societally useful, building on fundamental and applied research in science, medicine, engineering and social science.

1.2 Aims

- To build and consolidate new social science approaches and methods to meet the challenges of supporting innovation in the 21st century in developed and developing countries.
- To develop an integrated programme of research, consultancy, advice and teaching, in support of responsible, sustainable innovation that contributes to economic growth in the UK and abroad.
- To develop close collaboration across all colleges of the University of Edinburgh and all faculties of the Open University to ensure the Institute's work is optimally informed about scientific and medical developments and the innovation opportunities that arise from them, and to contribute to the delivery of impact from their research.

2 Innogen Institute Structure

2.1 Innogen Institute Management

The Innogen Institute Management Team includes the Innogen Director, the Deputy Director, and Co-Directors from both The University of Edinburgh (UoE) and The Open University (OU) covering the Institute's areas of interest. The Management Team meets monthly to make strategic and operational decisions relevant to the work of the Innogen Institute. It also meets periodically with Innogen Institute Members to support planning of the Innogen programme of work (teaching, research, policy initiatives, publications and communications) and to ensure effective implementation of activities and initiatives.

The Management Team includes:

- **Prof Theo Papaioannou** (OU) Innogen Director
- **Dr Geoff Banda** (UoE) Innogen Deputy Director
- **Prof Joyce Tait** (UoE) Innogen Co-Director
- **Prof David Wield** (OU) Innogen Co-Director, Global Innovation
- **Prof Maureen Mackintosh** (OU) Co-Director, Economics
- **Dr Stuart Parris** (OU) Innogen Co-Director, Economics

- **Dr Peter Robbins** (OU) Innogen Co-Director, Internal Liaison and Administration
- **Dr Niki Vermeulen** (UoE) Innogen Co-Director
- **Dr Dinar Kale** (OU) Innogen Co-Director
- **Dr Farah Huzair** (UoE) Innogen Co-Director
- **Prof Alan Raybould** (UoE)
- **Prof Chris Warkup** (OU)

2.2 Innogen Institute Membership

There are four categories of Innogen Institute affiliation:

Members are drawn from UoE and OU permanent faculty or contract-based researchers who actively participate in Innogen Institute teaching, research, publications, knowledge exchange and capacity building.

Associates are chosen to enhance the Institute's international innovation and development mandate and are drawn from Innogen Institute Visiting Fellows, academic staff at universities in the UK and abroad, industry, policy and other stakeholder communities.

Students supervised by Innogen members who advance, enrich and diversify the work of Innogen and who are expected to be core contributors to the Institute's activities, outputs, and culture.

Advisers are individuals with an interest in the work of the institute who are invited to make a particular contribution in a specific area based on their capacity and skills.

A list of the Innogen Institute's current affiliates can be viewed at www.innogen.ac.uk/people/

2.3 Staffing Changes

Professor Theo Papaioannou and Dr Geoff Banda continue in the roles of Director and Deputy Director, respectively.

This year we welcomed Dr Farah Huzair back from maternity and new Innogen members: Alan Raybould (Chair in Innovation in the Life Sciences, University of Edinburgh), Chris Warkup (Visiting Professor, The Open University), Smita Srinivas (Professorial Research Fellow, The Open University), Mark Lamont (Lecturer in International Development, The Open University) and Aidan Courtney (Roslin Institute, University of Edinburgh). Each new member offers unique expertise in policy and practice of innovation and development.

3 Achievements in 2019-20

3.1 Income Generation

The following grants were held by Innogen Institute members in the period April 2019-March 2020:

- Responsible Research and Innovation in the Engineering of Mammalian Systems. Joyce Tait, Jane Calvert. BBSRC, EPSRC & MRC. Total grant £13,2M, Innogen Institute contribution £507,861 (Nov 14 – Oct 19).
- Effectiveness of Policies and Interventions. Mark Winskel. UK industry, commerce and public corporations £120,142 (Oct 16 – Sept 20).
- GE3LS (Lead University of Alberta) Pig Disease Antimicrobial Resistance. Ann Bruce, £27,500, RES0030284 (Jun 15 – May 19).
- TRANSGENE: Medical Translation in the History of Modern Genomics. Miguel Garcia-Sancho. EU government bodies, £1,110,154 (Oct 16 – Sept 21).
- Diagnostic Innovation and Livestock (DIAL) Led by University of Exeter. Ann Bruce and Katie

- Adam. ESRC. Total grant £1,715,098; Innogen Institute component, £550,836 (2017 – 2021).
- The role of livestock in food system resilience in remote, upland regions. In collaboration with SRUC (Scottish Rural College) (Principal Investigator) £909,531 (2017 – 2021).
 - How to link industrial and social innovation for inclusive development: lessons from tackling cancer care in Africa. Maureen Mackintosh, Dinar Kale, Geoffrey Banda, Cristina Santos and Charlotte Cross. GCRF Inclusive societies, £699,515 (Sep 2018 – Feb 2021).
 - Migration for Inclusive African Growth. Dinar Kale. ESRC (Sep 2018 – Feb 2021).
 - Bioeconomy, pharmaceuticals and the global economy. David Wield, Joanna Chataway, Rebecca Hanlin. ESRC and OU (Jan 14 – Jan 20).
 - Engineering and international development. David Wield, Peter Robbins, Gordon Wilson. Open University IKD centre, SRA centre in inclusive innovation and DPP Development Funds (Nov 2014 – Jun 2021).
 - Tackling Infections to Benefit Africa, the TIBA Centre. Geoff Banda, James Smith and others. GCRF (Jun 2017 – Mar 2021).
 - The Chickpea Root Project. Geoff Banda, others. BBSRC (May 2017 – Oct 2019).
 - Responsible Innovation Standard. Joyce Tait, Innovate UK/British Standards Institution (BSI), £22,000. Innovate UK (Jan 19 – Sept 19).
 - Developing 'Alternative Practices' for Responsible Research and Innovation in the UK and Japan. Niki Vermeulen, Jane Calvert, Steve Sturdy and Koichi Mikami. ESRC, £32,449.00 (Jan 19 – May 20).
 - Structure-Function Analysis of SEFARI. Joyce Tait, Fumi Kitagawa, Peter Freeman. The Scottish Government, £98,128 (Apr 2019 – Mar 2020).
 - BovReg: Identification of functionally active genomic features relevant to phenotypic diversity and plasticity in cattle. Ann Bruce, and others. Horizon 2020. Total grant 5.9M EUR (Sept 2019 – Aug 2023).
 - REACT-FIRST: Reduced Emission Aquaculture & Chicken Trial For Integrated, Responsible and Sustainable Transformation of CO2 into animal feed. Alan Raybould and Joyce Tait. ISCF Future food production systems, £120,000 (Jul 2020 – Nov 2022).
 - Water Sanitation and Hygiene (WASH) Practices: situational and behavioural analyses to inform policy and practice in a rural area in Zimbabwe. F. Mutapi and G. Banda, £50K British Academy Knowledge Frontiers Awards (2019).
 - IP (Intellectual Property) Management Training Course for African Regional Economic Communities (RECs) and the African Union Development Agency. F. Mutapi and G. Banda, £40K. UKRI GCRF Global Impact Acceleration (2019).
 - Workshop with the African Vaccine Manufacturing Initiative to Develop a Road Map for the African Vaccine Policy to support local vaccine manufacture and health systems strengthening. F. Mutapi and G. Banda, £36K. Scottish Funding Council GCRF Strategy (2019).

3.2 Member Publications

Banda, G., Tait, J., and Mittra, J. (2019). Regenerative Medicine and Disruptive Technology: implications for manufacturing and clinical adoption. *Cell and Gene Therapy Insights*; 5(10) 1287-1303.

Banda, G., Tait, J., Watkins, A., Omdivar, O., and Mittra, J. (2019). Understanding the emergence and evolution of new business models in the UK regenerative medicine sector. *Technology Analysis And Strategic Management*. <http://doi.org/10.1080/09537325.2019.1685087>

Banda, G. (2019). Shashidhara Kolavalli and Marcella Vigneri: The Cocoa Coast: The Board-Managed Cocoa Sector in Ghana. *Food Security*. 11(3). pp 753-755. <https://doi.org/10.1007/s12571-019-00921-2>

Burnham-Stevens, C. and N. Vermeulen. (2020). "3D Bioprinting: Organs 'On Demand'" In Hansen & Schicktanz *Ethical Challenges of Organ Transplantation*. Forthcoming Transcript Verlag (in press).

Hackett, E., Leahey, E., Parker, J., Rafols, I., Hampton, S., Corte, U., Drake, J., Penders, B., Sheble, L., Vermeulen, N. and Vision, T. (2020). 'Do Synthesis Centers Synthesize?' *Research Policy* (in press).

Kale, D. (2019). Mind the gap: Investigating the role of collective action in the evolution of Indian medical device regulation. *Technology in Society*, 59, article no. 101121.

Makiola, A., Compson, Z.G., Baird, D.J., Barnes, M.A., Boerlijst, S.P., Bouchez, A., Brennan, G., Bush, A., Canard, E., Cordier, T., Creer, S., Curry, R.A., David, P., Dumbrell, A.J., Gravel, D., Hajibabaei, M., Hayden, B., van der Hoorn, B., Jarne, P., Jones, J.I., Karimi, B., Keck, F., Kelly, M., Knot, I.E., Krol, L., Massol, F., Monk, W.A., Murphy, J., Pawlowski, J., Poisot, T., Porter, T.M., Randal, K.C., Ransome, E., Ravigné, V., Raybould, A., Robin, S., Schrama, M., Schatz, B., Tamaddoni-Nezhad, A., Trimbos, K.B., Vacher, C., Vasselon, V., Wood, S., Woodward, G. and Bohan, D.A. (2020). Key questions for next-generation biomonitoring. *Frontiers in Environmental Science* 7, 197.

Malvezzi, S., Büche, C., Lorez, C. and Raybould, A. (2019). From basic research in toxicology to a career in regulatory toxicology: an industry perspective. *Chemical Research in Toxicology* 32, 1901-1903.

Mastroeni, M., Mittra, J. and Tait, J. (2019). Political influences on biotechnology-based innovation for European agriculture: risk-assessment and risk management, *Technology Analysis & Strategic Management*, DOI: 10.1080/09537325.2019.1573983

McDonald, J., Burns, A. and Raybould, A. (2020). Advancing ecological risk assessment on genetically engineered breeding stacks with combined insect-resistance traits. *Transgenic Research* 29: 135-148.

Mittra, J., Bruce, A., Scannell, J.W. and Tait, J. (2019). Regulatory and market influences on innovation pathways for the development of new antimicrobial drugs. *Technology Analysis and Strategic Management*. <https://doi.org/10.1080/09537325.2019.1634253>

Mittra, J., Mastroeni, M., Haddow, G., Wield, D., and Barlow, E. (2019). Re-imagining Healthcare and Medical Research Systems in Post Devolution Scotland, *Sociological Research Online*, 24 (1): 55-72.

Mittra, J., and Zoukas, G. (2020). Unpacking the Concept of Bioeconomy: Problems of Definition, Measurement and the Attribution of Value, *Science and Technology Studies*, 33 (1): 2-21.

Papaioannou, T. (2020). Innovation, value-neutrality and the question of politics: unmasking the rhetorical and ideological abuse of evolutionary theory. *Journal of Responsible Innovation*, 7(2) pp. 238–255.

- Papaioannou, T. (2020). Reflections on the entrepreneurial state, innovation and social justice. *Review of Evolutionary Political Economy*
- Papamichail, G., Rosiello, A., and Wield, D. (2019). Capacity-building barriers to S3 implementation: an empirical framework for catch-up regions. *Innovation: The European Journal Of Social Science Research*, 32(1), 66-84.
- Parris, S. (2019). Smart cities: locations for environmental entrepreneurship. In: Nuttall, William J; Gibson, David V; Trzmielak, Dariusz and Ibarra-Yunez, Alejandro eds. *Energy and Mobility in Smart Cities*. ICE Publishing, pp. 31–59.
- Raybould, A. and Burns, A. (2020). Problem formulation for off-target effects of externally applied double-stranded RNA-based products for pest control. *Frontiers in Plant Science* 11: 424.
- Reynolds, M., Lyons-White, J., and Knight, A. T. (2019). Systemic failure and the ‘Iron Triangle’ of conservation practice. In *Seeds of Change: Provocations for a new research agenda*. Geneva: Luc Hoffman Institute.
- Robbins, P., Wield, D., and Wilson, G. (2020). Engineering for Development as Borderland Activity. *Engineering Studies*, 12(1), 58-78.
- Robbins, P., Wield, D., Wilson, G., Watkins, A., and MacPhail, P. (2020). Global (best) together with (or against) local networks and practices? Liquid engineering and the uses programme. *Journal Of International Development*, 32(1), 28.
- Robbins, P., Wield, D., and Wilson, G. (2020). Exploring the Global and the Local in Engineering and International Development: towards a liquid engineering approach. *Journal Of International Development*, 32(1), 5-10.
- Rusakaniko, S., Makanga, M., Ota, M., Bockarie, M., Banda, G., Okeibunor, J., Mutapi F., Tumusiime, P., Nyirenda, T., Kirigia, J., and Nabyonga-Oren, J (2019). Strengthening National Health Research Systems in the WHO African Region – Progress towards Universal Health Coverage. *Globalization and Health*. (15) <https://doi.org/10.1186/s12992-019-0492-8>
- Stein, F., Perry, M., Banda, G., Woolhouse, M. and Mutapi, F. (2020). Oxygen provision to fight COVID-19 in sub-Saharan Africa. *BMJ Glob Health*. 5(6):e002786. doi:10.1136/bmjgh-2020-002786
- Szymanski, E., Vermeulen, N. and Wong, T. (2019). Yeast: One cell, one reference sequence, multiple genomes? *New Genetics and Society*, 38(4), 430-450.
- Tait, J. (Technical Author). (2020). Responsible Innovation – Guide. British Standards Institution, PAS 440. https://pages.bsigroup.com/l/35972/2020-03-17/2cgcnc1?utm_source=pardot&utm_medium=email&utm_campaign=SM-STAN-LAU-PAS-PAS440-2003
- Tait, J and Wield, D. (2019). Policy Support for Disruptive Innovation in the Life Sciences. *Technology Analysis and Strategic Management*. <https://doi.org/10.1080/09537325.2019.1631449>
- Tamminen, S. and N. Vermeulen (2019). Bio-objects: new conjugations of the living. *Sociologias* 21 (50): 156-179.
- Vidmar, M., Rosiello, A., Vermeulen, N., Williams, R., and Dines, J. (2020). *New Space and Agile*

Innovation: Understanding Transition to Open Innovation by Examining Innovation Networks and Moments. *Acta astronautica*, 167: 122-134.

PhD:

Misra, Gauri (2020). Exploring the Role of Private Sector in Development – Multinational Corporations and Product Innovations for the Bottom of the Pyramid Consumers. PhD thesis. Open University.

Mkwashi, Andrew S (2020). Medical Device Regulations, Industrial Capabilities, and Affordable Healthcare Technology Development: Case Studies from the United Kingdom and South Africa. Open University.

Ray, Raktim (2020). Spatial Adhocism as Practice for Conflict Politics: Theorising Urban Politics in Kolkata. Open University.

Vidmar, Matjaz (2020). Scottish Space Sector and Innovation: A multi-perspective study of an emerging innovation ecosystem in structural transition. The University of Edinburgh.

Working Papers:

Economics and Public Health: A case for interdisciplinary cohesion in the time of Coronavirus. Pritika Rao and Smita Srinivas.

Covid-19 Balancing the needs of public health and the economy. Farah Huzair and Joyce Tait.

3.3 Achievements and research impacts

9 May 2019

The idea of justice in innovation and development

Theo Papaionnou delivered his inaugural lecture exploring the idea of justice in innovation on the 4th June in the Berrill Lecture Theatre, Walton Hall, The Open University, Milton Keynes.

6 June 2019

Innovation for Development in a new societal era

Theo Papaioannou discussed inclusive innovation for development at the opening of II Edition of the International Development Summer Course organised by Calouste Gulbenkian Foundation, the Portuguese Platform of Non-Governmental Development Organizations (NGDO) and the Centre for African, Asian and Latin American Studies of ISEG - Lisbon School of Economics and Management, Lisbon University (CEsA/ISEG), 28th -31st May 2019.

27 June 2019

Innogen contributes to TIBA initiatives

Geoff Banda delivered an intellectual property workshop in Johannesburg and helps develop the 'Research for Health and Innovation Strategy for Africa'.

1 August 2019

Chris Warkup appointed Visiting Professor at Innogen

Chris Warkup, one of the UK's leading knowledge exchange practitioners, joined the Innogen Institute at The Open University until 2022.

23 August 2019

Innogen welcomes Alan Raybould

Prof. Alan Raybould joined the University of Edinburgh as Chair of Innovation in the Life Sciences.

11 September 2019

2019 DSA Annual Conference: Building our Future Together

Theo Papaioannou organised and chaired three panel sessions on 'Inclusive Innovation for Development: what Inclusion for a Fairer Future?' at the 2019 DSA Annual Conference.

19 September 2019

Synbio in the UK – A decade of developments

Innogen's work on governing the innovation ecosystem by developing a framework on Proportionate and Adaptive Governance of Innovative Technologies (PAGIT) was highlighted in the Synthetic Biology Leadership Council (SBLC) review of the UK's synbio activities in the last decade.

3-4 October 2019

Innogen retreat 2019

This year's annual meeting took place in Edinburgh and it brought together researchers from the Open University and the University of Edinburgh, as well as colleagues from the Open University Scotland, to discuss new developments in the policy & governance of innovative technologies, global health & development. Over two days, participants were able to discuss their current and future research and teaching plans, exchange ideas and identify new opportunities for collaboration.

Innogen's **new promotional video** was also presented at the meeting:

<https://www.youtube.com/user/InnogenInstitute>

18 November 2019

Innogen event: The role of social sciences in innovation

As part of the ESRC Festival of Social Science, the Innogen Institute brought together social science researchers and scientists from the Roslin Institute and the Centre for Synthetic and Systems Biology (SynthSys) at the University of Edinburgh for a free public event exploring the opportunities arising from the latest genetic technologies and the regulatory issues they are facing.

28 November 2019

Putting scientific knowledge to use

Chris Warkup, Visiting Professor at Innogen, chaired a session at the Royal Society conference in London on 'Transforming UK translation'.

6 December 2019

Innogen Director joins the Innovation Caucus

Theo Papaioannou was appointed member of the Innovation Caucus, an initiative funded by Innovate UK and the ESRC to promote greater knowledge exchange between social science researchers, other academic disciplines and businesses. The Innovation Caucus aims to ensure that social science insights support sustainable, innovation-led economic growth.

12 December 2019

Supporting Africa's innovation strategy

In November Geoff Banda attended the launch of The Health Research and Innovation Strategy for Africa 2018-2030 and spoke at the 2nd Vaccine Manufacturing Forum.

23 January 2020

Biosciences Big Ideas Pipeline

The Innogen institute submitted a Big Idea in response to the UKRI-BBSRC call for ambitious and exciting ideas that could transform research and innovation in the UK.

20 February 2020

Innogen co-Director speaks at American Association for the Advancement of Science (AAAS) 2020

Joyce Tait gave a talk at AAAS 2020 on managing the risks of synthetic biology.

12 March 2020

Innogen researchers to deliver new Masters programme in Global Development at the OU

Innogen researchers at the OU were involved in the development of this course, successor to the popular and influential MSc in Development Management, and some of their work has been included in the curriculum.

19 March 2020

Engineering and Development

Peter Robbins and David Wield edited a Special Issue of the Journal of International Development entitled 'The global and the local in engineering and international development'.

20 March 2019

Theo Papaioannou was appointed Member of the Expert Peer Review Group on Evaluation at the Department for Business, Energy and Industrial Strategy. The aim of the group is to provide advice on the design and implementation of specific evaluations and on the research methods required to develop a robust evidence base for the Department's policies.

27 March 2020

Innogen Research on Covid-19

Innogen members draw attention to lessons learnt from previous outbreaks of infectious disease, and to the importance of 'local health' and the law in global health emergencies.

Summaries of these and Innogen's latest activities can be found on the **Innogen website**

(<https://www.innogen.ac.uk/>) and in our quarterly newsletters that are sent out to over 1,000 subscribers.

3.4 External Appointments

Geoffrey Banda

Member, African Union/NEPAD Working Group on developing Research for Health and Innovation Policy for the African Union;

Member, African Union/ NEPAD Technical Working Group, Fund for Pharmaceutical Development (FAPD);

Member, Advocacy Advisory Committee, African Vaccine Manufacturing Initiative UNIDO Expert Group Meeting;

Member, Steering Committee, Tackling Infections for the Benefit of Africa (TIBA) Research Consortium.

Farah Huzair

Steering Committee member, BBSRC-funded crop genome editing resource, John Innes Centre.

Andy Lane

Board member, Buckinghamshire and Milton Keynes Environmental Partnership.

Maureen Mackintosh

Panel member, Medical Research Council, Antimicrobial Resistance in a Global Context funding panel;

Chair, ESRC Roundtable discussion of the role of social science in the Health Systems Research

Initiative, April;
Lead expert on Appropriate Incentives, UNIDO Expert Group Meeting on Practical Approaches for Government Incentives, Mobilizing Affordable Financing and Access to Technology for the Pharmaceutical Industry in Africa.

Theo Papaioannou

Associate Editor, Journal of International Development;
Member, Editorial Advisory Board, International Journal of Technology Management;
Member, AsSIST-UK (Association of Science, Technology and Innovation) Special Advisory Group;
Member, NESTA Informal Steering Group on Innovation Policy;
Member, Business, External Peer Review Group (PRG) on Evaluation, Business, Energy and Industrial Strategy (BEIS);
Member, Innovation Caucus, ESRC-INNOVATE UK.

Stuart Parris

Member, Advisory Board, School of Economics Finance and Accounting (EFA);
Faculty of Business and Law, Coventry University.

Peter Robbins

Co-investigator, H2020 project to stimulate sustainability transitions in European agriculture through better understanding the roles played by farm advice in farmer decision-making. (European Commission).

Miguel Garcia-Sancho

Member, Editorial Board, Endeavour (Journal);
Member, Editorial Board, Theoria (Journal).

James Smith

Member, Economic and Social Research Council (ESRC);
Trustee, Practical Action;
Committee(s) Member, League of European Research Universities;
Chair, international advisory board, Centre for Tropical Livestock Genetics and Health.

Joyce Tait

Member, Prime Minister's Council for Science and Technology;
Member and Chair of Governance Subgroup, Synthetic Biology Leadership Council, UK;
Member, UKRI/BBSRC Transforming Food Production Advisory Group;
Member, Life Sciences Scotland Triple A (Animal Health, Aquaculture and Agribusiness) Subgroup, Life Sciences Scotland;
Member, Roslin Foundation Board;
Member, EPSRC Peer Review College;
Member, Governing Board, Industrial Biotechnology Innovation Centre;
Member, Editorial Board, Engineering Biology Journal;
Member, ESRC UK Innovation Caucus.

Niki Vermeulen

Visiting researcher, Centre for Science and Technology Studies (CWTS), Leiden University;
Member, Royal Society of Edinburgh Young Academy;
Member, Innovation Caucus;
Member, Scottish Marine Science Strategic Delivery Group (SMSSDG);
Editorial board, Palgrave Communications;
Editorial board Inscriptions: writing the social studies of science, Manchester University Press;
Editorial board EASST Review.

David Wield

Research Assessor, Carnegie Trust for the Universities of Scotland;
Fellow, ESRC Peer Review College;
Member, UK Innovation Caucus;
Editorial Board, Technology Analysis and Strategic Management;
Editorial Board, Intl Journal of Technology Management and Sustainable Development;
Member, ESRC Centre on Constitutional Change;
Member, REF 2021 sub-panel C22, UK Research and Innovation (UKRI).

4 Teaching and Capacity Building

4.1 PhD Students

Innogen research staff continue to offer supervision for postgraduate study across a breadth of areas relating to social science and humanities aspects of the life sciences and the bioeconomy. In 2019-20, the following students were studying for their PhDs or submitted their thesis during that period:

Charlie Whetham
Raktim Ray
Gauri Misra
Federico Vigano
(Prof. Theo Papaioannou)

Sam Beechener
Tair Mukhamadiyev
Abel Villa
Giorgos Zoukas
Juliet Kariuki
Tara Wight
(Dr Ann Bruce)

Anna Couturier
Rosalind Attenborough
(Dr James Mittra)

Owais Anwar Golra
Matjaz Vidmar
Jin Ding
George Papamichail
Sara Valencia Cadavid
Abel Osvaldo Villa Rodríguez
(Dr Alessandro Rosiello)

Matjaz Vidmar
Ros Attenborough
Rodrigo Liscovsky
Fiona Coyle
Laura Volkmer
Kate Bowell
(Dr Niki Vermeulen)

Pallavi Joshi
Andrew Mkwashi
(Dr Dinar Kale)

Elizabeth Babister
Kirsteen Merrilees
(Dr Peter Robbins)

Paraddzayi Jawona
(G Banda, J Tait and F Huzair)

4.2 Masters Level Teaching

Innogen members, play leading roles in the development and delivery of the following programmes:

MSc in Management of Bioeconomy, Innovation and Governance (MSc BIG), The University of Edinburgh.

This programme is an innovative and dynamic postgraduate qualification designed to meet the increasing demand for skilled people in the growing global bioeconomy. The MSc BIG responds to a number of key challenges, including: developing sustainable innovation in a responsible manner; identifying and exploiting value throughout innovation ecosystems; and bringing new technologies to existing and emerging markets. MSc BIG graduates are taught how to use customized methods to deal with complex issues ranging from foresight and innovation systems analysis, strategic decision making in companies, value chain analysis and business model development, product and process regulation, to ensuring 'responsibility' in research and innovation. Students also have the opportunity to write their dissertations on collaborations through work-based placements with organizations or companies involved in the bioeconomy.

MSc BIG welcomed its inaugural class in 2012 and to date has successfully graduated 51 students, many of whom have gone on to take strategic roles in the bioeconomy.

Masters in Development Management, The Open University (Distance learning).

This post-graduate degree addresses the needs of development managers, as well as other professionals who work in development contexts, locally and globally. The Masters in Development Management programme promotes a better understanding of the complex processes labelled 'development', with a particular focus on dealing with conflict and on building the institutions that make development sustainable. The degree culminates in a research project which enhances both the students' research skills and understanding of a development management problem.

The Open University's Masters Programme in Development Management has more than 400 registered students and has graduated over 1,000 mid-career professionals from more than 100 countries.

From September 2020 this course will be succeeded by the Masters in Global Development.

5 Forward Plan, 2020 - 2021

5.1 Funding Opportunities

The Innogen Institute is well placed to meet the long term opportunities arising from the current funding environment. The framework of methods and approaches that we have developed has proved flexible and adaptive in the face of shifting innovation opportunities raised by new scientific discoveries and societal needs and by the reorganisation of research funding in the UK, particularly the increased emphasis on interdisciplinary research in UKRI and the very large sums being channelled into innovation-

related translational research through the Industrial Strategy Challenge Fund (ISCF) and the Global Challenges Research Fund (GCRF).

The following collaborations are also leading to new funding opportunities:

- the five-year Edinburgh University Synthetic Biology Research Centre (SynthSys Mammalian) that links two of our key areas of interest, synthetic biology and regenerative medicine
- the SynbiCITE Innovation and Knowledge Centre, based in Imperial College, supporting innovation in synthetic biology (Joyce Tait has a 5% staff role on this programme)
- Edinburgh Global Academy for Agriculture and Food Security (Joyce Tait and Alan Raybould have a 20% staff role on this programme)
- Edinburgh Plant Science Network
- UK Energy Research Centre

The Open University is supporting the Innogen Institute through its Strategic Research Area fund and supports a programme in International Development and Inclusive Innovation with £2.5m over five years (2015-2020).

Our expertise across a broad range of important current innovation policy priorities, our proven record in delivering excellent reports on time, and our interdisciplinary expertise makes us partners of choice in projects led by others within Edinburgh University and also nationally and internationally. We receive many more invitations to collaborate, and opportunities to lead major proposals, than we have the staff resources to accommodate.

5.2 Teaching

We are continuing successfully to promote the Masters in Management of the Bioeconomy, Innovation and Governance, and the associated teaching provisions in collaboration with the Universities of Glasgow and Strathclyde. Also, we will continue to develop and promote CPD offerings based on the Master's programme.

5.3 Innogen Management

The following are the management team's objectives for 2020-21:

- To maintain and grow the body of social science and interdisciplinary knowledge on innovation through new and extended programmes of research.
- To extend the Institute's activities to cover a broader range of advanced innovative technologies, as scientific research opens up new opportunities that are relevant to the Institute's expertise.
- To build and consolidate the Institute's international collaborations around the world.
- To maintain and grow effective collaborations between Innogen members and staff located in the University of Edinburgh, the Open University and the Open University Scotland to maximise the benefits arising from the skills located in each institution.
- To build the Institute's doctoral and masters level teaching and CPD programmes to support researchers and practitioners in industry, academia, policy, regulation and engagement.
- To continue to increase Innogen's impact on practice and policy, through documented uptake and use of Innogen Institute research outputs and advice.
- To continue constructive engagement with stakeholders and relevant institutions through effective communication and knowledge exchange.