



innogen

# Innogen Institute Annual Report 2020-2021



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 2020 to March 2021 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) Innogen 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/](http://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 one new Member: Dr Kevin Deane (Senior Lecturer in Economics, Faculty of Arts & Social Sciences, The Open University); and one new Associate Peter Kearns (Independent international consultant).

## **3 Achievements in 2020-21**

### **3.1 Income Generation**

The following grants were held by Innogen Institute Members in the period April 2020-March 2021:

- Effectiveness of Policies and Interventions. Mark Winskel. UK industry, commerce and public corporations, £120,142 (Oct 16 – Sept 20).
- 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).
- Engineering and international development. David Wield, Dinar Kale, Peter Robbins, Gordon

Wilson. Open University DPP Development Funds, £20,000 (Jan 2021-Dec 2023).

- Tackling Infections to Benefit Africa, the TIBA Centre. Geoff Banda, James Smith and others. GCRF (Jun 2017 – Mar 2021).
- 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).
- 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 CO<sub>2</sub> into animal feed. Alan Raybould and Joyce Tait. ISCF Future food production systems, £120,000 (Jul 2020 – Nov 2022).
- Fish farming in Scotland: optimising its contribution to climate change mitigation. Joyce Tait and Alan Raybould. OU Scotland, £7,500 (Jan 2021- Mar 2021).
- Choreographies of Scottish Seaweed R&D. Niki Vermeulen. OU Scotland, £7,500 (Jan 2021-Mar 2021).
- Co-investigator on Work Package 3 ('Living Labs for innovation support services') for the AgriLink project ('Agricultural Knowledge: Linking farmers, advisors and researchers to boost innovation') funded under H2020-RUR-2016-2 (Rural Renaissance - Fostering innovation and business opportunities). Led by Pierre Labarthe, INRA, France, grant value to Innogen at OU €186,000 (Jul 2017- Dec 2021).

### 3.2 Member Publications

Adam, K. E., Bruce, A. & Corbishley, A. Veterinary interventions to improve neonatal survival on British beef and sheep farms: a qualitative study. 4 Feb 2021, (E-pub ahead of print) In: *Frontiers in Veterinary Science*.

Ajwang, F. Responsive Regulation and Its Implications for Smallholder Participation in the Kenyan Fresh Fruit and Vegetable Export Value Chain. 2020. *Eur J Dev Res* 32, 1288–1311.

Azodo, I., Williams, R., Sheikh, A. & Cresswell, K. Opportunities and Challenges Surrounding the Use of Data From Wearable Sensor Devices in Health Care: Qualitative Interview Study. 22 Oct 2020, In: *Journal of medical Internet research*. 22, 10, p. e19542

Banda, G., Mugwagwa, J., Wanjala, C., Mackintosh, M., and Kale, D. Local manufacturing, local supply chains and health security in Africa: lessons from COVID-19. 2021. *BMJ Global Health*; 0:e006362.

Banda, G. & Huzair, F. Introduction to special issue: innovation/governance interactions in the bioeconomy, *Technology Analysis & Strategic Management*. 2021. 33:3, 257-259.

Buller, H., Adam, K., Bard, A., Bruce, A., Chan, K. W. R., Hinchliffe, S., Morgan, L., Rees, G. & Reyher, K. Veterinary diagnostic practice and the use of rapid tests in antimicrobial stewardship on UK livestock farms. 15 Oct 2020, (E-pub ahead of print) In: *Frontiers in Veterinary Science*.

Bruce, A., Jackson, C. & Lamprinopoulou, C. Social networks and farming resilience. 12 Jan 2021, (E-pub ahead of print) In: *Outlook on Agriculture*.

Cresswell, K. M., Williams, R. & Sheikh, A. Using cloud technology in health care during the COVID-19 pandemic. 1 Jan 2021, In: *The Lancet Digital Health*.

Cresswell, K., Williams, R., Carlile, N. & Sheikh, A. Accelerating Innovation in Health Care: Insights From a Qualitative Inquiry Into United Kingdom and United States Innovation Centers. 25 Sep 2020, In: *Journal of medical Internet research*. 22, 9, p. e19644

Cresswell, K. M., Williams, R. & Sheikh, A. Bridging the growing digital divide between NHS England's hospitals. 1 Dec 2020, In: *Journal of the Royal Society of Medicine*.

Cresswell, K., Williams, R. & Sheikh, A. Developing and Applying a Formative Evaluation Framework for Health Information Technology Implementations: Qualitative Investigation. 10 Jun 2020, In: *Journal of medical Internet research*. 22, 6, p. e15068

Cresswell, K. M., Sheikh, A., Franklin, B. D., Krasuska, M., Nguyen, H., Hinder, S., Lane, W., Mozaffar, H., Mason, K., Eason, S., Potts, H. W. W. & Williams, R. Formative independent evaluation of a digital change programme in the English National Health Service: Study protocol for a longitudinal qualitative study. 8 Oct 2020, In: *BMJ Open*. 10, 1

Cresswell, K. M., Williams, R., Carlile, N. & Sheikh, A. Why digitally-enabled health system transformation needs organizational, service, and social innovation as well as product innovation. 22 Jul 2020, In: *BMJ Health & Care Informatics*.

Cresswell, K. M., Sheikh, A., Franklin, B. D., Krasuska, M., Nguyen, H., Hinder, S., Lane, W., Mozaffar, H., Mason, K., Eason, S., Potts, H. W. W. & Williams, R. Theoretical and methodological considerations in evaluating large-scale health information technology change programmes. 27 May 2020, (E-pub ahead of

print) In: BMC Health Services Research.

Hackett, E. J., Leahey, E., Parker, J. N., Rafols, I., Hampton, S. E., Corte, U., Chavarro, D., Drake, J. M., Penders, B., Sheble, L., Vermeulen, N. & Vision, T. J. Do synthesis centers synthesize? A semantic analysis of topical diversity in research. 1 Jan 2021, In: Research Policy. 50, 1, 104069.

Heeney, C., Malden, S. & Sheikh, A. Protocol for a qualitative study to identify strategies to optimise hospital ePrescribing systems. 13 Jan 2021, In: BMJ Open. 11, 1, p. 1-6 6 p.

Huzair, F. Risk and regulatory culture: Governing recombinant DNA technology in the UK from 1970–1980 24 Dec 2020, (E-pub ahead of print) In: Technology Analysis and Strategic Management.

Krasuska, M., Williams, R., Sheikh, A., Franklin, B. D., Heeney, C., Lane, W., Mozaffar, H., Mason, K., Eason, S., Hinder, S., Rachel, D., Potts, H. W. W. & Cresswell, K. Technological capabilities to assess digital excellence in hospitals in high performing healthcare systems: an international eDelphi exercise. 18 Aug 2020, In: Journal of medical Internet research. 22, 8, p. e17022

Mkenda, V., Buller, H. & Bruce, A. Exploring the willingness to adopt pen-side diagnostic tests to improve antimicrobial medicine use amongst Tanzanian livestock farmers. 29 Mar 2021, (Accepted/In press) In: International Journal of Technology Management and Sustainable Development.

Mkenda, V., Woolhouse, M., Mutapi, F. and Banda, G. Recruiting students for the COVID-19 emergency response: lessons from eight African countries. *AAS Open Res* 2020, **3**:42

Papaioannou, Theo. The Idea of Justice in Innovation: Applying Non-Ideal Political Theory to Address Questions of Sustainable Public Policy in Emerging Technologies. 2021. *Sustainability*, 13(5), article no. 2655.

Papaioannou, Theo. Creative States: Is state-led risk-taking the answer to post-Covid-19 recovery? 2021. *RSA Journal*, CLXVII(1) pp. 30–35.

Papaioannou, Theo. Reflections on the entrepreneurial state, innovation and social justice. 2020. *Review of Evolutionary Political Economy*, 1(2) pp. 199–220.

Raybould, A. & Burns, A. Problem formulation for off-target effects of externally applied double-stranded RNA-based products for pest control. 16 Apr 2020, In: *Frontiers in plant science*. 11, p. 1-7 7 p., 424.

Rosiello, A. & Maleki, A. A dynamic multi-sector analysis of technological catch-up: The impact of technology cycle times, knowledge base complexity and variety. 5 Jan 2021, (E-pub ahead of print) In: *Research Policy*. 50, 3, 104194.

Srinivas, S. Institutional variety and the future of economics. *Rev Evol Polit Econ* 1, 13–35 (2020).

Stein, F., Perry, M., Banda, G., Woolhouse, M. & Mutapi, F. Oxygen provision in Sub-Saharan Africa to fight COVID-19. 11 Jun 2020, (E-pub ahead of print) In: *BMJ Global Health*. 5, 6, e002786.

Sturdy, S. Local mutations: On the tentative beginnings of molecular oncology in Britain 1980–2000 Mar 2021, In: *New Genetics and Society*. 40, 1, p. 7-25 19 p.

Sturdy, S., Miller, F., Hogarth, S., Armstrong, N., Chakraborty, P., Cressman, C., Dobrow, M., Flitcroft, K., Grossman, D., Harris, R., Hoebee, B., Holloway, K., Kinsinger, L., Krag, M., Löblová, O., Löwy, I., Mackie, A., Marshall, J., O'Hallahan, J., Rabeneck, L. & 9 others. Half a century of Wilson & Jungner: Reflections on the

governance of population screening. 6 Jul 2020, In: Wellcome Open Research . 5

Tait, Joyce & Brown, Alex & Lalinde, Isabela & Barlow, Daniel & Chiles, Matthew & Mason, Paul. Responsible innovation: Its role in an era of technological and regulatory transformation. 2021. Engineering Biology. 5. 2-9. 10.1049/enb2.12005.

Tait, Joyce and Wield, David. Policy support for disruptive innovation in the life sciences. 2021. Technology Analysis and Strategic Management, 33(3) pp. 307–319.

Wang, Kai, Shen, X. & Williams, R. Sequencing BGI: The evolution of expertise and research organisation in the world's leading gene sequencing facility. 25 Nov 2020, (E-pub ahead of print) In: New Genetics and Society.

Williams, R., Sheikh, A., Franklin, B. D., Krasuska, M., Nguyen, H., Hinder, S., Lane, W., Mozaffar, H., Mason, K., Eason, S., Potts, H. W. W. & Cresswell, K. M. Using Blueprints to promote interorganizational knowledge transfer in digital health initiatives—a qualitative exploration of a national change program in English hospitals. 11 Mar 2021, (E-pub ahead of print) In: Journal of the American Medical Informatics Association. 9 p., ocab020.

Winkel, M. & Kattirtzi, M. Transitions, disruptions and revolutions: Expert views on prospects for a smart and local energy revolution in the UK Energy Policy. 1 Sep 2020, (E-pub ahead of print) In: Energy Policy. 147, 111815.

#### **PhDs:**

'UK/Scottish Space Sector and Innovation' by Matjaz Vidmar.

'Scientific openness: a new epistemic virtue?' by Rosalind Attenborough.

#### **Working Papers:**

New approaches to learning and regulation in medical devices and diagnostics. Smita Srinivas and Dinar Kale.

The clinical foreground and industrial background: Customizing national strategy for COVID-19 testing. Smita Srinivas, Ramakrishna Prasad and Pritika Rao

### **3.3 Achievements and research impacts**

#### **18 March 2021**

##### **Joyce Tait delivers keynote presentation at Bloomsbury SET conference**

Joyce Tait gave a keynote presentation at the virtual Bloomsbury SET conference focused on infectious diseases and antimicrobial resistance. Her talk in the first session of the conference: “Interdisciplinary knowledge exchange to tackle global health challenges” highlighted some of the Innogen’s work on regulatory adaptation to support the development of new antimicrobial drugs and rapid diagnostics.

#### **16 March 2021**

##### **Special issue of *Technology Analysis & Strategic Management***

Innogen researchers have edited a special issue of the journal Technology Analysis & Strategic Management that focuses on analysing innovation in the bioeconomy across a broad range of sectors including the pharmaceutical, agricultural and medical devices sectors.

**16 March 2021**

**Joyce Tait contributes to the strategy development process for the Integrated Review (IR) of Security, Defence, Development and Foreign Policy**

The report published on the 16th March sets out a Strategic Framework for realising UK sovereignty, prosperity and security.

**12 March 2021**

**Local manufacturing for health in Africa in the time of Covid-19**

As part of the UK's Development and Economic Growth Research Programme (DEGRP), Innogen members authored a report from a webinar in which invited stakeholders from the African and Indian pharmaceutical sectors as well as academia reflected on the immediate experience of manufacturing for health under COVID-19 conditions on the African continent

**4 February 2021**

**Industry-wide standard supports companies to innovate responsibly**

Innogen Masters students trial the application of the British Standards Institution (BSI) Responsible Innovation Guide, PAS 440, in two early-stage biotechnology companies.

**21 January 2021**

**Innogen researchers speak out about the value and fair diffusion of COVID-19 vaccines**

Innogen researchers are featured in national and international media outlets addressing some of the questions that the vaccine roll-out has raised.

**15 December 2020**

**PAS 440 — Responsible Innovation in the spotlight**

In the BSI EDUCATION PODCAST, Joyce Tait explained how the standard PAS 440 was developed and its relevance for regulatory adaptation in the UK.

**28 November 2020**

**New Scientist Live**

Joyce Tait joined scientists at the Roslin Institute in a virtual panel discussion on gene-editing for food production at the New Scientist Live event: Future of Food and Agriculture.

**16 November 2020**

**In Conversation event: Are innovation policies ever value neutral?**

Innogen hosted an online event in which Smita Srinivas, Theo Papaioannou and David Wield discussed innovation as a political process of development in the context of COVID-19.

**5 November 2020**

**Rapid diagnostic tests are no panacea for tackling antimicrobial resistance**

Innogen members Ann Bruce and Katie Adam co-authored a paper as part of the Diagnostic Innovation and Livestock (DIAL) project team, in collaboration with the University of Exeter and Bristol Veterinary School. This new publication explores the potential role of rapid or point-of-care diagnostic tests for farm animals in supporting decisions about antimicrobial use in livestock.

**3 November 2020**

**Scotland's countdown to COP26**

Alan Raybould spoke about Innogen's contribution to the React-First project in the session on Sustainable



Food from Land and Sea at 'Scotland's countdown to COP26' event hosted by Scotland's Innovation Centres and The Herald.

#### **15 October 2020**

##### **National COVID-19 testing strategy analysis**

Innogen member Smita Srinivas and co-authors analysed COVID-19 testing in different countries. They highlight the need to take the industrial organisation of health systems within countries into account for testing strategies to be successful.

#### **8 October 2020**

##### **Predicting COVID-19 vaccine success**

Innogen Associate Dr Jack Scannell co-authored a policy paper for the Centre for Global Development that analyses the COVID-19 vaccine pipeline. This work aims to bring high-quality probabilistic models of the COVID-19 vaccine pipeline into the public domain, to help policy development as well as the management of technological and manufacturing risks.

#### **16 September 2020**

##### **Joyce Tait joins the Regulatory Horizons Council**

Innogen's co-Director is appointed member of the UK Government's new Regulatory Horizons Council, an independent expert committee set up to provide impartial, expert advice on the regulatory reform required to support the rapid and safe introduction of new technologies.

#### **20 July 2020**

##### **Ground-breaking carbon recycling project set to transform food production systems**

Innogen researchers are part of the Innovate-UK funded project REACT-FIRST, which brings together ten industry and academic partners to develop a scalable route to generate animal feed from captured carbon dioxide.

#### **19 July 2020**

##### **Analysis of the social impact of lockdowns in Africa**

As part of TIBA (the NIHR Global Health Research Unit Tackling Infections to Benefit Africa at the University of Edinburgh), Geoff Banda and Vera Florida Mugittu have contributed to a new report on the social impact of COVID-19 mitigation measures on nine African countries.

#### **9 July 2020**

##### **Professor Smita Srinivas receives the 2021 Ayres Award**

Professor Smita Srinivas has been honoured by the Association for Evolutionary Economics (AFEE) for her outstanding work in the area of institutional economics.

#### **25 June 2020**

##### **New dataset to study the history of genomics**

The team working on the ERC-funded project Medical Translation in the History of Modern Genomics (TRANSGENE), which comprises various Innogen members, have published a freely available online dataset that enables users to identify overlooked individuals, institutions and connections in the history of genomic science.

#### **18 June 2020**

##### **Drug manufacturing in Africa e-book hit**

A free e-book featuring Innogen's research into drug manufacturing in Africa has become one of Palgrave Macmillan's top five open access downloads of all time.

#### **16 June 2020**

### **SPRE webinar on working with policymakers**

On the 12th June, Nick Bibby, Director of the Scottish Policy and Research Exchange, led an online discussion with over 20 Innogen and OU Scotland researchers on how to engage with the world of policy.

### **28 May 2020**

#### **Securing a globally fair diffusion of COVID-19 vaccines**

Writing for the Open University's Social Scientific Research in the Time of COVID-19 series of informed articles, Innogen's Director, Theo Papaioannou, argues that combating the pandemic will require global application of a non-ideal justice in innovation.

### **22 May 2020**

#### **Promoting Responsible Innovation**

One of the highlights of this year's BSI's Standards e-conference was the launch of a Publicly Available Specification on Responsible Innovation (PAS 440), written by Innogen's co-director, Joyce Tait.

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 of Buckinghamshire and Milton Keynes Natural Environment Partnership  
Board member of on Arc Universities 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*

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.

Member of the ESRC Impact Acceleration Account (IAA) Panel

*Stuart Parris*

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

*Alan Raybould*

Member of the Advisory Committee on Releases to the Environment (ACRE)  
Chief Specialty Editor for Biosafety and Biosecurity section of *Frontiers in Bioengineering and Biotechnology*  
Member of the Editorial Board of *GM Crops & Food*

*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.

*Smita Srinivas*

T20 co-chair for Task Force 1 on Global Health and COVID-19.

*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 2020-21, 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 over 60 students, many of whom have gone on to take strategic roles in the bioeconomy.

*Masters in Global Development*

*The Open University (Distance learning).*

From September 2020 this course succeeds The Open University's Masters Programme in Development Management, which has graduated over 1,000 mid-career professionals from more than 100 countries.

The MSc in Global Development is an innovative, interdisciplinary and flexible course that equips students with the knowledge and skills to investigate, understand, and respond to key development challenges. Students will critically examine development theory, policy and practice across a range of issues. These include environmental sustainability, socio-economic security, global migration, conflict, and the changing politics of development. They will also build their capacity for critical and reflexive thinking, independent study and research, and collective dialogue and action.

## **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
- Working with OU Scotland
- TIBA (the NIHR Global Health Research Unit Tackling Infections to Benefit Africa at the University of Edinburgh)
- Innovate UK and the React-First Consortium

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. We will also continue to develop and promote the OU's Masters in Global Development and CPD offerings based on the Masters' programmes.

## **5.3 Innogen Management**

The following are the management team's objectives for 2021-22:

- 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 in Scotland, the UK and internationally.
- To continue constructive engagement with stakeholders and relevant institutions through effective communication and knowledge exchange.