Virtual Special Issue (VSI): The quest for responsible digital agri-food innovation

Rationale: The race toward agriculture 4.0 has begun – with national public bodies along with traditional and emerging technology-based corporations at various points of agricultural value chains clamouring to claim their market share in the agtech space – both within nation-states and across traditional sovereign borders (Rose and Chilvers, 2018). This Virtual Special Issue (VSI) will provide a forum to question the underlying logics of the international digitalisation of agricultural systems (Fleming et al., 2018; Jakku et al., 2019). The editorial team invite colleagues to draw on relevant theoretical frameworks to ground empirical insights regarding the state of this transition process within their respective frames of reference. There is much hype out there, and this VSI will help play an important and productive role in making sense of how interests, relations, and structures inform the present moment as represented in performances of innovation. We encourage contributors to build on recent work in this nascent field (for example: Berthet et al. (2018); Gorissen et al. (2016); Ingram (2018); Kivimaa et al. (2017); Pigford et al. (2018)). Ultimately, this special issue will build intellectual capability, provide an appropriate framework for, and practical examples of, the enactment of responsible digital agricultural futures moving forward (Eastwood et al., 2019).

Scope: Recent developments in science and technology studies (and beyond) have emphasised that responsible research and innovation (RRI) should be strived for (Gurzawska et al., 2017; Owen et al., 2012). In this VSI, we suggest 'responsible innovation' (Stilgoe et al., 2013) – considering principles of anticipation, deliberative inclusion, reflexivity and responsiveness – can be utilised as an ascendant master frame. As such, the practical relevance of this VSI will align with concepts utilised in the responsible innovation space to interrogate the following lines of questioning:

How do sector stakeholders *anticipate* the implications of the automation of agricultural supply chain decision-making in restructuring the agri-food sector – taken to the extreme what happens to rural households and communities if farms become farmerless? The editorial team encourage research that builds on work addressing the social, economic, cultural and environmental implications of such technological development and implications for networks of agricultural practitioners (Bronson, 2018; Carolan, 2017; Carolan, 2018; Eastwood et al., 2017; Wolf and Buttel, 1996; Wolf and Wood, 1997). It will be important to understand agricultural stakeholder meaning making processes though tinkering and/or craftsmanship in the digital agricultural future (Dufva and Dufva, 2019; Higgins et al., 2017).

How do publically funded research initiatives *deliberatively include* diverse viewpoints in the design process for new agricultural technologies to maintain trust – how do researchers weigh up progressing technological development and risks to agricultural stakeholders' social licence to operate (Parsons et al., 2014)? The editorial team encourage debate on the role of agricultural stakeholders and value adding moving forward – regional agri-food differentiation between machine and human crafted agri-food produce will likely provide multiple pathways into a digital future (Fuentes Navarro et al., 2015; Holgersson et al., 2018; Oliveira and Natário, 2016). In this regard, it will be important to re-consider agricultural network data and information exchange in the context of existing rurally-relevant institutions and norms (Hardy et al., 2019; Wolf, 1998; Wolf, 2006; Wolf, 2008; Wolf et al., 2001).

How do proponents incorporate *reflexivity* into the iteration of agtech platform development – how might societies, both collectively and privately, make the most of socio-technical investments in digital agriculture to create new rural economies while mitigating risk (Beers and van Mierlo, 2017)? The editorial team encourage discussions beyond decision support tool development *for* farmers to product development *with* agricultural partners to re-script lives (Rose et al., 2018). These considerations will help articulate the need for appropriate benefit sharing and the consideration of diverse values among agricultural network nodes – both human and those that are increasingly digital (Fielke et al., 2018; Lubell et al., 2014; Nettle et al., 2018).

How should society *respond* to data privacy and governance issues as agro-industrialisation takes the form of big data analytics through machine learning in the agri-food sector – what is the value of food (or data) from 'somewhere' in a digital future (Campbell, 2009)? The editorial team hope to explore agri-food development through lenses of cultural diversity, as agtech goes global the importance of local culture and place attachment become increasingly relevant (Carolan, 2017; Forster, 2013; Marsden, 2012) especially as they relate to approaches of acceptable data management and governance (Darnell et al., 2018; Regan, 2019). Using lessons from research on systemic change in agri-food systems can institutional arrangements avert negative socio-environmental outcomes by valuing people and place (Klerkx et al., 2010; Klerkx et al., 2009; Klerkx et al., 2012)?

Significance: International perspectives on the digitalisation of agricultural systems are critical to framing the challenges and opportunities for rural regions and communities into the 21st century (Fielke et al., 2019). Relevant and rigorously researched empirical and/or conceptual papers are sought to compare the digitalisation process in different contexts and allow for critical overarching considerations of the mosaic of rural digital heterogeneity. This VSI will build on momentum from cutting edge scholarly exploration explicitly examining the societal implications of digital agriculture and/or smart farming at the International Farming Systems Association symposium in Chania (2018) and the European Society for Rural Sociology gathering in Trondheim (2019). Similarly, related recent special issues of the *Journal of Rural Studies* (edited by Roberts et al. (2017) and Henry and Legun (2017)), *NJAS – Wageningen Journal of Life Sciences* (edited by Klerkx et al., (2019)) and the *Journal of Agricultural and Environmental Ethics* (edited by Blok et al., (2019)) can be built upon in new conceptual and empirical light. This will allow us to creatively imagine what it might mean to inhabit both 'digital' and 'rural' worlds in generations to come (Roberts and Townsend, 2015).

Open VSI

This is an open call for VSI papers. We are asking those interested to submit an extended abstract of their work which will be subject to initial peer review, we will provide feedback to the authors regarding suitability before full paper submissions are invited. This process will allow the editorial team to maximise the quality of the papers at two points in time, with initial peer review of extended abstracts and then journal-based peer review of the full VSI papers.

The extended abstracts should be a maximum of 2 pages (excluding references) and should be sent, along with any enquiries, to the corresponding editor (simon.fielke@csiro.au) by the **1st of September, 2020**. The extended abstract should contain:

- Title (tentative at least)
- Theoretical positioning/contribution to the field
- Research question/s with explanation of connection to the VSI
- Methods employed
- Main (tentative at least) findings

Critical dates

VSI extended abstract deadline – **1 September 2020**

Recommendation on extended abstract received by **30th September 2020**

VSI full paper submission portal closes – **28 February 2021**

VSI paper publication complete – June 2021

Editorial team

This special issue editorial team has been carefully selected to combine leading scholars in the topical social research space involving the digitalisation of agricultural systems. This special issue will also provide a forum to engage emerging researchers in this space with the aim of developing momentum toward critical intellectual mass and an international community of practice around responsible digital agricultural innovation research.

Corresponding editor

Dr. Simon Fielke *CSIRO Land and Water, Australia*

Bio: Simon Fielke is a Postdoctoral Fellow within the Social Dimensions project of CSIRO's Digiscape Future Science Platform. He has a lifelong interest in processes of rural and agricultural change and has spent the last decade immersed in proactive and collaborative social research within the agricultural innovation systems of New Zealand and Australia.

Editorial team

Assistant Prof. Kelly Bronson *University of Ottawa, Canada*

Bio: Kelly Bronson is a Canada Research Chair in Science and Society at University of Ottawa. She is a social scientist studying science-society tensions that erupt around controversial technologies (GMOs, fracking, big data) and their governance. Her research aims to bring community values into conversation with technical knowledge in the production of evidence-based decision-making.

Prof. Michael Carolan *Colorado State University, USA*

Bio: Michael Carolan is Professor of Sociology and Associate Dean for Research in the College of Liberal Arts at Colorado State University. (USA). He has published more than a dozen books and over 150 peer reviewed articles on subjects relating to sustainability, socio-technical change, food security, and the sociology of food and agriculture.

Dr. Callum Eastwood *DairyNZ, New Zealand*

Bio: Callum Eastwood is a farming systems scientist at DairyNZ. His areas of interest include: effective use of new technologies in farming systems, technological innovation systems, improving coordination between farmers and technology developers, design of social research in agriculture, integration of data into farm decision making, and adult learning processes as applied to agriculture.

Associate Prof. Vaughan Higgins *University of Tasmania, Australia*

Bio: Vaughan Higgins is an Associate Professor of Sociology at the University of Tasmania, Australia. Vaughan's research focuses broadly on understanding how agricultural policy, programmes and technologies are implemented in practice, and the ways in which landholders variously adopt, adapt or contest attempts to change their practices.

Dr. Emma Jakku *CSIRO Land and Water, Australia*

Bio: Emma Jakku is leading the Social Dimensions project within CSIRO's Digiscape Future Science Platform, a programme of research and development that seeks to create next generation tools that deliver the benefits of the digital revolution for Australian farmers and land managers. The Digiscape Social Dimensions project is exploring how information and advice networks are affected by and responding to digital transformation.

Prof. Laurens Klerkx *Wageningen University, The Netherlands*

Bio: Laurens Klerkx is Professor at the Knowledge, Technology and Innovation Group of Wageningen University, researching the social dynamics of agricultural innovation and roles of research institutes and agricultural advisory services in this. He serves on the editorial boards of Agricultural Systems and the Journal of Agricultural Education and Extension, and has earlier guest edited special issues in the International Journal of Agricultural Sustainability, Outlook on Agriculture, and the Journal of Agricultural Education and Extension.

Prof. Ruth Nettle *University of Melbourne, Australia*

Bio: Professor Ruth Nettle leads the Rural Innovation Research Group at the University of Melbourne, Australia. Ruth is an inter-disciplinary social scientist in the field of agricultural extension and innovation and agricultural workforce development. Ruth applies engaged research methods in the exploration of the current tensions and intersects between AgTech, farm workforce change and agricultural advisory services.

Dr Áine Regan *Teagasc, Ireland*

Bio: Áine Regan is a Research Officer with Teagasc, the Irish agriculture and food development authority. Her research aims to ensure that the trajectory of technological development in food and agriculture is inclusive and responsive to diverse needs in society. Áine's research areas include behaviour change, stakeholder engagement and risk governance.

Associate Prof. David Rose *University of Reading, United Kingdom*

Bio: David Rose is the Elizabeth Creak Charitable Trust Associate Professor in Agricultural Innovation and Extension at the University of Reading, UK. David's research focuses on the user-centred design of agri-tech and on the ethical/social implications of agriculture 4.0.

Dr. Leanne Townsend *The James Hutton Institute, United Kingdom*

Bio: Leanne Townsend is a Senior Social Scientist within the SEGS Group at the James Hutton Institute, UK. She leads research on digitalisation in rural areas, focusing on its impacts on agriculture and rural economies more broadly. She sits on the editorial board of Local Economy and has guest edited special issues in Journal of Rural Studies and Scottish Geographical Journal.

Associate Prof. Steven Wolf *Cornell University, USA*

Bio: Steven Wolf is Associate Professor in the Department of Natural Resources and the Graduate Field of Development Sociology at Cornell University (USA). He has been studying technical change in agriculture for over 25 years with a specific focus on environmental conservation. He serves on the Executive Committee of the Cornell University Initiative on Digital Agriculture (CIDA).

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