

## Signature projects

Our CBNS Signature Projects draw on the capabilities of our expert researchers to solve the big questions in bio-nano research.

# SOCIAL DIMENSIONS OF BIO-NANO INTERACTIONS

Leader: Professor Matthew Kearnes

Co-Leader: Dr Declan Kuch

### THE PROJECT

Bio-nano technologies, together with advances in precision and personalised medicine, are likely to profoundly change health care practices. By exploring the social dimensions of research across this area of work, in collaboration with key CBNS research initiatives, this programme will provide insights into the societal dimensions of predictive bio-nano technologies. This project seeks to address key questions related to the intersection between big data, healthcare, personalised and precision medicines, and regulation. The proposed programme of work will entail the use of the following social science methodologies, and will be facilitated by a range of cross-node collaborations.

These methods include:

1. Social Media Monitoring and analysis tools (using tools such as NodeXL) will enable tissue mapping of the institutional and discursive shaping of research agendas in precision, and personalised medicine;
2. Ethnographic Observation: close analysis of science-in-practice will serve to document the imagined social worlds that underpin developments in bio-nanotechnology, focusing specially on CBNS research projects;
3. Interdisciplinary Exchange Workshops will bring CBNS researchers into conversations with researchers working in the social sciences, humanities and law to explore the broader social dimensions of their work;
4. Targeted Public Engagement Initiatives will also form part of the work plan of the programme, enabling CoE researchers to address the societal dimensions of their research in appropriately designed and facilitated public forums.

**The benefits of this research:** This programme will provide insights into the social and regulatory responses to 'precision medicine' in Australia and other advanced industrialised countries.

This programme will also benefit public engagement with science through a parallel outreach capacity building programme in partnership with all nodes in the Centre of Excellence.

### ? THE BIG QUESTION

How can we understand the social dimensions of personalised and precision medicine, at the interface between bio-and nano-technology? Social science methodologies have often struggled to keep pace with new and emerging technologies – and have largely separated social questions from processes of technology development. This programme is designed to document the 'imagined social worlds' that underpin research in precision and personalised medicine, particularly in areas such as bio-nano sensor technologies, targeted cancer therapies and vaccines. We will also explore how advances in precision medicine rely upon advances in computational models and tools, development of large-scale health databases, and patient characterisation methodologies. We seek to uncover how research across these fields may precipitate new social practices.

**Our goals:** the core objective of this project is to explore, in real-time, how the novel configuration of material and human relations in bio-nanotechnology may bring about profound transformations in contemporary healthcare practice. We will also develop new theories of public outreach and engagement relevant to the novel challenges posed by bio-nano science and technology in the context of biomedical innovation posed by precision medicine.



Dr Declan Kuch and Dr Zach Houston discussing social dimensions of animal imaging at CAI, UQ.

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## Outreach and Media highlights

- Kuch, D. 2016: Health Data Futures: Prediction, Platforms, Populations. Medium, commentary on Medium;
- Chilvers, J., and Kearnes, M. 2015: Public participation in science and technology: why the failure to launch? Commentary in The Guardian.
- Kearnes' contributions to the "Reimagining NSW" project, sponsored by the Governor of New South Wales.
- UNSW Science and Society' forum' and expert commentary to the the UNSW iGEM, synthetic biology project.
- An ongoing series of *Biomedical Futures Workshops* that bring together primary care networks, clinicians, care professionals, CBNS researchers, healthcare administrators, social scientists and humanities researchers.

## Key publications

Researchers are pursuing a range of publication projects a research monograph entitled *Laboratories Economies – On the Cultural Life of Precision Medicine* together with a series of papers in *Science, Technology & Human Values, New Genetics & Society, Science as Culture, and Life Sciences, Society and Policy*.

## Publication highlights include:

- Chilvers, J., and Kearnes, M., eds. 2016: *Remaking Participation: Science, Environment and Emergent Publics*. Abingdon, Oxon: Routledge.
- Balmer, A. S., Calvert, J., Marris, C., Molyneux-Hodgson, S., Frow, E., Kearnes, M., Bulpin, K., Schyfter, P., Mackenzie, A., and P, M. 2016: Five Rules of Thumb for Post-ELSI Interdisciplinary Collaborations. *Journal of Responsible Innovation* 3(1): 73-80. DOI:10.1080/23299460.2016.1177867.
- Kuch, D., 2016, 'Integrated Social Science as Responsible Innovation: comparing Australian and European approaches', paper presented to the *Society for the Social Studies of Science (45) and European Association for the Studies of Science and Technology (EASST, Annual Meeting, Barcelona, dedicated stream on 'Responsible Research and Innovation: Critical Perspectives'*.

## Signature Project collaborations: Social dimensions of bio-nano interactions

Institution	Collaborator
University of Melbourne	Professor Stephen Kent
	Dr Stephen Parker
	Mr Josh Glass
University of New South Wales	Professor Justin Gooding
	Professor Maria Kavallaris
University of Queensland	Associate Professor Kris Thurecht
	Professor Rob Parton
Monash University	Dr Angus Johnston



Visiting Professor Barbara Prainsack (KCL) gives a public lecture on Precision Medicine to an audience of policy-makers at UNSW.



Associate Professor Matthew Kearnes discussing nano-particle regulation in Australia and the United States with Associate Professor Diana Bowman (ASU) at a public seminar at UNSW.



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