

Smart Sensing & Big Data Analytics Symposium

Speakers & Abstracts

Michael Smithson, Research School of Psychology, ANU

Decontextualizing + assumptions = fallacies: and it's worse for big data

Several widespread myths about public data and problematic assumptions regarding models of such data are intensified and less corrigible in “big data”. This presentation explores these problems and their potential consequences. The myths and assumptions surveyed include the following:

1. Big data have integrity:
 - a. They are precise
 - b. They are unbiased
 - c. They measure what we believe they measure

2. Models of big data are truth-trackers:
 - a. Every correlation is meaningful
 - b. Correlations + time-lag = causal relationship
 - c. The processes generating big data are stationary
 - d. We have adequate computing power and techniques to analyse big data

3. Big data are better than small data:
 - a. More information makes us better decision makers
 - b. The model that best explains the past is the best predictive model
 - c. Better prediction → greater control

MICHAEL SMITHSON is a Professor in the Research School of Psychology at The Australian National. He is the author of *Confidence Intervals* (2003), *Statistics with Confidence* (2000), *Ignorance and Uncertainty* (1989), and *Fuzzy Set Analysis for the Behavioral and Social Sciences* (1987), co-author of *Fuzzy Set Theory: Applications in the Social Sciences* (2006) and *Generalized Linear Models for Categorical and Limited Dependent Variables* (2013), and co-editor of *Uncertainty and Risk: Multidisciplinary Perspectives* (2008) and *Resolving Social Dilemmas: Dynamic, Structural, and Intergroup Aspects* (1999). His other publications include more than 140 refereed journal articles and book chapters. His primary research interests are in judgment and decision making under uncertainty, statistical methods for the social sciences, and applications of fuzzy set theory to the social sciences.

Michael Jensen, ANZSOG Institute for Governance, University of Canberra

Big data and systems analysis

“Big data” have been distinguished from other kinds of data in terms of their volume, velocity, and variety. This is to say, it is not just a matter of having lots of data (velocity), but that there is a qualitative difference associated with big data with respect to the speed at which it is encountered and accumulated as well as diversity of sources that are encountered as digital artefacts. The presentation picks up on this last point in arguing for the importance of Systems Analysis for the social sciences today. As the social world increasingly leaves digital traces of transactions and communications, our actions are readily renderable as computational objects. Computational social science is differentiated from surveys, long interviews, ethnographic observation and so forth for three reasons. Firstly, researchers have access to the native digital object constituting an element of social and political life.

Secondly, this object can be queried multiple times without changing its nature whereas surveys interviews and event observations have only one shot to get it right. Thirdly, these data can be combined readily with large volumes of data produced by transactions in adjacent systems connecting multiple fields of activity. The accessibility of multiple streams of such transactions and communications enables social scientists to access a census of materials from multiple domains of activity and observe the linkages between systems, subsystems, and their environments.

MICHAEL JENSEN is a Research Fellow at the ANZSOG Institute for Governance (ANZSIG). Prior to his position at ANZSIG, he was Juan de la Cierva Postdoctoral Fellow in the Department of Political Science and a researcher at the Institute for Government and Public Policy at the Autonomous University of Barcelona and has been a visiting scholar at the Internet Interdisciplinary Institute in Barcelona as well as the New Political Communication Unit at Royal Holloway, University of London. His research spans the subdisciplines of political communication, social movements, political participation, and political campaigning and elections. In the last few years, he has worked particularly with the analysis of social media data and other digital artefacts, contributing to the emerging field of computational social science.

Mathieu O'Neil, The News & Media Research Centre, University of Canberra

Online fields and issue diffusion

Though massive amounts of digital trace data can be collected about *how* people exchange information online, the question of *why* they do so remains elusive. Researchers typically address it by characterising issue diffusion as a form of social contagion: they focus on network-theoretic mechanisms to explain how information cascades, how viral dynamics are launched. At the ego-level, they invoke social influence and thresholds to explain at what point individuals are moved to act by the behaviour of others. At the macro-level, they analyse the effects of network centralisation, clustering and density. In our view, this does not sufficiently account for collective cultural dynamics, and we argue that a “field” level of analysis is useful to understand online behaviour. Fligstein & McAdam (2012) define a strategic action field as a constructed mesolevel social order in which individual or collective actors are attuned to and interact with one another on the basis of shared (not consensual) understandings about the purposes of the field, relationships to others in the field (including who has power and why), and the rules governing legitimate action in the field. Previous online research in this vein has examined online environmental groups in terms of how hyperlink and frame networks foster a sense of collective identity, and represent the means to compete over which risk issues are the most legitimate (Ackland & O'Neil 2011, O'Neil & Ackland 2014). Recent entrants were found to be more likely to adopt new issues, a finding confirmed in a subsequent study of Occupy Wall Street activists (Perez, Ackland & O'Neil 2014). Building on these insights, this paper represents the first step towards a systematic general theory of online fields. Using the example of the Occupy Wall Street Twitter network, we will assess the presence of dominants and whether this status was maintained over time by presenting a dynamic map of the network of actors (connected by retweets, mentions or follower relationships). We will also present a dynamic “semantic map” of hashtags constituting the issue space for OWS on Twitter, which we will then correlate to the network of actors and to the timeline of OWS events.

MATHIEU O'NEIL is Associate Professor of Communication at the University of Canberra. He contributed to the launch of the Virtual Observatory for the Study of Online Networks (VOSON) at the ANU in 2005. Between 2009 and 2013 Mathieu lectured in sociology of media at the Université Paris Sorbonne. In 2010 he founded and became one of the editors of the Journal of Peer Production. He has published a book and articles on relations of power, social change and the Internet; collaborative organization and expertise; and quantitative methods to map collective identity and issue diffusion in online fields.

Lexing Xie, Research School of Computer Science, ANU

Visual meme in social media: tracking real-world news in YouTube videos

Multimedia (image, video) and social networks are a ubiquitous duo in the current online life, but few has looked at the diffusion structure of multimedia discussions -- in part due to a lack of tools to reliably track multimedia content. We present visual memes, or frequently reposted short video segments, for tracking large-scale video remix in social media. Video remixing is a prevalent phenomenon on social media platforms, it is part of "vencular creativity" where users create "curated selections based on what they liked or thought was important". Social influence are often characterized from text-based online interactions such as quoting or reweeting, our tool allows such metric to be developed for visual media. We develop scalable and accurate detection algorithms to extract visual memes. We monitor real-world events on YouTube, and we model interactions over memes. This allows us to define several measures of influence. These abstractions, using more than two million video shots from several large-scale event datasets, enable us to quantify the level content remix, and make interesting observations about the influence of user and content, the dynamics of reposting, and make predictions about content importance.

LEXING XIE is Senior Lecturer in the Research School of Computer Science at the Australian National University. She was research staff member at IBM T.J. Watson Research Center in New York from 2005 to 2010, and adjunct assistant professor at Columbia University 2007-2009. She received B.S. from Tsinghua University, Beijing, China, and M.S. and Ph.D. degrees from Columbia University, all in Electrical Engineering. Her research interests are in applied machine learning, multimedia, social media. Her recent projects are on multimedia analysis, social media tracking, visual semantics, large-scale image and video search, geo-spatial event prediction and recommendation. Lexing's research has received five best student paper and best paper awards between 2002 and 2011, and a Grand Challenge Multimodal Prize at ACM Multimedia 2012. She was the 2005 IBM Research Josef Raviv Memorial Postdoc fellow in Computer Science and Engineering. She is an associate editor of IEEE Transactions on Multimedia, and ACM Transactions on Multimedia. Her service roles include the program and organizing committees of major multimedia, machine learning, web and social media conferences.

Mamoun Alazab & Rod Broadhurst, ANU Cybercrime Observatory, ANU

Using 'big data' analytics to identify malicious content: a spam case study

Cybercrimes involve sophisticated and rapidly evolving techniques to infiltrate computer networks, and 'big data' analytics can help understand the complex patterns of victimisation, attack methods and origins relevant to prevention and detection. A common vector for cyber-attacks are spam emails that often contain malicious content that attempt to compromise a computer and lure the recipient to click on a URL that in turn links to a malicious Web site or downloads an attachment with malware such as a zero-day exploit. Predicating spam messages that contain malware especially the more advanced phishing attack (e.g. 'spear phishing') is impossible without the insights derived from intensive analysis of the massive data associated with spam campaigns combined with prior knowledge of similar threats. The purpose of this presentation is to describe the trends in malware delivered by spam and illustrate how new analytics can be used to investigate massive amounts of spam email to uncover hidden patterns. We draw on real world data provided by the Australian Communication Media Authority (ACMA) via their Spam Intelligence Database (SID). Our analysis shows big data analytics can not only help manage and predict new threats, but it also can help reduce the costs and the need for different resources (e.g. anti-virus engines) to identify malicious threats spawned in cyberspace. The potential for such analytics to rapidly de-fang malware spam campaigns and identify 'hot-spots' in cyberspace well enable police and CERTs to respond more effectively to malware diffusion.

MAMOUN ALAZAB is a Research Associate at the Australian National University who is works on a number of projects addressing cybercrime and cybersecurity issues. He is also the co-founder of the ANU Cybercrime Observatory. Dr Alazab is a computer security researcher and practitioner, with industry and academic experience and is an active contributor to the academic as well as broader community working on cybercrime issues.

ROD BROADHURST is Chief Investigator ARC Centre for Excellence in Policing and Security at the ANU node, Professor at RegNet and Research Fellow College of Asia and the Pacific, ANU. He has recently been appointed foundation professor of criminology at ANU College of Arts and Social Science. Professor Broadhurst has been researching cyber-security related topics since 2000 when he convened the 1st Asian Cybercrime Summit at the University of Hong Kong in 2001. With Peter Grabosky he co-edited a major collection of articles entitled "The Challenge of Cybercrime in Asia" published by the University of Hong Kong Press in 2005. His widely cited article "Developments in the Global Law Enforcement of Cyber-Crime" published in *Policing: An International Journal of Police Strategies and Management* (2006) outlined the hurdles to effective prevention of cybercrime and suggested likely remedies still relevant to the present. His current research interests focus on intersections of crime on the Internet with the emergence of crime groups and transnational criminal enterprises. Professor Broadhurst and his colleagues Steve Chon and Dr Mamoun Alazab officially launched the ANU Cybercrime Observatory in 2012 in order to engage in research to better understand offender motivation, intention and behaviour on the Internet.

Robert Ackland, ADSRI, ANU

Exploring the structure of government on the web

This presentation provides preliminary findings from an Australian Research Council-funded project titled "The institutional structure of e-government: a cross-policy, cross-country comparison". The project involves the construction of large-scale hyperlink networks for Australia and the UK, where the network nodes are government websites and the sites that they directly connect to, and the networks are "complete" in the sense that they show all connections between all sites in the network. The presentation highlights several of the methodological challenges facing social scientists who use big data in online network research: dealing with potentially massive datasets (what are the limits of network visualisation?), interpreting the ties between network nodes (what is the meaning of a hyperlink between two sites?) and gaining more information on node attributes (can automatic methods be used to predict, for example, policy domains of different websites?).

ROBERT ACKLAND is an Associate Professor in the Australian Demographic and Social Research Institute at the Australian National University. His PhD was in economics, focusing on index number theory in the context of cross-country comparisons of income and inequality. Since 2002, Robert has been working in the fields of network science, computational social science and web science, with a particular focus on quantitative analysis of online social and organisational networks. He leads the Virtual Observatory for the Study of Online Networks project (<http://voson.anu.edu.au>), which has been conducting empirical research into online networks and developing associated software tools since 2005. Robert teaches masters courses on the social science of the Internet and online research methods, and his book *Web Social Science* (SAGE) was published in July 2013

Barry Sandison, Deputy Secretary, Department of Human Services, Australian Government

Big data analytics – for better servicing and to better inform public policy

The presentation will provide a conceptual overview on how the department is developing its capability to analyse "Big Data" (administrative data) to better inform service delivery and to support

policy development. There are growing expectations that government will use its “Big Data” assets in more innovative ways to transform service and policy development – whether from the perspective of government policy developers, researchers seeking greater access or citizens seeking easier dealings with government.

The Department is a major holder of “Big Data” through the administrative data sets it holds in respect of the social welfare, health and child support payments and services it delivers. The Department is driving a stronger internal analytical capability to use better the “Big Data” it holds, which includes data from a wide range of sources, including web information. Much of the challenge in moving to a “Big Data” culture is encouraging the curiosity to drive the analytics and presenting the findings from analytics in ways that are clear and focus decision makers on the right questions.

Making “Big Data” more accessible is important and can be progressed on a number of fronts – whether that might be different jurisdictions of government working better together with the administrative data they separately collect, making data accessible to researchers or fostering collaboration between government and academia. However, analysis using “Big Data” alone will not identify and close strategic knowledge gaps. It is also critical to have an understanding of the question the analysis is trying to answer as well as the issues and limitations of the “Big Data” being used.

Simon Barry, Director, Data Science, CSIRO

To be announced

SIMON BARRY leads the Data Science program at the CSIRO Division of Computational Informatics. This Research program has 110 staff and is focussed on the science of analysing data. During 1997-2007 Dr Barry worked at the Australian Government Department of Agriculture, Fisheries and Forestry. During this time Dr Barry was an architect of the National System for the Prevention and Control of introduced Marine pests, worked on several high profile import risk assessments and developed and implemented novel methodologies to produce a National Landuse Map of Australia. He has also developed the statistical framework for the Atlas of Australian Birds, and was a lead author for the uncertainty chapter of the 2002 good practice guidance and uncertainty management in National Greenhouse inventories. Prior to this Dr Barry was a lecturer at the Australian National University and a Research officer at the Australian Bureau of Statistics.

Clare Southerton, School of Sociology, ANU

Big data, intimate connections: smartphone use reconsidered as a relationship

With the ability to measure how we move and where we go, who we communicate with and when, as well as how we entertain ourselves and much more, the ubiquity of smartphones offers an enormous wealth of information about social life. Becoming our constant companions, perhaps it is the way smartphones come to feel like a part of our bodies, rather than merely a tool, which makes them such a rich source of data. Simultaneously this intimacy between user and phone is what makes the ethics of using such data so complex and controversial. This paper will argue that the intimate relationship between smartphones and their users needs to be explored in greater detail in order to inform debates around the use of Big Data. Drawing on qualitative interviews conducted with smartphone users and app developers, it will be argued that through habitual use smartphones become enfolded in the flows of our everyday lives to the extent that picking them up comes becomes the outcome of nonconscious inclinations and behaviours rather than individual conscious will.

Given that current debates around the ethics of Big Data have raised questions about how aware consumers are of the collection of their information and how this awareness impacts their decisions to

invest more information into their devices, these issues about habitual nonconscious use are more pertinent than ever.

CLARE SOUTHERTON is a PhD candidate in the School of Sociology at the Australian National University in Canberra. Her PhD research focuses on the relationship formed between people and smartphones, with a particular interest in the habitual everyday encounters with these technology that form an ‘intimacy’ with machines that relies heavily on the nonconscious. Her past research has explored the user experience of video gaming and ‘gamification’.

Deborah Lupton, Faculty of Arts and Design, University of Canberra

‘Data gone wild’? The quantified self assemblage, technologies of the self and the value of data

The quantified self is a recent phenomenon, springing from the official Quantified Self website and associated movement established by two editors of Wired magazine. Adherents of the quantified self engage in detailed and regular self-tracking and lifelogging practices, frequently using the latest wearable, sensor-embedded devices, as part of their efforts to learn more about themselves and improve their lives. In this paper I analyse the conditions that have come together to make the quantified self assemblage possible. I argue that the quantified self has emerged in the context of the current cultural moment of data-utopia, or the belief that data are superior forms of knowledge, combined with the affordances of contemporary digital technologies that allow individuals to produce large masses of data about themselves. Another dimension is the participatory features of social media, which encourage people to share their data with others as part of a self-tracking community or competitive endeavour. These discourses and practices intersect with others concerning individualisation, reinvention, the neoliberalist privileging of self-responsibility and the importance of attaining knowledge about the self as part of working upon and improving the self. The technologies of the self that self-tracking involve demonstrate the different forms of value with which data may be invested, including economic, affective, social/communal, personal and transformative. They also underline the growing importance individuals are placing upon exerting control over their own data and customising it for their own purposes.

DEBORAH LUPTON is a newly appointed Centenary Research Professor in the Faculty of Arts & Design, University of Canberra. Prior to this she was Senior Principal Research Fellow in the Department of Sociology and Social Policy at the University of Sydney. Her latest books are *Medicine as Culture*, 3rd edition (2012), *Fat* (2013), *Risk*, 2nd edition (2013), *The Social Words of the Unborn* (2013) and the edited collection *The Unborn Human* (2013). She is currently completing *Digital Sociology*, to be published by Routledge.

Emmeline Taylor, School of Sociology, ANU

Teaching us how to be smart? Reverence and resistance in relation to RFID monitoring in schools

Analysed within the context of the Surveillance School, this paper explores the use of RFID in schools from a comparative perspective. Whilst RFID has been trialled in schools in places such as the UK, the Philippines and South America, it is Japan and some states in the US that are leading the way in the RFID tracking of pupils. RFID microchips are commonly embedded in school passes which are required to be carried or worn at all times by pupils, whereas some schools embed the chips into ‘smart uniforms’ or use conductive ‘smart threads’ embroidered onto school jumpers. The objectives of RFID are diverse and although safety is often presumed to be the impetus a cursory look at the myriad objectives belies this. Borrowing library books, claiming revenue for attendance, purchasing lunch; RFID has found many applications. This paper focuses on the reverence that some countries have demonstrated for this technology and outlines the reasons why others have resolutely

resisted RFID in the school context. The paper concludes with a consideration of how resistance to everyday surveillance manifests and to what extent it can change surveillance systems.

EMMELINE TAYLOR is a Senior Lecturer at the Australian National University and has been researching the rise of surveillance in educational institutions for over a decade. She is the author of 'Surveillance Schools; Security, Discipline and Control in Contemporary Education' (Palgrave Pivot, 2013). The manuscript explores the role of surveillance in schools, drawing predominantly on North America and the UK. She has also contributed to a number of key texts that attend to issues of surveillance and technology such as the *Handbook of Surveillance Studies* (2012) and the *Handbook of Security* (forthcoming, 2014) as well as internationally recognised journals such as *The Sociological Review* and *The Journal of Education Policy*.

Peter Christen, Research School of Computer Science, ANU

Advanced record linkage for population reconstruction

The social sciences are currently seeing a shift from research using small-scale studies based on surveys to the use of large population databases. The research area of 'population reconstruction' has gained significant interest in recent times. The aim of work in this area is to create for example family trees from (historical) census data for whole populations. In order to achieve comprehensive data sets of high quality and coverage, advanced computer based record linkage techniques are required. This talk will provide an overview of the challenges and approaches for population reconstruction.

PETER CHRISTEN is an Associate Professor in the Research School of Computer Science at the Australian National University in Canberra. His research interests are in data mining and data matching (entity resolution). He is especially interested in the development of scalable and real-time algorithms for data matching, and privacy and confidentiality aspects of data matching and data mining. He has published over 80 papers in these areas, including the book 'Data Matching' (2012, Springer), and he is the principle developer of the Febrl (Freely Extensible Biomedical Record Linkage) open source data cleaning, deduplication and record linkage system.

Paul Thomas, CSIRO

Watching online behaviours to improve government services

Online behaviours such as web use, social media posts, and the use of online forums provide evidence of citizens' interactions with government services and also evidence of citizens' interactions with each other. Data describing these behaviours can be mined for patterns, and these patterns can tell us things we don't already know about the way people experience government policies and services.

This talk looks on two projects which illustrate the idea. In one we use trace data from clients interacting with a large Australian government website to automatically detect where people struggle to find information: that data is then used to incrementally improve web-based communication and get the right information out faster.

In the other we use data from social media including Twitter, Facebook, forums and news sites to help understand what Australians are saying about services when they talk to each other. This lets us understand people's sentiment and priorities, but it also lets us answer questions, recognise where there are problems, and fine-tune communications to get information where it's needed.

PAUL THOMAS is a research scientist with the CSIRO in Canberra and an adjunct at the Australian National University Research School of Computer Science. His research considers how people find,

use, and communicate electronic text: especially the design and evaluation of search engines and other web-based information tools, and the language of social media.

Pascal Van Hentenryck, Research School of Computer Science, ANU

From big data to optimisation

This talk reviews a number of large-scale projects in predictive analytics and optimisation enabled by big data. It also reviews a number of opportunities for big data, combining computational social science, machine learning, and optimisation.

PASCAL VAN HENTENRYCK leads the Optimisation Research Group (about 75 people) at National ICT Australia (NICTA). He also holds a Vice-Chancellor Strategic Chair in data-intensive computing at the Australian National University. Van Hentenryck is the recipient of two honorary degrees and a fellow of the Association for the Advancement of Artificial Intelligence. He was awarded the 2002 INFORMS ICS Award for research excellence in operations research and compute science, the 2006 ACP Award for research excellence in constraint programming, the 2010-2011 Philip J. Bray Award for Teaching Excellence at Brown University, and is a 2013 IFORS Distinguished speaker. Van Hentenryck is the author of five MIT Press books and has developed a number of innovative optimisation systems that are widely used in academia and industry.

Fleur Johns, UNSW Law

Laws of lists and rhythms of rule

Across international legal sectors as diverse as environmental conservation, migration, intellectual property protection, humanitarian relief and counter-terrorism, the list-plus-algorithm is, it seems, frequently displacing rival juridical forms on the global scale. This paper will share the early stages of a project probing some implications of the proliferation of this form of law. Beginning with a typology of the types of ‘work’ that this pair is called to do across the international legal order, the aim is to track the movement of legal knowledge and normative imperative from the arcane form of the list into an algorithmic mode, and back again, to explore the differing regulatory rhythms at work in these movements, and consider the effects that these may have on global regulatory outcomes. Also to be considered are conflicts and difficulties with which this formulation of lawful authority may be associated and the repertoire of techniques with which international lawyers typically address these. Among these, international lawyers’ and policymakers’ endless championing of transparency will be the focus of particular critique in this paper. Precisely as the prospect of ‘seeing through’ these devices seems, for a range of reasons, almost impossible to achieve, preoccupations with transparency have intensified. But what else might making these list-plus-algorithm configurations ‘public’ entail? The project to which this paper speaks will take up this question by exploring how lists-plus-algorithms bring peoples, places and things into lawful relation. It will argue, by this route, for the development of a more vibrant politico-legal vocabulary around associations that lists-plus-algorithms instantiate: associations, for example, among those co-placed in a pattern for juridical purposes. Lists and their alliances with algorithms are not so much depoliticizing as shifting the register of politics. Juridical thought needs to enter that register with a view to discerning what might yet be made of the political within it.

FLEUR JOHNS is Professor in the Faculty of Law at the University of New South Wales, conducting research and teaching in public international law and legal theory. She is the author of *Non-Legality in International Law: Unruly Law* (Cambridge, 2013) and the editor of *Events: The Force of International Law* (Routledge-Cavendish, 2011; with Richard Joyce & Sundhya Pahuja) and *International Legal Personality* (Ashgate, 2010). Before joining UNSW in 2014, Fleur was Co-Director of the Sydney Centre for International Law in the University of Sydney’s Faculty of Law

and, in January 2014, a Distinguished Visiting Professor at the University of Toronto. Outside the academy, Fleur practised law with Sullivan & Cromwell in New York for six years, specialising in international project finance in Latin America, and has worked on projects with a range of non-governmental and international organisations.

Lyria Bennett Moses & Janet Chan, UNSW Law

Using big data for legal decisions: testing the new tools

The buzz associated with “Big Data” has begun to colonize both legal practice and the administration of justice. These analytical methods promise to provide ready answers to questions such as: What are the chances my client will succeed in litigation? What are the probabilities that a potential parolee will pose a danger to the community? Where are police resources most effectively employed? We are led to believe that, with sufficiently large datasets and the right analytic and machine learning techniques, we will have simple answers to traditionally difficult questions.

Although Big Data techniques in legal analysis are relatively new, there are already some examples being developed and deployed. For instance, Lex Machina is a private analytics company founded in 2009 aiming to predict the cost and outcome of patent disputes. Similarly, a predictive model has been developed for securities fraud class action lawsuits. Finally, statistical techniques are being deployed in some jurisdictions to make decisions about bail, parole and police deployments.

While most of the concerns about Big Data in the legal literature have been about data collection, particularly issues of privacy, this paper focuses on the use of Big Data analytics for *drawing inferences*, particularly about likely legal outcomes and criminal activities, and the use of these inferences in *making decisions* in both private and public legal contexts. By comparing Big Data techniques with historical predecessors such as legal expert systems and sentencing databases, we explain why these new tools require critical appraisal before being deployed in legal practice and law enforcement. The issues that arise go beyond questions of reliability, raising concerns about the role of legal expertise, the legitimacy of relying on algorithmically derived extra-legal factors, and the lack of transparency in legal decision-making.

LYRIA BENNETT MOSES is Senior Lecturer and Director of Learning and Teaching at UNSW Law. Her research explores issues around the relationship between technology and law, including the types of legal issues that arise as technology changes, how these issues are addressed in Australia and other jurisdictions, the application of standard legal categories such as property in new socio-technical contexts, the use of technologically-specific and sui generis legal rules, and the problems of treating “technology” as an object of regulation.

JANET CHAN is Professor and Associate Dean (Research) at UNSW Law. She has a longstanding research interest in the impact of technology on criminal justice, especially policing, and how technology constructs and is constructed by occupational cultures. She was responsible for implementing the Sentencing Information System at the NSW Judicial Commission in the late 1980s.

Mark Andrejevic, Centre for Critical and Cultural Studies, The University of Queensland

Drone Logic: Distributed, Ubiquitous Monitoring and the "Big Data" Deluge

This presentation considers the figure of the drone as representative of the logic of monitoring and surveillance in the emerging "sensor society." We might line it up alongside other probes in the sensor society including smart phones, smart cars (that capture detailed data about how they are driven), and so on – eventually encompassing the range of interactive devices (both personal and commercially or publicly owned and operated) that come to populate our lives in the digital era. The promise of the

drone is four-fold: it extends and multiplies the reach of the senses, it saturates times and spaces in which sensing takes place, and it tends towards the automation of data collection, processing, and response. In this regard, drone logic comes to permeate the forms of monitoring to which we are increasingly subject in the workplace, social life, and the economic and political realms. This presentation considers some of the implications for how data is put to use in the emerging "sensor society."

MARK ANDREJEVIC is a distinguished media scholar who writes about surveillance, new media, and popular culture. He is Deputy Director and ARC QEII Research Fellow in the Centre for Critical and Cultural Studies at The University of Queensland. He is interested in the ways in which forms of surveillance and monitoring enabled by the development of new media technologies and 'informational excess' impact the realms of economics, politics, and culture. He is the author of numerous publications on surveillance and media and has written several prominent books including, *Reality TV: The Work of Being Watched* (2004), *iSpy: Surveillance and power in the interactive era* (2007) and *Infoglut: how too much information is changing the way we think and know* (2013). He is presently working on a five-year, ARC funded project looking at public attitudes towards measures to regulate the collection and use of personal information online and over mobile networks.
