



THE INDUSTRIAL REVOLUTION 4.0

PREPARING FOR DISRUPTIVE TECHNOLOGIES
IN 21ST CENTURY ASIA

26-27 OCTOBER 2017

**ASIA RESEARCH INSTITUTE, ARI SEMINAR ROOM
AS8 #04-04, 10 KENT RIDGE CRESCENT, SINGAPORE 119260**

THURSDAY, 26 OCTOBER 2017

09:00 – 09:15 REGISTRATION

09:15 – 09:30 WELCOME REMARKS & INTRODUCTIONS

KENNETH DEAN, National University of Singapore
DONGHYUN SONG, National University of Singapore
ERIC KERR, National University of Singapore

09:30 – 10:30 KEYNOTE ADDRESS

CHAIRPERSON **KENNETH DEAN**, National University of Singapore

09:30 **From Human 2.0 to Industry Revolution 4.0: 'Mind the Gap'**

MARIANNE FRANKLIN, Goldsmiths (University of London, UK)

10:15 Questions and Answers

10:30 – 11:00 MORNING TEA

11:00 – 12:30 PANEL 1 | PRECARIOUS LABOUR

CHAIRPERSON **LIEW KAI KHIUN**, Nanyang Technological University, Singapore

11:00 **ASEAN in Transformation: How Technology is Changing Jobs and Enterprises**

CHANG JAE HEE, International Labour Organization, Switzerland

11:20 **Automation in Cambodian Garment and Footwear Industries**

MOUYLY VICHHRA, International Labour Organization, and Better Factories Cambodia

11:40 **Formal and Informal Collectivization and New Digital Tools – The Case of Tuk Tuk Drivers in Cambodia**

MARGARET JACK, Cornell University, USA

12:00 Questions and Answers

12:30 – 13:30 LUNCH

13:30 – 15:00 PANEL 2 | GROUNDED VOICES

CHAIRPERSON **HALLAM STEVENS**, Nanyang Technological University, Singapore

13:30 **Who Wants 9-To-5 Jobs? Chinese Youth, Precarity and Security**

GLADYS PAK LEI CHONG, Hong Kong Baptist University

13:50 **Does Gender Matter Anymore? (New) Intersecting Vulnerabilities in Industrial 4.0**

MIKE GRIFFITHS, Social Policy and Poverty Research Group, Myanmar

14:10 **Power, Voices, and Activism in the Fourth Industrial Age: Wither Will They Go?**

NATALIE PANG, National University of Singapore

14:30 Questions and Answers

15:00 – 15:30 AFTERNOON TEA

15:30 – 17:00 PANEL 3 | THE HUMAN IN THE MACHINE

CHAIRPERSON **V.V. KRISHNA**, The University of New South Wales, Australia

15:30 Cult of the Technopreneur

CHUA HUI CHING EMILY, National University of Singapore

15:50 Being Smart – Smart Cities and Smart Citizens: The Indian Approach

RAKESH KUMAR, Education Technology Professional and Independent Scholar

16:10 The Shifting Landscape of Work and Organization: Exploring Power Relations at Work in the Digital Society

THIJS WILLEMS, Singapore University of Technology and Design

SAMUEL CHNG, Singapore University of Technology and Design

GAYATHRI HARIDAS, Singapore University of Technology and Design

POON KING WANG, Singapore University of Technology and Design

16:30 Questions and Answers

17:00 – 17:30 DAY 1 COMMENTARY

MOHAN DUTTA, National University of Singapore

17:30 END OF DAY 1

18:00 CONFERENCE DINNER (For speakers, discussants and invited guests only)

FRIDAY, 27 OCTOBER 2017

09:30 – 11:30 PANEL 4 | COMPARATIVES

CHAIRPERSON **FENG CHEN-CHIEH**, National University of Singapore

09:30 **Political Discourses on the Industrial Revolution 4.0 in South East Asia**

DONGHYUN SONG, National University of Singapore

09:50 **The Environmental Risks and Costs of the Global Digital Economy in Asia**

TANYA NOTLEY, Western Sydney University, Australia

10:10 **The Golden Years of More Ageing Pains? A Critical Assessment of Smart Singapore's Policy Response to Population Ageing**

YU-MIN JOO, National University of Singapore

TECK-BOON TAN, Nanyang Technological University, Singapore

10:30 **Automating Labour and the Politics of Cloud Technologies**

BRETT NEILSON, Western Sydney University, Australia

NED ROSSITER, Western Sydney University, Australia

10:50 Questions and Answers

11:30 – 12:00 MORNING TEA

12:00 – 13:30 PANEL 5 | ALTERNATIVES

CHAIRPERSON **TINA SHRESHTA**, National University of Singapore

12:00 **Creating Economic and Social Value from Atmospheric Platforms in Bandung, Indonesia**

Via Skype **ADAM FISH**, Lancaster University, UK

HAGORLY M. HUTASUHUT, Insitek, Indonesia

12:20 **4th Industrial Revolution in Humanitarian Contexts: Challenging Relationships with Political Actors and Populations in Need**

MARTIN SEARLE, Nanyang Technological University, Singapore

12:40 **Shenzhen's Maker Culture and the Digital Divide**

PIP SHEA, Monash University, Australia

XIN GU, Monash University, Australia

13:00 Questions and Answers

13:30 – 14:30 LUNCH

14:30 – 15:00 DAY 2 COMMENTARY

CHUA BENG HUAT, Yale-NUS College, and National University of Singapore

15:00 – 16:00 CLOSING REMARKS & DISCUSSIONS

DONGHYUN SONG, National University of Singapore

ERIC KERR, National University of Singapore

16:00 **END OF CONFERENCE**

KEYNOTE ADDRESS

From Human 2.0 to Industry Revolution 4.0: 'Mind the Gap'

Marianne Franklin

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Communications, Goldsmiths
(University of London, UK)

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Mass Online Surveillance, Cybersecurity, Privacy, Interoperability, Big Data and the Global South, Digital Liberties; these are some of the current buzzwords in debates about the implications that advances in digitally integrated, internet-dependent tools and automated systems have for both industrialized societies and international development agendas. Automation in industry and everyday life has been around for decades but since the turn of this century we have been witnessing the formative role of the digital as it is deployed in visions for the next "great leap forward" in industrialization. These hi-tech advances include *Cloud Computing*, the *Internet of Things* at the planetary level and, at the more personal level, satellite-dependent smartphone technologies, biometric forms of authentication and digital citizenship, or artificially intelligent consumer commodities such as driverless cars. All these devices, and networked systems are based on algorithmically driven forms of identification, categorization, control, and operation. They are thereby premised on the 24/7 tracking and surveillance of ordinary citizens in their everyday lives online and offline. Governmental intelligence services, law-enforcement agencies, and commercial service providers share a common goal in this regard.

This keynote address considers some of the legal, political, and sociocultural responses to these developments that are gathering momentum at the intersection of emerging human rights jurisprudence, 'digital liberties' activism, internet policy agenda-setting, and critical scholarship. Undergirding these interventions are complex questions such as; should public-privately funded R&D to advance the latest digital technologies slow down, or should humanity speed up? What is the role of the 'human' in international human rights law and norms in the wake of automated/artificial intelligences? How sustainable are these emerging technological futures for the environment let alone for those communities and societies on the other side of the global digital divide? Just because something is technically possible, economically attractive, does this make it ethically acceptable?

Marianne FRANKLIN (PhD) is Professor of Global Media and Politics at Goldsmiths, (University of London, UK), where she convenes the MA Program in Global Media and Transnational Communications. A recipient of research funding from the Social Science Research Council (USA), Ford Foundation, and the Australian Research Council, Professor Franklin has been active in recent years in human rights advocacy for policy agendas on internet design, access, and use. She is currently Chair of the Global Internet Governance Academic Network (@gignetr) and Co-Chair of the Internet Rights and Principles Coalition (@netrights) at the Internet Governance Forum, and founding editor of the Human Rights and the Internet series on openDemocracy. Previous books include *Digital Dilemmas: Power, Resistance and the Internet* (Oxford University Press) and *Postcolonial Politics, the Internet and Everyday Life* (Routledge). Her latest monograph, *Sampling Politics: Music and the Geocultural* (Oxford University Press), is due out next year. You can follow her on Twitter @GloComm.

ASEAN in Transformation: How Technology is Changing Jobs and Enterprises

Chang Jae-Hee

International Labour
Organization, Switzerland

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New and advanced developments in technology are transpiring at an increasingly rapid rate. The report of the ILO Bureau for Employers' Activities (ACT/EMP) explores the technological impacts felt by employers and workers of the ten countries that form the Association of Southeast Asian Nations (ASEAN). ASEAN is a politically and economically diverse region, boasting a population of over 632 million people, a swelling middle class, growing amounts of disposable income and an increasingly educated workforce. Technology presents tremendous potential and challenge for the ASEAN region.

The report presents a detailed analysis of how technology is transforming five key labour-intensive and economically prominent sectors in ASEAN: the automotive and auto parts; electrical and electronics; textiles, clothing and footwear; business process outsourcing; and retail sectors. It also highlights findings from extensive enterprise and student surveys as well as stakeholder interviews conducted in ASEAN and beyond. It is clear that technologies – both current and forthcoming – will increase productivity, render some occupations obsolete and create new ones.

The real question lies in whether ASEAN can take advantage of the benefits technology offers and if it can also adequately prepare its workforce. The report illustrates that countries that react to employment models of the past and compete on low-wage labour need to reposition themselves. Policymakers need to start projecting jobs for the future, ensure there is a diversity in economic structure, and create a more conducive environment that leads to greater human capital investment, research and development, and high-value production.

CHANG Jae-Hee is Senior Programme and Operations Officer at the International Labour Organization (ILO), Switzerland. She works with a global team of professionals who form the link between the ILO and its employer constituencies in seeking to ensure that business priorities are reflected in the ILO's work. She has been with the organization for 8 years serving in both HQ and the ILO regional office in Bangkok where she held a regional portfolio supporting national employers' organizations' efforts to be more effective voices for business across labour and social issues. Jae-Hee's main area of work includes providing evidence-based research and technical support to employers' organizations on policy development in areas such as skills, non-discrimination, women in business and management, fragile zones, enterprise development, and on wider labour market issues, such as the future of work and technology impact on jobs. She is a joint author of *ASEAN in transformation: How technology is changing jobs and enterprises*, which was released in July 2016.

Automation in Cambodian Garment and Footwear Industries

Mouyly Vichhra

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and Better Factories Cambodia

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Cambodia's garment and footwear exports have grown at a solid pace in recent years, with a compound annual growth rate of 10.8 per cent per annum over the 2014-2016 period. However, while the sector's export performance has been strong, other statistics suggest a less positive situation. While industrial relations in the sector still need lots of improvements, factories owners have suggested that perhaps the best way to avoid all conflict is to use automation on their production flow. My practical and professional experience with hundreds of garment factories and footwear in Cambodia reveal that when technology is incorporated on the production flow. Low skilled workers are likely to become more redundant. Women represent around 85% of the total workforce in the industry. Women tend to be low-skilled and occupy the lower paid positions. While Cambodia will encounter some displacement of low-skilled workers, there will be increasing demand for higher skilled technicians and engineers. The discussion will focus on to what extend automation will affect the Cambodia's garment and footwear industry and is Cambodia ready for this revolution?

To remain competitive, industry players must accelerate partnerships with educational and training institutions to groom the next generation of garment and footwear workers who have stronger technical qualifications and expertise and the ability to work seamlessly with multiple strands of emerging technologies

Mouyly VICHHRA has nearly 10 years of professional experience in the apparel industry and 3 years of experience as a Trainer and Enterprise Advisor with Better Factories Cambodia (BFC). Vichhra has a strong passion for fashion along with an excellent understanding of working conditions, industrial relations, and labour dispute settlement. Prior to her employment with BFC, she worked as a Legal Officer at the Arbitration Council Foundation where she provided her support to hundreds of labour dispute cases from various sectors in Cambodia. Vichhra has also been invited in many occasions as an international speaker in the areas of women and development. She also a co-author in a famous journal article on employment relations and political transition in Cambodia, published by the *Journal of Industrial Relations* Australian Labour and Employment Relations Association. Vichhra hold a Master degree from the University of Melbourne (Australia) in Employment and Labour Relations Law, a Bachelor's Degree of Law from the Royal University of Law and Economics, and a Bachelor's Degree of English literature from the University of Cambodia.

Formal and Informal Collectivization and New Digital Tools – The Case of Tuk Tuk Drivers in Cambodia

Margaret Jack

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This project investigates the disruptive potential and ethical risks of precarious work moving into the digital sphere through the case of the tuk tuk drivers' union in Phnom Penh, Cambodia: the Independent Democracy of Informal Economy Association (IDEA). Early scholarship regarding precarious work and the digital economy suggests both opportunities and concerns. Ahmed et al. (2016) describe the ways that Ola, a peer-to-peer application that connects riders to auto-rickshaw drivers in Bengaluru, India, changes the nature of work for these drivers. The introduction of the application risks eroding the independence of the drivers and puts a burden on them to learn a new application. Rosenblat and Stark (2015) explain how the ride-sharing platform Uber encourages a digitally and algorithmically mediated system of flexible employment which builds new forms of surveillance and control over workers. This project builds on previous work to explore the agency, or lack thereof, of the union of tuk tuk drivers vis-a-vis the digital economy. The project will utilize interviews with members of the tuk tuk drivers' union in pursuit of three goals: (1) to explore perceptions of the impact of PassApp and other newly released ride-hailing apps, (2) to specify the ways in which members of the union may utilize or subvert the digital sphere to their own advantage, and (3) to theorize on the ways in which this union — as opposed to individual workers — does or does not change the drivers' relationship to the digital economy.

Margaret JACK is a PhD Candidate in Information Science at Cornell University advised by Steven Jackson. Maggie utilizes her academic background in history of science and professional experience in the technology industry to approach problems of global computing with multiple lenses. Her work lies at the intersection of human computer interaction and science and technology studies. Maggie has ongoing ethnographic fieldwork and archival research in Cambodia since 2014. Her dissertation focuses on the use of social media for archiving pre-Khmer Rouge media, and the relationship between media, memory, and trauma in the Cambodian context. She is a foreign language and area studies fellow and a student of the Khmer language and Southeast Asian studies program at Cornell. Margaret is currently based in Phnom Penh.

Who Wants 9-To-5 Jobs? Chinese Youth, Precarity and Security

Gladys Pak Lei Chong

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“Slash”, a term coined by the New York Times columnist Marci Alboher to describe how technology has opened up a new horizon for many to pursue multiple careers in 2007, has attracted popular attention when a “slash” freelancer Susan Kuang introduced this term in Wechat to the Chinese readers in 2016. It quickly drew more than 100k readers, with hundreds of follow-up discussion on this. In Euro-American societies, this “slash” phenomenon has been widely critiqued for it over-romanticizes this precarious labour condition as intensifying debates expose how the sharing economy offered by platforms, such as Uber, has skirted national labour laws and worsened precarization. In China, slash, job security and precarization are discursively framed as a trendy lifestyle — consciously and voluntarily — chosen by the ambitious, talented and progressive ones, often rewarded with more income and social admiration. Discourse about “slashies” goes in tandem with a set of popular tech-led discourses about digital-mobile innovation, confidence, endurance, perseverance and selfexploration often personified by iconic figures such as Jack Ma and Ma Huateng. This “slash” subjectivity feeds into China’s evolving tech-led economy, as it needs an aspirational culture that generates dreams and hopes so young people will continue contributing to the nation’s development. Hong Kong, a developed economy once taking pride in being an Asian financial centre, struggles to transform itself with the tech-based economy. The self-reliant, self-exploration, adventurous spirits endorsed by the Chinese version of a slash subjectivity is struggling to find its equivalent in Hong Kong. Drawing on ethnographic research that combines observations and interviews with young entrepreneurs and tech-based startup initiators in Hong Kong and Beijing, this paper puts inter-Asia referencing into practice, so as to understand the diverging governing practices behind the tech-led economic transformations.

Gladys Pak Lei CHONG is an Assistant Professor at Hong Kong Baptist University. She received her PhD in Media and Cultural Studies from the University of Amsterdam. Her monograph, *Chinese Subjectivities and the Beijing Olympics* (in the “Critical Perspectives on Theory, Culture and Politics” series, published by Rowman and Littlefield International), develops the Foucauldian concept of productive power to examine how the Chinese government mobilized the population to embrace its Olympic project. She has also written articles and chapters about Chinese governmentality, cultural governance, gender, place-making, taxi-drivers and tactics of everyday life and Olympics security. Her research interests include process of subjectification, subjectivities, power-relations, youth studies, cultural governance, space, globalization, mobility, security, risks and the platform society. She is currently working on a comparative research project about Chinese youth funded by the Hong Kong Research Grant Council.

Does Gender Matter Anymore? (New) Intersecting Vulnerabilities in Industrial 4.0

Mike Griffiths

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New modes of production and consumption associated with Fourth Industrial Revolution where ICBM technology not only influence political, socioeconomic and cultural conditions, but the radical restructuring of work, employment and social relations introduces both new vulnerabilities and exclusions as well as new iterations of existing patterns of inequality. Intersectionality based on urban or rural status, literacy, gender, disability may be restructured to alter patterns of inclusion and exclusion. Public policies around social protection are largely based on social, political and economic assumptions which are increasingly invalidated by emerging possibilities, patterns and conditions.

Research paradigms seeking to explore new intersectionalities need also to draw on theories and approaches which are able to adequately dialogue with the epistemologies which underpin Industrial 4.0. This includes creative applications of complexity theory, which is also drawn on in applications of data mining, (used, for example, to predict consumer preferences). Complexity theory, by emphasizing the relational nature of systems, allows for analysis of emerging networks which may include or exclude persons who were previously privileged or marginalized. Moreover, complexity theory allows for disproportionate effects of certain factors, whereby technology-based networks of interdependence are susceptible to different patterns of risk.

This paper explores how research using complexity theory can allow better understanding and conceptualization of emerging precarity and vulnerability deriving from new intersectionalities of gender, geography and ethnic identity in the context of Myanmar's current socio-economic reform process.

Initially trained in clinical medicine and public health, **Mike GRIFFITHS** has worked in the social protection sector in Myanmar for over 13 years, currently working as lead researcher for the Yangon based Social Policy and Poverty Research Group (SPPRG), which has a particular focus on conducting research relevant to emerging government policy. Previous research work in Myanmar includes being lead researcher on the National Disability Survey 2009-10, a nationwide survey on formal sector migration, and two large-scale surveys looking at changing models of vulnerability and poverty in Myanmar. Recent publications include compilations of contemporary migration research and disability research in Myanmar, and new forms of belonging and precarity in rural Myanmar. As well as working for SPPRG, Dr Griffiths is also a PhD Candidate for the University of Hull, with current research focused on studying patterns of resilience in rural households and studies of traditional social protection organizations in Myanmar.

Power, Voices, and Activism in the Fourth Industrial Age: Whither Will They Go?

Natalie Pang

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The Fourth Industrial Age brings many democratic promises but also immediately exposes many pitfalls and vulnerabilities. In this talk, I will share my research on emerging forms of activism as mediated by technologies in the context of Singapore in the past decade. The affordances of social media platforms and how they interact with the bracketing of power and narrative context is the focus of my discussion, to provide questions and thinking on what 'vulnerability' means in this age, and the way forward in Singapore's digital future.

Natalie PANG is Senior Research Fellow at The Social Lab, Institute of Policy Studies in the Lee Kuan Yew School of Policy Studies, National University of Singapore. Before this, she was Assistant Professor in the Wee Kim Wee School of Communication and Information at Nanyang Technological University, and also studied public opinion polling in The Gallup Organization as Associate Consultant. She specialises in the study of digital activism and effects of social media, and ICTs in vulnerable communities.

Cult of the Technopreneur

Chua Hui Ching Emily

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This paper examines the effort to create a culture of “technopreneurship”, currently being undertaken by government agencies, private corporations and investors, and institutes of research and education in Singapore. It looks at discourses, policies, programs and competitions geared towards nurturing and valorising individuals who are driven to use new technological capacities to produce highly marketable products. I analyse these initiatives as part of a post-developmental strategy for maintaining economic growth and profitability, and argue that it departs from Singapore’s earlier development strategies in several troubling ways. First, it does not presuppose the need to balance, or manage the contradiction between commercial and social values, but rather conflates the two, under the sign of ‘marketable solutions’ to ‘real world problems’. Second, it does not assume that value is produced through the application of labour to an ever-renewable nature, but rather posits a world of finite assets and resources, which an ever-expanding pool of technopreneurs must compete to harness for their own profit. It promotes, in other words, the idea of disruptive, rather than productive, economic behaviour. Third, its orientation to the future is not characterized by a commitment to any particular definition of community, or particular way of life. Rather, it figures the future in terms of ‘survival’ at all costs and in any form – that is to say, in terms of survival as an end in itself. I suggest that these shifts will precipitate new and competing moral-political understandings of the self, society and social relations.

CHUA Hui Ching Emily is an Assistant Professor at the Department of Sociology, National University of Singapore. Her research explores the intersections of media, technology and politics; particularly, how these factors come to relate to and redefine one another, in the making of pasts, presents and futures, in China and Singapore.

Being Smart – Smart Cities and Smart Citizens: The Indian Approach

Rakesh Kumar

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The paper analyses the various notions of smart, the importance and the construction of smart citizens within the nebulous smart city concept. It looks at the India's attempt to implement a smart city project in the face of rapid urbanization and its various iterations and challenges. The paper posits that focusing on the city first is critical for India as it needs to deliver basic services to various sections including the poor and disadvantaged in a fair manner. The dominant discourse of smart city is of a top down, corporate driven, exclusionary idea. The paper avers that the word smart in smart city itself needs to emanate from both the city, media, knowledge as well as the education and skilling system rather than Smart IT solutions. Moreover, the use digital technologies and IT technologies is beneficial but has to be appropriately grounded in the needs, aspirations, politics and social life of the inhabitants including the huge and rapidly growing slum population. This means a new framework of focusing on the urban citizen and using as well as building their smart capabilities. It also means letting go of the fetish for building new cities and instead of that improving the existing ones. Does this offer a new way out for the beleaguered smart city? Will the smart citizen result in a smart(er) city? The answers (and the further questions it throws up) are important for India, Asia and maybe the whole world.

Rakesh KUMAR works in the field of education and is deeply interested in the use of technology to build a vibrant, inclusive society in India, which gives an opportunity for even the disadvantaged to excel. Currently he is in Sydney, Australia, with a venture capital firm investing in social impact areas like ed-tech In India, Singapore, Indonesia and China. Prior to this he has worked in senior roles in various organisations in India and South Asia in the field of e-learning and education technology as well as employability solutions. He has written about education and other issues in various periodicals in India, actively researches on personalised education and has also taught school children and in MBA colleges occasionally. Rakesh firmly believes in close interaction and cross-pollination between industry and academia. That will be mutually beneficial as well as help tackle big social issues of the day.

The Shifting Landscape of Work and Organization: Exploring Power Relations at Work in the Digital Society

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This paper discusses some effects of 'The Industrial Revolution 4.0' in the context of power relations at work. It has been argued that, with the rise of new measurement technologies, workers are increasingly being subjugated to pervasive forms of control. While these technologies can be considered new, their effects are perhaps less so; it reminds of several of the traditional disciplines of Taylorism, or scientific management, which have crucially shaped organizations and labor at the beginning of the 20th century (e.g. through meticulous time-and-motion studies and intense record-keeping). In this paper we explore, in the context of the IT industry in Southeast Asia, how current modes of control can be understood as a form of 'Digital Taylorism' and how these shape power relations at work. Increasingly, work is subjected to digital technologies such as wearables, big data, or algorithms. While these technologies enable new forms of labor, they can also be interpreted differently, namely as devices that instrumentally measure workers' productivity but also more subjective elements of human experience such as emotions or mood. They are ultimately established in order to produce 'quantifiable selves'. In the paper we want to theorize how we can understand these digital technologies as a form of 'Digital Taylorism' and how they exert control over the workplace and with what effects. We also explore what employees' resistance may look like in these digital futures and how workers may find ways to guard their subjective selves in the face of quantification.

Thijs WILLEMS is Postdoctoral Research Assistant at the Lee Kuan Yew Centre for Innovative Cities, Singapore University Technology and Design (SUTD) where he will focus on how (disruptive) technologies in the digital age change the meaning of work and organizations. Thijs' background is in organization studies and anthropology. He is interested in understanding how complex and technological organizations manage and organize people and processes to reach certain goals, and especially how employees experience their work in such environments. For his PhD research, he conducted a longitudinal ethnographic study on the Dutch railways to explain how people collaborate during various kinds of infrastructure breakdowns, ranging from daily delays of trains to complete system failures and even railroad suicides. Thijs has a methodological preference for conducting ethnographic research and 'getting his hands dirty', that is, participating, observing, and talking to those people he studies. He is a firm believer that such an insider perspective is important to understand not only how organizations operate but, more importantly, how organizational processes and technologies impact the work and life of people.

Samuel CHNG is Postdoctoral Research Fellow in the Chen Tianqiao Programme on Urban Innovation at the Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design (SUTD). He is a behavioural scientist and social psychologist with a research interest in understanding and mapping the regulatory mechanisms and experiences underlying human behaviour. His current research at the centre looks at enhancing technology adoption and implementation.

Gayathri HARIDAS is a Postdoctoral Research Assistant in the Chen Tianqiao Programme on Urban Innovation at the Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design (SUTD). She has a multi-disciplinary background in Biotechnology and STS. Her PhD research was on the role of universities in National Systems of Innovation. Her research interests include the politics of innovation, social construction of technology, education policy, and science, technology, and innovation policy.

POON King Wang is the Director of the Lee Kuan Yew Centre for Innovative Cities at the Singapore University of Technology and Design (SUTD). He is also concurrently Director – Strategic Planning for SUTD, and Co-Director – SUTD-JTC Industrial Infrastructure Innovation Centre. His interests are in the future of work, education and healthcare, and the economic and social impact of digital technologies.

Political Discourses on the Industrial Revolution 4.0 in South East Asia

DongHyun Song

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The aim of this paper is to outline the background for precarious groups in South East Asian (SEA) regions confronting the current top down strategies and policies of the Industrial Revolution 4.0. This is done by considering the four SEA countries' (Singapore, Malaysia, Vietnam and Indonesia) recent innovation policy frameworks at a comparative level.

Singapore is known to be the leader of this innovation in SEA regions through various policy developments such as the Smart Nation plan, as well as capacity building programmes such as Skill Future initiatives Smart Nation Programme Office and data.gov.sg. Malaysia's TN 50 is well on its way to atomising its manufacturing industry. Following up the paradigm of the industry 4.0, Vietnam and Indonesia also announced several plans early this year as policy directives at the ministry levels. Different emphasis has been identified in the four states' policy frameworks under the industry 4.0 approach. While the Singapore government plans to construct an ecosystem of data economy under the industry 4.0 ideology, the Malaysian government wants to reduce the ratio of foreign workers in the industry through industrial atomisation strategies. In Vietnam and Indonesia, workers face the highest risk due to automation in SEA, so these two are particularly concerned about the re-education of workers, together with infrastructure development; the level of this has not yet been reached to support the government vision, however.

This paper explores the political rationale for adopting the Industrial Revolution 4.0 at a comparative level by examining government policy documents and social discourses in the four countries' (Singapore, Malaysia, Vietnam and Indonesia) policy frameworks in response to the emerging trend of the Industrial Revolution 4.0. It also scrutinises how each country supports norms relating to specific training and in-person mentoring in order to secure fairness, human dignity and stewardship of worker capital.

DongHyun SONG has been working as a Postdoctoral Fellow at the Asian Research Institute, National University of Singapore since January 2016. He previously worked at the Korea Internet Security Agency (KISA) between January 2014 and January 2016, a research agency, and the Ministry of Science, ICT and Future Planning's sub-organization to support the government's ICT policy making. He has completed his doctoral degree (PhD in Media and Communications) at Goldsmiths, University of London. His research mainly focuses on exploring the gap between online media and its offline counterpart, as well as the effect of cyberspace on socio-political culture and digital media culture in everyday lives. He is currently examining social media culture in Asia in relation to the privacy and security concerns of the state's ideology.

The Environmental Risks and Costs of the Global Digital Economy in Asia

Tanya Notley

Institute for Culture and Society,
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Australia

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In just 15 years data flows have moved from having a near negligible impact on the global economy to today exerting a larger impact on GDP growth than the centuries-old trade in material goods (McKinsey 2016). The uptake of the Internet of Things and the growing use of Artificial Intelligence constitute a critical component of data flow future growth forecasts. Unlike materials goods, data flows are often described as immaterial or virtual. However, the dense flow of data around the world uses an intense amount of natural and finite resources including electricity, water, metals, elements and chemicals as well as the production of human-made materials including plastics and glass. Yet despite clear evidence of the materiality of digital flows, corporate and policy rhetoric about new technologies work artfully to disguise their environmental costs. With a focus on Singapore and China, this paper examines how the environmental costs of the digital economy are being considered and addressed by governments and citizens. The paper considers the scale of the data industries in each country as well as their respective communication technology production, circulation and disposal environmental practices and policies in order to ask: which places and people in Asia do – and will in the future – pay the burden for digital economy growth and how can this burden be reduced, be made transparent, and be more justly distributed?

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The Golden Years or More Ageing Pains? A Critical Assessment of Smart Singapore's Policy Response to Population Ageing

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Jumping onto the bandwagon of Industry 4.0, Asian countries are in a “fast and furious” race to incorporate I.O.T., big data, cloud technology, and even A.I. into their national development agenda. As these novel technologies are being implemented across varying economic, social, and political contexts, the question of how they will affect the elderly remains under-examined. Against sweeping claims that these technologies promote economic competitiveness, environmental sustainability, quality living, and democratic governance, our paper focuses specifically on the elderly – that precarious segment of the population that we tend to hear least about in this high-tech drive. While the elderly are often considered to benefit less – if at all – from Industry 4.0, it is also possible that the novel technologies associated with it can contribute substantively in the face of rapid demographic ageing in Asia. It is in this context that we ask: how might the elderly be included in this high-tech drive? What kinds of public policies are called for to build inclusive societies in the face of Industry 4.0? To this end, we examine Singapore's policies under its ‘Smart Nation’ and ‘Ageing in Place’ initiatives to shed light on these questions. Bridging two major policy issues in Asia today – Industry 4.0 and ageing, the paper explores whether Industry 4.0 supports the golden years or causes more ageing pains.

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Automating Labour and the Politics of Cloud Technologies

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Singapore is renowned as the centre of growth for data storage facilities in Asia. One of the key functions of data centers over the next decades will consist of supporting the transition to automated economies with the integration of artificial intelligence, machine learning and robotics into processes of capital accumulation. Yet in the policy literature on smart nations there is a lack of narratives that address the political and social problem of job loss that stems from automated futures. This paper engages the politics of data infrastructures in the age of automation. We ask what variegated labour means when the human is displaced from the machinery of capital. This involves consideration of the changing geographical reach of Singapore's data centres, the rapid construction of these facilities in nearby territories (including Malaysia's Johor state), and the implications of these changes for redefining established regional understandings of Southeast Asia. By combining this infrastructural approach to region making with an empirical concern for the technical operations of data centres we acquire a means of questioning zero sum narratives of automation and job loss in an analytical frame at once attentive to how capital hits the ground and the wider spatial and temporal transformations of digital capitalism.

Brett NEILSON is Research Professor at the Institute for Culture and Society, Western Sydney University. His recent work has focused on relations between globalization, migration, labour, and technology. He is the author, with Sandro Mezzadra, of *Border as Method, or, the Multiplication of Labor* (Duke University Press, 2013) and *The Politics of Operations: Excavating Contemporary Capitalism* (Duke University Press, forthcoming). With Ned Rossiter, he has coordinated the projects 'Transit Labour: Circuits, Regions, Borders' (<http://transitlabour.asia>) and 'Logistical Worlds: Infrastructure, Software, Labour' (<http://logisticalworlds.org>). With Ned Rossiter and Tanya Notley, he currently coordinates the project 'Data Farms: Circuits, Territory, Labour'. With Ilias Marmaras, Anna Lascari and Ned Rossiter, he is responsible for the conceptualisation of the serious game Cargonauts (<http://cargonauts.net>).

Ned ROSSITER is a Media Theorist noted for his research on network cultures, the politics of cultural labour, logistical media and data politics. Rossiter was appointed to Western Sydney University as Professor of Communication in 2011 and is currently a Fellow at the Institute for Culture and Society with a joint position in the School of Humanities and Communication Arts. He was a Senior Research Fellow at Leuphana University's Digital Cultures Resesearch Lab, Lüneburg in 2016. Rossiter is the author of *Organized Networks: Media Theory, Creative Labour, New institutions* (2006) and *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares* (2016).

Creating Economic and Social Value from Atmospheric Platforms in Bandung, Indonesia

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Google's Project Loon is flying over Indonesian cities balloons to provide internet to those who do not have it or cannot afford it. The Indonesian government is working with Google as well as funding the start-up company Helion to make the city of Bandung a world leader in the use of balloons to deliver the internet. Open source hardware and software communities also have the potential to develop balloons for affordable community WiFi projects and in the process generate diverse social values that challenge exclusive economic valuations of the atmosphere. This project investigates the "multiplicity of value regimes" that compete or collaborate in the atmosphere (Kjellberg et al. 2013: 19).

Many local information technology businesses in Indonesia are frustrated, believing that they are being excluded by Google and their government from the ability to create economic value from their atmosphere (Jakarta Globe 2015). Cultural geographers agree that atmospheric enclosure, encompassing "spatialities of inclusion and exclusion," leaves many important local stakeholders without access to value creation from the atmosphere (Vasudevan et al. 2008: 1645). They argue that by being first to market, copyrighting technologies for bringing internet from the air, co-regulating with bureaucrats, and collecting important scientific information, Google is "enclosing" (Philippopoulos-Mihalopoulos 2016: 151), "commercializing" (Shaw 2016: 21), or "colonizing" the sky (Crampton 2016: 137). To some theorists, the urban atmosphere of a city like Bandung has become "a patchwork of more or less detached and controlled enclosures" (Klauser 2010: 332). In this enclosure, it is argued, an economic value that privileges international technology companies dominates the air. This talk will examine generate qualitative and quantitative data as well as theoretical frameworks to investigate how numerous values are created from the atmosphere by diverse communities including international corporations, domestic business, and citizen publics.

Adam FISH is a Senior Lecturer at Lancaster University where he focuses on digital activism and digital industries. His authored books include *Technoliberalism* (Palgrave, 2017) and *After the Internet* (Polity, 2017). From 2017-2018 he is a Leverhulme Research Fellow conducting research titled "Opening the Droncode: The Privatisation of Urban Airspace," which will have him working in both the United Kingdom and Indonesia on atmospheric technologies such as drones, balloons, and satellites.

Hagorly M. HUTASUHUT is an Aerospace Engineer and graduate of the Bandung Institute of Technology as well as being the CEO of Insitek, an atmospheric technology startup company in Indonesia. He obtained his MSc in space science from the University College London and is the foremost expert on the application of balloons for internet delivery, having already made progress with his Helion initiative.

4th Industrial Revolution in Humanitarian Contexts: Challenging Relationships with Political Actors and Populations in Need

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The crossing of physical, biological and informational domains that characterises the fourth industrial revolution threatens the independence of humanitarian organisations. This is occurring in an environment in which the value and purpose of independence is already seriously questioned both in practice and in principle. This paper argues this is happening due to two related trends. First, several fourth industrial revolution technologies are improving the capacity of humanitarian organisations to gather, synthesise and analyse data, resulting in the production of information of increasingly strategic political or military value; second, cyber technologies in particular are simultaneously rendering that information more vulnerable to theft by third parties with relevant political and/or military agendas. In practice, this increases the likelihood of humanitarian actors functioning as appendages of others, representing a de facto loss of independence. This has operational implications, and also materially impacts the ongoing debate around the importance of independence in humanitarian work.

Martin SEARLE is Associate Research Fellow with the Humanitarian Assistance and Disaster Relief (HADR) programme, NTS Centre at S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University (NTU), in Singapore. He previously worked 6 years with the international medical humanitarian organisation Médecins Sans Frontières/Doctors Without Borders (MSF) in South Sudan, Central African Republic, Kenya, India, Bangladesh, Myanmar, Malaysia and at MSF headquarters on the South and Southeast Asia operational portfolio. Martin holds a BA (Hons) from University College London, and an MA from The New School.

Shenzhen's Maker Culture and the Digital Divide

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This paper questions the creative empowerment promised by the rise of 'maker culture' in Shenzhen, China. In the last decade, Shenzhen has received substantial government investment in new technologies and entrepreneurial ventures which aim to diversify its economic base and transform the city's traditional heavy manufacturing base into smaller, more specialised manufacturing. This has seen the rise of high-tech incubators, makerspaces, and specialised manufacturing plants. This unique cultural economy model — focusing predominately on cultural manufacturing aimed at creating new employment and urban development opportunities — is one of the key priorities of the national re-industrialisation policy 'Made in China 2025'.

Shenzhen, the first self-proclaimed City of Makers, has been labelled by *WIRED* magazine as the *Silicon Valley of Hardware* in the new industrial 'revolution'. This research evaluates several 'maker movement' initiatives in Shenzhen including makerspaces and Shenzhen Maker Faire. It will analyse their contribution to the new cultural economy and contest their promise in fostering democratic participation in maker cultures. Framed within the model of 'smart cities' and 'creative industries', the maker movement is highly driven by economic agendas, rooted in technocratic governance and is contributing to urban gentrification by attracting global 'creative class' and external investment. We argue that although the maker movement originated from an open, anti-global corporate control, anti-authoritarian and democratic spirit, it is highly susceptible to social division based on levels of digital literacy and cultural competencies.

Pip SHEA is Research Associate at the School of Media Film and Journalism, Monash University. Her research investigates how technology and organizational forms are shaping creative, civic and activist practice.

Xin GU is a Lecturer in Communication and Media Studies at the School of Media Film and Journalism, Monash University. Her research interests cover three areas – cultural and creative industries, arts and cultural management and digital culture and society. Xin has published widely on subjects of urban creative clusters and agglomerations; cultural work; creative entrepreneurship; creative and cultural industries policy; maker culture in China. Xin's current research focuses on the transformation of cities and narratives of 'creative industries' under different social, economic and political conditions.

About the Chairpersons, Commentators & Organisers

CHUA Beng Huat is Acting Head of Studies, Urban Studies at the Yale-NUS College, Singapore. Professor Chua received his PhD from York University, Canada. He has previously served as Provost Chair Professor, Faculty of Arts and Social Science (2009-2017), Research Leader, Cultural Studies in Asia Cluster, Asia Research Institute (2000-2015); Convenor of Cultural Studies Programmes (2008-2013) and Head of Department of Sociology (2009-2015), National University of Singapore. His publications on the society and political economy of Singapore include: *The Golden Shoe: Building Singapore's Financial District* (1989), *Communitarian Ideology and Democracy in Singapore* (1995), *Political Legitimacy and Housing: Stakeholding in Singapore* (1997), *Life is Not Complete without Shopping* (2003), *Liberalism Disavowed: Communitarianism and State Capitalism in Singapore* (2017), and as editor, *Singapore Studies II: Critical Studies* (1999). Beyond Singapore writings, he has edited several volumes on cultural politics in Asia, including *Consumption in Asia: Lifestyles and Identities* (2000), *Communitarian Politics in Asia* (2004), *Elections as Popular Culture in Asia* (2007). He is founding co-executive editor of the journal *Inter-Asia Cultural Studies*.

Eric KERR is Research Fellow in the Science, Technology and Society Cluster at the Asia Research Institute and teaches at Tembusu College, National University of Singapore. His work centres on the philosophy of technology and social epistemology with a focus on the petroleum engineering industry in Southeast Asia. Eric has published on topics including scientific evidence, engineering epistemology, survey methods, and applied and cross-cultural philosophy. He is Associate Editor and Book Review Editor at *Social Epistemology* and the *Social Epistemology Review and Reply Collective*. He is a co-founder and board member of the *Society for Philosophy of Information*. He received his PhD from the University of Edinburgh and has taught in the UK and the US before moving to Singapore. He has been a visiting scholar at the University of Vienna and TU Delft.

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Mohan J DUTTA is Provost's Chair Professor and Head of the Department of Communications and New Media at the National University of Singapore (NUS). He is the Founding Director of the Center for Culture-Centered Approach to Research and Evaluation (CARE), directing research on culturally-centered, community-based projects of social change, and founded the Center for Poverty and Health Inequities at Purdue University. Recognized as the "International Communication Association (ICA) Outstanding Public Policy/Applied Communication Researcher" in 2016, Professor Dutta works on academic-activist partnerships for social justice projects spanning sixteen countries, studying issues of labour, subalternity, precarity, communicative erasure, and subaltern resistance, and examining "academic strategies for placing the body on the line." Professor Dutta holds a Bachelor of Technology (Honors) in Agricultural Engineering from the Indian Institute of Technology (IIT), Kharagpur, and a PhD in Mass Communication from the University of Minnesota. Trained as a performer, Professor Dutta uses and studies participatory and third form theater, films, and advocacy interventions as anchors for disrupting local-global structures. He has published over 200 journal articles and book chapters, and was recently noted as the most published scholar in Health Communication. He has authored the book "Communicating health: A culture-centered approach" published by Polity Press, co-edited "Emerging perspectives in health communication: Meaning, culture, and power" (with Heather Zoller) published by Taylor and Francis, "Communicating for social impact: Engaging communication theory, research, and pedagogy" (with Lynn Harter & Courtney Cole) published by Hampton Press, "Communicating social change: Structure, culture, agency" published by Taylor and Francis, "Voices of Resistance" with Purdue University Press, "Neoliberal Health Organizing" with Routledge, "Imagining India in Discourse: Meaning, culture, power" with Springer, and the edited book "Communicating healthcare disparities" (with Gary Kreps) by Peter Lang Press. Currently he is working on his book "Decolonizing communication: Southern interventions," and a performance-based project titled, "Disrupting authoritarian structures: Narratives for cultural resistance."

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V.V. KRISHNA is currently Professorial Fellow, Faculty of Arts and Social Sciences at the University of New South Wales, Sydney, Australia. He has a PhD from the University of Wollongong, Australia and has more than 30 years of research, teaching and consultancy experience in science and technology policy studies, history and sociology of science and technology, innovation studies and science, technology and developing world in leading academic and research institutions in India, Australia, Singapore, China and Canada. He was Professor in Science Policy and Chair, Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University, New Delhi for more than 20 years. He held visiting faculty positions at the National University of Singapore; McGill University, Montreal, Canada; Maison des Science De l'Homme, Paris; United Nations University, Japan; Western Sydney University, Sydney and Tsinghua University, Beijing. Over the years, he published over 40 papers and five books which include: *Science, Technology and Diffusion of Knowledge: Innovation Systems in Asia-Pacific* (Edward Elgar 2007); *Scientific Communities in the Developing Countries*, (Sage 1997). His latest book is on *Universities in the National Innovation Systems: Experiences from Asia Pacific* (Routledge 2017) He is Editor-in-Chief of ranked international journal *Science, Technology and Society* (Sage). He was member of various expert committees and been consultant at UNESCO, OECD, ILO and other international agencies. He contributed to World Science Report 1998 and UNESCO Science Report 2005, and to the ILO in 2001 for its programme on the informal sector. He served as expert on European Research Council's Grand Challenges and European Union, Brussels, based networks on research and innovation policies since 1990s.