PetaJakarta.org
Year 1 Research Highlights
November 2013 – 2014
by Dr Etienne Turpin &
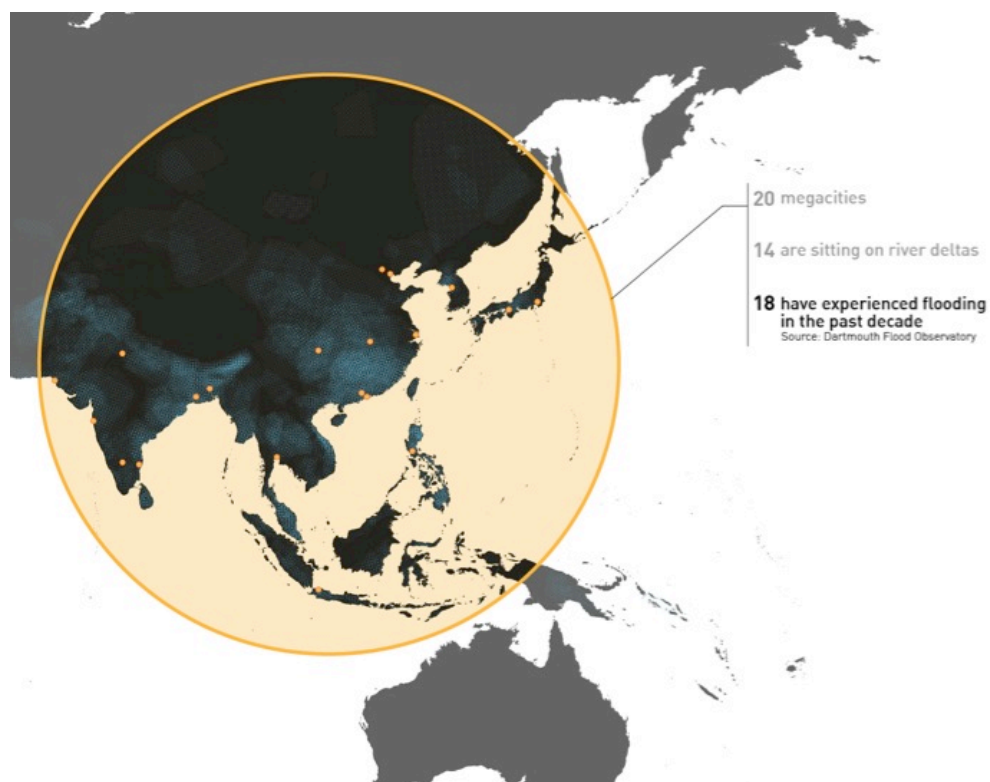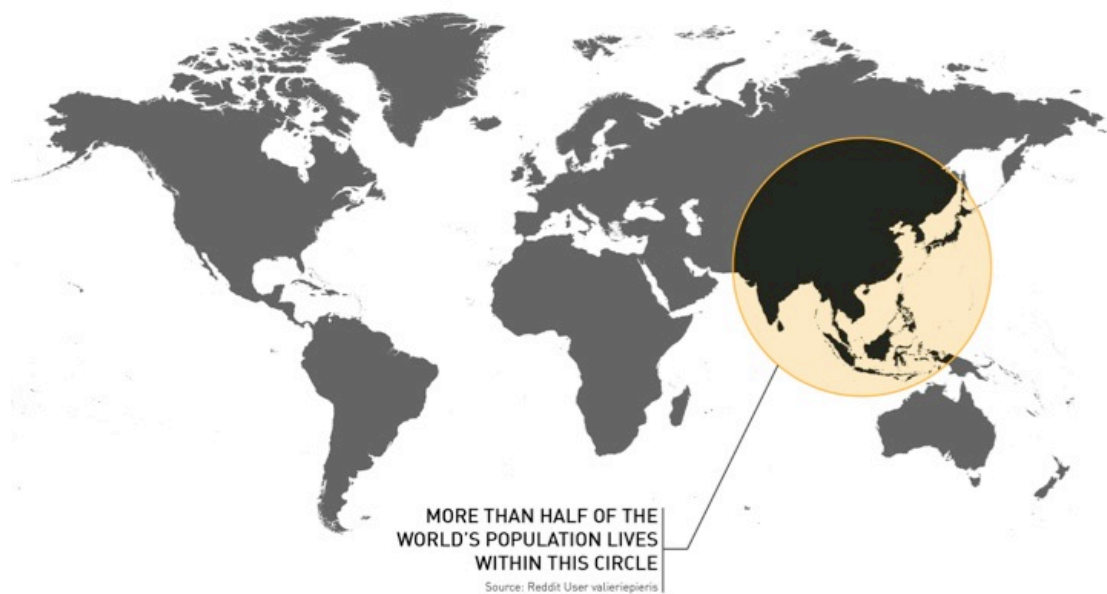Dr Tomas Holderness

PETA JAKARTA
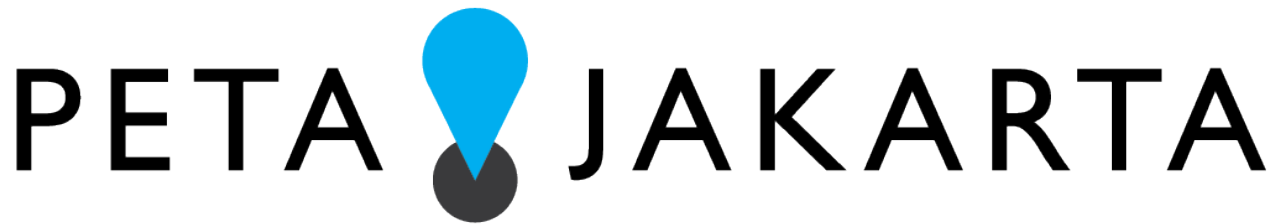
Project Summary

As part of the SMART Infrastructure Facility's 'Urban Livability, Sustainability, and Resilience Research Group,' Co-PIs Dr. Etienne Turpin and Dr. Tomas Holderness, with Investigators Dr. Rohan Wickramasuriya, Dr. Matthew Berryman, Dr. Olivia Dun, Dr. Rodney Clark, and Sara Dean (M.Arch, MSc. Design), have developed the crowd-sourcing data collection project **PetaJakarta.org** (Map Jakarta). The overall aim of the project is to advance our capacity to understand and promote the resilience of cities to both extreme weather events as a result of climate change and to long-term infrastructure transformation as a process of climate adaptation. **PetaJakarta.org** is a pioneering web-based platform that harnesses the power of social media to gather, sort, and display information about flooding for Jakarta residents and governmental agencies in real time.

The platform runs on the open source software **CogniCity**—a GeoSocial Intelligence Framework developed by the SMART Infrastructure Facility, University of Wollongong—which allows situational information to be collected and disseminated by community members through their location enabled mobile devices, and optimizes infrastructure surveys and asset management for governmental actors. Equipped with scalable mapping technology for mobile devices and a critical alert service, this software enables the communication of two-way time-critical information to and from individuals and government agencies.

As the pilot study for our long term SMART research project on urban resilience and adaptation to climate change in developing nations, **PetaJakarta.org** will radically change real-time data collection and feedback for flood monitoring in one of most precarious delta cities of Asia. **Petajakarta.org** uses the highly transferable software **CogniCity**, which can be deployed in other megacities, in alternate languages, and for other critical urban problems pressurized by climate change. [**Figs. 01 & 02**] The pilot study helps to demonstrate that the University of Wollongong is a leader in the emerging field of Applied GeoSocial Intelligence Engineering.

The following report summarizes the achievements of the project during its first year of operation; these achievements are organized in chronological order.

Cover Image: aggregated tweets about flooding from the 2013-14 monsoon season in Jakarta; data from the Twitter #DataGrant.

MORE THAN HALF OF THE
WORLD'S POPULATION LIVES
WITHIN THIS CIRCLE
Source: Reddit User valieriepieris

20 megacities

14 are sitting on river deltas

18 have experienced flooding
in the past decade
Source: Dartmouth Flood Observatory

Figs. 01 & 02. With half of the global population in Asia, and many residents clustered in coastal river deltas, the demand for tools that enable the civic co-management of climate adaptation will increase as precipitation intensifies and the sea level rises in Asian megacities.

Agreements, Contracts & Affiliations

Nov 2013   Dr Turpin & Dr Holderness agree to collaborate as Co-PIs for PetaJakarta Research Programme

Dr Holderness invited to publish "GeoSocial Intelligence" in *IEEE Technology & Society* Magazine

Jan 2014   Dr Turpin appointed leader of the SMART GeoSocial Intelligence for Urban Livability and Resilience Research Group (GSI)

March 2014   PetaJakarta signs partnership agreement with Jakarta Emergency Management Agency (BPBD DKI) to collaborate on one year (May 2014-May 2015) Joint Pilot Study on Urban Resilience

April 2014   PetaJakarta officially endorsed by the United Nations Pulse Lab and supported by the UN Pulse Lab Jakarta

Aug 2014   Dr Holderness establishes the SMART Open Source Geospatial Laboratory (OSGeo-ICA accreditation) to support PetaJakarta

Sept 2014   PetaJakarta signs contract with Australian National Data Service for Major Open Data Collection (MODC) Project [funding $200K AUD]

Dr Turpin named Associate Research Fellow at the Australian Center for Cultural Environmental Research Faculty of Social Sciences, University of Wollongong

Oct 2014   Twitter officially endorses PetaJakarta and offers to provide support during 2014/2015 monsoon season; this marks Twitter's first official academic research collaboration using live data

Dr Turpin named Visiting Lecturer for Urban Data Politics (via teleconferences) at University of California, Berkeley, College of Environmental Design

Nov 2014   PetaJakarta launched at the SMART Infrastructure Facilty with the Jakarta Emergency Management Agency (BPBD)

Fig. 03. Jakarta experienced major flooding in January 2013; these events suggested that new approaches to researching urban resilience and climate adapation were necessary.

Grants & Funding Support

Jan 2014   UOW Global Challenges Strategic Fund (Awarded)
                    via Sustaining Coastal and Marine Zones
                    [$5K AUD]

                    UOW Research Development Fund (Awarded)
                    [$20K AUD]

                    SMART Research Development Fund (Awarded as Matching Funds)
                    [$20K AUD]

June 2014   DECRA by Co-PI Dr Holderness (Pending)
                    Reducing the Risk of Heatwaves Using Thermal Earth Observation
                    [$297K AUD]

                    DECRA by Co-Pi Dr Turpin (Pending)
                    Civic Co-management for Urban Resilience in Megacities
                    [$280K AUD]

                    Support for UOW Student Flood Teams A & B (Awarded)
                    Faculty of Engineering and Information Sciences
                    & SMART Infrastructure Facility Matching Funds
                    [$35K AUD]

                    STMP Student Mobility Funding (Awarded)
                    Support for UOW Student Flood Team B
                    [$22K AUD]

                    CiptaMedia.org Grant for Software Development (Not awarded)
                    Open Source Software (OSS) Proposal for OSM-XRay Community
                    Mapping Tool
                    [$80K AUD]

July 2014   Twitter #DataGrant via Twitter OSS Engineering (Awarded)
                    Access to historical Twitter data for PetaJakarta.org

August 2014   Google Faculty Research Award (Pending)
                    Designing an open source software platform for social media data
                    aggregation with Jakarta Emergency Management Agency
                    [$48K USD]

August 2014   National Science Foundation #BIGDATA (Not awarded)
cont'd   "Making Big Data Actionable for Environmental Design"
                   submitted in collaboration with Professor Kyle Steinfeld of the
                   University of California, Berkeley, College of Environmental Design
                   [$1800K USD]

Sept 2014   UOW Global Challenges Project Fund (Awarded)
                   Sustaining Coastal and Marine Zones
                   [$50K AUD]

                   New Colombo Plan Part 2 (Pending)
                   Funding for Student Flood Team C
                   [$35K AUD]

Fig. 04. Jakarta has the highest rate of social media usage globally and produces the largest number of tweets per day of any city worldwide.

Fig. 05. The increase in precipitation intensity is changing flood patterns in Jakarta. Above, the 2007 flood line ("banjir") is discernable on a wall above the Tongtek Bridge in East Jakarta; in 2013-2014, the flood pattern led to multiple unpredicted evacuations in the city, instead of one major flood event.

Invited Lectures & Seminars

Nov 2013   Dr Turpin, Invited Seminar, "Data, Design, and Urban Poverty," at the Institute for Social Transformation Research, University of Wollongong, Australia

Dr Turpin, Book launch for *Jakarta: Architecture + Adapation* and lecture by Professor AbdouMaliq Simone, "Just the City," SMART Infrastructure Facility, University of Wollongong, Australia

Dr Turpin, Invited Keynote Lecture, "Data and Discovery: New Geographies of Intelligence," at the Asia Art Archive, Hong Kong

Dr Turpin, Invited Panel Discussion, "Planetary Urbanization," at the Shanghai Study Center of the University of Hong Kong, Shanghai, China

Dec 2013   Dr Turpin, Invited Lecture, "Architecture in the Anthropocene," at The Barbershop Artspace, Lisbon, Portugal

Dr Turpin, Invited Seminar, "Architecture in the Anthropocene," Center for Research Architecture, Goldsmiths, UCL, London, UK

Dr Turpin, Invited Seminar, "Architecture in the Anthropocene," at the Faculty of the Built Environment, University of Edinburgh, Edinburgh, UK

April 2014   Dr Turpin, Invited Lecture, "The Intelligence of Excess," at the Energy, Environment & Design Lab, Harvard University Graduate School of Design, Cambridge, USA

Dr Turpin, Invited Panel Discussion, "Between a Rock and Hard Plastic: Art in the Anthropocene," with Dr. H. Davis and Professsor S. Lotringer, Human Resources Arts Cooperative, Los Angeles, USA

May 2014   Dr Holderness, Invited Lecture, "Creating web maps for mobile devices," at the Surveying and Spatial Sciences Institute, Emerging Technologies Forum, Melbourne, Australia

Dr Holderness, Dr Wickramasuriya, and Dr Turpin, Invited Presentation, "PetaJakarta.org" at Twitter Australia, Sydney, Australia

June 2014	Dr Holderness, Invited Panel Discussion, "Changing the World with Social Media," at the Big Boulder Conference, Colorado, USA
	Dr Holderness, Invited Lecture, "PetaJakarta.org," at the National Center for Atmospheric Research (NCAR), Colorado, USA
	Dr Turpin, Invited Keynote Lecture, "Understanding Urban Resilience Through Social Media," at the Prototype:Y2014 Conference for Open Culture & Critical Making, Yogyakarta, Indonesia
	Dr Turpin, Book launch for *Jakarta: Architecture + Adapation* and Invited Panel Discussion with Professor Rudolf Mrazek and Dr H. Farid, Ruangrupa Art Space, Jakarta, Indonesia
Sept 2014	Dr Turpin, Dr Holderness & S. Dean, Invited Workshop, "Big Data for Design Thinking," at the Harvard University Graduate School of Design, Cambridge, USA
	Dr Turpin & Dr Holderness, "Hacking Social Media to Survive Climate Change," at the MIT Urban Risk Lab, Cambridge, USA
	Dr Turpin, Dr Holderness & S. Dean, Invited Workshop, "Prototypes for Designed Engagement," at the Department of Art + Design, Northeastern University, Cambridge, USA
	Dr Holderness, Invited Workshop, "GeoSocial Intelligence for Design Research," at the College of Environmental Design, University of California, Berkeley, USA
	Dr Holderness & Dr Turpin, Invited Lecture, "PetaJakarta.org: Ongoing Research from the Twitter #DataGRant," at Twitter Inc. Headquarters, San Francisco, USA
Oct 2014	Dr Turpin and Dr Holderness, Invited Presentation, "PetaJakarta.org," at The Open Data Institute, London, UK
	Dr Turpin, Invited Lecture, "Design for Civic Co-management," at the Sensing Practices-Citizen Sense Seminar Series, Department of Sociology, Goldsmiths, UCL, London, UK

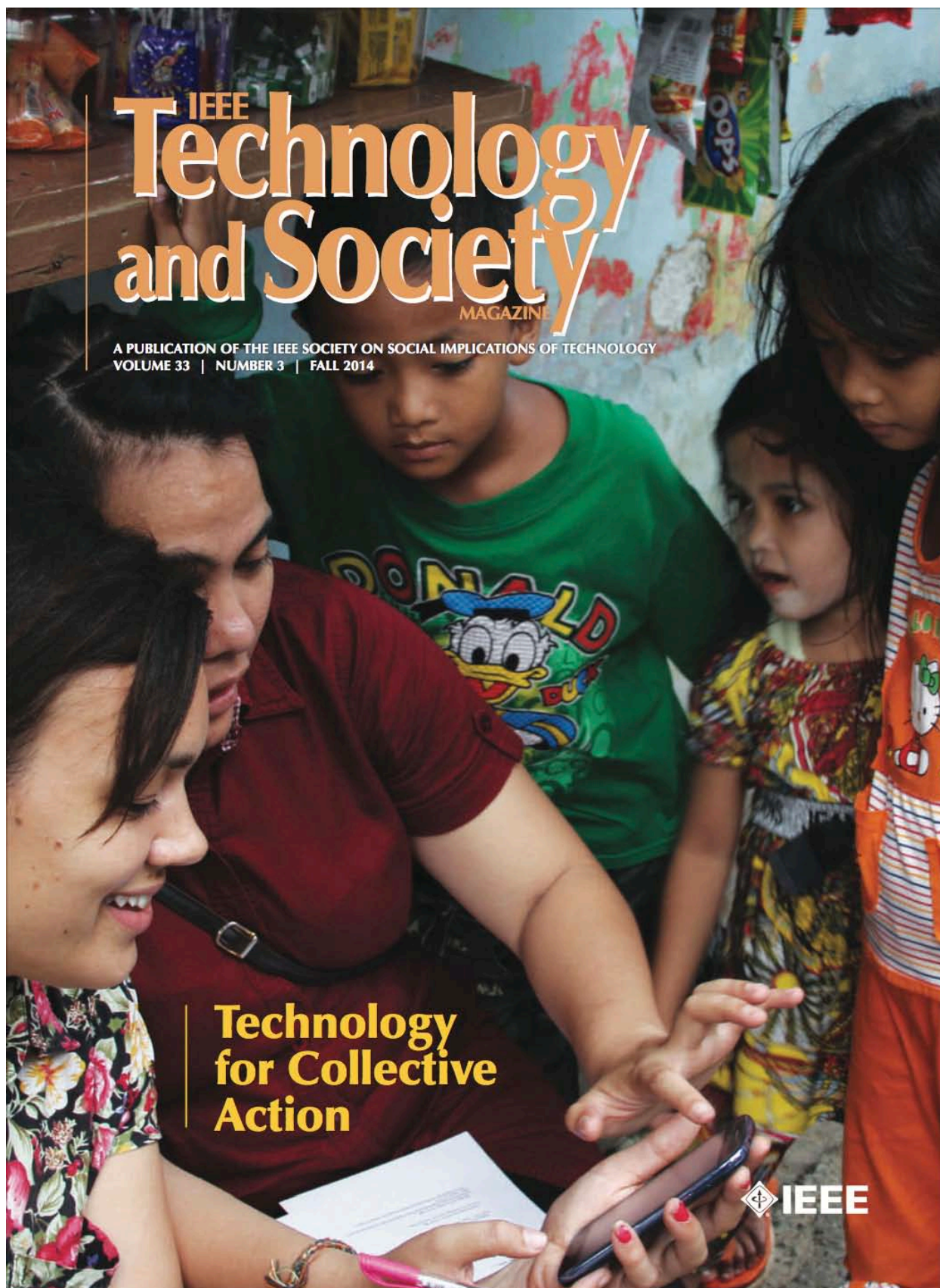| Oct 2014 cont'd	Dr Turpin, Invited Workshop, "Contested Territories: Design and Spatial Politics," at The Bartlett School of Architecture, UCL, London, UK
	Dr Turpin, Invited Lecture, "In Defense of Urban Poverty," at the Expanded Territories Research Seminar, Faculty of the Built Environment, University of Westminster, London, UK
	Dr Turpin, Invited Keynote Dialogue, "Urban Stratigraphy and Activism Urbanism," with Simon Price of the International Commission on Stratigraphy, Haus der Kulturen der Welt, Berlin, Germany
Nov 2014	Dr Turpin & Dr Holderness, Invited Keynote Lecture, "Meeting the Global Challenge of Coastal Cities Through Civic Engagement," at the Department of Urban Studies, Universitas Indonesia, Jakarta, Indonesia
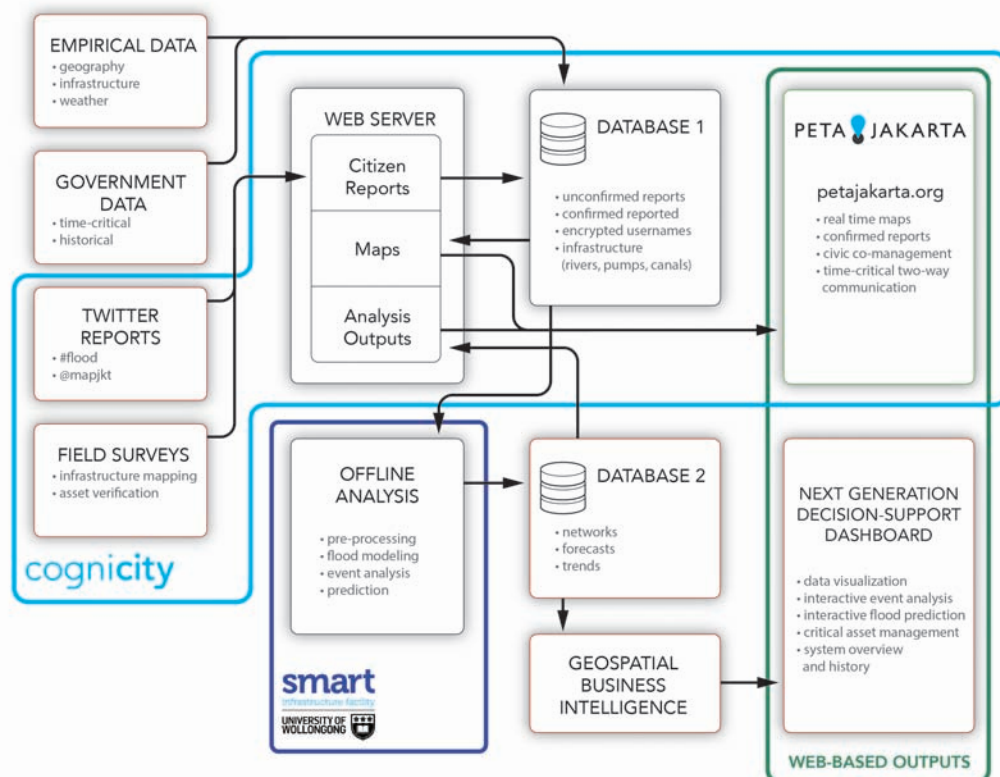
Fig. 06. Schematic of GeoSocial Intelligence Framework used for PetaJakarta.org.

Technology for Collective Action

IEEE

PETAJAKARTA YEAR 1 (NOVEMBER 2013-2014) : PRESENTATIONS, CONFERENCES & WORKSHOPS

HOBART, AUSTRALIA

Dr Turpin, Dr Holderness, Dr Wickramasuriya & S. Dean, Conference Presentation, "Postnatural Urbanism in Jakarta: GeoSocial Intelligence and the Future of Urban Resilience," at the Unnatural Futures Conference, University of Tasmania

Dr Turpin, Dr Holderness, S. Sorli & S. Dean, Public Exhibition, "#Inundation 3: Jakarta," for the Unnatural Futures Group Exhibition, University of Tasmania

MELBOURNE, AUSTRALIA

Dr Holderness, Invited Lecture, "Creating web maps for mobile devices", Surveying and Spatial Sciences Institute, Emerging Technologies Forum

Dr Holderness, Dr Turpin, Dr Wickramsuriya & Professor K. Michael, Conference Presentation, "Using Crowdsourced GeoSocial Intelligence for Civic Infrastructure Planning," UAV Triple Zero Summit

BRISBANE, AUSTRALIA

Dr Holderness, Dr Turpin, and Professor K. Michael, Conference Presentation, "Infrastructure planning through GeoSocial Intelligence," at the 'Defining the Sensor Society' Conference, University of Queensland

YOGYAKARTA, INDONESIA

Dr Turpin, Invited Keynote Lecture, "Understanding Urban Resilience Through Social Media," at the Prototype:Y2014 Conference for Open Culture & Critical Making

HONG KONG

Dr Turpin, Dr Holderness, and Professor M. Cate Christ, Advanced Research Workshop, "Open Source Cities: Next Generation Community Mapping & Open Data Infrastructure," at the Asia Art Archive's Open Platform Art Basel

Dr Turpin, Invited Keynote Lecture, "Data and Discovery: New Geographies of Intelligence," at the Asia Art Archive

SHANGHAI, CHINA

Dr Turpin, Invited Panel Discussion, "Planetary Urbanization," at the Shanghai Study Center of the University of Hong Kong

BERLIN, GERMANY

Dr Turpin, Invited Keynote Dialogue, "Urban Stratigraphy and Activism Urbanism," with Simon Price of the International Commission on Stratigraphy, Haus der Kulturen der Welt

AMSTERDAM, THE NETHERLANDS

Dr Turpin, Conference Presentation, "Reimagining the Work of Collection," at the Collecting Geographies Conference, Stedelijk Museum

LONDON, UK

Dr Turpin, Invited Lecture, "Design for Civic Co-management," at the Sensing Practices-Citizen Sense Seminar Series, Department of Sociology, Goldsmiths, UCL

Dr Turpin, Invited Workshop, "Contested Territories: Design and Spatial Politics," at The Bartlett, UCL

Dr Turpin, Invited Lecture, "In Defense of Urban Poverty," at the Expanded Territories Research Seminar, Faculty of the Built Environment, University of Westminster

Dr Turpin and Dr Holderness, Invited Presentation, "PetaJakarta.org," at The Open Data Institute

Dr Turpin, Invited Seminar, "Architecture in the Anthropocene," Center for Research Architecture, Goldsmiths, UCL

EDINBURGH, UK

Dr Turpin, Invited Seminar, "Architecture in the Anthropocene," at the Faculty of the Built Environment, University of Edinburgh

PORTLAND, USA

Dr Holderness, Conference Presentation, "Map Jakarta: Enabling Civic Co-management Through GeoSocial Intelligence," at the Free & Open Source Software for Geospatial (FOSS4G) Annual Conference

SAN FRANCISCO, USA

Dr Holderness, Invited Workshop, "GeoSocial Intelligence for Design Research," at the College of Environmental Design, University of California Berkeley

Dr Holderness & Dr Turpin, Invited Lecture, "PetaJakarta.org: Ongoing Research from the Twitter #DataGrant," at Twitter Inc. Headquarters

Dr Turpin, Invited Faculty Position as Visiting Lecturer of Urban Data in Studio One—Data Made Me Do It, College of Environmental Design, University of California Berkeley

LOS ANGELES, USA

Dr Turpin, Invited Panel Discussion, "Between a Rock and Hard Plastic: Art in the Anthropocene," with Dr. H. Davis and Professsor S. Lotringer, Human Resources Arts Cooperative

BOULDER, USA

Dr Holderness, Invited Panel Discussion, "Changing the World with Social Media," at the Big Boulder Conference

Dr Holderness, Invited Lecture, "PetaJakarta.org," at the National Center for Atmospheric Research (NCAR)

WOLLONGONG, AUSTRALIA

Dr Turpin and Dr Holderness, Coordination of SMART Infrastructure Facility & BPBD Joint Pilot Study Preparedness Workshop, SMART Infrastructure Facility

Dr Turpin appointed as Associate Research Fellow, Australian Center for Cultural Environmental Research, University of Wollongong

Dr Turpin, Invited Seminar, "Data, Design, and Urban Poverty," at the Institute for Social Transformation Research, University of Wollongong

Dr Turpin, Book Launch and lecture with Professor AbdouMaliq Simone, "Just the City," SMART Infrastructure Facility

SYDNEY, AUSTRALIA

Dr Holderness, Dr Wickramasuriya, and Dr Turpin, Invited Presentation, "PetaJakarta.org," Twitter Australia

Dr Holderness & Dr Turpin, Coordination of Advanced Research Workshop, "Smart Data Collection: Developing a GeoSocial Intelligence Framework for Studying Resilience in Complex Urban Systems," with CSIRO, Twitter, and Ushahidi, at the Sydney Business School of the University of Wollongong

Dr Holderness, Conference Presentation, "Geospatial Social Media," at The Humanities and Technology Camp, State Library of New South Wales

BOGOR, INDONESIA

Dr Turpin & Dr Holderness, Conference Presentation, "Understanding Urban Resilience to Enable Climate Adaptation," at the 'Ecosystem-based disaster risk reduction and climate change adaptation' Conference, United Nations University

JAKARTA, INDONESIA

Dr Turpin & Dr Holderness, Invited Keynote Lecture, "Meeting the Global Challenge of Coastal Cities Through Civic Engagement," at the Department of Urban Studies, Universitas Indonesia

S. Sorli, S. Dean, Dr Turpin & Dr Holderness, Coordination of Advanced Architecture Research Studio, "Inundation 3," with the Graduate architecture program of the Department of Architectural Science, Ryerson University

A. Shepherd, S. Asun, Dr Turpin & Dr Holderness, Coordination of Student Workshop, "Ciliwung Perspectives: Biodiversity, Sustainability & Resilience," for the Department of Urban Studies, Universitas Indonesia, with the Ciliwung Institute & Ciliwung Merdeka

LISBON, PORTUGAL

Dr Turpin, Invited Lecture, "Architecture in the Anthropocene," at The Barbershop Artspace

VIENNA, AUSTRIA

Dr Turpin & Dr Holderness, Conference Presentation, "A GeoSocial Intelligence Framework for Studying & Promoting Resilience to Seasonal Flooding in Jakarta, Indonesia," at the International Institute for Applied Systems Analysis, International Symposium for Next Generation Infrastructure 2014

LANCASTER, UK

Dr Turpin, Invited Lecture, "Hacking Urban Data for Climate Co-adaptation," at the Lancaster Center for the Environment, Lancaster University

MONTREAL, CANADA

Dr Turpin & Dr Holderness, Conference Presentation, "Open Source City Project: PetaJakarta.org Pilot Study," at the Innovation and its Contestants—5th Annual Emerging Scholars Conference, Department of Art History and Communication Studies, McGill University

BOSTON, USA

Dr Turpin, Dr Holderness & S. Dean, Invited Workshop, "Big Data for Design Thinking," at the Harvard University Graduate School of Design

Dr Turpin & Dr Holderness, "Hacking Social Media to Survive Climate Change," at the MIT Urban Risk Lab

Dr Turpin, Dr Holderness & S. Dean, Invited Workshop, "Prototypes for Designed Engagement," at the College of Art and Design, Northeastern University

Dr Turpin, Invited Lecture, "The Intelligence of Excess," at the Harvard University Graduate School of Design

PHILADELPHIA, USA

Dr Turpin and Dr Holderness, Conference Presentation, "Navigating Postnatural Urbanism: Jakarta as the City of the Anthropocene," at the Association of Asian Studies Annual Conference

TORONTO, CANADA

S. Sorli, S. Dean, Dr Turpin & Dr Holderness, Public Exhibition, "#Inundation 3: Jakarta," at The Paul H. Cocker Gallery, Department of Architectural Science, Ryerson University

TAMPA, USA

Dr Turpin and Dr Holderness, "From Noise to Knowledge: Crowd-sourcing GeoSocial Intelligence in Jakarta's Urban Villages," at the American Association of Geographers Annual Meeting

Workshops & Teaching

March 2014   A. Shepherd, S. Asun, Dr Turpin & Dr Holderness, Coordination of Student Workshop, "Ciliwung Perspectives: Biodiversity, Sustainability & Resilience," for the Department of Urban Studies, Universitas Indonesia, with the Ciliwung Institute & Ciliwung Merdeka, Jakarta, Indonesia

May 2014   Dr Holderness & Dr Turpin, Coordination of Advanced Research Workshop, "Smart Data Collection: Developing a GeoSocial Intelligence Framework for Studying Resilience in Complex Urban Systems," with CSIRO, Twitter, and Ushahidi, at the Sydney Business School of the University of Wollongong, Australia

                    Dr Turpin, Dr Holderness, and Professor M. Cate Christ, Advanced Research Workshop, "Open Source Cities: Next Generation Community Mapping & Open Data Infrastructure," at the Asia Art Archive's Open Platform Art Basel, Hong Kong

June 2014   S. Sorli, S. Dean, Dr Turpin & Dr Holderness, Coordination of Advanced Architecture Research Studio, "Inundation 3," with the Graduate architecture program of the Department of Architectural Science, Ryerson University, Jakarta, Indonesia

Oct 2014   Dr Turpin and Dr Holderness, Coordination of SMART Infrastructure Facility & BPBD Joint Pilot Study Preparedness Workshop, SMART Infrastructure Facility, University of Wollongong, Australia

Nov 2014   Dr Turpin and Dr Holderness, Coordination of University of Wollongong Student Flood Team A with Jakarta Emergency Management Agency and PetaJakarta Field Office, Jakarta, Indonesia

Fig. 07. (from page 13) Cover of *IEEE Technology & Society Magazine* (Fall 2014), with PetaJakarta cover image and caption: PetaJakarta surveyors check the updated results of their GeoSocial Rapid Assessment Survey Platform (#GRASP)—a crowd-sourcing damage assessment tool built on the social media network Twitter and the OSS CogniCity—as children look on in the flood prone area of Bukit Duri, Jakarta, Indonesia (March 2014); photo courtesy of Etienne Turpin.

Conference Presentations

Oct 2013
Dr Turpin and Dr Holderness, Respective Conference Presentations at ISNGI Australia; begin discussion about collaboration on Applied GeoSocial Intelligence Engineering, Wollongong, Australia

Dr Holderness, Conference Presentation, "Geospatial Social Media," at The Humanities and Technology Camp at the State Library of New South Wales, Sydney, Australia

March 2014
Dr Turpin, Conference Presentation, "Reimagining Collection," at the Collecting Geographies Conference, Stedelijk Museum, Amsterdam, The Netherlands

Dr Turpin & Dr Holderness, Conference Presentation, "Navigating Postnatural Urbanism: Jakarta as the City of the Anthropocene," at the Association of Asian Studies Annual Conference, Philadelphia, USA

April 2014
Dr Turpin & Dr Holderness, Conference Presentation, "From Noise to Knowledge: Crowdsourcing GeoSocial Intelligence in Jakarta's Urban Villages," at the American Association of Geographers Meeting, Tampa, USA

May 2014
Dr Holderness, Dr Turpin, and Professor K. Michael, Conference Presentation, "Infrastructure planning through GeoSocial Intelligence," at the 'Defining the Sensor Society' Conference, The University of Queensland, Brisbane, Australia

June 2014
Dr Turpin & Dr Holderness, Conference Presentation, "Understanding Urban Resilience to Enable Climate Adaptation," at the 'Ecosystem-based disaster risk reduction and climate change adaptation' Conference, United Nations University

July 2014
Dr Turpin, Dr Holderness, Dr Wickramasuriya & S. Dean, Conference Presentation, "Postnatural Urbanism in Jakarta: GeoSocial Intelligence and the Future of Urban Resilience," at the Unnatural Futures Conference, University of Tasmania, Hobart, Australia

Sept 2014   Dr Holderness and Dr Turpin, Dr Berryman, Dr Wickramasuriya present "Map Jakarta: Enabling Civic Co-management through GeoSocial Intelligence," at Free and Open Source Software For Geospatial Conference, Portland, USA

Dr Turpin & Dr Holderness, Conference Presentation, "A GeoSocial Intelligence Framework for Studying & Promoting Resilience to Seasonal Flooding in Jakarta, Indonesia," at the International Institute for Applied Systems Analysis, International Symposium for Next Generation Infrastructure 2014, Vienna, Austria
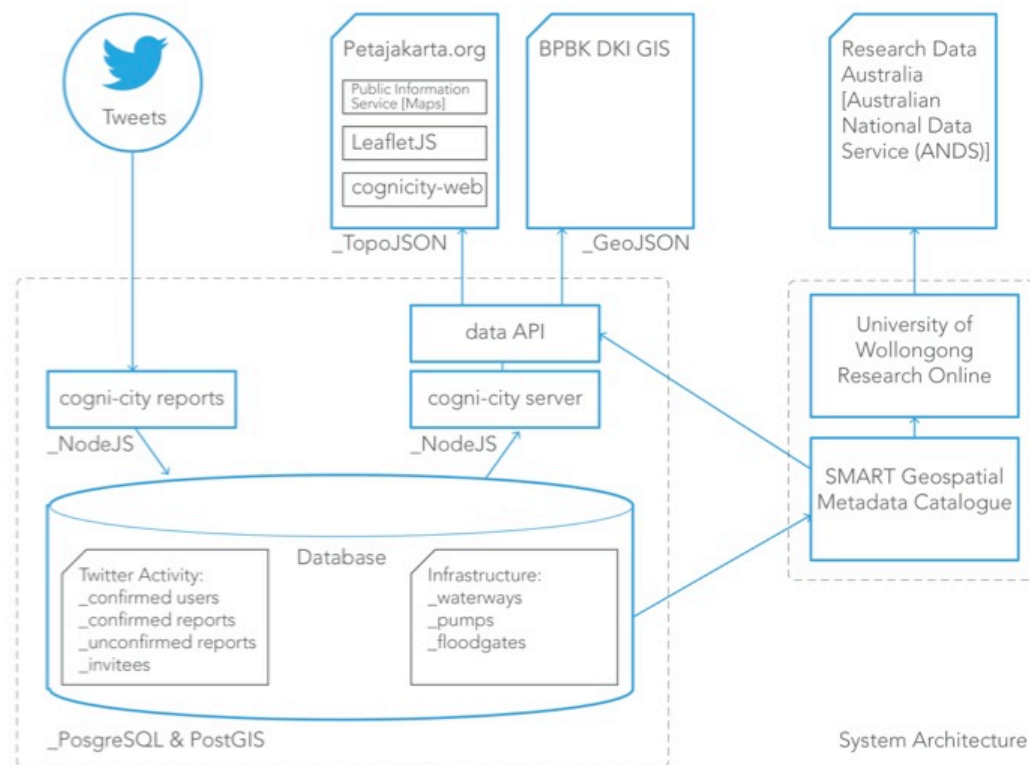
Fig. 07. System Diagram for PetaJakarta.org.

Publications

Sept 2013   T. Holderness et al., "An Evaluation of Spatial Network Modelling to Aid Sanitation Planning in Informal Settlements Using Crowd-sourced Data," Proceedings of the International Symposium for Next Generation Infrastructure, Sydney: 185–192.

Nov 2013   E. Turpin, A. Bobbette, and M. Miller, editors. *Jakarta: Architecture + Adaptation* [Bilingual English & Bahasa Indonesian edition] (Depok: Universitas Indonesia Press, 2013).

T. Holderness, "GeoSocial Intelligence," *IEEE Technology & Society Magazine* 33: 17–18.

Dec 2013   E. Turpin, editor. *Architecture in the Anthropocene: Encounter Among Design, Deep Time, Science & Philosophy* (Ann Arbor: Open Humanities Press, 2013).

March 2014   E. Turpin, "What Do Cities Tell Us About Their Inhabitants' Desires?", an interview with Italian Architecture Journal *Tourette | Encounters,* Issue 01 (Spring 2014).

April 2014   E. Turpin, T. Holderness & G. Quaggiotto. "Combining 'Big' and 'Small' Data to Build Urban Resilience in Jakarta," an interview for United Nations Global Pulse Blog, April 2014, http://unglobalpulse.org/urban-resilience-petajakarta.

Nov 2014   E. Turpin, T. Holderness & S. Dean, "Designing Platforms for Civic Co-management," in *Participatory Urbanisms*, UC Berkeley Global Urban Humanities Initiative (accepted)

E. Turpin & T. Holderness, "Jakarta as an Urban Twittering Machine," in *Social Media & Identity in Southeast Asia*, edited by Catherine Gomes (accepted)

H. Davis & E. Turpin, editors. *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments & Epistemologies* (Ann Arbor: Open Humanities Press, printing November 2014).

UNIVERSITY OF WOLLONGONG
Judy Raper,
Deputy Vice-Chancellor for Research

FACULTY OF ENGINEERING AND INFORMATION SCIENCE
Chris Cook,
Executive Dean

SMART LEADERSHIP
Pascal Perez,
Research Director
Tania Brown,
Chief Operating Officer

UOW COMMERCIAL & INNOVATION UNIT
George Tomka,
Commercialisation Manager
Stuart Parker,
Commercial Research Manager

UOW GLOBAL CHALLENGES
Chris Gibson,
Director
Clive Schofield,
Challenge Lead, Coastal and Marine Zones
Tamantha Stutchbury,
Research Strategy Leader
India Lloyd,
Communications

SMART SECRETARIAT
Michael Grainger,
Research Operations Manager
Tim Davies,
E-Research Coordinator
Victoria Black,
Communications Officer

UOW MEDIA
Jacqueline Wales,
Media and PR Officer

EIS INTERNATIONAL OFFICE
Anji Hall,
International Manager
Julia Najjar,
International Administration Assistant

PROJECT INVESTIGATORS
Rohan Wickramasuriya, Investigator
Matthew Berryman, Investigator
Olivia Dun,
Social Media & Governance
Investigator (UOWGC)

COGNICITY DEVELOPERS
Selera Labs
Lucas Freeman
Robert Ogie
Rhys Powell

SENIOR RESEARCH ASSISTANTS
Nathan Brown

PETAJAKARTA ADVISORY PANEL
Rodney Clarke,
Associate Professor
Lesley Head,
Professor
Katina Michael,
Associate Professor

AUSTRALIAN NATIONAL DATA SERVICE (ANDS)
Keith Russell,
Partnerships Program Manager
Alan Glixman,
Client Liaison Officer

CO-PRINCIPAL INVESTIGATORS
Etienne Turpin, PetaJakarta
Tomas Holderness, PetaJakarta

STUDENT RESEARCHERS
Asslam Ali, Ph.D. Thesis
Andrew Lim, Ph.D. Thesis
Albert Yang, M.Sc. Thesis
William Ashford, B.Eng. Thesis

VISITING RESEARCHERS
Frank Sedlar,
Faculty of Engineering,
University of Michigan

FIELD TEAM
Yantri Dewi,
Office Director &
Research Coordinator
Muhammad Kamil,
Research Assistant
Robin Hartanto,
Research Assistant
Widya Ramadhani,
Research Assistant

DESIGN TEAM
Sara Dean,
Investigator & Design Director
Mary O'Malley,
Designer
Vjosana Shkurti,
Designer

PETAJAKARTA TEAM

COLLABORATORS

UNIVERSITAS INDONESIA
Pak Komara,
Director,
Urban Studies Program
Ms. Herlily,
Assistant Professor,
Dept. of Architecture,
Faculty of Engineering
Farid Rakun,
Assistant Professor,
Dept. of Architecture,
Faculty of Engineering

UN PULSE LAB JAKARTA
Jonggun Lee,
Data Scientist

BPBD DKI PUSDALOPS
Endang Achadiat Entam,
Head of Division
Informatics & Controlling
Iwan Panghitan Samosir,
Head of Division
Emergency & Logistics
Basuki Rakhmat Syatibi,
Head of Controlling Section
Mohammad Rahmat Kurniawan,
Staff Informatics &
Controlling Division
Kartina Dwi Putri Setyani,
Staff Pusdalops
Priyanka Prajna Paramitha,
Staff Pusdalops
Purnomo Adhi Wibowo,
Staff Pusdalops

AIFDR
Mahardika Fadmastuti,
GIS Officer,
Risk and Vulnerability Team

TWITTER
Jim Moffitt,
Developer Advocate
Elaine Ellis Reddy,
Communications
Mark Gillis,
#DataGrant & Academic
Collaborations
Jeff Sarnat,
#DataGrant Engineer
James Kondo,
VP Product Development
Chris Moody,
VP Data Strategy
Dickson Seow,
Head of Communications
for Asia Pacific
Danny Keens,
Director of Media for Australia
Rishi Jaitly,
Director of Media Partnerships
for South and Southeast Asia

Software Development Timeline

Feb 2014   CogniCity Prototype Field Tests v0.1
                           > Recorded 150,000 "flood" Tweets/24h

Apr 2014   PetaJakarta.org (CogniCity-Web) deployed
                  Twitter Data Grant Awarded

May 2014   Pilot study launched with BPBD
                  Web developer appointed

Jun 2014   Technical progress meeting with BPBD, AIFDR, World Bank
                  CogniCity architecture + data API design

Jul 2014   ANDS Major Open Data Collection Fund Award

Aug 2014   PetaJakarta & Open Data API v0.1 released
                           > 174 revisions
                           > 27,087 lines of code

Sep 2014   PetaJakarta & CogniCity deployed on Amazon Cloud

Oct 2014   Access to Twitter/GNIP PowerTrack Awarded
                  @PetaJkt Twitter Account whitelisted for two-way user experience
                  Australian launch of PetaJakarta.org

Nov 2014   BPBD DKI Jakarta Workshop & Technical Integration
                  Indonesian launch of PetaJakata.org
                  Monsoon deployment of PetaJakarta.org & CogniCity.info

May 2015   Pilot study White Paper Publication & Evaluation with BPBD DKI
                  Jakarta

Public Exhibitions of Research

July 2014   Inundation 3: PetaJakara.org
                   Unnatural Futures Group Exhibition
                   University of Tasmania
                   Hobart, Australia

Nov 2014   Inundation: Jakarta [Fig. 08]
                   The Paul H. Cocker Gallery, Department of Architectural Science,
                   Ryerson University
                   Toronto, Canada
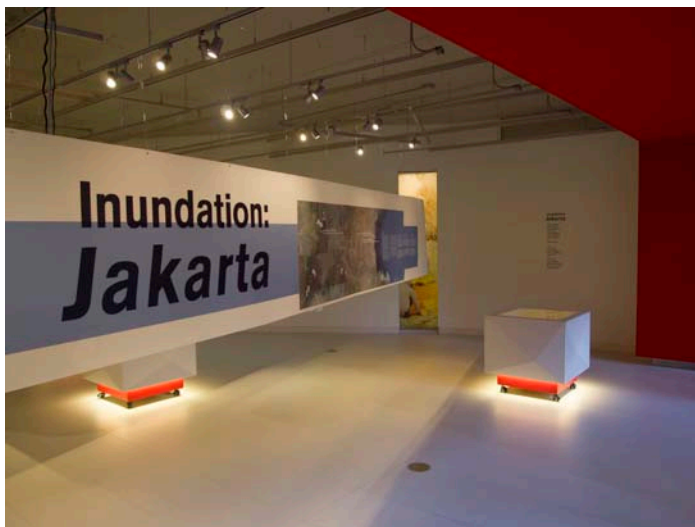
Fig. 08. Details from the The Paul H. Cocker Gallery, Ryerson University, November 2014.

Visiting Researchers & Research Collaborations

Nov 2013   David Alderson, Research Associate, School of Civil Engineering and Geosciences, Newcastle University, Newcastle, UK

March 2014   Ruth Kennedy-Walker, Postgraduate Research Fellow, School of Civil Engineering and Geosciences, Newcastle University, Newcastle, UK & World Bank Sanitation Team, Jakarta, Indonesia

May-Sept 2014   Frank Sedlar, Graduate Student, Faculty of Engineering, University
& Jan 2015   of Michigan, Ann Arbor, USA

October 2014   Jakarta Disaster Management Agency (BPBD DKI Jakarta), Joint Pilot Study Preparedness Workshop, University of Wollongong **[Fig.09]**

Fig. 09. Welcome lunch with EIS Executive Dean Chris Cook and BPBD DKI Jakarta workshop guests.

UOW Student Supervision

Asslam Umar Ali, "Big Data Analytics in Citizen Science," Ph.D. Thesis.
	Supervisors: Associate Prof. K. Michael, Dr Holderness, Dr Turpin

Andrew Lim, "Governance Framework Development for Big Data," Ph.D. Thesis.
	Supervisors: Associate Prof. K. Michael, Dr Holderness, Dr Turpin

Albert Yang, "Urban Flood Modelling Using GeoSocial Intelligence," MSc. Thesis.
	Supervisors: Associate Prof. K. Michael, Dr Holderness, Dr Turpin

William Ashford, "Assessment of Flood Mitigation Infrastructure Network," B.Eng. Thesis.
	Supervisors: Dr Holderness & Dr Turpin

Fig. 10. By working with local communities who are highly exposed to flood risks along the Ciliwung River, PetaJakarta compliments "big data" analysis with innovative "small data" collection techniques.

Principal Investigator Biographies

Dr Tomas Holderness

email   Tomas@uow.edu.au
twitter @iHolderness

Dr Holderness is a Geomatics Research Fellow at the SMART Infrastructure Facility, University of Wollongong. His research focuses on the use of geospatial analysis, Earth observation, and network modeling techniques applied to urban infrastructure resilience and Earth systems engineering. In collaboration with colleagues from Newcastle University (UK), Dr. Holderness developed a pioneering spatio-topological database schema for encoding, modeling and analysis of spatial infrastructure networks, and their inter-dependencies. He has successfully applied this framework to model sanitation networks in rapidly-urbanizing developing regions of Africa using crowd-sourced data and volunteer geographic information. This research provided a novel insight into the infrastructure challenges faced by developing nations, and allows the calculation of long term operating costs of different improved sanitation network options. Before joining the SMART Infrastructure Facility, as a spatial modeler for the Geospatial Engineering Research Group at Newcastle, Dr. Holderness was responsible for the development of an open-source integrated modeling environment for urban systems research. Dr. Holderness developed a prototype framework that allowed the integration of models to create processing flow-lines and statistical ensembles for land-use change modelling in response to different climate scenarios. Prior to this research Dr. Holderness' PhD thesis analysed long time series thermal Earth observation data to quantify intra-urban spatio-temporal temperature dynamics in Greater London.

Dr Etienne Turpin

email   eturpin@uow.edu.au
twitter @turpin_etienne

Dr Turpin is leader of the GeoSocial Intelligence Research Group and Vice-Chancellor's Postdoctoral Research Fellow at the SMART Infrastructure Facility, Faculty of Engineering & Information Sciences, and Associate Research Fellow at the Australian Center for Cultural Environmental Research, Faculty of Social Sciences, University of Wollongong, Australia. Etienne is also the founder and director of anexact office, a design research practice committed to multidisciplinary urban activism, artistic and curatorial experimentation, and applied philosophical inquiry, based in Jakarta, Indonesia. He is the editor of *Architecture in the Anthropocene: Encounters Among Design, Deep Time, Science, and Philosophy* (Ann Arbor: Open Humanities Press, 2013), and co-editor of *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies* (Ann Arbor: Open Humanities Press, forthcoming 2014). Before joining SMART, Dr. Turpin taught advanced design research and architecture at the Taubman College of Architecture and Urban Planning, University of Michigan, where he was also a Research Fellow in the Center for Southeast Asian Studies. From 2011-2013, Dr. Turpin coordinated the Architecture + Adaptation research platform in collaboration with colleagues from the University of Michigan (USA), the University of Hong Kong, Rangsit University (Thailand) and Universitas Indonesia (Indonesia). Through this platform, Dr. Turpin organized studio courses and workshops examining the potential for design to support community resilience in Southeast Asian megacities facing the threat of flooding as the result of extreme weather events, the intensification of seasonal precipitation, and catastrophic infrastructure failure. This research resulted in a series of public exhibitions (in the United States, Germany, Thailand, and Indonesia) regarding design, sustainability, and resilience, as well as the bilingual (English and Bahasa Indonesian) publication of *Jakarta: Architecture + Adaptation* (Depok: Universitas Indonesia Press, 2013). Etienne is a member of the Synapse International Curators' Network of the Haus der Kulturen der Welt in Berlin, Germany, where he is the co-editor of the *Intercalations* publications series.