

## **Future Earth/Global Carbon Project**

### **International Workshop on “Towards Green Smart Cities in the IoT Era”**

**Date:** Mar 19-21, 2018

**Venue:** The University of Tokyo (Ito International Research Center)

<http://www.u-tokyo.ac.jp/ext01/iirc/en/index.html>

**Co-hosts:** National Institute for Environmental Studies and University of Tokyo

**Co-organizers:**

Yoshiki Yamagata (Principal Researcher, National Institute for Environmental Studies)

Perry Yang (Associate Professor, Georgia Institute of Technology)

Akito Murayama (Associate Professor, The University of Tokyo)

Ayyoob Sharifi (Executive Director, GCP-Tsukuba International Office)

Erik Pihl (Science Officer, Future Earth Swedish Hub)

**Outline:**

Over the past several years the smart city concept has gained significant momentum in science and policy. At the same time, many actual smart city initiatives have been developed across the globe. Through technological innovation and integration of a wide range of advanced Information and Communication Technologies (ICTs), Big Data, Internet of Things (IoT) and Artificial Intelligence (AI) solutions, smart city initiatives are expected to improve the efficiency and effectiveness of urban operations and resource management. Smart city development with the use of IoT applications is also revolutionizing urban systems design as system of systems approach for fixing various urban issues and creating climate resilient cities.

The Global Carbon Project-Tsukuba International Office (<http://www.cger.nies.go.jp/gcp/>) (as a Future Earth project), has been coordinating “Urban and Regional Carbon Management (URCM)” for over 15 years. Building on the experience in collaboration with Future Earth (Decarbonization and Urban Knowledge Action Networks), we will hold a three-day workshop to discuss about how we can design and implement IoT-based Green Smart Cities.

The objective of the workshop is to bring together academic researchers, ICT companies and urban developers to discuss how IoT (+AI) technologies can trigger transformations towards smarter systems of cities (composed of smart homes, water, energy, mobility, and communication systems) that are low carbon, improve well-being of citizens, and ultimately contribute to achieving the United Nations Sustainable Development Goals (SDGs) and New Urban Agenda.

The workshop will feature a combination of oral presentations and panel discussions on a broad array of issues related to sustainable and smart cities in the IoT era. The expected outcomes of this workshop will include: establishment of an academy-industry working group on green smart cities project proposal to the Future Earth, co-designed and co-implementation strategies for funding research and development initiatives, and contribution to the book “Urban Systems Design for Smart

Communities in the IoT Era” which will be published by Elsevier (<http://scitechconnect.elsevier.com/elseviers-new-smart-cities-book-series-launched/>).

The topics that should be discussed include:

- Key Performance Indicators (KPIs), assessment frameworks and certification systems to evaluate the performance of smart city projects and verify claims of smartness and greenness using IoT technologies at the community scale.
- Practical examples of smart cities and utilization of KPIs for evaluating smart city performance. This will include discussions on the transfer and communication of success stories, and strategies to address gaps, and challenges.
- Business, organizational, and technological challenges and barriers for promoting smart cities and integrating IoT services.
- Standardization of city indicators and its viability (considering the variations in terms of growth in different cities and the acceptance by stakeholder of the standards).
- How can cities drive global decarbonization by setting examples, changing consumption patterns, and driving innovation? How does it work in combination with ICT/IoT as catalyst? How can Open Data and Open Source as concepts be useful?
- Paradigm shifts needed for integrating digital placemaking into urban planning and design, and leveraging smart city technologies, big data, and IoT for designing and retrofitting cities for improving human well-being in the communities.

### March 19<sup>th</sup> (Day 1) sessions

The first day workshop is devoted to discussing possible new city indicators for guiding urban systems design at the community-scale towards green smart cities. This is expected to be a highly interactive workshop. Following short presentations, participants will get involved in interactive dialogues to share their insights and experiences.

#### Outline:

<b>Morning session</b> Co-Chairs: Yoshiki Yamagata (NIES), Perry Yang (Georgia Tech)	
8:30-8:45	Opening remarks / Aims of the workshop / Introductions Fumiko Kasuga (FE-Hub), Akito Murayama (The University of Tokyo), Ayyoob Sharifi (GCP-TIO)
8:45-9:45	Urban Systems Design for and Green Smart Communities in the IoT Era Perry Yang, Yoshiki Yamagata and Hiroaki Nishi (Professor, Keio University)
9:45-10:45	IoT technologies and ICTs for Smart Cities <ul style="list-style-type: none"> <li>• Building a Smart Future with Data: The Open API Ecosystem Approach, Yasunori Mochizuki (Vice President, NEC Corporation) (30 minutes)</li> <li>• Ericsson city level engagement including solutions and activities, Pernilla Bergmark</li> <li>• Methods and standards for GHG assessments of ICT impacts at a city level, Pernilla Bergmark (Ericsson) (30 minutes)</li> </ul>
10:45-11:00	Coffee break
11:00-12:00	Discussion: How to get from today’s situation to the ideal state of Green Urban Systems Design by making use of IoT/ICTs businesses, planning/design and communities?
12:00-13:00	Lunch
<b>Afternoon session</b> Co- Chairs: Akito Murayama (University of Tokyo), Eliot Allen (Criterion Planners)	
13:00-14:00	Smart City in the Japanese Context: District-Scale Challenges

	<ul style="list-style-type: none"> <li>Prospects and Challenges for Planning Green Smart Cities and Communities, Akito Murayama (University of Tokyo) (30 minutes)</li> <li>Investments for Green Smart Cities and Communities, Kensuke Nishiyama (Development Bank of Japan) (30 minutes)</li> </ul>
14:00 -15:00	<p>Smart City Standards &amp; Certification Globally, Eliot Allen (Criterion Planners) (45 minutes)</p> <ul style="list-style-type: none"> <li>Key global organizations</li> <li>International standards</li> <li>Certification systems</li> <li>Trends &amp; prospects</li> </ul> <p>Experiences from smart city indicator development including introduction to the indicators from ITU, Pernilla Bergmark (Ericsson) (15 minutes)</p>
15:00-15:15	Coffee break
15:15-17:00	<p>Discussion:</p> <ul style="list-style-type: none"> <li>Global perspective: What is happening around the world? – Frameworks, standards, platforms, etc.</li> <li>Development and improvement of certification systems for promoting green smart cities</li> <li>Communication and knowledge gaps between different stakeholders (industry, academia, local authorities, citizens)</li> <li>Challenges in Japan: Co-design process involving various actors</li> </ul>

### March 20<sup>th</sup> (Day) 2018 EPB Symposium on Urban Systems Design

The papers in the morning sessions are selected from the following special volume applications:

*Environment and Planning B: Urban Analytics and City Science (Editor-in-Chief: Michael Batty)*

*Urban Systems Design: from “Science for Design” to “Design in Science” (Guest Editors: Perry Yang and Yoshiki Yamagata)*

[http://journals.sagepub.com/pb-assets/cmscontent/EPB/EPB\\_callforpapers\\_extension.pdf/](http://journals.sagepub.com/pb-assets/cmscontent/EPB/EPB_callforpapers_extension.pdf/)

In the afternoon session, some of the latest research activities are presented by host institutions.

**Outline** (each presenter will be allocated 20 minutes, including Q&A):

<b>Morning session</b> Chair: Yoshiki Yamagata (NIES)	
8:30-8:45	Introduction: Perry Yang and Yoshiki Yamagata
8:45-9:45	<p>Session 1: Urban Form and Performance</p> <p>1.1 Statistical distribution for building lot depth - Hiroyuki Usui, University of Tokyo</p> <p>1.2 Urban form and Limits of On Demand Mobility - Dimitrios Papanikolaou, University of North Carolina, Charlotte</p> <p>1.3 Urban form, energy and emissions: spatial simulation of climate change solutions - Jonathan Salter, University of British Columbia</p>
9:45-10:45	<p>Session 2: Energy System Driven Urban Design</p> <p>2.1 A Home System of Practice Analysis of Low Carbon Precinct Residents: the WGV case study - Jessica Breadsell, Curtin University</p> <p>2.2 Community Energy by Design: A Simulation-based Design Workflow using Measured Data Clustering to Calibrate Urban Building Energy Models (UBEMs)</p>

	- Tarek Rakha, Syracuse University 2.3 An Engineering-based Design Approach to Support Urban Design - Helen Chen, Disney Imagineering
10:45-11:00	Coffee break
11:00-12:00	Session 3: Interactive Urban Design 3.1 Benchmark: Open Sourcing the Measurement of Public Life - Michael Pearce, MIT 3.2 Transmitting Urban Information Use in Social Interactive Design: A Spatial Mediator in a Real-time City - Sookyung Chun, Harvard University 3.3 The Quality of Place on Streets: a human-centred measurement based on machine learning and street view images - Yu Ye, Tongji University
12:00-13:30	Lunch
<b>Afternoon session:</b> Perry Yang (Georgia Tech)	
13:30-14:30	Session 4a: GCP related studies on green smart cities - Urban forms: Yoshiki Yamagata (NIES) - Mobility: Peraphan Jittrapirom, (Radboud University) - Well-being: Leena Ilmora (IIASA)
14:30 -16:30	Session 4b: Tokyo Smart City Studio - Georgia Institute of Technology - University of Tokyo
16:30-17:00	Coffee break
17:00-17:40	Concluding Keynote Speech: Smart City from Science for Design to Design in Science, Michael Batty, University College London

### March 21 (Day 3) Project proposal and book editorial meetings

#### Morning 9:00-12:00

- Follow-up on the first and second day discussions.
- Brainstorming project proposals on a new certification system for Green Smart Cities
- Participants of the workshop are welcome to participate

#### Afternoon 13:30-16:30

- Editorial meeting for the Elsevier Smart City book series outline
- <http://scitechconnect.elsevier.com/elseviers-new-smart-cities-book-series-launched/>
- Urban Systems Design for Smart Communities in the IoT Era

## List of participants (Alphabetically ordered)

### Workshop and symposium participants

Name	Affiliation
Jelena Aleksejeva	The University of Tokyo
Eliot Allen	Criterion Planners, Portland
Michael Batty	University College London (Remote Presentation)
Pernilla Bergmark	Ericsson
Robert Binder	Georgia Institute of Technology
Jessica Breadsell	Curtin University
Helen Chen	Georgia Institute of Technology
Sookyung Chun	Harvard GSD
Christine Eon	Curtin University
Yuki Hashimoto	Future Earth Secretariat
Yujiro Hirano	National Institute for Environmental Studies
Hiroki Hiramatsu	Woonerf (consulting company working on Green Building)
Masao Inoue	New Town Center Development Co., Ltd.
Leena Ilmola	IIASA - International Institute for Applied Systems Analysis
Peraphan Jittrapirom	Radboud University, The Netherlands
Takumi Kawamura	NEC Corporation
Fumiko Kasuga	Global Hub Director – Japan, Future Earth Secretariat
Dararat Khamchiangta	Asian Institute of Technology
Zachary Lancaster	Georgia Institute of Technology
Kanae Matsui	Georgia Institute of Technology
Tomoko Matsui	The Institute of Statistical Mathematics, Japan
Anastasia Milovidova	KPMG
Yasunori Mochizuki	Vice President, NEC Corporation
Daisuke Murakami	The Institute of Statistical Mathematics
Akito Murayama	The University of Tokyo
Hiroaki Nishi	Keio University
Kensuke Nishiyama	Development Bank of Japan
Natsumi Okuhara	NEC Corporation
Dimitrios Papanikolaou	University of North Carolina, Charlotte
Michael Pearce	Massachusetts Institute of Technology
Tarek Rakha	Syracuse University
Marika Saito	Tsukuba University
Kentaro Sako	Development Bank of Japan
Jonathan Salter	University of British Columbia
Ayyoob Sharifi	National Institute for Environmental Studies
Masachika Suzuki	Sophia University/United Nations University
Asumi Tomomizu	NEC Corporation
Giancarlos Troncoso	The University of Tokyo
Hiroyuki Usui	The University of Tokyo
Yihan Wu	Ecourban Lab (Tongji University and Georgia Tech)
Yu Ye	Tongji University
Yoshiki Yamagata	National Institute for Environmental Studies
Perry Yang	Georgia Institute of Technology
Takahiro Yoshida	Tsukuba University
Aiku Yuki	National Institute for Environmental Studies

The Georgia Tech- The University of Tokyo-Tsukuba University Studio will be organized back to back with the workshop. Studio participants (over 20 graduate students) are not listed here. They are supposed to fully attend the first day of the workshop and partially the second day.