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Kevin Shanley & Ying-Yu Hung
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Erle Ellis
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Jo Guldi
Harvard Society of Fellows

Eduardo Rico & Enriqueta Llabres
ARUP - Relational Urbanism

Todd Shalait
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Rosalind Williams
Massachusetts Institute of Technology

landscape infrastructure

March 23-24, 2012
Harvard Graduate School of Design
Symposium

Urban life is sustained by infrastructure. Highways, harbors, airports, power lines, landfills and mines figure as dominant effigies of contemporary urbanization. The sheer size of these elements renders their understanding as a single system practically impossible, yet their operations depend precisely on their continuity to support the flow of capital and cultural mobility. Often found underground, or beyond the periphery of cities, the presence of urban infrastructure remains largely invisible until the precise moment at which it fails or breaks down. Floods, blackouts and shortages serve as a few reminders of the limited capacity and fragility of this large operating structure that unilaterally depends on constant control and micro-management for its sustenance.

As the invisible background of contemporary society, the smooth functioning of infrastructure has literally naturalized the processes of urbanization, whereas less than a century ago, a basic level of collective, essential services barely existed. Rarely do we stop to interrogate the functioning, let alone the effects—geospatially, metabolically, or semiotically—of this Taylorist, technological superstructure. Yet recent events—the sudden collapse of highway bridges, the rise and fall of water levels, the growing hazards of coastal storms and coastal eutrophication, the accumulating effects of carbon emissions, the surge in foreign oil prices and spike in food prices, the drop in credit markets, the increase in population mobility and dispersal—are instigating a critical review of the basic foundations upon which urban economies depend.

Emerging from current economic exigencies and environmental imperatives, this symposium engages these challenges by re-examining the precepts of infrastructure—the basic systems of essential services that support a city, a region, a nation, a continent—as well as the patterns of urbanization from which they originated. Responding to the overexertion of civil engineering and the inertia of urban planning vis-à-vis the pace and complexity of urbanization at the turn of the twenty-first century, the symposium challenges the technocratic role of engineers, transportation planners and policy makers who have profoundly shaped the urban environments that we move through and live in today. Drawing from the growing agency of contemporary urbanists—ecologists, geographers, historians, designers, conservationists and social groups—who are rethinking the pervasiveness of centralized infrastructures, guest speakers employ a telescopic outlook to bring forth alternative models, methods and measures across a range of scales, that seek to decouple Fordist economies of scale from paradigms of economic growth.

By revealing the multi-dimensional complexities, externalities and cross-dependencies within the infrastructures of waste and water, energy and mobility, food and fuel, guest speakers further examine how landscapes of technological hardware and biophysical software can be cultivated as both systems and strategies for contemporary urbanization that are flexible, contingent, and multidimensional. Through groundbreaking research and contemporary projects, the underlying objective of the symposium is to unearth and unlock the potential of emerging synergies and high-performance strategies that span the critical divide between ecology and economy to design patterns of urbanization for the twenty-first century.

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Graduate School of Design
Harvard University

program

Day 1
Friday, March 23, 2012 @ 8:30pm
Piper Auditorium, Gund Hall

Day 2
Saturday, March 24, 2012 @ 8:30am
Piper Auditorium, Gund Hall

keynote lecture

Infrastructure as Lived Experience
Rosalind Williams
Bern Dibner Professor of the History of Science and Technology, MIT

*Discussion: Hashim Sarkis & Rania Ghosn

As the opening presentation for the *Landscape Infrastructure* Symposium, Williams' lecture explores the socio-technological turn of civil engineering vis-à-vis the complexity of contemporary urban life at the dawn of the twenty-first century. Drawing from her extensive research on the ebbs and flows of the technological landscape, the lecture traces the rise of transatlantic urbanization in the nineteenth and twentieth centuries, to shed light on the confluence of engineered infrastructures and complex natural systems across various media, narratives and environments, both on land and off shore.

Panel 2 - 11:00am
representing infrastructure
From the Personal to the Planetary

Citizen Cartographies
Liz Barry, PLOTS

The Anthromes Project: Biosphere as Infrastructure for the Anthropocene
Erle C. Ellis, UMBC

The Infrastructure State
Jo Guldi, Harvard Society of Fellows

Building Infrastructure: Water, Science & Technology and the Rise of the US Army Corps of Engineers
Todd Shalait, BSU

The Nitrogen Question
Sabine Barles, Université Paris 1

*Moderators: Antoine Picon & Michael Jakob

Infrastructure connects as much as it divides. It is an instrument of power and control as much as it is a system of distribution and supply. Looking to military and political origins, this panel seeks to cast light on the repercussions of large scale, technological systems by revisiting historical episodes ranging from the formation of the United States Army Corps of Engineers in the early twentieth century and the rise of the British Infrastructure State in the nineteenth century, to the legacy of centralized underground infrastructure in late eighteenth century France. Emuents, floods, divisions, inequities, and injustices are a few of the less palatable flows marginalized by mechanization, supported by standardization, centralized by conveyance, or simply buried underground. Unearthing intertwined and conflicting ecologies, the panel questions the historically rooted notion of seamlessness that has lent the appearance of smoothness and permanence to contemporary urban infrastructure.

Panel 3 - 2:00pm
rebuilding infrastructure
Ecological Engineering, Soft Systems & Economic Synergies

Constructed Ecologies
Wendi Goldsmith, The Bioengineering Group

Urban Processes & Relational Modelling
Eduardo Rico, ARUP
Enriqueta Llabres, Relational Urbanism,

Plants as Megastructure
Peter Del Tredici, Arnold Arboretum - GSD

Degrees of Precision
Christophe Giroit, ETH

Building Soft
Kevin Shanley & Ying-Yu Hung, SWA - IRIS

The Metabolic Landscape
Dirk Sijmons, TU Delft - HNS

*Moderators: Nina-Marie Lister & Chris Reed

*Moderators: Neil Brenner & Anita Berrizbeitia

Fueled by the revolution in geographic information systems, a recent boom in using new media to visualize flows, dynamics, patterns and processes has rapidly expanded our understanding of the invisible substrates of urbanization. Previously unseen substrates—including contamination plumes, communication systems, resource urbanism, energy networks and oceanic ecologies—are becoming increasingly accessible. In tandem, an emerging generation of critical geographers and mappers are moving beyond paradigms of scientific specialization towards using cartography as an active cultural medium. Through citizen science, crowd sourcing, and open source software, new modes of collecting data are empowering individuals and triggering the formation of organizations that work in real time, with real data, producing highly accurate, visually engaging information. From the subterranean to the orbital, these emerging mapping practices are exposing the complexity of urban environments across scales. The enhanced reality offered by interactive mapping interfaces provides means for seeing invisible systems and understanding complex ecologies that support urbanization, while presenting base-maps upon which we can design for the next generation.

biographies

Kate Ascher is Milton Professor of Urban Development at Columbia University, GSAPP. She is the author of several books on public infrastructure, including *The Works: Anatomy of a City* (2005). With extensive experience in public and private sectors, she currently leads Happold Consulting's U.S. practice.

Sabine Barles is Professor at L'Institut de Géographie, Université Paris 1 Panthéon Sorbonne, a member of l'Institut Universitaire de France and Director of the interdisciplinary program "Ville & Environnement." As a civil engineer, she holds degrees in the History of Technology from Le Conservatoire National des Arts et Métiers, and in Urbanism from l'École Nationale des Ponts et Chaussées.

Liz Barry is Director of Urban Erythrology: A Historical Consortium for Open Technology & Science (PLOTS) and Grassroots Mapping. She has taught at Columbia University, Pratt Institute, and The New School, and worked at SOM. Both an Urban Designer and Landscape Architect, she holds a masters in Architecture and Urban Design from Columbia University, GSAPP.

Peter Del Tredici is Adjunct Associate Professor of Landscape Architecture at Harvard University, GSD. He is also a Senior Research Scientist at the Arnold Arboretum and author of *Wild Urban Plants of the Northeast: A Field Guide* (2010). He holds a doctorate in Plant Ecology from Boston University.

Erle Ellis is Associate Professor of Geography and Environmental Systems at the University of Maryland in Baltimore. As Head of the Laboratory for Anthropogenic Landscape Ecology, he is a leading theorist of Anthropocene, the Age of Humans. Holding a doctorate from Cornell University, his research investigates the ecology of anthropogenic landscapes and their changes across scales.

Christophe Giroit is Chair of Landscape Architecture at the ETH Department of Architecture, where he directs the Institute of Landscape Architecture and the Landscape Visualization & Modeling Lab. His practice

focuses on large-scale projects involving dynamic topographic landscape modeling. He is part of the ETH Future Cities Laboratory in Singapore, currently investigating the Cal-Citwung in Jakarta.

Wendi Goldsmith is CEO and Founder of The Bioengineering Group. Her background spans geology, plant and soil science, ecological planning, water quality management and river restoration design. She has extensive experience in all phases of project design and implementation for lakes, rivers and tidal areas.

Jo Guldi is a historian of modern Britain and Junior Fellow at the Harvard Society of Fellows. She recently published *Roads to Power: Britain Invents the Infrastructure State* (2011) and has taught at the University of California-Berkeley and the University of Chicago. She is an avid videographer, hosting the popular Landscape Studies podcast and Inscape blog.

Ying-Yu Hung is Managing Principal at SWA Group. As a licensed Landscape Architect, she has collaborated with Morphosis, SOM, RTKL and NBBJ. Past work includes award-winning projects at Stanford University, pedestrian open space in Shanghai, a former Bethlehem Steel site in Pennsylvania and waterfront competitions in China and Taiwan.

Enriqueta Llabres is Director at Relational Urbanism. She combines this research with the work of her own architectural practice, DMA Collective. She holds a Masters of Architecture and Urbanism from the Universitat Politècnica de Catalunya, and is now completing doctoral studies at the London School of Economics.

Eduardo Rico is a civil engineer at ARUP, as well as participant in Grounda and Director of Academics at Relational Urbanism. He combines his work on infrastructure strategies with teaching in Landscape Urbanism at the AA, London. He has taught at the Berlage Institute in the Netherlands.

Todd Shalait is Director and Professor at the Center for Idaho History and Politics, Boise State University. He is the author of several books including *Structures in the Stream: Water, Science, and the Rise of the*

U.S. Army Corps of Engineers (1994) and co-edits *Idaho Landscapes: History, Science, and Art* (2009).

Kevin Shanley is CEO of the SWA Group based in Houston, Texas, he has worked in locations from North America to the Middle East and Asia. A member of the American Society of Landscape Architects and the Urban Land Trust, he is also Chairman of the Board of the Bayou Preservation Association.

Dirk Sijmons is Professor of Landscape Architecture in the Department of Urbanism at TU Delft. He is also Director of H+N+S Landschapsarchitecten and was the first State Landscape Architect of the Netherlands between 2004 and 2008. He is author of *Landscape* (2002) and *Greetings from Europe* (2008).

Rosalind Williams is Bern Dibner Professor of the History of Science and Technology at MIT and author of *Revolutions: A History of the Technical Change* (2002), *Notes on the Underground* (1990, 2008) and *Dream Works* (1992). She holds a doctorate in history from the University of Massachusetts and an honorary doctorate from the Technical University of Eindhoven, Netherlands.

Dawn Wright is Chief Scientist at Environmental Systems Research Institute (ESRI). She is Professor of Geography and Oceanography at Oregon State University, Fellow of the American Association for the Advancement of Science, and Stanford's Aldo Leopold Leadership Program. Wright received her doctorate in Physical Geography and Urban Design from the University of California, Santa Barbara.

Nina-Marie Lister is Associate Professor of Urban and Regional Planning at Ryerson University in Toronto and Visiting Associate Professor of Landscape Architecture at Harvard University, GSD. She is a Registered Professional Planner, founder of pLandscape, and co-editor of *The Ecological Approach: Complexity, Uncertainty, and Managing for Sustainability* (2008).

Gerdo P. Aquino is President of the SWA Group. He has extensive experience in planning multi-scaled ecological corridors, as well as repurposing streets and plazas in urbanized areas of North America, China and Latin America. He is

Neil Brenner is Professor of Urban Theory at Harvard University, GSD and co-director of the Urban Theory Lab, GSD. He previously taught sociology and metropolitan studies, and was an affiliated faculty member of the American Studies Program, NYU. He holds a doctorate in political science from the University of Chicago.

Rania Ghosn is an architect, geographer, and Assistant Professor of Architecture at the University of Michigan. As one of the founders of the journal *New Geographies* (2009-), she edited its third issue, *Landscapes of Energy* (2009). She holds a Doctorate in Design from Harvard University, GSD and Masters in Geography from University College London.

Kevin Holden is the U.S. Army Corps of Engineers' National Lead and Technical Proponent for Landscape Architecture. With over twenty years of experience in various districts and watersheds, his work is founded on performance planning, ecological techniques and multidisciplinary mission management associated with watershed planning and disaster recovery.

Michael Jakob is Visiting Professor of Landscape Architecture at Harvard University, GSD, Professor in the History and Theory of Landscape at Hepia, Geneva, Professor of Comparative Literature at Granichou Institute of Landscape Architecture at BIARCH, Barcelona. His research focuses on landscape theory, aesthetics, the history of vertigo, contemporary theories of perception and the politics of architecture.

Pierre Bélangier is Associate Professor of Urban and Regional Planning at Ryerson University in Toronto and Visiting Associate Professor of Landscape Architecture at Harvard University, GSD. He is a Registered Professional Planner, founder of pLandscape, and co-editor of *The Ecological Approach: Complexity, Uncertainty, and Managing for Sustainability* (2008).

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Adjunct Associate Professor of Landscape Architecture at the University of Southern California. **Antoine Picon** is G. Warré Travel-stead Professor for the History of Architecture and Technology and co-director of doctoral programs at the GSD. His research addresses the history of architectural and urban technologies from the eighteenth century to the present.

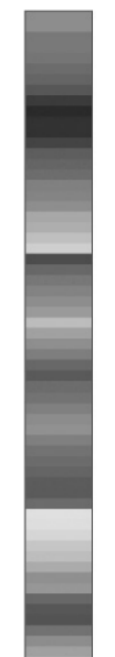
Chris Reed is Adjunct Associate Professor of Landscape Architecture at the GSD, and Principal and Founder of STOSS Landscape Urbanism. A strategic design and planning practice, STOSS has earned international distinction for its hybrid approach to public works projects, rooted in infrastructure, functionality and ecology.

Hashim Sarkis is Aqe Khan Professor of Landscape Architecture and Urbanism in Muslim Societies. He teaches courses in the history and theory of architecture and is a practicing architect based in Cambridge and Lebanon. His projects include a housing complex for the fishermen of Tyre, a park in downtown Beirut and two schools in Northern Lebanon.

Dan P. Schrag is Sturgis Hooper Professor of Geology at Harvard University, Professor of Environmental Science and Engineering, and Director of the Harvard University Center for the Environment. Schrag currently serves on President Obama's Council of Advisors on Science and Technology and is a MacArthur Fellow.

Charles Waldheim is John E. Irving Professor of Landscape Architecture and Chair of Landscape Architecture at Harvard University, GSD. Previously, he was Associate Dean at the University of Toronto. He edited *The Landscape Urbanism Reader* (2006) and received the Rome Prize Fellowship in Landscape Architecture at the American Academy in Rome.

Pierre Bélangier, symposium organizer and director, is Associate Professor of Landscape Architecture and Coordinator of the Urbanism, Landscape, Ecology concentration of the Masters in Design program at Harvard University, GSD. He is editor of *The Landscape Infrastructures DVD* (2008) and received the Professional Grand Rome in Architecture from The Canada Council for the Arts.



This chart visualizes the lifespans of equipment associated with waste, water, energy and transportation systems across North America. As we approach—and pass—the breakdown point for many post-WWII urban infrastructures, important questions emerge. What and how should we rebuild? How do we build in the face of dynamic climates and coastal hazards? Should we design for permanence or for failure? Should we build stronger or weaker structures? Can natural systems be coupled with technological facilities? Cross-disciplinary action by ecologists, urbanists, historians, geographers and engineers is necessary as we construct the next generation of public works projects for an era of unprecedented change and uncertain risk. Data is compiled from the following organizations: American Association of State Highway and Transportation Officials, American Institute of Physics, American Iron and Steel Institute, American Society of Civil Engineers, American Society of Civil Engineers' Report Card for America's Infrastructure, American Water Works Association, Asphalt Institute, Association of American Railroads, Asphal Institute, Canadian Council of Ministers of the Environment, Center for an Urban Future, Clean Air Council, Earth Engineering Center of Columbia University, Federal Aviation Administration, Federal Emergency Management Agency, Federal Highway Administration, Federal Transit Administration, Gotham Gazette, I-Corp International Inc., New Jersey Transit, New York City Department of Transportation, The New York Times, Ohio Department of Natural Resources, Passenger Rail Working Group, Railway Tie Association, Rand Infrastructure, Safety and Environment Center, Transportation for America, United States Department of Energy, United States Department of Transportation, United States Environmental Protection Agency, United States Nuclear Regulatory Commission.

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