ANTHROPOCENE CURRICULUM
CAMPUS: THE TECHNOSPHERE ISSUE
April 14–22, 2016
Haus der Kulturen der Welt, Berlin

Project Background and Genealogy

Seminars – Anthropocene Campus | The Technosphere Issue

ANTHROPOCENE CURRICULUM
Haus der Kulturen der Welt, Berlin
Max Planck Institute for the History of Science, Berlin

PROJECT BACKGROUND AND GENEALOGY

Over the course of 2013–14, Haus der Kulturen der Welt (HKW) in cooperation with the Max Planck Society, Deutsches Museum, the Rachel Carson Center for Environment and Society, and the Institute for Advanced Sustainability Studies facilitated The Anthropocene Project, producing situations for engagement and supporting new forms of research and practice. Several exhibitions, public events, and workshops, as well as a comprehensive publication (Textures of the Anthropocene: Grain, Vapor, Ray; MIT Press, 2014), all contributed to unraveling the Anthropocene across disciplines and within public awareness. In January 2013 the project had been formally launched with a four-day discursive gathering at HKW. The diversity of positions, perspectives, materials, and formats present at The Anthropocene Project. An Opening charted a broad territory for future discussion and debate, as well as it established connections for further collaboration and content-development. The opening set up routes of exchange between formal disciplines, while leaving open the potential for cross-pollination of critical thinking between the arts, science, humanities, politics, and the public.

In 2012, two preliminary workshops, organized by HKW in close partnership with the Max Planck Institute for the History of Science (MPIWG), offered early- and mid-career researchers from a broad range of disciplines the opportunity to present their particular research perspectives on Anthropocene topics. At the opening, two further workshops convened to present and discuss ongoing aspects of research. First, the Anthropocene Research Forum widened the scope from individual research to institution-based projects. Presentations of five different academic initiatives from across Europe provided insights into an already established landscape of active Anthropocene research and emphasized the multifaceted scientific as well as political potential of the topic.
The second workshop, titled Anthropocenic Research Roundtable, brought together 20 individuals, each of whom a leading figure in their respective fields, collecting individual visions for the exploration of alternative forms of knowledge-production and collaboration. In its unique constellation the roundtable fuelled lively discussion on the future design of a scientific community that lives up to the challenge of the Anthropocene. Many concerns expressed at this roundtable revolved around the future role of education. Out of these, HKW and MPIWG took the initiative and developed the framework of the long-term Anthropocene Curriculum project which has been realized for the first time in November 2014 as a 9-day Anthropocene Campus and will now embarking into a sequel: Anthropocene Campus: The Technosphere Issue.

PROJECT AIMS

The core premise of the Anthropocene hypothesis asserts that we already are in a “geological age of humanity,” an age of anthropos’ making. This has important practical and theoretical implications not only for the (Earth) sciences themselves but also for the humanities, design, and the arts. Demanding structurally novel commitments, the Anthropocene predicament offers the chance to make previously uncharted, transdisciplinary connections visible and to experiment with new forms of reflection on and approaches to the spectra of issues that define the Anthropocene.
Against this background the general driving aim of the Anthropocene Curriculum idea is to transform interdisciplinary exchange into an operative tool and enter a phase of collaboration. A continued debate strives for a cross-fertilization of different research topics and methodological approaches, combining diverse views and materials. This has been practically done by composing an experimental Anthropocene Curriculum, collectively crafted by a group of 27 university teachers from a broad spectrum of disciplines and interests and thus being supported by a diversity of expertise. The immediate goal was to collaboratively compose a transdisciplinary curriculum for higher education, presenting a workable and pedagogically feasible design for shared knowledge-building under the Anthropocene auspices.

The Anthropocene Curriculum addresses these questions by way of a cross-disciplinary experiment in higher education. Initiated by HKW and the Max Planck Institute for the History of Science, Berlin (MPIWG) the project has brought together renowned university teachers from science, the humanities, and art & design. They have collaboratively developed a set of topics relevant to the Anthropocene in an attempt to encourage the integration of cross-disciplinary thinking, mutual learning, and civic commitment in the curricula of universities and research institutions.

ANTHROPOCENE CAMPUS
NOV 14-22, 2014

The Anthropocene Curriculum has been put into teaching practice for the first time in November 14–22, 2014 at the **Anthropocene Campus** in Berlin, where the exemplary curriculum was simultaneously tested and further developed by directly involving a group of 100 internationally-accredited postgraduates. Participants were given the opportunity to participate in a series of seminars and public presentations collectively prepared and supervised by the 27 instructors over the course of the previous year. Implementing the exemplary curriculum, and testing, exploring, and discussing its feasibility within a larger group of committed young researchers provided a further possibility to work on a mutual understanding of the Anthropocene's challenges. Accompanied by a public program and closing off with a larger public forum, the specific role of education in the collaborative development of vital cross-topics for future engagement was extensively discussed. Hosted on non-academic terrain, this negotiation presented a rare opportunity to work out a pedagogically feasible design for knowledge building and knowledge transfer.

The seminar topics aimed for a kaleidoscopic and resourceful approach that emerged from the glaring necessity to build a knowledge base simultaneously broad in its disciplinary perspectives as well as out-of-the-box and that helps to readjust the human position within a broader geo-fabric. In this way, the exemplary courses being assembled in a concerted effort more generally served as a springboard for a long-tail process to creatively develop a mutual understanding for recursive themes and tropes that create the basis for Anthropocene research and knowledge, a transdisciplinary field that successively becomes integrated over the course of the Anthropocene Curriculum. The experimental cooperations across the disciplinary divides that have been exemplified in this project seek to address the educational skills needed to tackle the critical environmental and humanitarian challenges that the Anthropocene poses. It is thus an attempt at knowledge and educational practice to turn "Earthbound," that is to adapt to the manifold ways in which Earth and humans have become enmeshed.
Thus, an immediate benefit of this temporary co-learning space, created on the premises of a cultural institution, was to enter a concentrated discourse – free of university-curricular constraints – on knowledge design and dissemination, on skills and their trainings that are adequate for the Anthropocene challenge. The temporary campus itself was a central component of a series of interrelated situations— public events, exhibitions, screenings—at the HKW, with which the two-year Anthropocene Project came to a close.

ANTHROPOCENE CAMPUS: THE TECHNOSPHERE ISSUE
APRIL 14-22, 2016

Along with investigating the diverse subject matter and implications covered by the concept of the Anthropocene, the **Anthropocene Campus: The Technosphere Issue** shall explore – as the title indicates – the "technosphere," a term that surfaced early on in the literature but is only now gaining specificity as part of the geoscientific Anthropocene debate. It designates a new global "sphere" interacting with other Earth spheres, such as the biosphere, the atmosphere, the pedosphere, and the hydrosphere, namely a technological sphere, that is a techno-scientific, techno-social and techno-economical fabric of infrastructures and systems of circulation consuming energy and transforming raw materials. Although still preliminary, the technosphere is described as a heterogeneous, temporarily stabilizing complex of technologies and practices that, thanks to continuous optimization and systematization, has developed its own dynamic and attained a degree of autonomy from human intention. This internal dynamic refers to infrastructural path dependencies such as those of the entrenched energy or financial systems, technological standards, or indeed specific trends in applied research itself, for example in biotechnology or green genetic engineering.

The seminars of the **Anthropocene Campus: The Technosphere Issue** will look in particular at the origin and sources as well as the present- and future-determining constitution and processuality of this technosphere. Together with the international participants they will examine its specific formative power and the world-changing dynamic it has unleashed. Are there specific origins and conditions which have led to the establishing of this technosphere? Is it accurate to ascribe it as possessing an inherent power and dynamic? What are the limits of intentional human action within the technosphere? Is it tied to specific ideologies and economies? Which methods are helpful in analyzing its operativity and effects? Questions like these are designed to translate the broader engagement with the Anthropocene into concrete problematic situations, rendering the whole issue more accessible and manageable.

The following points are to be particularly emphasized as the programmatic goals of the second campus by drawing on the example of the technosphere:

- Elaboration of the conceptual connection between the Anthropocene and education into questions concerning applied and constitutive knowledge;
- Structuring the subject matter of the newly acquired interdisciplinary knowledge and preparing it for educational use, i.e. formulating a curriculum capable of being adapted for higher education as well as the non-academic sector;
- Identifying and developing further fields, themes, and positions considered central to Anthropocene research (e.g. engineering, agricultural sciences, design, geography);
- Pooling and prospective presentation of the research and study results in the form of a website serving as a portal for the project, a growing repository and a platform for related projects

Ten seminars are planned, the majority of which are oriented on conceptual blueprints of the technosphere as well as descriptions of its specific architectures and modes of operation, reflecting its transdisciplinary range.

The internal seminar structure of the campus will be augmented by three public evenings on *Technosphere × Knowledge.* In three evenings, instructors of the Campus as well as further academics, artists and thinkers will investigate the interlacing between current knowledge production and the technosphere.

ANTHROPOCENE CURRICULUM
CAMPUS: THE TECHNOSPHERE ISSUE
April 14–22, 2016
Haus der Kulturen der Welt, Berlin
Tentative Seminar Schedule

Seminars from April 15-17, 2016

AXIOMATIC EARTH | Theater Hall
A Seminar by Susana Caló, Adrian Lahoud, and Godofredo Pereira with Matteo Pasquinelli and Susan Schuppli
Keywords: *axiomatic, problematic, subjectivity, technoscience, algorithm*

CO-EVOLUTIONARY PERSPECTIVES ON THE TECHNOSPHERE | K1
A Seminar by Manfred Laubichler, Daniel Niles, Jürgen Renn, and Masahiro Terada with Joyeeta Gupta and Sander van der Leeuw
Keywords: *network, evolution, dichotomy of culture/ nature, complex system, long durée*

FERAL TECHNOLOGIES: MAKING AND UNMAKING MULTISPECIES DUMPS | Café Global
A Seminar by Elaine Gan, Bettina Stoetzer, and Anna Tsing with Soyoung Yoon

Seminars from April 17-19, 2016

GOVERNING THE TECHNOSPHERE | K 1
A Seminar by Beate Geissler, Brian Holmes, and Oliver Sann with Karin Knorr Cetina, Ryan Griffis and Claire Pentecost

TECHNO-METABOLISM | Theater Hall
A Seminar by Paul N. Edwards, Gabrielle Hecht, and Jonas Loh

KNOWING (IN) THE ANTHROPOCENE | Café Global
A Seminar by Sasha Engelmann, Mark Lawrence, Janot Mendler de Suarez, Melanie Sehgal and Bronislaw Szerszynski with Zoe Lucia Lüthi, Franz Mauelshagen and Falk Schmidt

ROMANCING THE ANTHROPOCENE – URBAN DIFFRACTIONS OF THE TECHNOSPHERE | K3
A Seminar by Elena Bougleux, Herbert Lohner, Myriel Milicevic, and Alexandra Toland
Keywords: *Transdisciplinary Fieldwork, Berlin, Chamisso, Urban Biodiversity, Romanticism*

Seminars from April 19-21, 2016

SENSING THE INSENSIBLE: AESTHETICS IN/AND/THROUGH THE ANTHROPOCENE | K 1
A Seminar by Jeremy Bolen, Emily Eliza Scott, and Andrew Yang with Heather Davis
Keywords: *Aesthetic, affective experience, visuality, (remote) sensing, embodiment*

ALGORITHMIC INTERMEDIATION AND SMARTNESS | Theater Hall
A Seminar by Bernard Geoghegan, Stéphane Grumbach, Orit Halpern, Olivier Hamant, and Robert Mitchell with Mark Hansen and Erich Hörl
Keywords: *Digital world, smartness, intermediation platform, big data, crowdsourcing/funding, sharing economy, governance, technocene, algorithms, homeostasis*

WHOSE? READING THE TECHNOSPHERE AND THE ANTHROPOCENE FROM AFRICA | Café Global
A Seminar by Clapperton C. Mavhunga with Shadreck Chirikure, Gabrielle Hecht, D.A. Masolo, and Chaz Maviyane-Davies

AXIOMATIC EARTH

Keywords: *axiomatic, problematic, subjectivity, technoscience, algorithm*

The Axiomatic Earth describes a condition in which calculation becomes a site of political struggle. The threshold that distinguishes between the calculable and incalculable is a paradigmatic site of conflict since increasingly it forms the condition of possibility for what is deemed worthy and worthless, valued and valueless, what can and cannot be insured, what can and cannot be made to circulate. In this sense, we believe there is no single technosphere, but rather multiple wave fronts of calculation that expand throughout the planet incorporating more and more of life and matter into systems of abstraction and machinic reasoning. These forms of power work to continually generate new automated couplings between matter, machines and human beings. They are political in so far as they are contested in ways that constitute new forms of collective subjectivity. Every technology redistributes a set of affective coordinates and opens possibilities for political re-imagination, whether this is a conflict over the resolution of remote sensors, the classification of hydrocarbons, or estimates of credit rating.

This seminar will argue that the technosphere can be harnessed to a political effect that is contrary to the epistemic hegemony that has reduced the Earth to a problem of financial value. Allowing different modes of seeing or measuring, technologies of calculation do not simply present an improved perspective over the world. Instead they present a different world, and thus allow the formulation of different problems. They open the possibility of a different aesthetics and of a radical reformulation of the politics of inhabiting in the Earth.

SUSANA CALÓ
is a researcher based in London. She is completing a PhD in philosophy at the Centre for Research in Modern European Philosophy (CRMEP), London, with a research on the relations between language, semiotics and politics, drawing on the work of Félix Guattari and Gilles Deleuze. She has a degree in Psychology and a Masters in Modern and Contemporary Philosophy, from the University of Porto, with a thesis exploring a dynamical systems approach to cognition. She has worked in the field of cognitive science and developmental psychology in several research centres in Portugal and in the U.K.

ADRIAN LAHOUD
is an architect, researcher and educator. Currently he is a Reader in Architecture and directs the M.Arch Urban Design at The Bartlett, University College London. Adrian also acts as a Studio Master/Thesis Advisor at the Projective Cities MPhil in Architecture and Urban Design at the Architectural Association, London. Before joining the Centre for Research Architecture, Goldsmiths in 2011 as Director of the MA programme and Research Fellow on the Forensic Architecture, ERC project, he ran an award winning architectural practice in Sydney, Australia and directed the Masters in Urban Design at University Technology Sydney.

GODOFREDO PEREIRA
is an architect, researcher and writer based in London. He holds an M.Arch from the Bartlett School of Architecture and a PhD from the Centre for Research Architecture, Goldsmiths University of London. His work "The Underground Frontier" investigates political and territorial conflicts within the planetary race for underground resources. As part of Forensic Architecture he leads the Atacama Desert Project, a geo-forensic analysis of environmental violence in the Atacama Desert in Chile. He edited the book Savage Objects, INCM, 2012. He is currently the coordinator of History and Theory at the M.Arch Urban Design program at the The Bartlett, UCL, where he also leads the Axiomatic Earth design studio.

MATTEO PASQUINELLI
is a philosopher. He wrote the book Animal Spirits: A Bestiary of the Commons (2008) and edited the anthologies Gli algoritmi del capitale (2014) and Alleys of Your Mind: Augmented Intelligence and its Traumas (forthcoming for Meson Press) among others. He lectures frequently at the intersection of political philosophy, media theory and cognitive sciences in universities and art institutions. His texts have been translated in many languages and he has contributed to academic and non-academic journals and newspapers such as Springerin, Multitudes, Fibreculture, Theory Culture & Society, Parrhesia, Leonardo, Lugar Comum, Rethinking Marxism, e-flux, Open!, DIS magazine, Libération, Il manifesto, Der Freitag. Together with Wietske Maas he wrote the Manifesto of Urban Cannibalism. In 2014 at NGBK Berlin he co-curated the exhibition The Ultimate Capital is the Sun and the symposium The Metabolism of the Social Brain.

SUSAN SCHUPPLI
is an artist and writer based in London. Her research practice examines media artefacts that emerge out of sites of contemporary conflict and state violence to ask questions about the ways in which media are enabling or limiting the possibility of transformative politics. Current work explores the ways in which toxic ecologies from nuclear accidents and oil spills to the dark snow of the arctic are producing an "extreme image" archive of material wrongs.
She is Senior Lecturer and Deputy Director of the Centre for Research Architecture, Goldsmiths. Previously she was an Associate Professor in visual/media arts in Canada. Schuppli received her PhD from Goldsmiths and participated in the Whitney Independent Study Program after completing her MFA at the University of California San Diego.

CO-EVOLUTIONARY PERSPECTIVES ON THE TECHNOSPHERE

Keywords: *network, evolution, dichotomy of culture/ nature, complex system, long durée*

Rather than seeing the technosphere as the final product of human history this seminar instead explores its deep evolutionary roots. In order to do so, it examines the set of constructive processes that have defined the relationships between organisms and their environments since the dawn of evolution. It introduces and integrates regulatory network and niche construction perspectives in order to examine how evolutionary dynamics explain the path-dependent nature of evolutionary change, the dynamics of evolutionary innovation, and the expansion of inheritance systems.

The technosphere is not just the entirety of the material and societal components of the global technologically-based system. It is also a space in which humanity's metabolism with its terrestrial environment takes place, in an interactive process through which the environment is constantly transformed by human labor, economic conditions and epistemic components. Technology, in this view, is an integral part of these deep evolutionary processes, both as a product and an evolutionary actor in its own right. Only when conceiving the technosphere as created through human transformation of multiple environments can we hope to grasp its co-evolutionary nature, and therefore its potentiality. Within a coevolutionary perspective, in short, the technosphere could become autonomous, but as actors within it, as the subjects whose knowledge it represents, we can still know and possibly change it.

This seminar will explore more deeply the real mental and material action of humanity *in* nature, that is, the interactions between humans, plants, animals, and places that have sustained human populations for long periods of time, and which are still present in our world today. It will identify mental, artifactual, aesthetic, and ecological phenomena that illuminate the processes and experiences of co-evolution in the hope of amplifying our analysis of the technosphere today.

MANFRED LAUBICHLER

is President's professor of theoretical biology and history of biology at Arizona State University (ASU). Trained as a biologist, zoologist, philosopher, and historian of science at Vienna, Yale, and Princeton, his research field spans from theoretical and evolutionary developmental biology, complexity theory, and the cultural history of science to digital humanities and computational methods. At ASU, he serves as director of the Center for Social Dynamics and Complexity, associate director of the interdisciplinary "Origins Project" and director of the "Evolutionary Theory Core of Complex Adaptive Systems." He is on several editorial boards of publications such as *Biological Theory* and the Max Planck Research Library for the History and Development of Knowledge.

DANIEL NILES

is a human-environmental geographer (PhD Clark University) at the Research Institute for Humanity and Nature (Kyoto, Japan). He is interested in what people mean, and the landscapes they envision, when they talk about "sustainable agriculture". He has served as visiting researcher at the National Museum of Ethnology (Osaka, Japan) in 2008, and as assistant (2009) and associate (2014) professor at RIHN. Publication e.g.: *Slow places, fast movements and the making of contemporary rurality* (in *Critical Food Issues: Society, Culture and Ethics,* Praeger Press 2009).

JÜRGEN RENN

is director at the Max Planck Institute for the History of Science in Berlin since 1994. His research focuses on structural changes in systems of knowledge, particularly in the natural sciences. He is co-initiator of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities launched by the Max Planck Society in 2003 and publisher of the innovative book series Edition Open Access. Holding a PhD in mathematical physics, he is honorary professor at Humboldt-Universität and at Freie Universität Berlin as well as adjunct professor for Philosophy and Physics at Boston University.

MASAHIRO TERADA

was born in Kobe, Japan, in 1971. After having finished a doctor's course for Japanese pre-modern history at Osaka University, Japan, he worked in The National Museum of Japanese History as a researcher, The Committee for Inheriting Historical Materials of Anti-airport Struggle in Narita as a researcher, and Institute for Humanity and Nature as an appointed associate professor. His main research interest is on representation of "negative" memories like natural disasters or war in museum and monument and mutual relationship between historical notion and natural environment. He is a co-editor of "A Young Generation's Guide of Museums and Memorials of the Second World War in Asia"(Iwanami Publishing, Tokyo, 2006, in Japanese), and "Kioku Hyogen Ron (The Methodology of Representation of Memory)" (Showado Publishing, Kyoto, 2009, in Japanese). He is also a cooperate researcher of the National Museum of Ethnology, Japan, and the Center of Integrated Area Studies of Kyoto University. His research field is North East Asia (especially China, Korea, and Japan), South East Asia (especially Vietnam, Indonesia), and Europe (especially Germany, France). He had given lectures on the theme of memory at numerous universities like Chiba University, Japan (2006, 2007), Meiji University, Japan (2006, 2007), Vietnam National Hanoi University, Vietnam (2010), Syiah Kuala University, Indonesia (2011), School of Planning and Architecture, Bhopal, India (2012).

JOYEETA GUPTA

is professor of environment and development in the global south at the Amsterdam Institute for Social Science Research of the University of Amsterdam and UNESCO-IHE

Institute for Water Education in Delft. She is editor-in-chief of International Environmental Agreements: Politics, Law and Economics and is on the editorial board of seven other journals. She was lead author in the Intergovernmental Panel on Climate Change which won the 2007 Nobel Peace Prize with Al Gore and of the Millennium Ecosystem Assessment which won the Zaved Second Prize. She is on the scientific steering committees of the Global Agricultural Research Partnership (CGIAR) research programme on Forests, Trees and Agroforestry; Earth System Governance; Science Europe's Scientific Committee for the Social Sciences; and the European Joint Programming Initiative - Climate Transdisciplinary Advisory Board. She is on the Board of Trustees of Oxfam Novib and the Board of Directors of the Royal Tropical Institute in Amsterdam. She is Vice-President of the Netherlands national Commission on Development Cooperation and member of the Advisory Council on International Affairs.

SANDER VAN DER LEEUW
pioneered the application of the complex adaptive systems (CAS) approach to long-term human-environment dynamics. In the 1990's he led an interdisciplinary research project applying CAS to environmental problems spanning across Southern Europe – the first of its kind. In the 2000's he co-directed a similar project on invention and innovation. He taught in Amsterdam, Leyden, Cambridge (UK) and Paris before becoming the founding director of Arizona State University's interdisciplinary School of Human Evolution and Social Change. He is now a Foundation professor in that school and in the School of Sustainability, and a director of ASU's Complex Adaptive Systems Initiative. He is External Professor of the Santa Fe Institute, a Corresponding Member of the Royal Dutch Academy of Arts and Sciences. In 2012, he was awarded the title "Champion of the Earth for Science and Innovation" by the United Nations Environment Programme.

FERAL TECHNOLOGIES: MAKING AND UNMAKING MULTISPECIES DUMPS

What are we to make of proliferating crises: environmental degradation, forced migration, species exterminations, unforgiveable debt? These are unfolding simultaneously within a golden age of technoscientifically-enhanced discoveries: maze-busting slime molds, co-evolving immune systems, more-than-human webs of symbiotic, invasive, artificial intelligence. Every day, we bounce between creativity and catastrophe, grappling with love and rage. The paradoxes are not hard to enumerate. The real challenge lies in describing their entanglement. And yet, the Anthropocene trips up hard-earned categories and practices, pressing for radical approaches to understanding novel social dynamics. Rather than elaborating a straightforward analytical tool for defining a human-centered geological epoch, the Anthropocene presents a multidimensional puzzle structured around complexities and ruptures. When nature and culture—ways of being and ways of belonging—can no longer be studied as exclusively human, nonhuman or machine, how might we approach this puzzle? Who inhabits and orders the Technosphere?

This seminar conceptualizes the Technosphere as an unintended muddle of multispecies relationships that emerge from contaminated landscapes, postwar rubble, and garbage heaps—in short, dumps. Such a muddle may be considered through feral technologies—novel and weedy capacities for materially significant change. Critical studies of change call for serious attention to companion species and the making and unmaking of multiple technologies of coordination. This seminar proposes an interdisciplinary exercise in critical description: a mix of fieldwork on ruderal ecologies, digital art, and multispecies ethnography. It is grounded in Teufelsberg (Devil's Mountain), one of Berlin's highest peaks and made from rubble cleared from the city after the war.

ELAINE GAN
is art director of Aarhus University Research on the Anthropocene (AURA) and a fellow in Architecture & Environmental Structures at the New York Foundation for the Arts. Her research explores multispecies temporalities as technologies of coordination, by focusing on rice and its companions. Her practice combines art, environmental anthropology, and science studies. Recent activities include a curatorial project at Kunsthal Aarhus titled *DUMP! Multispecies Making and Unmaking,* collaborative research with AURA and Matsutake Worlds Research Group, exhibitions with media collective, World of Matter, and writing on art and political ecology. She is co-editor of a forthcoming book with Anna Tsing, Nils Bubandt, and Heather Swanson, *Anthropocene: Arts of Living on a Damaged Planet* (Island Press).

BETTINA STOETZER
is assistant professor in Global Studies at MIT. Her research focuses on the intersections of ecology, globalization, and urban social justice. Stoetzer's current book project, *Ruderal City: Ecologies of Migration and Urban Life*, explores the changing cultural politics of nature and citizenship in the city of Berlin. Drawing on ongoing fieldwork, the book engages several sites that have figured prominently in German national imaginaries – urban wastelands, gardens, forests, and parks – to show how human-environment relations have become a key register through which urban citizenship is articulated in contemporary Europe. Stoetzer has published on topics such as transnationalism, cities, affect, ecology, and film, and is author of a book on feminism and anti-racism in Germany.

ANNA TSING
is professor of Anthropology at University of California, Santa Cruz. She is also Niels Bohr professor at Aarhus University in Denmark and director of Aarhus University Research on the Anthropocene (AURA). Her current research follows the humble trails of mushrooms into the great economic, cultural, and ecological dilemmas of our times. She is the author of *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, *Friction: An Ethnography of Global Connection,* and *In the Realm of the Diamond Queen: Marginality in an Out-of-the-way Place*, all from Princeton University Press. She has co-edited numerous volumes, most recently, with Carol Gluck, *Words in Motion: Towards a Global Lexicon*, from Duke University Press.

SOYOUNG YOON
Soyoung Yoon is Program Director and Assistant Professor of Art History & Visual Studies at the Department of the Arts, Eugene Lang College of Liberal Arts, The New School. She is also a Visiting Faculty at the Whitney Museum Independent Study Program [ISP]. In 2015/16, she is a Postdoctoral Fellow at the Pembroke Center for Teaching and Research on Women at Brown University, under the annual theme of "Fatigue," the first installation in a five-year series on "War." Yoon received her Ph.D. from Stanford University, and holds a B.A. from Seoul National University. She has published in Grey Room, Millennium Film Journal, Film Quarterly, Shifters, among other journals and books.

Yoon is at work on two book projects around the re-definition of the status of the "document" in the post-war period: Walkie Talkie, regarding the rise of cinéma vérité amidst the struggles for decolonization and new techniques of policing; and Miss Vietnam: The Work of Art in the Age of Techno-war, a project on feminist mediation, which reframes technological reproducibility via the framework of reproductive labor.

GOVERNING THE TECHNOSPHERE

The Metropolitan Scale

The technosphere has been defined by Peter Haff as a machine network of planetary extent, comprising "the world's large-scale energy and resource extraction systems, power generation and transmission systems, communication, transportation, financial and other networks... including computers, windows, tractors, office memos and humans." Is the technosphere governed? By whom – or by what?

This seminar is based on the observation that large metropolitan areas internalize the full range of technospheric functions, whether through production, maintenance, consumption, or governance. All large metropolitan areas produce and service major inputs to the technosphere (manufactured goods, knowledge products, health services), and they centralize regional inputs for global distribution, via data centers, airports, intermodal logistics hubs, pipelines, etc. Similarly, all such areas constitute major consumption sites (food, fuel, manufactures, cultural commodities). Finally, the metro areas include functions of governance, defined here in the physiological/cybernetic sense as the regulation of a dynamic equilibrium between many quasi-autonomous parts. Governance is exercised not only by administrative organs of the nation-state, but also and primarily by financial sectors, corporate HQs, military commands, computer programming complexes, expert-knowledge networks centered on universities, armed or non-violent insurgencies, etc, all of which are socio-technical assemblages including both interest groups and machinic components with their own path-determined characteristics and "baked-in" imperatives. To define the technosphere – to sense it, know it, express it, and to help reshape it – one can begin at the metropolitan scale and explore how these governance functions intermediate between territorial processes and global networks. It's at the metropolitan level that one can experience the technosphere in the flesh.

BRIAN HOLMES

is an art and cultural critic with a taste for philosophy and on-the-ground intervention. Living in Paris from 1990 to 2009, he collaborated with political art groups such as Ne Pas Plier, Bureau d'Etudes, Public Netbase, Hackitectura, Makrolab, and published in Multitudes, Springerin, and Brumaria. With Claire Pentecost and the 16 Beaver Group he co-organized the Continental Drift seminars in New York. His essays revolve around art, free cooperation, the network society, political economy, and grassroots resistance. His books include *Escape the Overcode: Activist Art in the Control Society* and *Unleashing the Collective Phantoms: Essays in Reverse Imagineering*, as well as *Volatile Smile* (with Geissler / Sann). Currently living in Chicago and working on political ecology, he is a member of the Compass group (http://midwestcompass.org), collaborates with Rozalinda Borcila (http://southwestcorridornorth westpassage.org) and teaches at the University of Illinois. The majority of his texts can be found at http://brianholmes.wordpress.com.

BEATE GEISSLER / OLIVER SANN

Beate Geissler and Oliver Sann have been active as a collaborative partnership since 1996. Their work concentrates on inner alliances of knowledge and power, their deep links in western culture and the escalation in and transformation of human beings through technology. On the threshold dividing document from created reality, on the border between factual occurrence and fictional bringing-into-being, their work scrutinizes the inherent idiosyncrasies of media and technology. Within the collaborative space of an artist duo and interdisciplinary research, the artists' work spans science, anthropology, sociology, philosophy, political science and contemporary art. Geissler/Sann more recently have been the recipient of grants from the Elisabeth Cheney Foundation and the Graham Foundation, Chicago. Currently, Geissler is an Associate Professor of Art at the University of Illinois at Chicago and Sann is Assistant Professor at the School of the Art Institute, Chicago.

KARIN KNORR CETINA

was born in Frankfurt am Main, Germany and was raised in San Juan, Puerto Rico in the 1960s. She finished her education in Paris and London. Knorr has taught, exhibited and lectured internationally, including at Tate Britain, Tate Modern, The University of Westminster, Goldsmiths, Harvard and The Art Institute of Chicago. She studied at the University of Westminster in the mid-1970s, exhibiting photography that addressed debates in cultural studies and film theory concerning the 'politics of representation' practices which emerged during the late 1970s and early 1980s. She is currently Professor of Photography at the University for the Creative Arts in Farnham, Surrey.

RYAN GRIFFIS

is currently involved in a number of collaborative research and art projects focused on the political ecology of the midwest. With Sarah Ross, he co-founded Regional Relationships, a platform for visual art and writing that finds connections across cultural and geographical borders, and challenges common distinctions between urban and rural spaces. Under the name Temporary Travel Office, Ryan has created work and publications that attempt to use tourism as an opportunity for critical public encounters. These works have been presented in various institutional forums, including the Los Angeles County Museum of Art, the Bureau for Open Culture (Columbus College of Art & Design), AREA Chicago, The MAK Center, The Center for Land Use Interpretation and Los Angeles Contemporary Exhibitions. He has curated exhibitions e.g. for the School of the Art Institute of Chicago and George Mason University on themes that include the politics of genetic technologies, energy consumption and artistic forays into agriculture.

Currently he is an Associate Professor for the School of Art and Design at the University of Illinois at Urbana-Champaign.

CLAIRE PENTECOST

Claire Pentecost's work engages collaboration, research, teaching, writing, lecturing, drawing, installation and photography in an ongoing interrogation of the institutional structures that organize knowledge. Her projects often address the contested boundary between the natural and the artificial, focusing in recent years on food, agriculture and bio-engineering. She has collaborated with Critical Art Ensemble and the late Beatriz daCosta, and since 2006 she has worked with Brian Holmes, 16Beaver and many others organizing a series of seminars to articulate the interlocking scales of our existence in the logic of globalization. In the Midwest, she collaborates with Compass, initiating a series of public hearings on the activities of the Monsanto Corporation. Recently Pentecost has exhibited at dOCUMENTA(13), Whitechapel Gallery, and the 13th Istanbul Biennial. She is represented by Higher Pictures, New York, and is Professor and Chair of the Department of Photography at the School of the Art Institute of Chicago.

TECHNO-METABOLISM

The technosphere transforms energy, materials, and information. In the course of producing and consuming food, goods, and services, it metabolizes not only fossil and nuclear fuels, but also solar energy, through processes including photosynthesis (agriculture), wind, and hydro. The technosphere also metabolizes information, ingesting some kinds of data as inputs and producing other data as outputs, often in complex cycles of feedback and control. The technosphere uses energy and materials in part to transform information, while information guides the metabolism of energy and materials.

The waste products of this metabolism are, in turn, transforming both the biosphere and the geosphere. Microplastics, artificial chemicals, and human-made radioactive materials can be detected in the cells of organisms all over the planet, including in the deep oceans. Greenhouse gases and particulate aerosols are transforming the atmosphere and the climate. Radioactive wastes from uranium mining, weapons testing, and power plants will persist for tens of thousands of years. So will microplastics.

Raw materials and wastes are constituent of the technosphere, not external to it. And while they may be widely spread, they are not evenly spread. Tracking and mapping their deposit patterns reveals the geopolitics and inequalities that are equally constitutive of the technosphere.

Scientists, historians, and other analysts have proposed new ways to conceptualize and model technometabolism that directly account for these materials. Meanwhile, some practitioners are seeking ways to close or de-intensify metabolic loops to reduce energy requirements and material waste. “Data exhaust” — the data generated by individual activity, from web searches to Facebook to online shopping — is one significant “waste” product of the technosphere, now increasingly “recycled” to detect patterns, trends, and individual preferences.

Today’s deluge of increasingly fine-grained data, combined with new visualization techniques, offer a plethora of creative ways to grasp the technometabolism, blending artistic expression with scientific and social data. This seminar will develop creative approaches to understanding and visualizing these interplays of energy, materials and information in the radical inequality of the technosphere.

PAUL EDWARDS
is a professor in the interdisciplinary School of Information (SI) and the Department of History at the University of Michigan and directs the University of Michigan Science, Technology and Society (STS) program. His current research concerns the social dynamics of monitoring, modeling, and memory in large scientific cyber-infrastructures, as well as further work on the history of meteorology and other large-scale information infrastructures.

GABRIELLE HECHT
is Professor of History at the University of Michigan, where this year she is also a Mary I. and David D. Hunting Family Fellow at the Institute for the Humanities.Hecht has written two award-winning books: *Being Nuclear: Africans and the Global Uranium Trade* (MIT Press and Wits University Press, 2012) and *The Radiance of France: Nuclear Power and National Identity after World War II* (MIT Press, 1998, 2009). She serves on the scientific advisory board for the Andra, France’s national radioactive waste management agency, among others. More broadly, Hecht’s scholarship addresses themes such as technopolitics, occupational and environmental health, labor, ontological politics, and nationalism, colonialism, and post-coloniality. She is currently working on a book on *Technology and Power in Africa*(under contract with Cambridge University Press), as well as a series of essays on radioactive and other forms of waste, tentatively titled *Toxic Tales from the African Anthropocene*.

JONAS LOH
holds a M.A. in Design Interactions from the Royal College of Art, London and a B.A. in Interface Design from the University of Applied Sciences Potsdam.
As co-founder and designer at Studio NAND, Jonas Loh is directing various design projects spanning the fields of information visualisation, interaction and exhibition design. The non client oriented work of the studio reflects and discusses the impact of current and future technologies by creating design fictions based on technical props. Further, the studio is organizing workshops around topics such as DIY electronics and information visualization.
The work of Studio NAND has been presented at exhibitions and public installations, as for example the Siggraph Emerging Technologies Exhibition in Los Angeles, the MoMA New York, V2 Rotterdam, the Venice Biennale and Ars Electronica.

KNOWING (IN) THE ANTHROPOCENE

The concept of the "technosphere" developed by Peter Haff refers to an emergent, semi-autonomous "sphere" of the Earth, comparable to the hydrosphere or biosphere, currently being produced by a planet in flux (Haff 2014). A growing number of human and non-human entities are being locked into this technosphere, which is itself locked into an accelerating exploitation of fossil fuels and other material resources, and depends on particular forms of knowledge production. It must therefore be asked: is a different kind of technosphere possible? What forms of knowledge might a different technosphere require and engender? In order to explore such questions, we will take as our point of departure the *Aerocene*: a nascent, collaborative, speculative vision of the future proposed by Berlin-based artist Tomás Saraceno.

In the *Aerocene*, societies become untethered from the Earth's surface. Instead of relying on extracting resources from Earth's subterranean sinks and combusting them, the Aerocene by contrast simply encloses volumes of ambient air in envelopes, and thereby embarks on a collaboration with elemental flows of energy and matter. The *Aerocene* performs experiments in lighter-than-air motion, without fossil fuels or refined gases, to sustain the movements of a range of aerostatic devices for scientific research, for human transport – or even for human habitation in what Saraceno terms *Cloud Cities*. The *Aerocene* invites us to develop new forms of collaborative knowledge production that combine the sciences and humanities, craft and philosophy, speculation and sensory experience.

We will take the *Aerocene* as an alternative future technosphere founded on a shift in the dominant global "thermodynamic imaginary" (Moe, 2014). Rather than immediately moving to technoscientific "solutions" and thereby implicitly consenting to a particular vision of the future, we will try to suspend entrenched disciplinary habits of thought and speculate about which future we actively want to create. In exploring the *Aerocene* we will use techniques to unlearn ingrained, modernist "bifurcations" of thought (Whitehead 1920). We will develop forms of interdisciplinarity and transdisciplinarity that resist the allure of prematurely integrated forms of knowledge and instead experience creative agonism between modes and ontologies of knowing (Barry *et al.* 2008).

SASHA ENGELMANN
is a geographer of art exploring creative experiments with the poetics and politics of air. Over the past two years she has carried out site-based fieldwork at Studio Tomás Saraceno in Berlin, especially related to Saraceno's residency with the Centre National d'Études Spatiales (French Space Agency), and the long-term project *Becoming Aerosolar*. She lectures on geography and multidisciplinary arts practice at the Institut für Architekturebezogene Kunst (IAK), Technical University of Braunschweig, and is completing a DPhil in Geography and the Environment at Oxford University.

MARK LAWRENCE
is scientific director at the Institute for Advanced Sustainability Studies (IASS) in Potsdam, focusing on mitigating the impacts of short-lived, climate-forcing pollutants (SLCPs), and on the potential impacts, uncertainties and risks of "climate engineering". Dr Lawrence received his Ph.D. in 1996 from the Georgia Institute of Technology. From 2000 until 2011 he was a research group leader at the Max Planck Institute for Chemistry in Mainz. He served as interim professor for meteorology at the University of Mainz during 2009-2010, and moved to the IASS in 2011. In 2014 he was appointed Honorary Professor at the University of Potsdam. Dr Lawrence is author or co-author of over 100 peer-reviewed publications. He has led various international projects, has served as editor for two journals (Atmospheric Chemistry and Physics; Atmospheric Environment), and is on several international committees, including being co-chair of the International Global Atmospheric Chemistry program (IGAC).

JANOT MENDLER DE SUAREZ
is a Visiting Research Fellow with Boston University's Pardee Center for the Study of the Longer-Range Future, and Consulting Technical Advisor with the Red Cross Red Crescent Climate Centre. Currently specializing in forecast-based financing, circular economies, and experiential learning game design, facilitation & training, Janot spent 11 years establishing GEF-IW:LEARN, the Global Environment Facility's International Waters knowledge-sharing program involving 182 countries. While Senior Lecturer in Geography at Royal Holloway University of London, she piloted a Centre for Developing Areas Research distance MSc program. A lead author of Global Oceans Forum climate policy briefs, she has consulted with UNIDO, World Food Programme, Rockefeller Foundation, Oxfam, START, the World Bank, American Red Cross, USAID and numerous national governments. Recent publications include: *Ensuring Survival: Oceans, Climate & Security*, *Games for a New Climate: Experiencing the Complexity of Future Risks*.

MELANIE SEHGAL
is Junior Professor of Literature, Science and Media Studies at Viadrina European University, Frankfurt (Oder). She received her PhD in philosophy from the Technical University of Darmstadt with a dissertation on empiricism and speculative thinking in William James and Alfred North Whitehead. Her work focuses on forms of speculative thinking beyond the nature/culture divide from classical pragmatism, process philosophy to science and technology studies and new materialist feminist thought.

BRONISLAW SZERSZYNSKI
is Reader in Sociology at Lancaster University, UK. His research crosses the social and natural sciences, arts and humanities, and situates the changing relationship between humans, environment and technology in the longer perspective of human and planetary history. His recent work explores the Anthropocene, geoengineering and planetary evolution. Szerszynski is the author of *Nature, Technology and the Sacred* (2005), and co-editor of *Risk, Environment and Modernity* (1996), *Re-Ordering Nature* (2003) and *Nature Performed* (2003). He has organized or co-organised many interdisciplinary and participatory events on environmental themes, including *Between Nature: Explorations in Ecology and Performance* (Lancaster, 2000), *Experimentality*, a year-long collaborative research programme on experimentation in the sciences, arts and wider society (Lancaster/Manchester/London, 2009-10), and *Anthropocene Monument*, with Bruno Latour and Olivier Michelon (Toulouse, 2014-2015).

ZOE LUCIA LÜTHI
is a research fellow at the Institute for Advanced Sustainability Studies in Potsdam. She holds a PhD at the University of Chinese Academy of Sciences (UCAS) in Bejing and a MSC in Climate Sciences at the University of Bern, Switzerland. Her research follows natural and environmental science, focusing on long-range transport of air pollution to the Himalaya Tibetan Plateau region. She has worked as a climate consultant in Nepal and in Bhutan for the International Center for Integrated Mountain Development. During her five-year stay in Asia, Zoe developed a keen interest in meditation, a praxis which she uses to gain insights that go beyond the approach of the natural sciences and feed into her efforts towards sustainability and transdisciplinarity in the Anthropocene. Her current IASS project “A Mindset for the Anthropocene” (AMA) explores the question of how inner transformation processes can contribute to sustainability – and, conversely, on the question of how societal transformations can enrich not just the ‘outside world’ but also people´s ‘inner lives’.

FRANZ MAUELSHAGEN
is a Senior Fellow at the Institute for Advanced Sustainability Studies (IASS). He is a member of the research cluster SIWA, Sustainable Interactions with the Atmosphere. His work focuses on the Anthropocene and looks at the implications that this idea has for our understanding of global (environmental) history and modernity, and its place in the history of great transformations. Dr. Mauelshagen earned an M.A. in philosophy, history and law from the Rheinische Friedrich-Wilhelms University in Bonn (Germany) and a Ph.D. in history from the University of Zurich (Switzerland).

FALK SCHMIDT
is Academic Officer in the Executive Office at the IASS Potsdam, where he was from 2010-2011 Research Fellow of the TransGov Project. From 2009-2011 he was Consultant for the UN-Water Decade Programme on Capacity Building, Bonn. From 2004-2011 he doctorate in Political Science at Freie Universität Berlin.

ROMANCING THE ANTHROPOCENE – URBAN DIFFRACTIONS OF THE TECHNOSPHERE

Tracing shadows – an examination of technological datasets and Romantic concepts in the study area of Berlin-Moabit

Keywords: *Transdisciplinary Fieldwork, Berlin, Chamisso, Urban Biodiversity, Romanticism*

The seminar begins with the curious tale of Peter Schlemihl, the shadowless man, as a trope for contemporary urban diffractions of the Technosphere. Written in 1814 by the Berlin-based botanist and Romantic novelist, Adelbert von Chamisso, the tale of the shadowless man casts a critical light on issues of capitalism, mobility, scientific advancement, social responsibility, and statelessness and immigration—then as now. As the story goes, the hero trades his shadow and thus his existence and identity to the devil for limitless wealth only to be shunned by society. After a period of inevitable philanthropy, he trades in his riches for a pair of magical, seven-league boots, with which he travels the world in search of peace before finally finding solace in the study of earth sciences.

The first part of the seminar unpacks the legacy of the shadowless man in the context of Berlin as a hub for multiple Technospheres. Schlemihl's (i.e. Chamisso's) scientific ambitions can be traced in the Berlin Digital Environmental Atlas, a comprehensive dataset documenting almost every possible aspect of the city's natural and built environment, from breeding bird populations and rare flowers, to carbon dioxide emissions, population density, and environmental justice. This wealth of knowledge stands in sharp contrast to the complicity of a political elite who have sold the city's public lands to devilish investors in the face of climate change, demographic upheaval, and the wanderings of tens of thousands of displaced individuals who, like Chamisso's hero, possess nothing more than their shadows, but bring new forms of knowledge to an already complex repository.

The second part will embark on a collective field exercise through the Westhafen area of Berlin-Moabit to explore the potential dialogue—or divergence—between quantitative data, personal narrative, and changing imagery. Using methods of participatory observation, a form of anthropological "shadowing," ecological site surveys, creative cartography, artistic invention, and radical story-telling participants track down evidence of industrial infrastructures and biological niches, local perceptions and everyday visions, and the paths and patterns of resources being shipped, stored, sold, or wasted. Literary moments from the Schlemihl story and key concepts of Romanticism, such as mystery, spontaneity, horror, and the sublime (concepts that appeared as revolutionary counterpoints to the scientific rationalization of nature in the nineteenth century), are applied to the overly quantified contemporary city. Amidst a sea of data, new romantic protagonists develop alternative narratives of the city.

ELENA BOUGLEUX
is Associate Professor of cultural anthropology at the University of Bergamo and teaches anthropology of science in the PhD program of the Research Center on Anthropology and Epistemology of Complexity (CE.R.CO). Her research makes use of ethnographic and visual methodologies, shaping her work as member of the Gender and Intercultural Studies Laboratory (UniFi 2003-2007), and as coordinator of the Workshop on Migration and Urban Ethnography (UniBg 2009). Her recent research is focused on the processes and practices of applied research performed by the research & development departments of multinational corporations. Her present ethnographic field is located in the Indian r&d of a US-based corporation and concentrates on the strategies of resistance and appropriations enacted by local actors, in order to modify or accomplish the corporate policy of expansion in emerging contexts.

HERBERT LOHNER
is urban ecologist and consultant for Nature Conservation at BUND Friends of the Earth Germany, Berlin.

MYRIEL MILICEVIC
is an artist and interaction designer. With her Neighbourhood Satellites she explores the hidden connections between people and their natural, social, and technical environments. These connections and systems are often turned into practical-utopian models and stories: how can energy leaks in the city become power sources? How can we guide butterflies to new meadows in the Rocky Mountains? How would plants grow if they were cultivated in political systems? What can we learn from people in the hills of Thailand for our urban lives? These explorations are mostly of a participatory nature, emerging from collaborations with other practitioners in the context of workshops, classrooms, exhibitions, residencies and fieldwork. Myriel received her MA from the Interaction Design Institute Ivrea, Italy and her diploma in Graphic Design from the Gerrit Rietveld Academie, Amsterdam. Further, she studied at the Conceptual and Information Arts department of San Francisco State University.

ALEXANDRA TOLAND
is a visual artist and landscape planner based in Berlin. She was a DFG fellow in the "Perspectives in Urban Ecology" graduate research group in Berlin and recipient of an Andrea von Braun scholarship in 2013. She has lectured at the TU Berlin, Leuphana University, and the University of Arts Berlin, and has co-chaired the German Soil Science Society's (DBG) Commission on Soils in Education and Society since 2011. Her interests include: environmental art, urban ecology, soil protection, and transdisciplinary processes. She is also an enthusiastic beekeeper, vermicomposter, forester, and mother of two.

SENSING THE INSENSIBLE: AESTHETICS IN/AND/THROUGH THE ANTHROPOCENE

Keywords: *Aesthetic, affective experience, visuality, (remote) sensing, embodiment*

"Aesthetic" is often understood as a matter of beauty or style, but the Anthropocene pushes us to reconsider the word's original meaning (from Greek): to perceive by the senses or by the mind, to feel. Indeed, our perceptions of the Anthropocene have been largely shaped by a technospheric net of satellites, cameras, and detectors resulting in an aesthetic regime of data used to narrate profound changes to climate, landscape, and biodiversity over the past 400 years. But what comes after the GIS image? If quantification, abstraction, and the logic of evidential traces have been the means by which we've largely come to recognize our purported Anthropocene condition, then the question becomes how we might proceed so that our "sensing" is less "remote," and forge aesthetics that incorporate not only the representational, but also the lived and affective experiences of various anthropo-scenes.

This workshop will pull at the aesthetics of the Anthropocene as they already exist and as they might still be invented, exploring how we move from the analysis of specimens into integrated and dynamic forms of participation beyond spectatorship or mere comprehension. Through facilitated, small-group exercises and presentations, the seminar will examine influential tropes (e.g. utopic, dystopic, photographic, metric) and ways that the Anthropocene reinforces or disrupts our default visual languages, and the definition of "aesthetics" itself. Engaging performance, para-fictional research, and design as well as visual art practices, this seminar aspires to mobilize aesthetics beyond the picture plane.

JEREMY CHRISTOPHER BOLEN

is a Chicago based artist, researcher and educator interested in site specific, experimental modes of documentation and presentation. Much of Bolen's work involves rethinking systems of recording in an attempt to observe invisible presences that remain from various scientific investigations, military experiments and human interactions with the earth's surface. His work has been exhibited internationally with recent exhibit-tions at La Box, Bourges; MOCP, Chicago; The Mission, Houston; Galerie Zürcher, Paris; Andrew Rafacz, Chicago; Salon Zürcher, New York; The Drake, Toronto; Untitled Art Fair, Miami; Gallery 400, Chicago; Depaul University Art Museum, Chicago; Hyde Park Art Center, Chicago; EXPO, Chicago; Roots and Culture, Chicago. Bolen holds a MFA from the University of Illinois at Chicago and currently serves as a Lecturer of Photography at the School of the Art Institute of Chicago.

EMILY ELIZA SCOTT

is an interdisciplinary scholar, artist, and former park ranger focused on contemporary art that illuminates pressing ecological and/or geopolitical issues, often by blurring with other forms of thinking and making to impactfully engage the world. A postdoc in the architecture department at ETH Zürich, her writings have appeared in *Art Journal, American Art, Third Text, Social Text,* and *Cultural Geographies* as well as multiple edited volumes. Her first book (coedited with Kirsten Swenson), *Critical Landscapes: Art, Space, Politics,* was just released by Univ. of California Press. She is a founding member of two long-term, collaborative projects: World of Matter (2011-), an international art and research platform on global resource ecologies, and the Los Angeles Urban Rangers (2004-), a group that develops guided hikes, campfire talks, field kits, and other interpretive tools to spark creative explorations of everyday habitats in their home megalopolis and beyond.

ANDREW YANG

is a transdisciplinary artist and scholar working with the interwoven ecology of the natural, cultural, and bio-historical. His projects have been exhibited from Oklahoma to Yokohama, Chicago to Kassel - with new work in the 14th Istanbul Biennial in 2015. His writing & research appear in journals crossing biology, art, and philosophy including *Biological Theory*, *Interdisciplinary Science Reviews*, *Antennae*, *Interdisciplinary Studies in the Philosophy of Science*, *Leonardo*, as well as the upcoming anthology *City Creatures: Animal Encounters in Chicago Urban Wilderness* (UChicago Press 2015). He holds a PhD in Zoology and MFA in Visual Arts and is currently an Assocaite Professor at the School of the Art Institute of Chicago. In the fall of 2015 he will a visiting scholar and the Max Planck Institute for the History of Science (MPIWG) working on the theme of archival knowledge in the Anthropocene.

HEATHER DAVIS

Heather Davis is a researcher, writer and editor from Montreal. She is currently a postdoctoral fellow at the Institute for the Arts and Humanities at Pennsylvania State University, where she is working on a project which traces the ethology of plastic as a materialization of the philosophic division of the subject and object. She completed her Ph.D. in the joint program in Communication at Concordia University in 2011 on the political potential of community-based art. She has been a visiting scholar in the Master's program in Aesthetics and Politics at the California Institute for the Arts, the Experimental Critical Theory program at UCLA, the Hemispheric Institute of Performance and Politics at NYU and the Department of Women's and Gender Studies at Rutgers University. She has written about the intersection of art, politics, and ecological disaster for numerous art and academic publications and is the editor of *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies* and *Sex, Dreams, Animals and Action: Contemporary Feminist Art in Canada* (both forthcoming).

ALGORITHMIC INTERMEDIATION AND SMARTNESS

Keywords: *Digital world, smartness, intermediation platform, big data, crowdsourcing/funding, sharing economy, governance, technocene, algorithms, homeostasis*

This seminar explores the Anthropocene—and the possibility it will lead to the "technoscene," in which technology itself becomes a geological force, progressively independent of the (democratic) decisions of humans—through two related concepts: "intermediation" and "smartness." Intermediation is the activity of connecting people with common or complementary interests: e.g., in the traditional economy, banks intermediate between lenders and borrowers. With the advent of the Internet, new intermediation services have emerged, such as search engines and social networks. Intermediation is ensured by algorithms, which "decide" what is relevant for people. Even as algorithms aim to satisfy users, they also optimize for other parameters, such as establishing a uniform balance between demand and supply. Intermediation also enables sharing of resources, crowdsourcing, and crowdfunding by making people aware of potential consumers or producers of services. In the framework of the Anthropocene, the main question is: what forms of futurity, speculation, and life do algorithmic intermediation produce? To explore this latter aspect of intermediation, we focus on "smartness," which has risen to prominence as a catchhold term legitimating the increased introduction of computation, sensor and "big data" analytics to intermediate algorithmically among humans, technologies, and the environment. "Smartness" has come to take on a morally virtuous connotation as a purportedly necessary, even mandatory, set of practices by which to sustain or preserve human life in the face of environmental, security, and financial insecurities. Much of this discourse is driven by corporations, as evidenced by the popularity of company tags such as IBM's recent corporate slogans ("Think Smart"; "Smarter Planet"), and products such as the "smart phone" and the "smart home," and "smart cities," all of which aim to integrate environmentally responsible practices, optimize consumer behavior, and operate as technologies of cybernetic governance.

Seminar structure: The first half day will be spent discussing the main concepts (smartness, algorithmic intermediation, technocene) based on the suggested readings. The second half-day will be spent in small groups visiting particular sites (e.g., the Reichstag) and/or working on small group projects. The third half-day will be spent presenting/debating the results to the larger group, and identifying possible follow-up projects/publication for the Anthropocene coursebook.

BERNARD DIONYSIUS GEOGHEGAN

is a media theorist and historian of technology at Leuphana Universität Lüneburg. His research interests include digital media, visual culture studies, software studies, and theotechnics. His essays appear in journals including Critical Inquiry, The IEEE Annals on the History of Computing, Theory, Culture & Society, and Interaction Studies.

STÉPHANE GRUMBACH

is senior scientist at Inria and a specialist of data. He has worked on complex data types, such as spatial, statistical, as well as biological data, and has designed a compression algorithm for DNA sequences. His main interests are targeted to topics at the intersection of disciplines. His current research focuses on the disruptions of the digital revolution, particularly on intermediation platforms, which transform data to create new economic and societal means. Currently he is director of IXXI, the Complex Systems Institute at ENS Lyon, promoting crossdisciplinary research to address contemporary challenges, and heads the Dice research group from Inria devoted to the Economy of Data. He has been strongly involved in international relations, has spent eight years in China, first as a diplomat and then in the Chinese Academy of Sciences, where he headed the Sino-European IT Lab, LIAMA.

OLIVIER HAMANT

is a senior researcher at the National Institute for Agronomical Research (Lyon, France). He is working on feedbacks in plant development using cell biology, mechanics and modeling (see e.g. Hamant O *et al.,* 2008 Science; Uyttewaal *et al.,* 2012 Cell). Most of the concepts developed in this work arise from analogies between disciplines, including social sciences and art. In 2012, he was awarded the "Laurier jeune chercheur INRA" and the Paul Doisteau – Emile Blutet prize from the French Academy for his interdisciplinary work on plants. More recently, he has received a grant from the European Research Council to consolidate this research (ERC "MechanoDevo"). As a member of the Michel Serres Institute on the question of the shortage of resources and public goods, he is strongly interested in the challenges that the Anthropocene raises and has been a participant at the HKW Anthropocene Campus I.

ORIT HALPERN

is an assistant professor in History at the New School of Social Research and Eugene Lang College, and an affiliate in the Design Studies MA program at Parsons School of Design. Her research is on histories of digital media, cybernetics, cognitive and neuroscience, architecture, planning, and design. Her recent book *Beautiful Data: A History of Vision and Reason since 1945* (Duke University Press, 2014) is a genealogy of big data and interactivity. Her published works and multi-media projects have appeared in numerous venues including *The Journal of Visual Culture, Public Culture, Configurations, BioSocieties* and at ZKM in Karlsruhe, Germany. She has also published essays in numerous art catalogues and curated design exhibitions.

ROBERT MITCHELL
is the Marcello Lotti Professor of English and director of the Center for Interdisciplinary Studies in Science and Cultural Theory at Duke University (USA). He is author of three monographs, including *Bioart and the Vitality of Media* (University of Washington Press, 2010) and *Experimental Life: Vitalism in Romantic Science and Literature* (Johns Hopkins UP, 2013), and co-author of the DVDROM *Biofutures: Owning Body Parts and Information* (U of Pennsylvania P, 2008). He is also co-editor of several essay collections, including *Releasing the Image: From Literature to New Media* (Stanford UP, 2011), and co-editor of the book series "In Vivo: The Cultural Mediations of Biomedical Science" (University of Washington Press). He has published many articles in humanities, social science, and natural science journals, including *Science*, *The American Journal of Bioethics*, *Biosocieties*.

MARK HANSEN
is professor of Literature and Visual Studies at Duke University. Crossing a host of disciplines, including literary studies, film and media, philosophy, science studies, and cognitive neuroscience, he investigates the role of technology in human agency and social life. Exploring the meaning of the relentless technological exteriorization that characterizes the human as a form of life, his research pays particular attention to the key role played by visual art, literature, and cultural practices in brokering individual and collective adaptation to technology from the industrial revolution to the digital revolution.

ERICH HÖRL
is full professor of Media Culture at the Institute of Culture and Aesthetics of Digital Media
(ICAM) at Leuphana University Lüneburg. He is also senior researcher at Leuphana's Digital Culture Research Lab (DRCL). His research interests include the elaboration of a general ecology of media and technology as well as the description as well as the critique of the process of cyberneticization.
He is the contributing editor of *Die technologische Bedingung. Beiträge zur Beschreibung der technischen Welt* (Berlin 2011: Suhrkamp) and of *Die Transformation des Humanen. Beiträge zur Kulturgeschichte der Kybernetik* (Frankfurt/Main 2008: Suhrkamp). Among his articles is *A Thousand Ecologies: The Process of Cyberneticization and General Ecology*, in *The Whole Earth. California and the Disappearance of the Outside*, ed. by Diedrich Diederichsen and Anselm Franke, Berlin 2013: Sternberg Press, pp. 121-130.

WHOSE? READING "THE TECHNOSPHERE" AND "THE ANTHROPOCENE" FROM AFRICA

Does the concept of "the"/"an" anthropocene promote or inhibit the possibilities of a polycentric global epistemology? Does it de-center or re-center the Western ratio? With what implications? When should the beginning of the anthropocene be demarcated? Why there and according to whom? Anthropocene... in whose language? Is it possible to have more than one anthropocene, along the lines of "modernity in two languages" ("yours" and "ours") that Partha Chatterjee suggested in 1997? The anxiety is that "the anthropocene" and even "the technosphere" may become, wittingly or unwittingly, a convenient vocabulary to restore Euro- and Western-centricity, taking us back to an imperial or colonial mode of representation of seeing from Berlin, London, and Washington and extending hegemonic worldview without regard to situatedness. Pluralizing (technospheres, anthropocenes--even anthropo*scenes*) is one step towards a democracy of operative language allowing different markers of time, thought, tools, realities, scales, causalities, effects, and categories to coexist and participate in shaping global vocabularies. This seminar will therefore consider what *a* (not "the") technosphere, *an* atmosphere, and *a* biosphere might mean from Africa, not just as outcomes of incoming ideas or artifacts in the present, but endogenous modes of thought and practice over a much longer durée. This seminar brings together some of the world's most renowned scholars of Africa, each addressing the concept of anthropocene (and technosphere) from her/his own special: archaeology, history, history, STS, and graphic design. Guest lecturers will be Shadreck Chirikure, University of Cape Town; Gabrielle Hecht, University of Michigan; Chaz Maviyane-Davies, Massachusetts School of Art and Design; and D. A. Masolo, University of Louisville (Philosopher).

CLAPPERTON CHAKANETSA MAVHUNGA
is an associate professor of science, technology, and society at MIT. He is the first graduate of the University of Michigan's Science, Technology & Society (STS) Program and one of few African scholars trained in and publishing at the intersection of African History and STS. He has published many articles and book chapters, including "Vermin Beings." Prof. Mavhunga is the author of *Transient Workspaces: Technologies of Everyday Innovation in Zimbabwe* (MIT Press, 2014), and has just finished his second book, tentatively entitled *What Does Science Mean from Africa? A View from Dzimbahwe* and an edited volume entitled *What Do Science, Technology, and Innovation Mean from Africa?*, both of which are under review with MIT Press. His next two book projects focus on *Chimurenga*, Zimbabwe's war of independence, as a laboratory in which the colonial state and the oppressed are the agents in the convergence and blending of indigenous and incoming sciences, technologies, and innovations.

SHADRECK CHIRIKURE
is a Senior Lecturer in the Department of Archaeology at the University of Cape Town. He obtained the degrees of MA Artefact Studies (2002) and PhD in Archaeology (2005) from the Institute of Archaeology, University College London. His doctoral thesis explored the technology and socio-cultural metaphors associated with pre-colonial iron production in northern Zimbabwe.

CHAZ MAVIYANE-DAVIES
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