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Synthesis
*at Arizona State
University*

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Synthesis
14/15 Annual Report

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New fields of study open up if we turn an unbiased attention to science before its fragmentation into physics, biology, psychology and philosophy, and to techne before its fragmentation into arts and engineering.

Modern Alchemy

The Story of Synthesis

The familiar form of science which has come to dominate our present era emerged from alchemical practices in the 17th century. Along the way it introduced a rift with long-lasting consequences. The Newtonian description of the world as a mechanical system with direct transmission of force by physical contact became the basis of the new mode of inquiry. Any phenomenon that could not be expressed in the manner of such mechanical laws fell into disregard.

Newton was both the first modern scientist and the last alchemist. His work on mechanics provided science with its model practice; ever since then physics has sought universal mechanical explanations. Gravitation, which Newton introduced as a universal law, was deemed 'occult' by his contemporaries because it invoked action at a distance and did not fit mechanical explanation. To this day gravity remains a challenge for science.

The reductive mechanistic approach disregards local knowledge and its fertile twining with the material world into rich, affective practices. Privileging the mechanical over organic relations and phenomena has produced a disregard for natural and cultural habitats, which eventually impoverishes even the most privileged societies.

In recent years the limits of reductive science have become apparent: its innovative potential is increasingly exhausted and the value of its kind of progress is questioned. We begin to see the boundaries between these 'two cultures' as more permeable.

The supposed dichotomy between man and animal, the supposed passivity of plants, and the supposed inertness of matter are increasingly recognized as biases, not facts. These biases can be dismantled with fertile results. Extending questions of consciousness to animal and vegetable life, for instance, has recently revealed complex supporting interactions among plants and their ecosystems.

New fields of study open up if we turn an unbiased attention to science before its fragmentation into physics, biology, psychology and philosophy, and to techne before its fragmentation into arts and engineering. We build a scientific practice that returns to, and benefits from, *amodern* modes of inquiry and draws on the fullness of amodern intuition. However, to do more than merely setting the clock back, the new science we propose draws power from a new humanities – the practices of making meaning.

Poiesis, the art of creation, precedes theory-building, and theory-building precedes methodology, because methodology repeats a process that no longer generates knowledge. Therefore the arts and humanities play a central role in creating fresh knowledge. But how can engineers and humanists learn more effectively from artists other than beholding their singular products, and vice-versa?

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precedes theory-building,
and theory-building precedes
methodology.

Synthesis hosts research clusters, each motivated by an experimental question or proposition inspiring equally two or more investigators. To be productive, this sort of deep transdisciplinary research and learning requires respect and patience for alien norms of what counts as a contribution. As a community Synthesis works on the Principle of Charity: “I don’t know what you’re talking about. But I grant that you know what you’re talking about. So I’ll come back and work with you again.” To this communicative principle we add a new collective practice – a modern alchemy.

Alchemy was the art of transmuting bodies and substances, the quick and the dead, the inert becoming vital, accidentals and essences becoming quintessences. Five centuries ago, alchemy was a practical and magical art, concerned with bodies and materials that are always suffused with ethical, vital and material power. Under the prism of the Enlightenment, such practices split into the practical (e.g. engineering or medicine), the scientific, and the art of the imaginary. Our work fuses these arts together again to transmute the material of social relations.

Synthesis provides a place for experimentally inventing and fusing fresh practices of understanding how the world works with fresh practices of making meaning. The motto “Art all the way down” implies that we cannot do business as usual by simply identically reproducing ourselves : our apprentices will learn but differ from the professions under which we were trained. We create stronger alloys of the know-hows and know-thats we have inherited from the past 500 years of knowledge creation. This is the basis for our choice of themes and affiliates. Transdisciplinary research is more than merely sitting an engineer and an artist and a philosopher in a room; it means transforming each discipline’s own ways of doing things, with care.

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room; it means transforming each discipline’s own ways
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Message from Sha Xin Wei

A year after running under full sail with a great crew of adventurous makers and thinkers from all quarters, it's a pleasure to present you with the Synthesis Center's first Annual Report. With the help of mentors and colleagues from the Topological Media Lab in Montreal, the Center for New Music and Technology in Berkeley and research centers in sister universities, we can point with pride to a suite of experiments, events, and technoscientific products with conceptual edge and imagination.

Thanks to strategic investment from the Provost and President of Arizona State University, we're welcoming a new generation of talented students working with courageous artists and scholars who, having mastered their home areas of practice and theory, are sailing out into deeper, open waters. We invite you to join us.



SYNTHESIS / who we are

Vision

Building an ecology of practices for imagining and making the worlds we inhabit.

Mission

Computer-driven media now circulate and activate images, sound and objects at densities greater than human limits of comprehension. We face the limits of effectively managing the technologies that activate our everyday world. Our challenge is how to build and inhabit environments that leverage the power of emerging technologies for shelter, sociality and play.

We pursue our mission by developing new practices for imagining and creating worlds that do not burden but enliven experience. We design technologies and techniques for animating environments that are richer but not more complicated, by asking how can we create worlds that we would *want* to live in?

Impact

In the 21st Century technology is omnipresent and deeply entwined in our daily lives. We study the human experience of technology so that we can impact its design, adoption, and incorporation into different aspects of our daily lives. The practical impacts of this research are myriad and can apply to any sector powered by technology including:

Health care innovation

Architecture and industrial design

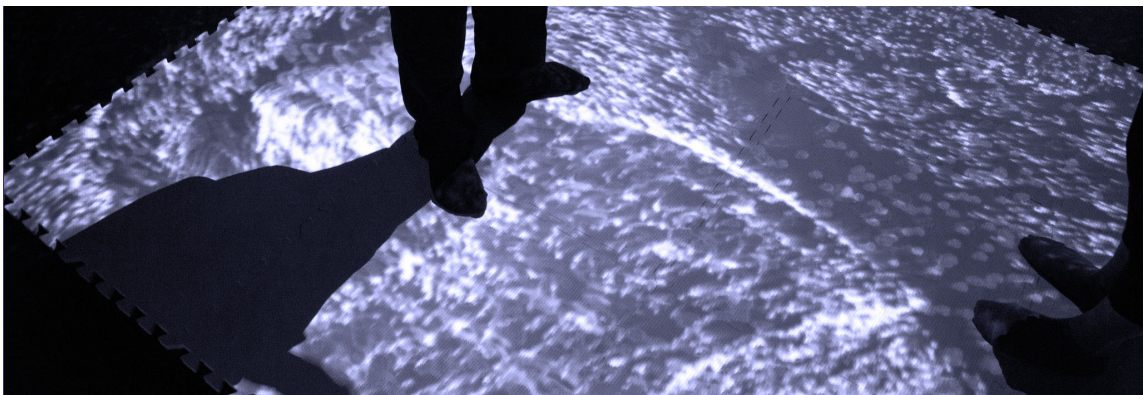
Science and engineering

Policy and communication

Arts and culture

Economy and society

／ We research how to use technology to
enrich our world without complicating it. ／



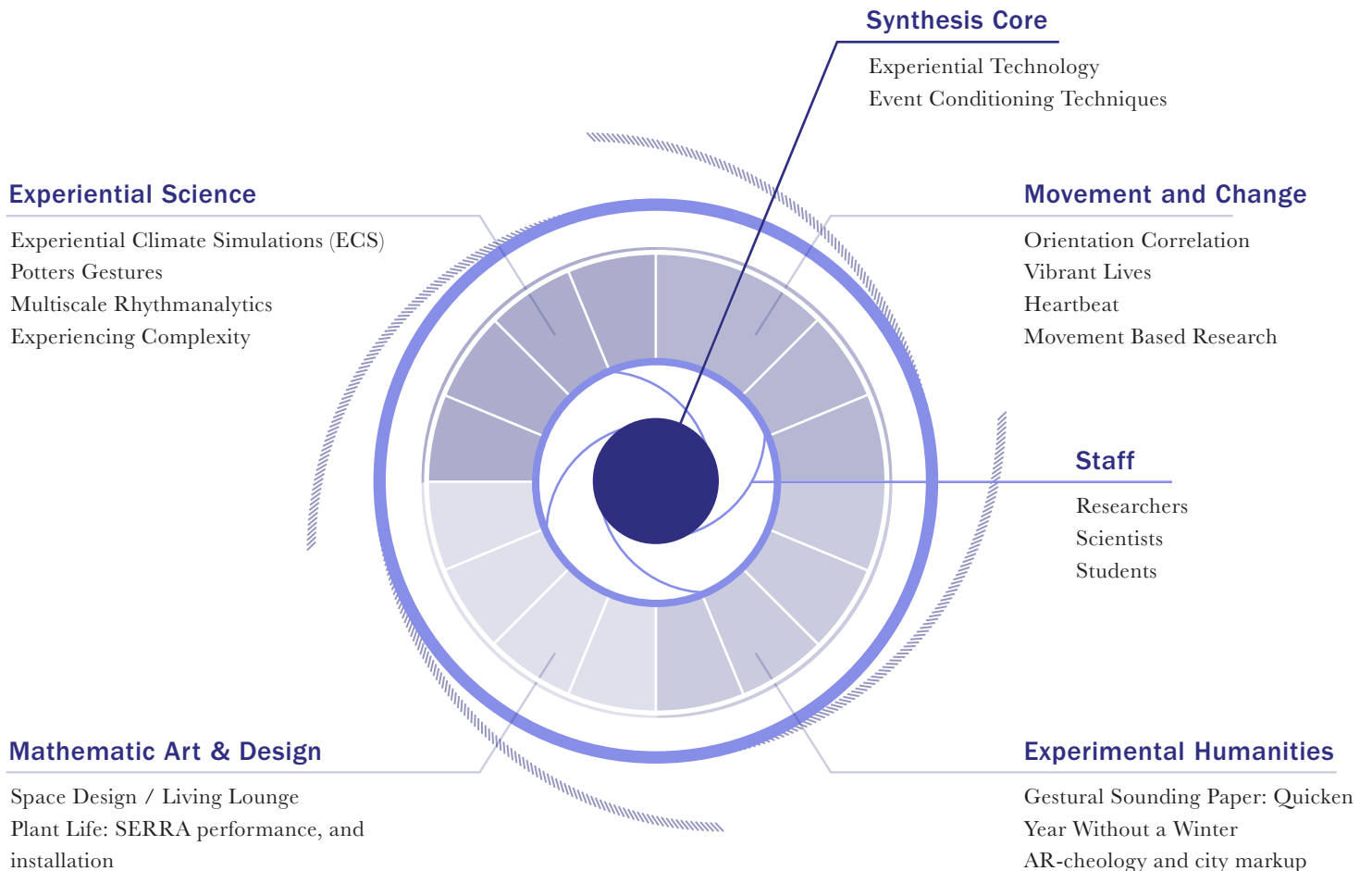
I Infrastructure

What is Synthesis?

The Synthesis Center is a place – a social construct designed to redistribute the intellectual, economic, and social energy of different disciplines to create fresh knowledge. Like any place it is built out of:

- 1 a physical space where people can gather, work, and communicate with each other
- 2 a group of people who live and work together in accordance with shared goals
- 3 the capacity to support the conversations and work of its members

Our place functions like a wheel spinning on an axis. We provide the axis to transfer the energy of our participants, and the grease to keep the wheel spinning true. To spin the wheel our participants provide energy in the form of external funding, time, special technology, work.



II

Research and Funding

How do we function?

Synthesis functions by providing the capacity to blend disciplinary work. It does this by first creating and maintaining an ethos of working practices that all researchers will share regardless of their training. This ethos is created and maintained by a core staff of professional transdisciplinaryians

who work transversally across projects, curate results, and mediate insights among all participants. This staff is supported by the energies of our collaborators and in return they facilitate the synthesis of fresh knowledge and know-how.

III

Engagement

What do we hope to accomplish?

We produce new knowledge about how people, technology, society articulate creatively and expressively in the 21st century. By balancing uneven external forces such as funding, institutional, and disciplinary power, we give researchers and apprentices the time and space they need to not just juxtapose their habits but to fuse and create

fresh knowledge, fresh tactics, techniques, technology, *techné*. How? by experimentation, the variation of experience that transforms the phenomenon, the apparatus, the method and the experimentalist in the course of the experiment. We synthesize a fresh technicity blending a *scienza nuova* with *ars nova*.



People

Staff



Sha Xin Wei
Director



Chris Roberts
Research Director



Julian Stein
Media Environment
Lead



Brandon Mechtley
Complex Systems
Lead



Dehlia Hannah
Research Curator:
Atmosphere



Kristi
Garboushian
Communications
Coordinator



Christian Montoro
Graphic Designer

Affiliate Faculty

Todd Ingalls

Associate Research Professor and Assistant Director | Arts, Media + Engineering

Pavan Turaga

Assistant Professor | Arts, Media + Engineering | Electrical, Computer, and Energy Engineering

Christian Ziegler

Assistant Professor | Arts, Media + Engineering

Garth Paine

Associate Professor | Arts, Media + Engineering | Music

Byron Lahey

Arts, Media + Engineering

Jessica Rajko

Assistant Professor | School of Film, Dance, Theater

Jacqueline Wernimont

Assistant Professor | Department of English

Affiliate Students

Garrett L. Johnson

Media Arts and Sciences | Arts, Media + Engineering

Brenda McCaffrey

Media Arts and Sciences | Arts, Media + Engineering

Connnor Rawls

Digital Culture | Arts, Media + Engineering

Ian Shelansky

Interdisciplinary Digital Media and Performance | School of Film Dance + Theater, AME

Chris Zlaket

Digital Culture | Arts, Media + Engineering

Gabriella Isaac

Digital Culture | Arts, Media + Engineering

Prashan S. Seshasayee

Electrical Engineering | School of Computing, Informatics, and Decision Systems Engineering

Megan Patzem

Digital Culture | Arts, Media + Engineering

Cooper S. Yoo

Media Arts and Sciences | Arts, Media + Engineering

Qiao Wang

Electrical Engineering | School of Electrical, Computer, and Energy Engineering

Chinmay Dharmadhikari

Electrical Engineering | School of Electrical, Computer, and Energy Engineering

Michael Krzyzaniak

Media Arts and Sciences | Arts, Media + Engineering

Josh Gigantino

Media Arts and Sciences | Arts, Media + Engineering

Nicole Williams

Media Arts and Sciences | Arts, Media + Engineering

Courtney Brown

Doctor of Musical Arts | School of Music

Varsha Iyengar

Computer Science | School of Computing, Informatics, and Decision Systems Engineering

Joshua Stark

Computer Science | Barrett, the Honors College

Alex Abreu

Media Arts and Sciences | Arts, Media + Engineering

Alyssa Forbes

Digital Culture | Arts, Media + Engineering

Affiliates



Freida Abtan	Music and Computing, Goldsmiths University of London, UK
Julie Akerly	Dance School of Film, Dance and Theater
Jakob Bak	Copenhagen Institute of Interaction Design
Ron Broglio	Associate Professor, Department of English
Nikolaos Chandolias	Rafael Lozano-Hemmer Studio, Montreal
Grisha Coleman	Associate Professor, Arts, Media + Engineering
Niklas Damiris	Visiting Scholar, Stanford University, Swiss Finance Institute at the University of Lugano
Josée-Anne Drolet	Alkemie, Montreal
Patricia Duquette	Artist Topological Media Lab, Concordia University, Montreal
Michael Epperson	Director, Center for Philosophy and Natural Sciences, California State University Sacramento
Omar Faleh	Topological Media Lab, Concordia University, Montreal
Ed Finn	Director Center for Science and the Imagination Assistant Professor, Arts, Media + Engineering
Adrian Freed	Research Director, Center for New Music and Audio Technologies, UC Berkeley
David Gauthier	Netherlands Institute for Cultural Analysis Utrecht University
Satinder Gill	Center for Music and Science, Cambridge University
Katie Jung	Topological Media Lab, Concordia University, Montreal
Celia Lury	Director, The Centre for Interdisciplinary Methodologies, University of Warwick
Vangelis Lympouridis	Creative Media & Behavioral Health Center, USC
John MacCallum	Center for New Music and Audio Technologies Teraswarm ERC, UC Berkeley
Michael Montanaro	Associate Director, Topological Media Lab Chair of the Department of Contemporary Dance, Concordia University, Montreal
Evan Montpelier	Topological Media Lab, Concordia University, Montreal
David Morris	Associate Director, Topological Media Lab Chair of the Philosophy Department, Concordia University, Montreal
Natasha Myers	Department of Anthropology; Institute for Science and Technology Studies, York University (Canada)
Navid Navab	Topological Media Lab, Concordia University, Montreal
Adam Nocck	Lab for Critical Technics Assistant Professor, Arts, Media + Engineering
Paul Shrivastava	Executive Director, Future Earth
Liza Solomonova	Dream and Nightmare Laboratory, Université de Montréal
Andreas Spanias	School of Electrical, Computer and Energy Engineering, Ira A Fulton School of Engineering
Oana Suteu	Filmmaker, Montreal
David Tinapple	Assistant Professor, Arts, Media + Engineering
Helga Wild	Water Cooler Logic, Menlo Park

RESEARCH / what we do

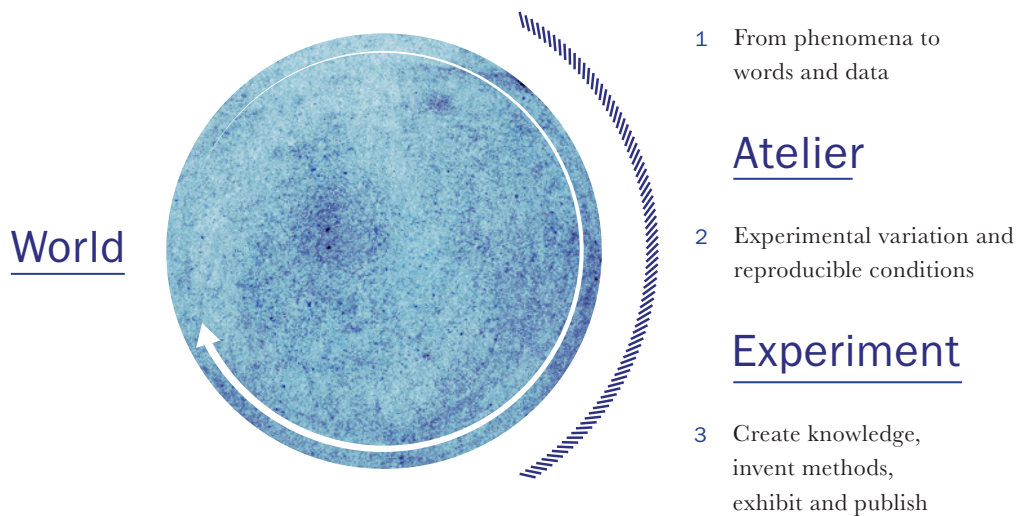
A responsive environment should not make statements, nor should it make spectators.

Although Synthesis creates knowledge through making, this is not a place for individuals to produce individual works of art, nor for hackers to tinker with with the latest round of technology. We work with partner studios and labs for such work. Synthesis is a place for thinking through the collective making of events, varied experimentally and reproducibly by computational means. A responsive environment should not make statements, nor should it make spectators.

Synthesis researchers draw from diverse disciplines in the humanities, engineering and the arts to blend knowledge and know-how to find meaningful ways of animating the worlds in which we live and play.

In particular, we use techniques from responsive environments, time-based media, experiential science, and non-anthropocentric design theory.

We offer affiliates at any level of experience the chance to associate with other expert and talented people and be enriched with techniques, but most importantly with approaches, tactics of experiment backed by as much studied knowledge as we can offer through our seminars, teas, and walks. We use whatever techniques make the most compelling experience for the minimum engineering overhead: realtime media instruments, custom objects, event structures, reading and writing, movement.



Featured Projects



Atmosphere and Place

What makes a location a particular location, a place? What qualities make a place particular, have no locus, pertain to no object, yet are definite? Atmosphere.



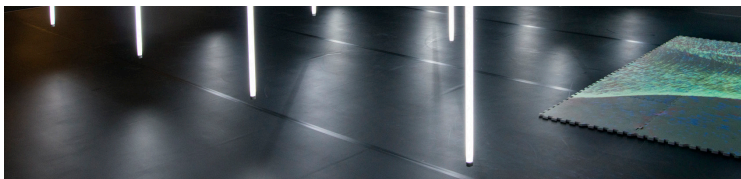
Rhythmanalysis

How can we understand the experience of cities, organizations, bodies and media via a multi-scale approach to temporal phenomena?



Improvisational Environments

How can we use responsive realtime timebased media to build environments for ethico-aesthetic experiment?



Lighting and Rhythm

How do light and other fields of media modulate temporality – our shared sense of dynamic, change, and rhythm?



Sounding Paper

Prototyping with sensor-infused paper that modulates sound in respond to touch, we explore gestural expression via animate matter.



Vegetal Experience: SERRA

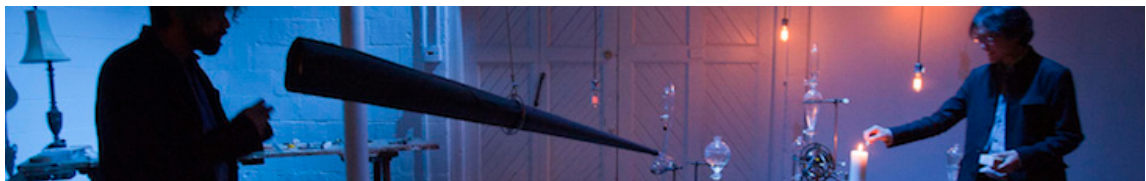
A new hybrid of philosophy, botany and art: inspired by the behavior of plants and vegetal life, we invent a new kind of thinking through movement.

Disciplinary Fusion

Transforming Research–Creation

Synthesis' chief mission the first year was to adapt a Canadian research-creation culture into a knowledge enterprise suitable for the New American University. Most of our activities focused on transitioning practices

from Dr. Sha's Topological Media Lab (2001-2014), developing a community of students and researchers in which such practices can successfully evolve into a new means for disciplinary fusion.



Hosting Research Clusters

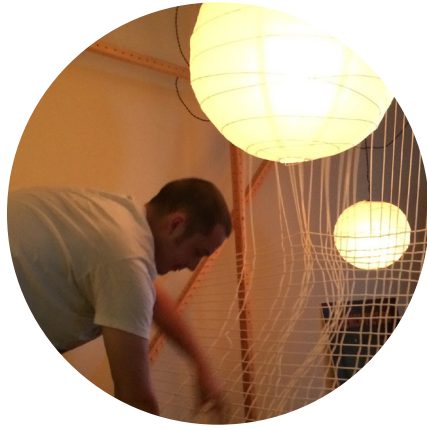
Synthesis hosted a series of residencies that applied cutting-edge artistic methods to use-inspired research problems. Two (Lighting and Rhythm and Improvisational Environments) were used to explore how theatrical-grade digital technology can be used to augment (or enchant) quotidian spaces, and two (Atmosphere and Place and Heartbeat) applied

digital technology and artistic methods to invent fresh, compelling and rigorous ways of engaging fundamental questions about lived experience. Each residency served as a means for introducing the ethos and methods of research-creation to a team of American scholars with whom we will develop projects next year.

Cultivating Synthesis

In order for disciplines to fuse, their practitioners must mingle well. Dr. Sha has worked for the past 20 years with over 120 makers – artists, theorists, engineers – to develop a working ethos for people from radically different traditions to blend methods to generate fresh knowledge and technology,

motivated by fundamental problems and propositions that transcend the frames of particular disciplines. At present this blending is best structured as a series of project streams organized around major themes that inspire disciplinary fusion.



Synthesis projects can be grouped into four major research streams

1 **Experiential Science** *and embodied computing*

In this stream we study how people can directly and palpably tinker with or steer the most complex scientific simulations to learn about the world. We leverage 15 years of pioneering work with realtime gestural media and responsive environments to create scientific tools, instruments and whole immersive environments that let inhabitants steer otherwise inaccessibly complex models via embodied interaction and rich media feedback in realtime. Our guiding assumption is that these techniques combined with rich narrative tools greatly speed and scale up

the generation of hypotheses and theories for testing with advanced (and expensive) instrumentation. This will reduce the cost of conducting big science and also provide a play space for creating alternate imaginaries. The Atmosphere and Place residency kicked off the development of a prototype system that allows a person to corporeally engage with a computational model of fluid dynamics used to approximate a layer of atmospheric activity, showcased in the 2015 Conference on Complex Systems.

2 **Movement and Change** *media, bodies, organizations, cities*

We extend state of the art work with movement and time-based media to explore how the sense of dynamic, change, and rhythm shapes and intertwines the processes of life, city, industry, with processes of nature at multiple time scales. We will contribute to urban design and the resilience of future cities

across the globe. We compare temporal phenomena via notions of rhythm as a way for people with otherwise incommensurate vocabularies and methods to compare insights about movement and change in experiential, built and natural environments, phenomena for which we lack neat theories.



3 Mathematic Art and Design *performance and society*

Mathematicians, like artists, do not measure or count bits of “nature” – they imagine and propose “what if?” Whereas biology is about the stuff of life, *mathematic* art and design can be about the life of stuff, like sound, light, movement, song, affect or software. In this research stream we alloy computational media arts and sciences with propositions about process, performativity and embodiment *unframed* from theater, music, dance, martial arts to create

fresh modes of expression for our dynamic age. Sidestepping linguistic and static representation, we can coordinate expressive movement in concert with media.

The Heartbeat residency explored these themes by studying the articulation of a dancer’s internal rhythm with the movement of a group of accompanists. We are hosting studies of how ensembles of rehearsed and un-rehearsed people correlate their actions non-verbally in physical space.

4 Experimental Humanities *and speculative engineering*

Another stream this year is to explore through reflection how to blend disciplinary strengths via expanded kinds of experimental practice. In this capacity we participate in a larger conversation about what research is within a practice-based college, and how can we incorporate concepts from process and complexity, and practice-based methods into

the textually oriented humanities. We challenge ourselves to think engineering and science beyond tools and gadgets, while leveraging the unique critical practices of humanities and the arts. We are building networks of disciplinary evaluators to help us conduct a longitudinal study of the transformation of disciplinary practices under such syntheses.

Ecology of Practices Research Network

circulating affiliated projects and researchers to develop along host sites' particular strengths

Place & Atmosphere
Rhythm
Movement & Responsive Media
Plant Life & Sustainability
Theory

- Centre for Interdisciplinary Methodology | Warwick University
- Center for New Music, Art & Technology | UC Berkeley
- Center for Music & Science | Cambridge University
- Center for Philosophy and Natural Science | CSU Sacramento
- Copenhagen Institute of Interaction Design
- Complexité et information morphologiques | École Normale Supérieure, Paris
- David O'Brien Center for Sustainable Enterprise | Concordia University
- Goldsmiths London
- Graduate School of Design | Harvard University
- Synthesis | Arts, Media, Engineering | Arizona State University
- Humanities Innovation Lab | UC Davis
- Institut de Recherche et Coordination Acoustique/Musique, Paris
- Lab for Critical Technics | Arizona State University
- Laboratoire du geste, Art and Philosophy | Panthéon-Sorbonne Paris 1
- Plant Collaboratory | York University
- Queen Mary University, London
- Santa Fe Institute for Complexity Studies
- School of Architecture | ETH Zurich
- Science and Technology Studies | UC Davis
- Topological Media Lab | Concordia University

Calendar of Events

hosted by Synthesis

2013	10/25	Workshop TML 1: Improvisational Sound	Navid Navab vimeo.com/82210401 blog.digitalculture.asu.edu/?q=node/534
	11/21	Workshop TML 2: Synthesis Seminar: Animated Sound & Lighting	Julian Stein vimeo.com/81542680 blog.digitalculture.asu.edu/?q=node/561
	12/12	Workshop TML 3: Synthesis Seminar: Realtime Manipulation of Electronic Media	Evan Montpelier vimeo.com/81610665 blog.digitalculture.asu.edu/?q=node/583
2014	1/1	Event Sha Xin Wei named Director of AME	The ASU Herberger Institute for Design and the Arts welcomes media arts, science and technology scholar Sha Xin Wei as the new Director of its School of Arts, Media + Engineering. vimeo.com/87521693
	2/6	Presentation “Play and Games”	Sha Xin Wei Digital Culture Lecture https://vimeo.com/86337788
	2/15 - 3/7	Residency Experiment Improvisational Environments (IER)	Adrian Freed, John MacCallum, Navid Navab, Vangelis Lympouridis, Chris Ziegler, Garth Paine, Sha Xin Wei, Todd Ingalls, Evan Montpelier, Katie Jung improvisationalenvironments.weebly.com
	2/18	Interview CSI's 5 Burning Questions	Sha Xin Wei Center for Science and the Imagination vimeo.com/85742085
	5/28 - 5/30	Symposium Self-Organising Maps CAAD Metalithicum Zurich	Sha Xin Wei, with Ludger Hovestadt, Vera Bühlmann, Michael Epperson A Nonanthropocentric Approach to Apperception vimeo.com/98263858 vimeo.com/105531008 Profiling Key Concepts in Continuous Geometry vimeo.com/98266829 vimeo.com/105048654
	9/1 - 12/31	Study Research Ecology of Herberger	Helga Wild and Niklas Damiris: External consultants. Assessment of research ecology at the Herberger Institute of Design and the Arts
	9/1/13 - 8/15	Research Project Quicken Gesturally Sensitive Sounding Paper Copenhagen Institute of Interaction Design	Lead: Sha Xin Wei, Intel Research Fellow; Chris Wood, Navid Navab, Jamie Allen, Pavla Baxová, Jakob Bak (CIID) quickenpaper.weebly.com

Calendar of Events

hosted by Synthesis

	7/9 - 7/11	Talk INTETAIN 2014 Columbia College Chicago	Sha Xin-Wei, Keynote, 6th International Conference on Intelligent Technologies for Interactive Entertainment. Co-hosted with the European Alliance for Innovation. www.intetain.org/2014
	5/15 - 8/18	Project Brickyard Augmented Interiors	Lead: Katie Jung; Research Team: Byron Lahey, Garrett Johnson, Matthew Briggs, Kevin Klawinski, Assegid Kidane, Luke Kautz, Peter Weisman, Tain Barzso
	11/17 - 11/25	Experiment and Workshop Lighting and Rhythm	Movement + Media: Lead: Chris Ziegler; Researchers: Omar Faleh, Garrett Johnson, Varsha Iyengar, Vickie Hall, Eleanor Hanafin Temporality + Media: Lead: Sha Xin Wei; Researchers: Pavan Turaga, Pete Weisman, Michael Bateman, Ian Shelanskey, Aniket Sarangdhar, Omar Faleh, Connor Rawls, Julian Stein, Garrett Johnson, Gabriella Isaacs, Michael Krzyzaniak, Rushil Anirudh, Qiao Wang, Julie Akerly, Jessica Rajko, Connor Rawls, Varsha Iyengar lightingrhythm.weebly.com
2015	1/1 - 2/20	Experiment and Workshop Heartbeat	Leads: Sha Xin Wei, Teoma Naccarato, John MacCallum; Researchers: Garrett Johnson, Gabriella Isaacs, Michael Krzyzaniak, Rushil Anirudh, Qiao Wang, Julie Akerly, Connor Rawls, Assegid Kidane, Pete Weisman, Varsha Iyengar rhythmanalysis.weebly.com
	4/16 - 4/18	Symposium Place and Atmosphere	Keynote: Silvia Benedito, Harvard Graduate School of Design Organizers: Chris Roberts and Dehlia Hannah atmosphereandplace.weebly.com
	4/13 - 5/11	Development Residency Vegetal Life SERRA, Montreal	Leads: Oana Suteu Khintirian, Ginette Laurin; Artists, Evan Montpellier, O Vertigo
	8/24 - 9/4	Development Residency Vegetal Life SERRA, ASU	Lead: Oana Suteu Khintirian visual art; Visiting Artist: Ginette Laurin (O Vertigo) choreography; Researchers: Todd Ingalls, Julian Stein, Gabriela Fuchs, Synthesis team
	9/28 - 10/2	Installation Environment Conference on Complex Systems, Tempe	Lead: Chris Roberts; Researchers: Pete Weisman, Synthesis media and tech team: Connor Rawls, Megan Patzem, Chris Zlaket, Josh Stark
2016	1/13 - 1/17	Research Residency Maths after Deleuze and Badiou	Michael Epperson, Center for Philosophy and Natural Science, CSU Sacramento
	1/1 -	Experiment and Workshop Movement and Rhythm	Leads: Todd Ingalls, Sha Xin Wei; Researchers: Julian Stein, Garrett Johnson, Gabrielle Isaacs; Cumhuriyet Erkut, Dan Overholt (Aalborg)

Visitors and Visits

hosted and posted by Synthesis

2014	3/4	David Rothenberg, musician
	3/5	UC Davis, Quality vs Quantity, Measurement
	5/7-5/12	Niklas Damiris Stanford visiting scholar, Swiss Banking Centre University of Lugano
	5/7-5/12	Helga Wild WaterCooler Logic
	9/18	Cornelius Popel University of Applied Sciences Ansbach
	10/31	Thanassis Rikakis Carnegie-Mellon University
	12/2	Women in Philanthropy
2015	2/3	Alan Lightman, writer
	2/10	President Olivier Laboux and Frédéric Benhamou Vice-President of Research and Innovation Université de Nantes
	2/16	Scott Parazynski, Center for Human Achievement and Maximizing Performance
	2/16-2/20	John MacCallum, CNMAT Berkeley; Teoma Naccarato, Choreographer, Montreal
	2/19	Chinese Academy of Fine Arts
	3/15-5/19	Wenner-Gren Foundation Symposium, New Media New Publics, Lisbon
	3/26	Roger Malina Leonardo, The International Society for Arts, Science and Technology
	3/26	Hugh Crawford Georgia Institute of Technology
	3/27	Nina Czegledy International Symposium on Electronic Art
	3/28	Balance Unbalance
	4/6-4/15	Silvia Benedito Landscape Architecture, Graduate School of Design, Harvard
	4/6-4/15	Tim Choi UC Davis Science and Technology Studies
	4/6-4/15	Melissa Bukovsky National Center for Atmospheric Research
	4/15-4/19	Public Life: Politics of Care, Vienna
	4/21	Xi'an Jiaotong University, China
	4/22	Bryan Daniels Center for Complexity and Collective Computation, UW-Madison
	5/12	President Michael Crow and Provost Mark Searle
	6/8-6/10	Alliance for the Arts in Research Universities, Carnegie Mellon University
	8/1-8/4	Ginette Laurin, Artistic Director, O Vertigo
	9/2	Brian Johnson, Intel Futurist
	10/16	Mirielle Eaton and Manuela Berger Thunderbird School of Global Management, Geneva
	10/29-10/30	Chandler Innovation Center
	11/10	AI & Humans, CyberSalon London
	11/16	Jim O'Donnell, Arizona State University Librarian
	11/16	Ian Douglas Executive Director, Institute for the Science of Teaching and Learning
	11/23	Melani Walton
2016	1/13 - 1/17	Michael Epperson, Center for Philosophy and Natural Science CSU Sacramento
	2/15	National Film Board of Canada
	2/11 - 2/14	National Center for Atmospheric Research
	2/23	JD Talasek National Academy of Sciences
	3/9	Future Earth, Montreal

Synthesis

Arizona State University

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lightingrhythm.weebly.com

quickenpaper.weebly.com

serracreation.weebly.com

Credits

p 14

1st image: Bernault Smilde, Numbus Visual (2013), Centre for Contemporary Art, Carlow, Ireland.

3rd image: Topological Media Lab (2013), Einsteins Dream workshop, Concordia University, Montreal.

6th image: Oana Suteu Khintirian (2015), Serra workshop, O Vertigo Studio, Montreal.

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Michael Montanaro (2013), Candle Installation at Play Symposium, The University of Chicago Gray Center for Arts and Inquiry and Topological Media Lab.

All other images by Synthesis at ASU.