



WEAVING

COGNITION

TECHNOLOGY

CULTURE

April 5 – 8, 2017

Columbia University

<http://scienceandsociety.columbia.edu/cssevent/weaving-cognition>

Weaving: Cognition, Technology, Culture

3rd Annual Embodied Cognition Workshop

April 5 – 8, 2017

Columbia University, New York City

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This conference is sponsored by the Center for Science and Society, the Dorothy Borg Research Program of the Weatherhead East Asian Institute, the Institute for Comparative Literature and Society, and the Department of History, Columbia University.



Cover Image: Brocade weaving, Nabenchauk, Chiapas, Mexico, 1991 —
Photo by Lauren Greenfield/INSTITUTE

INTRODUCTION

In his quixotic search for a mechanical calculating machine, the great nineteenth-century British polymath Charles Babbage was inspired by French textile entrepreneur and manufacturer Joseph-Marie Jacquard's punch cards that "programmed" complex designs into his silk textiles as weavers moved their shuttles back and forth at their looms. The cards determined the up and down movement of warp threads in the correct order to allow weft threads to weave over or under them. Punch cards could do this because weaving is one of the oldest binary systems. Babbage's patron and supporter, Ada Lovelace, recognized this, writing "We may say most aptly that the Analytical Engine *weaves algebraical patterns* just as the Jacquard-loom weaves flowers and leaves." Jacquard's punch cards mechanized a system already performed for millennia by skilled weavers, who had conceptualized and woven by hand these complex either-or, up-down patterns, often by means of "drawboys" and girls sitting atop the looms, the pattern sometimes codified in songs sung while weaving, the rhythm indicating when to draw up the warp threads.

The craft of weaving can thus be seen as foundational to the digital revolution, just as it was central to the Industrial Revolution. Yet, weaving, and its necessary prerequisite, spinning, are ancient human activities, possibly older than the cultivation of grains and the domestication of animals.

Like other human crafts, they developed out of human interaction with the material world—the exploration, experimentation, problem-solving, innovation, improvisation, and predicting about the environment that humans must do in order to survive. In the complexity of their designs, however, textiles make clear that out of this physical interaction with the environment, conceptual representations emerge. In other words, human bodily skills give rise to cognitive capacities. This intertwining of bodily skill and

cognition is indicated by the deep embedding of textiles into our conceptual language: we speak of textiles and texts, both rooted in the verb “to weave,” fabrics and fabrication, and when we “spin a yarn,” we imagine, create, or, as cognitive neuroscientists might put it, we engage in metacognition.

By and large, the bodily techniques, skills, and tools of craft are not generally understood to have this deep connection to mental cognition. The conference aims to challenge this assumption by examining weaving and skill from a variety of perspectives. Questioning the relationship between the mind, body, and tools of the weaver invites a re-examination of the social and political status of such knowledge and crafts. The program thus brings together scholars from history, economics, sociology, anthropology, psychology and cognitive sciences, experts in textile and craft, textile entrepreneurs, artists, and weavers to investigate broad questions about craft as cognition, cognitive change over time, innovation in craft, and the role of “traditional” crafts in modern economies.

Free and open to the public, the program consists of two parts: Two days of sessions with expert weavers around the loom, with demonstrations of weaving techniques, and opportunities to learn at the looms; and two days of lectures and discussion by speakers from the academic, art, and commercial realms. In addition, there will be a display of historic and contemporary hand woven textiles, and artists [Marshall Reese and Nora Ligorano](#) will discuss their woven fiber optic installations.

Organizers: Pamela H. Smith (Columbia), Carol Cassidy (Lao Textiles), Patricia Greenfield (UCLA)

SCHEDULE

Tuesday, April 4, 2017

6:00pm-7:30pm: The Business of Handloom Fashion: The Future of Sustainable Dyeing and Weaving Workshops in India and Okinawa

Speakers: Annapurna Mamidipudi (University of Maastricht) and Amanda Mayer Stinchecum (Harvard and Hōsei University)
Moderator: Dorothy Ko (History, Barnard College)

918 International Affairs Building, Columbia University, 420 West 118th Street (between Amsterdam Avenue and Morningside Drive). Please note that the fourth floor is at street level. See [website](#) for information).

Workshop Day 1: Wednesday, April 5, 2017

Registration is **required** for workshops:

<https://cssweaving.eventbrite.com>

10:00am - 12:00pm: Weaving Demonstrations and Learning Opportunities

2:00pm - 4:00pm: Weaving Demonstration and Learning Opportunities

4:00pm - 6:00pm: Weaving Demonstration and Learning Opportunities

Weavers:

Carla Childs, Germantown Friends School, backstrap loom
Lao Masterweaver, Mrs. Bouakham Phengmixay, Lao Textiles, frame loom

Lao Ikat Master, Mrs. Simone Khamdypaphanh, Lao Textiles, frame loom

All workshops will take place at 513 Fayerweather Hall, Columbia University, 1180 Amsterdam Avenue (at 117th Street).

Workshop Day 2: Thursday, April 6, 2017

Registration is **required** for workshops:

<https://cssweaving.eventbrite.com>

10:00am - 12:00pm: Weaving Demonstration and Learning Opportunities

2:00pm - 4:00pm: Weaving Demonstration and Learning Opportunities

All workshops will take place at 513 Fayerweather Hall, Columbia University, 1180 Amsterdam Avenue (at 117th Street).

Conference Day 1: Friday, April 7, 2017

8:30am - 5:00pm: Conference, see full agenda on the following pages.

Faculty House, Columbia University, 64 Morningside Drive, 2nd Floor (enter the campus gates on West 116th Street between Amsterdam Avenue and Morningside Drive. [Map and directions here.](#))

Conference Day 2: Saturday, April 8, 2017

9:30am - 6:30pm: Conference, see full agenda on the following pages

Faculty House, Columbia University, 64 Morningside Drive, 2nd Floor (enter the campus gates on West 116th Street between Amsterdam Avenue and Morningside Drive). [Map and directions here.](#)

6:30pm - 9:00pm: Closing Reception and Textile Exhibition

Faculty House, Columbia University, 64 Morningside Drive, 2nd Floor (enter the campus gates on West 116th Street between Amsterdam Avenue and Morningside Drive). [Map and directions here.](#)

Conference Day 1: Friday, April 7, 2017

AGENDA

8:30-9:00	Breakfast
9:00-9:30	Introduction: Why Weaving and Cognition? Speaker: Pamela H. Smith (History, Columbia)
9:30-10:45	How are Habits and Skills Learned? A Perspective from Neuroscience Speaker: Daphna Shohamy (Psychology, Columbia) Respondent: Suvarna Alladi, (Neurology, National Institute of Mental Health and Neurosciences, India) Chair: Nori Jacoby (Presidential Scholar in Society and Neuroscience, Columbia)
10:45-11:00	Break
11:00-12:00	Needle and Thread in Surgery and Tailoring: A Cross-Disciplinary Conversation Speakers: Roger L. Kneebone (Surgical Education and Engagement Science, Imperial College) and Izzy Dabiri (Freelance Costume Tailor) Chair: Carmel Raz (Society of Fellows, Columbia)
12:00-1:00	Lunch

<p>1:00-2:00 (Talk)</p> <p>2:00-3:45 (Demos)</p>	<p>Weaving Code and the Original Mobile App</p> <p>followed by: Weaving Demonstrations</p> <p>Speakers: Carol Cassidy, Bouakham Phengmixay, Simone Khamdypaphanh, and Somphone Pasithiphone (Lao Textiles)</p> <p>Chair: Tianna Uchacz (Making and Knowing, Columbia)</p>
<p>3:45-4:00</p>	<p>Break</p>
<p>4:00-5:00</p>	<p>Embodiment, Cognition, Creativity and Social Change: Learning to Weave in a Maya Community, 1969-2012</p> <p>Speakers: Patricia Greenfield (Psychology, UCLA) with Carla Childs (Weaver, Germantown Friends School) and Ashley Maynard (Psychology, University of Hawaii)</p> <p>Chair: Ann-Sophie Barwich (Presidential Scholar in Society and Neuroscience, Columbia)</p>

Conference Day 2: Saturday April 8, 2017

AGENDA

9:30-10:00	Breakfast
10:00-11:00	<p>Weaving as a Sociotechnical System</p> <p>Speaker: Annapurna Mamidipudi (History of Science, Maastricht University)</p> <p>Respondent: Andrew Goldman (Presidential Scholar in Society and Neuroscience, Columbia)</p> <p>Chair: Donna Bilak (Making and Knowing, Columbia)</p>
11:00-11:15	Break
11:15-12:30	<p>KEYNOTE LECTURE</p> <p>The Indian Loom, Climate Change and Democracy</p> <p>Speaker: Uzramma (Independent Scholar, Goldsmith and Handloom Activist)</p> <p>Respondent: Maurie Cohen (Director, Science, Technology, and Society Program, New Jersey Institute of Technology)</p>
12:30-2:00	Lunch

2:00-3:00	<p>Cognition and Creativity in High-End Fashion Design</p> <p>Speaker: Barbara Faedda (Italian Academy, Columbia)</p> <p>Respondent: Dorothy Ko (History, Barnard College)</p> <p>Chair: Lan A. Li (Presidential Scholar in Society and Neuroscience, Columbia)</p>
3:00-4:00	<p>Practice, Design, and Innovation with Textiles</p> <p>Speaker: Clare King (Propel, LLC)</p> <p>Respondent: Paul Sajda (Biomedical Engineering, Columbia)</p> <p>Chair: Jenny Boulboulé (Artechne Project, Utrecht University)</p>
4:00-4:30	Break
4:30-6:30	<p>Response and Discussion</p> <p>Discussants: Ulinka Rublack (History, Cambridge), and Stephen Flusberg (Psychology, SUNY Purchase)</p> <p>Moderator: Pamela Smith (History, Columbia)</p>
6:30-9:00	<p>Textile Exhibition & Reception, featuring Nora Ligorano and Marshall Reese (LigoranoReese, NYC)</p>

WEAVING: COGNITION, TECHNOLOGY, CULTURE

Day 1 – Friday, April 7, 2017

PROGRAM ABSTRACTS

WELCOME

9:00am – Introduction: Why Weaving and Cognition?

Pamela H. Smith (History, Columbia)

9:30am – How are Habits and Skills Learned? A Perspective from Neuroscience

Daphna Shohamy (Psychology, Columbia)

Respondent: Suvarna Alladi (Neurology, National Institute of Mental Health and Neurosciences, India)

A central tenet of modern cognitive neuroscience is that there are different forms of learning that depend on different brain regions. A key distinction is between memory for facts and events (learning what) and learning of skills or habits (learning how). This basic framework has paved the way to a new understanding of how the brain supports the learning of skills and habits. I will discuss these advances from neurons to behavior, their implications for specificity vs. flexibility of knowledge, and their implications for both adaptive and maladaptive behaviors.

11:00 am – Needle and Thread in Surgery and Tailoring: A Cross-Disciplinary Conversation

Roger L. Kneebone (Surgical Education and Engagement Science, Imperial College) and Izzy Dabiri (Freelance Costume Tailor)

This conversation will explore similarities and differences in two practitioners' experiences of joining, weaving, and darning by

asking how threads can constitute metaphorical as well as literal connections between apparently unconnected areas of expertise.

1:00 pm – Weaving Code and the Original Mobile App

Carol Cassidy, Bouakham Phengmixay, Simone Khamdypaphanh, and Somphone Pasithiphone (Lao Textiles)

Lao has a rich tradition of weaving with many diverse ethnical groups. Many groups have their own unique and distinctive textile designs. Among these groups are the Lao-Tai ethnic which practice complex weave structures. Various systems have been devised to design and store intricate patterns. We will demonstrate how each warp end is designated as a zero or one (up or down), thus creating a binary code of weaving fabric. The Lao-Tai peoples have developed a two-heddle system to create and preserve complex supplementary “brocade” designs. This enables the pattern code to be used and reused. This unique method allows the weaver to “store” her designs and accompany her when she travels.

In addition, we will also demonstrate Ikat, a resist dye method, and tapestry weaving, and how our team at Lao Textiles has been using these traditional techniques to create modern designs for nearly 30 years. Master weavers Ms. Simone and Mrs. Bouakham will demonstrate these ancient methods and show how very simple technology can be used to create highly complex patterns and designs and used in a modern context.

**4:00 pm – Embodiment, Cognition, Creativity and Social Change:
Learning to Weave in a Maya Community, 1969-2012**

Patricia Greenfield (Psychology, UCLA) with Carla Childs (Weaver, Germantown Friends School) and Ashley Maynard (Psychology, University of Hawaii)

French anthropologist Marcel Mauss posited that bodily techniques are both culturally and biologically based. Backstrap loom weaving, which has been at the center of Maya culture for hundreds of years, exemplifies this conjunction: the weaver's body, a basic biological fact, is an essential part of the loom frame. In the embodied knowledge of weaving, verbalization and mental representation seems less important than bodily movement. At the same time, backstrap loom weaving requires a certain level of cognitive development; and woven patterns need to be mentally represented in order to be physically represented in the weaving process.

Different cognitive skills and modes of learning to weave are required for creating traditional textile patterns versus innovating novel patterns.

All of these requirements enter into the way weaving is learned and transmitted from generation to generation. Yet, neither transmission processes nor woven designs are a static part of culture; both change as society changes. My presentation will address these issues by means of a multidisciplinary, cross-temporal, and multimethod research approach - employing ethnographic observation, cognitive experiments, textile study, and video microanalysis over three generations and 43 years in a rapidly changing Maya community in Chiapas, Mexico.

WEAVING: COGNITION, TECHNOLOGY, CULTURE

Day 2 – Saturday, April 8, 2017

10:00 am – Weaving as a Socio-technical System: From Innovation to Cognition

Annapurna Mamidipudi (History of Science, Maastricht University)
Respondent: Andrew Goldman (Presidential Scholar in Society and Neuroscience, Columbia)

Handloom weaving in India is a vibrant and dynamic craft based technology that is more than two thousand years old. It is the second largest provider of rural livelihoods, with a ten per cent share of the domestic textile market, unified under the cultural brand of 'handloom'. Yet, weavers, like other craftspeople in India, stand in the shadow of deep divisions: rich/poor, urban/rural, modern/traditional, Brahmin/Dalit, educated scientist/illiterate labor. As a system of knowledge, handloom weaving is associated with a museumized past rather than a promising future, the weaver is seen as a laboring body, rather than an innovative mind. Yet through the claiming, contesting and attributing of knowledge, actors in the socio-technical system of handloom weaving constantly endeavor to change what is valued as knowledge. Studying the use of color and dyeing practices of handloom weavers—as material, mechanism and metaphor—I will explore the making, maintaining and attributing of craft knowledge as opportunity for political action: as a unifying device for cultural cohesion, as embodied cognition that engages both mind and body, and as tool for justice and equity.

KEYNOTE LECTURE

11:15 am – The Indian Loom, Climate Change and Democracy

Uzamma (Independent Scholar, Goldsmith and Handloom Activist)

Respondent: Maurie Cohen (Science, Technology, and Society, New Jersey Institute of Technology)

Hand weaving, far from being a niche activity, is one of the largest rural occupations in contemporary India. Rather than a relic of the past, the handloom is an ecologically sustainable mode of production for the future. It is the perception of hand-weaving as an outmoded technology that inhibits this potential. Because of its means of production employing kinetic human energy, rather than energy generated by fossil fuels, the large scale of Indian hand weaving can be a force for environmental production. Since India is one of the largest growing economies in the world today, the regeneration of Indian hand-weaving would have a positive effect on climate change everywhere. The low-cost of infrastructure for hand production means that large-scale employment can be easily generated.

Hand weaving, therefore, contains the possibility of a wide distribution of ownership of production, and therefore, of social equity and redistribution of wealth in India. The contemporary experience of weavers and their oral histories filled unexplained gaps in the historical record. They painted a different picture from the general view of the inevitable decline of hand-weaving with the mechanisation of cotton yarn spinning and weaving. A reading of history made it clear that it was through the introduction of large scale spinning that colonial forces were able to control supplies of yarn for weaving, and therefore of the entire textile process.

This insight was the starting point of my long exploration into the past, present and possible future of cotton yarn spinning in India

and its relation to hand weaving and cotton farming. The Malkha initiative was born of this experience. Malkha aims to replace large spinning mills with smaller ones, which would match the small scales of cotton farming and hand weaving, thus encouraging lateral relations among the stages of production and the possibility of producer ownership and democracy in production in India. I recount the story of the long and continuing struggle to establish the Malkha idea in practice.

2:00 pm – Cognition and Creativity in High-End Fashion Design

Barbara Faedda (Italian Academy, Columbia)

Respondent: Dorothy Ko (History, Barnard College)

Since prehistory, the cognitive skills developed by human beings in producing their clothing, ornaments, and accessories have been incredibly sophisticated. Exploration and experimentation have developed a rich set of tools, processes, and technologies for weaving, embroidery, pleating, bleaching, dyeing, cutting, sewing, and spinning. In the present-day, high-end fashion is traditionally characterized by handmade garments and advanced manufacturing practices along with complex technologies, and today designers are eager to explore further and find new solutions in their creative process, and to introduce more interaction with scientific innovation. In May 2016, at the Met Gala, a model wore a ‘Cognitive Dress’ developed by IBM Watson in collaboration with the fashion house Marchesa. Each rose stitched on the dress contained a LED light which changed colors based on the emotions communicated by the public, in real time, via Twitter.

A few years before, Google smart glasses were used by fashion designer Diane von Furstenberg during her fashion show, introducing the new phase of wearable technology into high-end fashion design. The glasses, worn by the models and the

company's staff, were able to capture the creative and performance process from new perspectives and angulations. Interactive surfaces, conductive yarns, and connected clothes are the outcome of another recent initiative by Google, Project Jacquard. All these examples share the fact that new high technological tools applied to fashion affect its creative process, as well as the personal and collective experience with clothing. They also change human perception and modify the interaction between the 'dressed body' and the world.

3:00 pm – Practice, Design, and Innovation with Textiles

Clare King (Propel, LLC)

Respondent: Paul Sajda (Biomedical Engineering, Columbia)

Wearables and smart garments envision a world in which our clothing is capable of sensing, measuring and even responding. Currently, commercial “smart” garments use attached sensors, but the smart garment world will only be possible with the seamless integration of electronic elements like microcontrollers, sensors, and actuators into the textiles themselves when they are woven or knitted. Textile engineers and garment designers do not understand electronics, and electronics engineers think that textiles are simple to make (after all, we all wear clothing so how hard can it be to make textiles!).

The development of smart textiles will require these two very different types of engineers and designers – electronics and textiles – to learn to speak each other's language and to work together with textile and garment structures in order to design and innovate. The vision of smart connected garments remains magical thinking until textiles can understand electronics and electronics can understand textiles. Clare will discuss the challenges to crossing the divide between electronics and textiles for designing and building smart textiles for commercial markets,

and speak about work within her company that is using new rapid prototyping textile manufacturing equipment capable of producing at a unit size of one.

4:30 pm – Response and Discussion

Discussants: Stephen Flusberg (Psychology, SUNY Purchase) and Ulinka Rublack (History, Cambridge)

6:30 pm - Reception featuring Exhibition Viewing and Presentation by LigoranoReese

Artists Nora Ligorano and Marshall Reese (LigoranoReese, NYC) will talk about weaving fiber optic thread and, in the process, developing a new art form incorporating networking, communication theory, and computer science. Starting from the proposition that weaving is a social activity shared among the world's cultures, they soon realized that looms were the first computerized machines using punch cards at the beginning of the Industrial Revolution, and that today, humanity's stories are threaded and networked throughout the world wide web.

These ideas guided them in choosing the tapestry as a form for making art about the transmission and weaving of information. Ligorano and Reese will discuss these ideas with reference to their works.

PARTICIPANT BIOS

Suvarna Alladi

Professor of Neurology, National Institute of Mental Health and Neurosciences, Bangalore, India

Dr Suvarna Alladi has 20 years of experience in the field of neurology. She trained in Cognitive Neurology at the Department of Clinical Neurosciences, at the University of Cambridge and in Cognitive Ageing and Cognitive Epidemiology at the University of Edinburgh. Dr. Alladi's group is investigating the relationship between education, use of multiple languages/bilingualism, and occupation in building neural reserve. She is also interested in understanding life-course experiential factors that protect against cognitive and functional decline in ageing. Her recent observations suggest that engagement in skillful activities throughout life enhances resilience against brain disease. Dr. Alladi also established one of the first Cognitive Disorders Clinics in India which serves over 2000 patients with dementia and other cognitive disorders.

Carol Cassidy

Founder, Lao Textiles

American Carol Cassidy has been weaving since she was seventeen years old. She traveled to Laos in 1989 as a textile expert with the United Nations Development Programme. In 1990, she started Lao Textiles, among the first commercial weaving workshops in Laos. Carol and the 40 Lao artisans she employs produce exquisitely crafted wall hangings, scarves, shawls and custom furnishing fabrics. Carol's pieces are displayed in galleries and museums throughout the United States.

Carla Childs

Germantown Friends School, Philadelphia

Carla Childs learned to weave on a backstrap loom as a student in the late 1960's and early 1970's when she took part in the Harvard Chiapas Project, a long-term ethnographic field study, which ran from 1957 to 1980. She traveled to the Mayan community of Zinacantán in Chiapas, Mexico, where, over a three year period, she was an active participant in several different research projects. These culminated in a study involving the videotaping of young girls learning how to weave and detailed analysis of how they were taught. In the early 1990's, Carla returned to Zinacantán to gather data from a second generation of weavers. A third generation was studied in 2012. She has continued to work on detailed follow-up analysis of this research data up until the present. Currently Carla directs and costumes plays at Germantown Friends School and around the Philadelphia area.

Maurie Cohen

Professor of Sustainability Studies and Director of the Program in Science, Technology, and Society at the New Jersey Institute of Technology

Maurie J. Cohen is Professor of Sustainability Studies and Director of the Program in Science, Technology, and Society at the New Jersey Institute of Technology. He is also Associate Faculty Member with the Division of Global Affairs at Rutgers University, Associate Faculty Member with the Rutgers/NJIT Urban Systems Program, and Associate Fellow at the Tellus Institute. Cohen is additionally Editor of Sustainability: Science, Practice, and Policy (SSPP), co-founder and Executive Board Member of the Sustainable Consumption Research and Action Initiative (SCORAI), and co-founder and co-facilitator of the Future Earth Knowledge-

Action Network on Systems of Sustainable Consumption and Production. Cohen received his Ph.D. in regional science from the University of Pennsylvania in 1993.

Izzy Dabiri

Costume Tailor

Izzy Dabiri is a freelance costume tailor. From 2014-2016, she was the Production Costume and Tailoring Apprentice at the Royal Opera House, London. In this role she trained under and worked with the pattern cutters, tailors and stitchers of the ROH. She worked for ballet and opera productions including 'Andrea Chenier', 'Woolf Works', 'Carmen', and 'Il Trovatore'. She has also worked on productions and projects for The Royal Shakespeare Company, The National Theatre, Birmingham Royal Ballet, and The School of Historical Dress. Although she has been involved with a wide variety of projects, her main areas of interest are historical tailoring and embroidery.

Barbara Faedda

*Associate Director, Italian Academy for Advanced Studies,
Columbia University*

Barbara Faedda is the Associate Director of the Italian Academy for Advanced Studies at Columbia University where she is also Adjunct Assistant Professor in the Department of Italian. She received her Ph.D. in Legal Anthropology and Social Science from the Università S. Orsola Benincasa di Napoli. Her professional background also includes experience in an Italian luxury fashion firm in Rome in the 1990s and a continuing research interest in fashion and visual culture.

Stephen Flusberg

Assistant Professor of Psychology, SUNY Purchase College

Stephen Flusberg is an Assistant Professor of Psychology at SUNY Purchase College, where he directs the Everyday Cognition Lab. His research aims to illuminate the relationships between embodiment, language, and cognition by exploring how commonplace actions and experiences – like picking up an object, reading a story or newspaper article, or lying on the couch to watch TV – shape how we perceive and think about the world. He is especially interested in the role that metaphor and analogy play in our ability to reason about complex and abstract domains, from climate change and law enforcement, to the economy, emotions, and mental illness. He received his PhD in psychology from Stanford University, and BAs in Psychology and Religion from Northwestern University. At Purchase College, he also serves as the Faculty Pedagogy Fellow, leading workshops and offering individual teaching consultations based around the latest scientific research on learning and memory.

Andrew Goldman

Presidential Scholar in Society and Neuroscience, Columbia University

Andrew Goldman is a pianist, composer, and cognitive scientist from San Diego, CA. Andrew completed his PhD in 2015 at the University of Cambridge with Prof. Ian Cross on the cognition of musical improvisation. Andrew is currently a Presidential Scholar in Society and Neuroscience at Columbia University. His research project aims to theorize improvisation in a way that is compatible with neuroscientific inquiry, and involves conducting neuroscientific experiments with musicians. He performs regularly as a classical pianist in solo and chamber music settings. His composition activities are currently focused on songwriting.

Andrew's original one-act musical entitled "Science! The Musical" was premiered in Cambridge, UK in 2014.

Patricia Greenfield

Distinguished Professor of Psychology, UCLA

Patricia Greenfield received her PhD from Harvard University and is currently Distinguished Professor of Psychology at UCLA, where she is a member of the Developmental Psychology group. Her central theoretical and research interest is in the relationship between culture and human development. She also directs Children's Digital Media Center @ Los Angeles, which researches the developmental implications of Facebook, YouTube, and other Internet issues. She was founding Director of the FPR-UCLA Center for Culture, Brain, and Development.

Simone Khamdypaphanh

Ikat Master Weaver, Lao Textiles

Ikat Master Mrs. Simone Phankeo (Khamdypaphanh) is from Hantsa, Phongsaly district, Phongsaly Province, in northern Laos. Simone learned to weave and wind Ikat from her aunt Mrs. Sychan. When she was fifteen years old, her uncle took her to Vientiane to go to high school. When she finished high school she took the medical school exam. She didn't pass. In 1990, at age seventeen, she came to work at Lao Textiles. She has been tying, dyeing and weaving Ikat ever since. Mrs. Simone has mastered all aspects of silk weaving and dyeing and has trained the next generation of Lao Ikat masters. She is married and has two children.

Clare King

Founder, Propel LLC

Clare King started her career working in economic modeling, only to shift gears and start Cherry Tree, one of the first technical outdoor clothing companies for children. From there she followed her passion for technical textiles, working for companies both large and small, including GE, before founding Propel, a product innovation management company focused on the development, sales, and marketing of innovative textile driven technologies, with the US Military and Fire Service as primary customers. Clare is currently the principal investigator for a US Navy funded project to develop and prototype smart electrically functional uniforms to keep pace with the evolving multifunctional human-system interface technologies envisioned for future ship command, control and operations. Clare holds degrees from Oxford and Princeton Universities and has done further study at Parsons School of Design, The New School, and Rhode Island School of Design.

Roger L. Kneebone

Professor of Surgical Education and Engagement Science, Imperial College London, Wellcome Trust Engagement Fellow

Professor Roger L. Kneebone, PhD, FRCS, FRCSEd, FRCGP, HonRCM, is a clinician and educationalist who leads the Centre for Engagement and Simulation Science at Imperial College London and the Royal College of Music–Imperial Centre for Performance Science. His multidisciplinary research into contextualized simulation builds on his personal experience as a surgeon and a general practitioner and his interest in domains of expertise beyond medicine. He is a Wellcome Trust Engagement Fellow and in 2011 became a National Teaching Fellow. Roger presents a series of podcast conversations with people whose interests and

careers cross boundaries released on iTunes under the title of Countercurrent.

Dorothy Ko

Professor of History, Barnard College, Columbia University

Dorothy Ko is a cultural historian who specializes in gender and body in early modern China. Her current research focuses on women's artistry and skills in textiles, which constitute an alternative knowledge system to male-centered textual scholarship. Her teaching interests also include the history of women and gender in East Asia; feminist theories; and visual and material cultures. Professor Ko's research and scholarship have been supported by the Guggenheim Foundation, the Institute for Advanced Study, Princeton, and the American Council for Learned Societies. Her book *Cinderella's Sisters* was awarded the 2006 Joan Kelly Memorial Prize of the American Historical Association for the best work in women's history and/or feminist theory.

Nora Ligorano and Marshall Reese

Artists, LigoranoReese, NYC

LigoranoReese, the collaborative team of Nora Ligorano and Marshall Reese formed in the mid-1980s, rethinks traditional art forms investigating the impact of technology on art with new materials and processes. Their latest new media sculptures, illuminated woven fiber optic data tapestries, weave light based on real time data to form a picture of a world rarely visible. The fiber optic data tapestries are an art form about networking, communication, and society. Their work has been featured at exhibitions and permanent collections at numerous institutions around the USA. Their work can be viewed at ligoranoreese.net.

Annapurna Mamidipudi

Postdoctoral Scholar, History of Science, Maastricht University

Annapurna Mamidipudi was educated as an engineer, before she worked for nearly two decades in Dastkar Andhra, an NGO that supports vulnerable craft livelihoods in South India. She has trained herself in natural dyeing techniques that were becoming extinct, and actively contributed to production and marketing processes of artisan groups. She completed her doctoral thesis in 2016 entitled “Towards a theory of Innovation for handloom weaving in India.” She has since been invited to the University of Chicago’s Neubauer Collegium, as well as the Max Planck Institute for the History of Science as a visiting fellow. Currently she is employed at the University of Maastricht as a postdoc to study responsible innovation and sustainable agriculture. Annapurna’s research interests include the study of traditional craft, particularly history and practice of handloom weaving; sustainable agriculture, politics of development and the role of markets in sustaining traditional arts and crafts.

Somphone Pasithiphone

Senior Administrator, Lao Textiles

Ms. Somphone Pasithiphon is from Vientiane, Laos. She graduated in 1999 from Lao University. She has worked as a valuable member of the Lao Textiles team since 1997. As a Senior Administrator, she has worked and traveled with the weavers to exhibitions and workshops in many countries. She has accompanied weavers to San Francisco and New York and represented Lao Textiles in Hong Kong, and as part of an ASEAN (Association of Southeast Asian Nations) delegation to Vietnam.

Bouakham Phengmixay

Master Weaver, Lao Textiles

Master weaver Mrs. Bouakham Phengmixay (Inthavong) is originally from Ban Natoum, Kham district, Xiengkhouang Province, in northern Laos. She comes from a long line of female weavers. Her grandmother is originally from Houaphan, Hiem village, from the Thai Chao ethnic group. Mrs. Bouakham was taught basic weaving in cotton from her mother at age seven. By twelve she was skilled enough to pick a design, make the heddle, prepare the warp and dye natural colors. At the age of sixteen she was able to weave silk skirts. Her grandmother encouraged her to work with weaving and taught her to sell her textiles. In 1997, Mrs. Bouakham started to work as a skilled weaver at Lao Textiles, Vientiane, Laos. She is married and has two children.

Ulinka Rublack

Professor of History, University of Cambridge

Ulinka Rublack is professor of early modern European history at Cambridge University and a Fellow of St John's College. She is author of a prize-winning study of the role of Renaissance dress to create visual realities and stimulate cultural debate, *Dressing Up: Culture Identity in Renaissance Europe* (OUP, 2010) and co-editor of the recent full colour edition of the sartorial biography of a sixteenth-century accountant: *The First Book of Fashion* (Bloomsbury, 2015). Ulinka's new book *The Astronomer & the Witch: Johannes Kepler's Defense of His Mother* was published by Oxford University Press in October 2015 and will be published by Klett-Cotta in 2018. She is editor of the forthcoming *Oxford History of the Protestant Reformations* (2017) and has written an extensive commentary for Penguin's first graphic classic, Hans Holbein, *The Dance of Death* (2016).

Paul Sajda

Professor of Biomedical Engineering, Electrical Engineering and Radiology, Columbia University

Paul Sajda is a Professor of Biomedical Engineering, Electrical Engineering and Radiology at Columbia University and is Director of the Laboratory for Intelligent Imaging and Neural Computing (LIINC). His research focuses on using neuroimaging and machine learning to understand how the brain directs attention to update its models of the world, switches between models to make decisions and modulates its state of arousal to optimize this switching. He is particularly interested in fusing multimodal neuroimaging (simultaneous EEG and fMRI) with behavioral and physiological measures (e.g., eye-tracking and pupillometry) to better understand attention switching within the context of rapid perceptual decision-making as well as clinically relevant psychological constructs. He is the current the Editor-in-Chief for the IEEE Transactions in Neural Systems and Rehabilitation Engineering and Chair of the IEEE Brain Initiative. He is a founder/co-founder of three neurotechnology start-up companies.

Daphna Shohamy

Associate Professor of Psychology, Columbia University

Daphna Shohamy, PhD is an Associate Professor of Psychology at Columbia University and a Principal Investigator at the Zuckerman Mind Brain Behavior Institute. She received her PhD from Rutgers University in 2003. Dr. Shohamy's research combines brain imaging in healthy humans with studies of patients with brain disorders to understand how we learn from experience, how memories are formed, and how past experience shapes the way we make decisions.

Pamela H. Smith

Seth Low Professor of History and Director of the Center for Science and Society, Columbia University

Pamela H. Smith, professor, specializes in early modern European history and the history of science. Her current research focuses on attitudes to nature in early modern Europe and the Scientific Revolution, with particular attention to craft knowledge and historical techniques. She is founding director of the Making and Knowing Project (www.makingandknowing.org), founding director of the Center for Science and Society (scienceandsociety.columbia.edu), and chair of the Presidential Scholars in Society and Neuroscience program (presidentialscholars.columbia.edu).

Uzramma

Independent Scholar, Goldsmith and Handloom Activist

Uzramma has been associated with the indigenous cotton textile industry of India since 1989. She currently holds the position of Director in both the Decentralised Cotton Yarn Trust and the Malkha Marketing Trust. She founded a not-for-profit research consultancy for the industry, Dastkar Andhra in 1990. During her tenure there, Dastkar Andhra was active in working with cotton handloom weaver co-operatives to develop systems for linking artisanal textile production to the market, and in research and training in natural dyeing. Dastkar Andhra has trained artisan groups all over India and in five Central Asian countries in the techniques of natural dyeing of different materials. In 2005 Uzramma founded the Decentralized Cotton Yarn Trust to put production in the hands of producer cooperatives. Uzramma has been a member of policy groups for the handloom industry constituted by the Planning Commission and the Prime Minister's Office of the Government of India.



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