Sense-Making & Making Sense

4.20.17

#mediaX2017 Conference

mediaX is a forum, an incubator of ideas, and a programmatic platform to support multi-disciplinary discovery relationships. Our initiatives explore how understanding people can improve the design of technologies – in the areas of learning, mobility, collaboration, entertainment and commerce.

As industry affiliate program of the H-STAR Institute in the Graduate School of Education, mediaX programs are grounded on respect for different approaches to discovery and centered on our belief in the power of collaboration – between business and academic researchers, on campus and around the world.

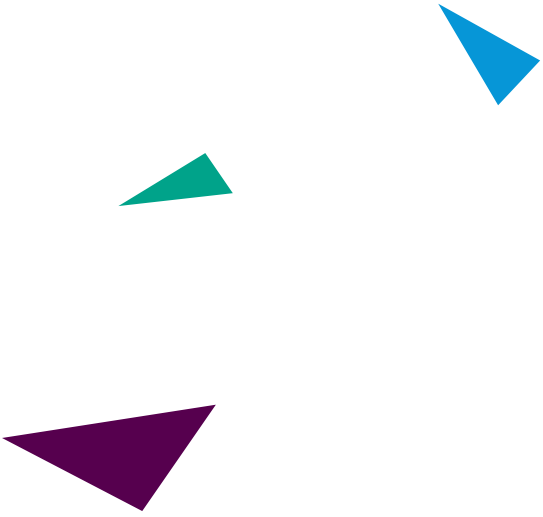
In trusted relationships, aligned on questions that are important for the future, mediaX collaborations seed campus-wide research and coordinate industry interest. Through dialogue and collaboration, university and industry researchers challenge what we know now and stretch intellectual resources to gain new insights relevant to academic and business collaborators.

Together, we pursue new insights on how information technology affects people's lives, how to better design products and services to make them more usable, and the innovative use of communication technologies to improve the human experience.

Sense-Making & Making Sense

mediaX 2017 Conference

Stanford University
April 20, 2017
#mediaX2017



mediaX
at Stanford University
HSTAR Affiliate Program

Ventura Hall | 220 Panama Street, Stanford, CA 94305 | mediaX.stanford.edu

To our members:

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Philips
Prudential
Sábia Experience
Samsung
SESCON
SESI/CNI and its industry partners
Tampere University of Technology
VBP Orange

...A special thank you for your membership and participation

Welcome

Thinking back on the 100+ research projects that our members have made it possible for mediaX to sponsor, I asked our faculty director, Roy Pea, what he considered to be the prevailing theme across all the projects. His response came in an instant, "Sense-Making & Making Sense." Thank you for that inspiration, Roy. It's true.

mediaX research themes are inspired by our member organizations and by Stanford research strengths. Sensors and sensing have been key interests of mediaX members, since we began in 2001. Nearly all of our research themes have included one or more projects that included an aspect of sensing. Interaction, technology, and learning are key words in over 80% of our projects - including both human and machine learning.

With support from mediaX, affiliated researchers from the College of Engineering, Humanities and Sciences, the Graduate School of Education, Law, Medicine, and Business have identified and pursued critical questions in sense-making and making sense. Innovation and creativity are often found at intersections of established disciplines. Inspiration for products, services and publications have emerged from these intersections.

A select list of mediaX-funded projects on Sense-Making & Making Sense is included on page 28.

The importance of this topic continues. Today's conference will highlight some of the technological, scientific and human horizons that may influence mediaX Themed Research and discovery collaborations in the future.

Thanks to Roy for highlighting this theme as the topic for the #mediaX 2017 Conference. And a very sincere and heartfelt appreciation to the mediaX network – our affiliated labs, corporate members and friends – for making this possible. With trust, friendship and shared interests, we look forward to working together to create the future.

Warmly,
Martha

Martha G. Russell, PhD
Executive Director, mediaX, Stanford University

SCHEDULE

Sense-Making & Making Sense

#mediaX2017 Conference Agenda

Mackenzie Room, Jen-Hsun Huang Engineering Center

Thursday, April 20, 2017

8:30 - 8:35am

Opening

TAPTH@T

8:35 - 8:40am

A Welcome to Collaboration and an Invitation to Discovery

Martha Russell - Executive Director, mediaX, Stanford University

8:40 - 8:45am

Centennial Recognition

Dan Schwartz - Dean, Graduate School of Education, Stanford University

8:45 - 9:00am

Sense-Making & Making Sense: Powerful Ideas

Roy Pea - Faculty Director, mediaX, Stanford University

9:00 - 9:45am

The Game is Changing

John Seely Brown - Independent Co-Chairman, Deloitte's Center for the Edge, Visiting Scholar and Advisor to the Provost, University of Southern California

9:45 - 10:00am

Break

10:00 - 10:30am

Haptic Systems for Enhancing the Human Sense of Touch

Allison Okamura - Professor, Mechanical Engineering, Stanford University

10:30 - 11:30am

Panel: Engineering for Human Sense-Making

Moderator: **Karina Alexanyan** - mediaX, Stanford University

Brian Pierce - DARPA - *Collaborating with Machines on the Data Wisdom Spectrum*

David Sirkin - Center for Design Research - *Automated Context Sensing*

Ryota Yamada - Omron Corporation - *Technology to Understand Humans*

Ajay Chander - Fujitsu - *Digital Life Systems*

11:30am - 12:15pm

Neuroscience: Path to the Future

William Newsome - Professor, Neurobiology and Director, Neuroscience Institute, Stanford University

12:15 - 1:00pm

Lunch

Downstairs in Amphitheater

1:00 - 1:15pm

Our Multifaceted Lens

Martha Russell - Executive Director, mediaX, Stanford University

1:15 - 1:45pm

Human 2.0 - The Future of Sense-Making

Amy Kruse - Chief Scientific Officer, Platypus Institute

1:45 - 2:15pm

Predicting Psychological Traits from Digital Footprints

Michal Kosinski - Assistant Professor, Organizational Behavior, Graduate School of Business, Stanford University

2:15 - 2:30pm

Break

2:30 - 3:15pm

Panel: Human Sense-Making of Engineered Systems

Moderator: **Karina Alexanyan** - mediaX, Stanford University
Leonard Medlock - Director, EdSurge - *Making Sense of Teamwork in Remote Collaboration*
Megan French - Communication, Stanford University - *Social Media Folksonomies*
Kendall Haven - Distinguished Visiting Scholar, mediaX, Stanford University - *Your Brain on Story*

3:15 - 4:00pm

Chasing Fire

Paul Saffo - Distinguished Visiting Scholar, mediaX, Stanford University

4:00 - 4:15pm

Framing the Questions for Future Research

Martha Russell - Executive Director, mediaX at Stanford University

4:15 - 5:00pm

Networking Reception

Mackenzie Room Balcony, Jen-Hsun Huang Engineering Center

TAPTH@T

Opening

8:30 - 8:35am

Tap what? TapTh@t!

TapTh@t *is the only advanced tap dance performing group at Stanford University. We strive to bring tap dancing to the forefront of dance culture by fusing a wide variety of styles and musical genres, as well as improvisation, constantly pushing the envelope when it comes to tap performance and improvisation. All pieces are examples of student choreography—past performances have been choreographed to music by Michael Jackson, Beyoncé, and Vance Joy, as well as from the Disney musical Mulan!*

A Welcome to Collaboration and an Invitation to Discovery

8:35 – 8:40am

Martha G. Russell

Executive Director, mediaX, Stanford University

Martha Russell is Executive Director of **mediaX** at Stanford University, Senior Research Scholar at the Human Sciences Technology Advanced Research Institute, and Senior Research Fellow at the Institute for Creativity and Capital at The University of Texas at Austin. Dr. Russell leads business alliances and interdisciplinary research for mediaX at Stanford University. With people and technology as the intersecting vectors in many media contexts, Dr. Russell has established collaborative research initiatives in ICT and technology leadership – for national agencies and for technology companies. She pioneered one of the first US public-private partnerships in microelectronic and information science and also in manufacturing technologies. With a focus on the power of shared vision, Dr. Russell has developed planning/evaluation systems and consulted regionally and internationally on technology innovation for regional development.

Dr. Russell studies relationship systems – people to people, to their brands, to their organizations, and for innovation. Using data-driven visualizations, her recent studies have take innovation's pulse and tracked the evolution of innovation ecosystems in digital media, learning technologies, and sensors. She has applied insights about relational capital and decision analytics to corporate, regional and national challenges. Dr. Russell serves as an advisor to the Journal of Technology Forecasting and Social Change, the Journal of Enterprise Transformation and several startup companies.

Speakers

Centennial Recognition

8:40 – 8:45am

Dan Schwartz

Dean, Graduate School of Education, Stanford University

Daniel Schwartz is Dean of Stanford Graduate School of Education and an expert in human learning and educational technology. Schwartz oversees a laboratory whose computer-focused developments in science and math instruction permit original research into fundamental questions of learning. He has taught math in rural Kenya, English in south-central Los Angeles, and multiple subjects in Kaltag, Alaska. This diversity of experience informs his work. Among many honors, Schwartz was named Graduate School of Education Teacher of the Year for 2015. His latest book, *The ABCs of How We Learn: 26 Scientifically Proven Approaches, How They Work and When to Use Them*, distills learning theories into practical solutions for use at home or in the classroom. NPR noted the book among the "best reads" for 2016.

Photo Credit: Ian Terpin / University Communications
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Sense-Making & Making Sense: Powerful Ideas

8:45 - 9:00am

Roy Pea

Faculty Director, mediaX, Stanford University

Roy Pea is the David Jacks Professor of Education and the Learning Sciences at Stanford University, Co-Founder and Faculty Director of the H-STAR Institute, Director of the PhD Program in Learning Sciences and Technology Design, and Professor, Computer Science (Courtesy). Since 1981, Dr. Pea has been exploring how information technologies can support and advance the scientific understanding and practices of learning and teaching, with particular focus on topics in science, mathematics, and technology education and their associated symbolic and communicative interchanges that are integral to learning.

Dr. Pea has contributed to building a number of interdisciplinary research centers and complex projects that engage researchers, educators, and industry leaders in collaborative design partnerships for uses of learning technologies. His research centers on how innovations in computing and communications technologies and affiliated socio-cultural practices can influence learning, thinking, and educational systems. Two major lines of research are: (1) developing a new paradigm for everyday networked video interactions for learning and communications (http://diver.stanford.edu), and (2) investigating how informal and formal learning can be better understood and connected, as Co-PI of the LIFE Center (http://life-slc.org) funded by the National Science Foundation as one of several large-scale national Science of Learning Centers.

Sense-Making & Making Sense: Powerful Ideas

Humans are pre-eminently sense-making animals, seeking patterns to find order and predictability in the worlds that they experience. Because of the central roles of the physical, social and representational worlds in human cognition and sense-making, learning scientists devote particular attention to how, over the course of ontogenesis, children and adults employ their sense-making apparatus, the brain and the body, and its various sensory modalities, to engage in sense-making activities. Humans also make meanings—with spoken word and gesture, and with symbolic representations, such as those established with information and communication technologies, from written language to images, number systems, social media, programmable language expressions, tangible user interfaces, and immersive worlds and games. People expect others to produce meanings much as they do. So in interactions, we see the intertwining of humans as meaning-makers and as sense-makers.

Speakers

The Game Is Changing, Are We?

9:00 – 9:45am

John Seely Brown

Independent Co-Chairman, Deloitte's Center for the Edge
Visiting Scholar and Advisorto the Provost, University of Southern California

John Seely Brown (JSB) was the Chief Scientist of Xerox Corporation until April 2002 as well as the director of the Xerox Palo Alto Research Center (PARC) until June 2000. A master integrator and instigator of productive friction, JSB explores the whitespace between disciplines and builds bridges between disparate organizations and ideas. In his more than two decades at PARC, Brown transformed the organization into a truly multidisciplinary research center at the creative edge of applied technology and design, integrating social sciences and arts into the traditional physics and computer science research and expanding the role of corporate research to include topics such as the management of radical innovation, organizational learning, complex adaptive systems, and nano-technologies. JSB is currently a visiting scholar and advisor to the Provost at the University of Southern California (USC) where he facilitates collaboration between the schools for Communication and Media and the Institute for Creative Technologies (ICT). JSB is also the Independent Co-Chairman for Deloitte's Center for the Edge where he pursues research on institutional innovation and a reimagined work environment built on digital culture, ubiquitous computing, and the need for constant learning and adaptability. His personal research interests include digital youth culture, digital media, and the application of technology to fundamentally rethink the nature of work and institutional architectures in order to enable deep learning across organizational boundaries – in brief, to design for emergence in a constantly changing world.

The Game is Changing – ARE WE?
New mindsets and sense making strategies may be required.

Given the crazy pace of change that we all love and hate, we, in this room, must be prepared to not only take on the emerging hard socio-technical challenges, but also to deeply question our institutional architectures, our public policies, and forms of learning. All of these are entangled. Indeed, new AI - deep learning systems, for example - raise fundamental ethical issues while they also influence and enable new behaviors and social practices. This means that as technologists, we are now being thrown into the midst of some fundamental – if not ontological – questions. This talk will explore our rapidly changing, broadly connected and radically contingent world and the lenses needed to frame, or reframe, the challenges that technological advances have pushed forward. Making sense of all this on a daily base ain't easy but each of us, in our own way, needs to step up to this challenge. A crisis of imagination is upon us. And we must find ways to overcome the tyranny of the present.

Haptic Systems for Enhancing the Human Sense of Touch

10:00 – 10:30am

Allison Okamura
Professor, Mechanical Engineering, Stanford University

Allison Okamura is a Professor in the Mechanical Engineering Department at Stanford University, with a courtesy appointment in Computer Science. She was previously Professor and Vice Chair of Mechanical Engineering at Johns Hopkins University. Her research focuses on developing the principles and tools needed to realize advanced robotic and human-machine systems capable of haptic (touch) interaction, particularly for biomedical applications. Haptic systems are designed and studied using both analytical and experimental approaches.

Haptic Systems for Enhancing the Human Sense of Touch

Haptic (touch) feedback can play myriad roles in enhancing human performance and safety in skilled tasks. In teleoperated surgical robotics, force feedback improves the ability of a human operator to effectively manipulate and explore patient tissues that are remote in distance and scale. In virtual and augmented reality, wearable and touchable devices use combinations of kinesthetic (force) and cutaneous (tactile) feedback to make rich, immersive haptic feedback both more compelling and practical. In this talk, I will present a collection of novel haptic devices, control algorithms, and user performance studies that demonstrate a wide range of effective design approaches and promising real-world applications for haptic feedback.

Speakers

Panel: Engineering for Human Sense-Making

10:30 – 11:30am
Moderator: **Karina Alexanyan,** *mediaX, Stanford University*
Karina Alexanyan is the Member Benefits Manager with mediaX at Stanford University. Dr. Alexanyan's research background is in global social media networks, technology, and education. She has consulted for leading academic, corporate and non-profit clients, including Stanford, Harvard and Columbia Universities. Alexanyan holds a PhD in Communications from Columbia University School of Journalism, a M.A. in Communication from NYU and a BA in Linguistics and Modern Languages from the Claremont Colleges.

Brian Pierce is the Deputy Director of DARPA's Information Innovation Office (I2O). This is Dr. Pierce's second tour at the agency, having served as the deputy office director of the Strategic Technology Office from 2005 to 2010. Dr. Pierce has almost 30 years of experience developing advanced technologies in the aerospace/defense industry. Prior to joining DARPA, he was a technical director in Space and Airborne Systems at the Raytheon Company. From 2002-2005, he was executive director of the Electronics Division at Rockwell Scientific Company.

Collaborating with Machines on the Data Wisdom Spectrum

Before machines, humans handled all tasks across the data-wisdom spectrum. Machines today perform low-level data and information processing tasks, freeing humans to concentrate on higher-level endeavors involving knowledge, understanding and wisdom. In the future, we will want machines to collaborate with humans at the upper end of the data-wisdom spectrum, as illustrated by representative DARPA programs.

David Sirkin is a Research Associate at Stanford University's Center for Design Research (CDR) and Lecturer in Electrical Engineering, where he teaches interactive device design. At CDR, Dr. Sirkin focuses on design methodology, as well as the design of physical interactions between humans and robots, and autonomous vehicles and their interfaces. Dr. Sirkin frequently collaborates with, and consults for, local Silicon Valley and global technology companies including Siemens, SAP and Microsoft Research.

Automated Context Sensing

Automated Context Sensing projects involve designing robot or IoT behavior based on social or environmental context, as well as developing tools and applications that can sense driver/pedestrian state in automated cars or engage with them directly. For example, a navigation application that asks drivers about events in the world serves as a perfect cover story to infer their situation awareness, which then informs how the automated system should respond.

Panel: Engineering for Human Sense-Making continued

Ryota Yamada is an Expert at the Open Innovation Initiative, Technology and Intellectual Property H.Q., OMRON Corporation. Mr. Yamada joined OMRON in 2002 as a Software Engineer. From 2003 to 2006, Mr. Yamada was a Visiting Researcher at mediaX at Stanford University, where he worked with Professor Cliff Nass on designing and implementing Socially Intelligent Agent technology, which improves human performance. After returning to Japan, he worked on the research and development of web communication systems for experts in factory and wireless sensor network systems. Mr. Yamada holds Bachelor's and Master's degrees in Engineering from the Nagoya Institute of Technology in Japan.

Technology to Understand Humans

"Technology to Understand Humans" is under development as a next generation core technology at OMRON. Ideas for future applications to be realized through open innovation will be shown as examples.

Ajay Chander leads R&D teams in imagining and building new human-centric technologies and products. His work has spanned digital healthcare and wellness, software security, and behavior design. Currently, Dr. Chander directs the Digital Life Lab at Fujitsu Labs of America, which builds solutions that acknowledge and leverage the "humans-in-the-loop" in an increasingly digitally dense world. At Fujitsu, Dr. Chander also provides technical and thought/strategy leadership for all aspects of the interplay between technology and the human experience, with a focus on human-centric systems and solutions. Dr. Chander holds a PhD in Computer Science from Stanford University.

Digital Life Systems

Fujitsu's continuous, connected, and personalized "Digital Life" systems and services span several service verticals including healthcare/wellness and education/training, and user settings including consumer/enterprise and provider/client. Active research projects explore augmenting human, organizational, and systemic capabilities with computational sensing, analysis, and influence systems.

Speakers

Neuroscience – Path to the Future

11:30am – 12:15pm

William Newsome

Professor, Neurobiology and Director, Stanford Neurosciences Institute

Bill Newsome is an Investigator of the Howard Hughes Medical Institute and Professor of Neurobiology at the Stanford University School of Medicine. Dr. Newsome is also the Director of the Stanford University Neurosciences Institute. Dr. Newsome is a leading investigator in systems and cognitive neuroscience. He has made fundamental contributions to our understanding of the neural mechanisms underlying visual perception and simple forms of decision making. Among his honors are the Rank Prize in Optoelectronics, the Spencer Award, the Distinguished Scientific Contribution Award of the American Psychological Association, the Dan David Prize of Tel Aviv University, the Karl Spencer Lashley Award of the American Philosophical Society, and the Champalimaud Vision Award. He was elected to membership in the National Academy of Sciences in 2000, and to the American Philosophical Society in 2011. Newsome recently co-chaired the NIH BRAIN working group, charged with forming a national plan for the coming decade of neuroscience research in the United States. He received a B.S. degree in physics from Stetson University and a Ph.D. in biology from the California Institute of Technology.

Neuroscience - Path to the Future

Can the human brain ever understand itself? Professor Newsome, co-director of planning for the US BRAIN Initiative, takes us on a tour of the frontiers of contemporary neuroscience research, highlighting possibilities for revolutionary change in how we understand the brain.

Humans as Sense-Making Machines

1:15 - 1:45pm

Amy Kruse

Chief Scientific Officer, Platypus Institute

Amy Kruse is the Chief Scientific Officer of the Platypus Institute, an applied neuroscience research organization that translates cutting-edge neuroscience discoveries into practical tools and programs that enhance the human experience. Dr. Kruse's primary focus at the Platypus Institute is a project entitled "Human 2.0" – a multi-faceted initiative that helps selected individuals and teams leverage neurotechnology to generate meaningful competitive advantages. Previously, Dr. Kruse was VP and CTO of Cubic Global Defense, where she oversaw the company's research and development (R&D) programs, as well as a government civilian Program Manager at the Defense Advanced Research Projects Agency (DARPA), where she created and oversaw the Agency's first performance-oriented neuroscience program. Dr. Kruse's efforts at DARPA generated scientific breakthroughs in areas including augmented cognition, accelerated learning, cognitive enhancement, team neurodynamics, and brain stimulation, and they resulted in the creation of multiple programs that measurably enhanced both individual and team performance in several branches of the US military. Dr. Kruse is a member of several defense panels and advisory boards for organizations including the National Academies and the Defense Science Board. She is also the author of numerous scientific papers, chapters, and articles. Dr. Kruse earned a Bachelor of Science in Cell and Structural Biology and a PhD in Neuroscience from the University of Illinois at Champaign-Urbana, where she was awarded a National Science Foundation Graduate Fellowship.

Human 2.0 – The Future of Sense Making

Humans are unparalleled sense-making machines. Try as we might, there is no substitute (yet) for the human brain. At the same time, the pace of information and technological change has increased, and shows no sign of slowing. Throughout history, we have relied on technology to increase our performance and effectiveness, to great success. However, technological change is now accelerating so quickly, the human brain can no longer keep pace. Our brains have not experienced the same "upgrade" that machines have enjoyed. Compounding this issue, technology itself creates cognitive overload. How does the human sense-making machine meet this challenge? It is time to do the same thing with our wetware that we do with our hardware. To meet the sense-making challenges of the future we need to upgrade the human brain. Together we will explore the amazing features of the human brain and how we can further enhance our senses to meet the challenges of the modern world.

Speakers

Predicting Psychological Traits from Digital Footprints

1:45 - 2:15pm

Michal Kosinski

Assistant Professor, Organizational Behavior, Graduate School of Business, Stanford University.

Michal Kosinski is the Assistant Professor in Organizational Behavior at the Graduate School of Business, Stanford University. After receiving his PhD in Psychology from the University of Cambridge (UK) in 2014, Kosinski spent a year as a Postdoctoral Scholar at the Computer Science Department at Stanford University. Kosinski's research had a significant impact on both academia and the industry. His findings featured in The Economist, inspired two TED talks, and prompted a discussion in the EU Parliament. In 2013, Kosinski was listed among the 50 most influential people in Big Data by DataIQ and IBM, while three of his papers were placed among Altmetrics' "Top 100 Papers That Most Caught the Public Imagination".

Predicting Psychological Traits from Digital Footprints

A growing proportion of human activities such as social interactions, entertainment, and gathering information, are now mediated by online social networks. Such activities can be easily recorded, offering an unprecedented opportunity to study and assess psychological traits using actual - rather than self-reported - behavior. Our research shows that digital records of behavior, such as Tweets or Facebook Likes can be used to accurately measure a wide range of psychological traits. Such Big Data assessment has a number of advantages: it does not require participants' active involvement; it can be easily and inexpensively applied to large populations; and it is relatively immune to cheating or misrepresentation. Essentially, if the ethical and methodological challenges could be overcome, Big Data has the potential to revolutionize psychological assessment, marketing, recruitment, insurance and many other industries.

Panel: Human Sense-Making of Engineered Systems

2:30 – 3:15pm
Moderator: **Karina Alexanyan,** *mediaX, Stanford University*

Leonard Medlock is a Director at EdSurge, where he leads the Concierge program, a match-making service between K-12 schools and districts and education service providers. Previously, Medlock was a coach and lecturer at the Stanford d.school and a Research Assistant at Stanford's Project Based Learning Lab, where his work on global teamwork and collaboration was published in the International Journal of AI & Society. Medlock teaches graduate courses on designing for social impact at Claremont Lincoln University. He is a 2015 Pahara NextGen Fellow and holds a M.A. from the Stanford Graduate School of Education in Learning, Design and Technology and a B.S. in Mechanical Engineering from Duke University.

Making Sense of Teamwork in Remote Collaboration

Leonard's work explores how productivity and contextual measures of engagement (e.g. number of questions answered or ideas generated) are affected by differences in physical space, technological capability and cultural interactions across distributed teams. He has co-created frameworks and software tools that help make these conditions transparent and explicit across teams.

Megan French is a PhD student in Communication at Stanford. She is interested in how people understand online environments and how one's perceptions affect the way they engage and relate to others within cyber-social systems, such as social networking sites, online dating sites, and peer-to-peer platforms. Her work focuses on people's expectations surrounding their interactions online, including expectations for response when posting on social media, as well as people's beliefs about the role of algorithms, such as the Facebook News Feed, in mediating those online interactions.

Social Media Folkonomies

Megan's work on folk theories of social feeds has examined people's implicit beliefs about how the Facebook News Feed and Twitter feed operate. Leveraging people's use of metaphors, she has found that there are four core folk theories for social feeds that tap into people's evaluation of a system, how they think the system works, and their beliefs about the system's intent.

Speakers

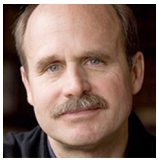
Panel: Human Sense-Making of Engineered Systems continued

Kendall Haven is a mediaX Distinguished Visiting Scholar. Haven is the only U.S. Military Academy at West Point graduate to turn professional storyteller. Now a master storyteller, Haven has performed for over 6 million worldwide during his 30 year career and has led the research effort for the National Storytelling Assn. and International Storytelling Center into the architecture of effective story structure and into the process of story-based influence and persuasion. Haven was the only storyteller or story writer recruited as part of the recent U.S. Department of Defense DARPA research program to explore the cognitive neurology of how stories exert influence.

Your Brain on Story

Haven's research has confirmed that the brain is physically hardwired to make sense in specific story terms and in specific character-based story structures. Identifying this Neural Story Net and the Eight Essential Story Elements it uses to perform its Make Sense Mandate has led to insights into how brains automatically make sense of new information and experience, and of the dominant elements that control how we create meaning from that information.

Photo Credit: Linda A. Cicero / Stanford News Service © 2012 Stanford University



Chasing Fire

3:15 - 4:30pm
Paul Saffo
Distinguished Visiting Scholar, mediaX, Stanford University

Paul Saffo is a Silicon Valley-based forecaster with three decades experience helping corporate and governmental clients understand and respond to the dynamics of large-scale, long-term change. He is a Distinguished Visiting Scholar with mediaX, teaches forecasting in the Engineering School at Stanford, and is chair of Future Studies at Singularity University. Saffo is also a non-resident Senior Fellow at the Atlantic Council, and a Fellow of the Royal Swedish Academy of Engineering Sciences. Saffo holds degrees from Harvard College, Cambridge University, and Stanford University.

Photo Credit: Linda A. Cicero / Stanford News Service © 2013 Stanford University

Chasing Fire - IT's Crucial Role in Meeting This Century's Exponential Challenges.

Steeped in Moore's Law, IT professionals assume they thoroughly understand exponential phenomena. Nothing could be further from the truth, and the consequence has been two decades of neglected challenges and missed opportunities. Meeting the challenges ahead demands a fresh examination of exponential assumptions in the service of deep innovation in the digital domain. Anything less amounts to a reckless abdication of responsibility by the IT community.

mediaX Events

mediaX programs focus on how the relationship between people and technology can be enhanced, augmented and improved. Every year, mediaX offers a diverse array of Seminars, Conferences, Workshops and Discovery Collaborations on a variety of themes at the intersection of human sciences and technology.
https://mediax.stanford.edu/page/events

Upcoming Events for 2017

Interactive Media and Games Seminars
Ongoing, Tuesdays through June 6th from 12:00 - 1:00pm
Location - Sapp Center for Science Teaching & Learning, Rm 114
http://mediax.stanford.edu/forums/interactive-media-games

Jeffrey Ventrella: Artificial Life Meets Augmented Reality
Randy Lee: Tencent's Approach to Games and the Western Market
Antero Garcia: Dungeons & Dragons in an Era of Terror, Nationalism, and Gamergate
Sirkka Jarvenpaa: Radical Innovation for Formula E
Dennis Fong: Capturing and Sharing Video Gaming's Best Moments
Ian Cinnamon: Gamification Beyond Games
Allan Alcorn: Tales of the Creation of the Video Game Industry
Soraya Murray: On the Visual Politics of Video Games

July, 2017
Workshop
Strategic Leadership for Corporate Longevity In Dynamic Environments

August, 2017
Workshop
Innovations in Human Sciences and Technologies for the Experience Economy
Workshop
Global Innovation Leadership in Human Sciences and Information Technology

September, 2017
Workshop
Smart Future: Smart People

November, 2017
Conference
The Role of Humans in Artificial Intelligence Applications and Systems
Conference
Emerging Innovation Ecosystems for AI Educational Technologies

Recent mediaX Events:

Conferences & Summits

- Sensing and Tracking for 3D Narratives - *October, 2016*
- mediaX 2016 Conference
  Augmenting Personal Intelligence - May, 2016
- Digital Cities Summit - *October 2016*
- Platforms for Collaboration & Productivity - *November, 2015*
- The Experience of Immersion - *November, 2015*
- mediaX 2015 Conference
  Writing the Code for Personal Relevance - April, 2015

Workshops

- The Future of Talent - *February, 2017*
- Individual Infomatics – *October, 2016*
- Energizing Innovation and Creativity at the Intersection of People & Advanced Communication Technologies – *August, 2016*
- Innovating at the Intersection of People and Information Technologies – *August, 2016*
- Working Through Emerging Challenges in Performance Environments – *July, 2016*
- Innovation at the Intersection of People and Advanced Communication Technologies – *May, 2016*
- Human Technology Insights for Retail Advantage – *March, 2016*
- Accelerating Innovations in Learning – *February, 2016*
- Smart Workspaces 3.0 - *July & August, 2015*
- Smart Workspaces & the Wellbeing of Knowledge Workers – *February, 2015*

Papers

- Smart Workspaces – Themes and Scenarios - *2015*
- Team Performance in a Networked World - *2016*
- Middle Class Sustainability and Workforce Development - *2017*

Seminars

- Science Storytelling Series – *February, March & April 2015*
- Interactive Media and Games – *Weekly Seminars, 2015-2016*

mediaX Research Themes

https://mediax.stanford.edu/themes

Great Questions + Leading Thinkers = Transformative Insights!

mediaX at Stanford University is built on our belief in the power of collaboration – between business and academic researchers on campus and around the world.

In trusted relationships, aligned on questions that are important for the future, mediaX collaborations challenge what we know now and stretch intellectual resources to gain new insights relevant to both academic and business partners.

mediaX Research Themes enable member companies to collaborate with Stanford scholars on leading-edge questions that have a time horizon of three to seven years and often revolve around complex issues that are not yet well defined.

The combination of Silicon Valley's entrepreneurial culture, actively engaged industry partners, Stanford thought leadership, and the energetic creativity of bright motivated graduate students and post-doctoral students infuses the **mediaX Research Theme program** with unique opportunities that draw upon the full technological, cultural and intellectual resources at Stanford University.

mediaX Research Themes include:

Insights from Digital Learning Environments

This Theme highlights innovations in digital teaching and learning practices and pedagogy, with an eye towards leveraging the large amounts of data available on Stanford's instrumented learning platforms. Research highlights opportunities for improving the functioning of digital or blended learning and understanding the effects of digital or blended learning more generally. The focus includes formal and informal learning environments, in school and out of school; and extends to learners and their contexts as well as instructors and administration.

Contextual Futures for Smart Personal Devices

Emerging uses of digital applications are igniting new cyber-social communities, reorganizing social and economic systems, and altering relationships people have with each other, their employers, their teachers and mentors, and their environments. The ways that people relate to their mobile devices, and through them to one another, are adding digital dimensions to identity, reciprocity, trust, authenticity, memory, transparency, and service. Nested in an ecosystem of related technologies, such as sensors, IoT, big data, deep learning, and cloud computing, the future contexts and use patterns of smart devices create challenges and opportunities.

Memory, Estates and Legacies in a Digital Age

The digital estate is a new metaphor for situating digital activities and recognizing the self in the digital medium. Digital technologies permeate all aspects of our lives, including information access, content creation, insight sharing, life-long and life-wide learning. Individuals engage with a rich ecosystem of digital technologies to create and use valuable digital assets that shape their lives and the society as a whole. Imagine a digital estate of content, data, services and tools that supports an individual's activities and experiences in context.

Future of Work, Community and Vitality

The existing workplace is built for organizations that move slower than today's product cycles and information flows. People and society change more slowly. To accommodate the speeds of tomorrow, work places and work spaces need to change. Their changes will be influenced by urbanization, mobile and ubiquitous communications, the reshaping of communities, big data, the rise of the service sector, changes in the labor force, the advent of the platform economy, the imperative for creativity, and new insights about the impact of worker wellbeing on productivity. In response to intense global competition fueled by exponential technological growth, mediaX collaborations explore how continuous learning and workplace vitality are reshaping industries across sectors and across communities.

Knowledge Worker Productivity

As technology evolves, workplace systems and practices also evolve, shaping how people engage, work, and communicate with others. Knowledge is the fuel of technology-based organizations, and the innovation frontier has shifted to knowledge use and creativity. At mediaX, we are interested in the future of knowledge worker productivity in the context of the intense global competition fueled by exponential technology growth that is reshaping industries across sectors. This includes the quality of decision-making. It addresses individuals, their collaboration in teams, organizations that enable, and the new frontiers of collective intelligence and citizen science.

mediaX Research Themes continued

Advanced Human Communication Technologies

The fusion of virtual and physical worlds for advanced human communications technologies represents an explosive new field of interdisciplinary inquiry, including augmented and virtual reality as well as embedded sensor systems. These multidisciplinary projects advance knowledge applied to how people living in the oxygenated world collaborate and share information in the digitized world. Research into the interaction between physical objects and their virtual counterparts inform the ways that "real-time" and "re-lived" virtual experiences support learning, innovation and productivity.

Human Machine Interaction and Sensing

Sensor technology continues to increase and improve the quantity and quality of data on human movements and behaviors. Leveraging sensors for research into human machine interaction can generate powerful insights into human psychology, biomechanics, communication, learning and education, collaboration and productivity. This research initiative highlights projects exploring technologies for emotion detection, real time video capture, gesture recognition, vision based reasoning, machine learning, biofeedback and augmented reality.

Science Storytelling

What makes a story spread into a shared vision? How do storytellers use those levers to reach and influence? Choosing the right story for the situation and telling it in an appropriate way differentiates leaders in business, education and public spheres. Effective stories spark action, communicate who you are, transmit values, tame the grapevine, share knowledge, foster collaboration, and lead people into the future. In science, expert storytelling is essential to promoting public support for research and funding. This Research Theme has included sold-out seminars on the Paradox of Suspense, the Contagion of Ideas, and the Power of Participation, featuring presentations by thought leaders and storytellers in the fields of journalism, film, psychology, neuroscience, engineering, medicine, and data analysis.

Interactive Media and Games

Interactive media and games play growing roles in education, arts, science and health. This Theme brings together diverse research areas to provide interdisciplinary perspectives on media and game history, research, technology, applications, industry, aesthetics and potential. Our Interactive Media and Games seminars, running since 2015, highlight insights from research that inspire high-impact media and games.

Upcoming seminars are listed on the Events page

Future of Content

In today's media environment, creation and consumption are two sides of the same coin. New services that enable learning, provide personalization, and assure integrity, trust, security and authenticity are being developed for individuals and organizations. These changes impact media content in learning environments of all types – higher education, K-12, continued education, and workplace training. They transform the way individuals and organizations of all types create, consume and curate media content, for education and for industry.

Publish on Demand

The world of media has been experiencing a tsunami of innovation. The way content is created, consumed and curated has changed dramatically over the course of the last few years. In publishing, this innovation has erupted in what some call the "mass amateurization" of media; it extends to how traditional content creators and distributors are restructuring new business models. Across media ecosystems content increasingly must be personalized and portable; new content creation and data management models in self-publishing and open publishing are changing the way businesses think about educational, research, trade and leisure content. To explore "signals of change," mediaX has catalyzed interdisciplinary explorations to understand how overlapping factors will influence publish-on-demand.

We welcome new Research Themes that will tackle the 21st Century's most important questions on people and information technology.

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Sense-Making & Making Sense

Research Projects

- *Persuasion and Operant Conditioning via Interactive Technology*
- *A Rich and Dynamic Treebank for HPSG*
- *Social Psychology of Voice Interfaces*
- *Spatial Meaning Constraints in Visual Language Reading*
- *Controlling Networks of Aircraft using Dialogue Systems*
- *Grounding with Language, Gesture and Gaze*
- *Blind Navigator*

- *Science Education Networks of Sensors*
- *Audio Latency and its Effect on Networked Musical Performance*
- *Persuasive Narratives Delivered via Mobile Devices*
- *Designing Embodied Speaking Agents to Maximize Learning and Engagement*
- *A Teachable Agent for Strategy Learning*
- *Learning English via Robust Conversation*
- *Re-use of Rich Contextual Gesture-Discourse-Sketch Knowledge*

- *Interactive Computational Assistants for Video Segmentation & Classification*
- *Accelerating the Usefulness of Video Libraries through HyperDiving*
- *Structuring Video Content with Assistance from the Sound Track*
- *Collaborative Visual Sensor Networks*
- *User/Agent/Avatar Modeling Framework for Multiple Contexts*
- *Using Sensing Technologies to Create Social Awareness*
- *Context Sensitive Audio Analysis for Interactive Multimedia Indexing*

- *Tactor.Net: Multi-User Gaming and Training with Tactile Interaction*
- *Interactive Multi-user Multimedia Knowledge Capture, Sharing & Reuse*
- *Understanding Impression Accuracy in Distributed Work*
- *Cross Cultural Characters and Avatars: eLearning Analysis*
- *Distributed Collaborative Work on Video Documents*
- *A Hidden Conductor for Orchestrating Learning Interactions*
- *Collaborative Design for Capturing and Communicating Project Results*

- *Bridging the Analog to Digital in Support of Mobile Collaboration*
- *Expressive Haptics for Collaborative Mobile Devices*
- *Emotion Detection from Real Time Video Capture of Facial Expressions*
- *A Robust Calibration-Free Gaze Tracking System*
- *Trust, Reputation, and Anonymity in P2P Publishing and Content*
- *Interacting with Integrated Information*
- *Eye-Tracking as an Augmented Input*

- *Helping Mobile Devices Share with Walls That Remember*
- *Detection of Comprehension and Emotion from Facial Expressions*
- *Smart Home Care Network Using Distributed Vision-Based Reasoning*
- *Towards a Multi-Modal Augmented Reality Human-Robot Interface*
- *Designing Sensor-Based Interactions by Example*
- *Human-Machine Interaction and Sensing of the Golf Swing*
- *Revealing and Using Emotion Detection*

- *ShowMeTellMe*
- *The Impact of Social Belief on the Neurophysiology of Memory*
- *Virtual Sensor Networks*
- *Using Video Game Platforms to Understand Thinking Styles of Collaborators*
- *Mutual Understanding in Global Business Meetings*
- *The Utility of Calming Technologies in Improving Productivity*
- *Finding Behavioral and Neural Signatures for Collective Creativity in Groups*

- *Supporting Self Regulation for Online Course Students*
- *Interaction using Situated Spatial Gestures*
- *Physical Media as Active Social Learning Agents*
- *Hybrid Tangible Interfaces for STEM Learning in K-12 Environments*
- *Assessing Learning in a Virtual Reality Field Trip*
- *Promoting Effortful Thinking in K-12 Online STEM Learning*
- *Capturing and Considering Multimedia Journey Narratives*

mediaX Membership Benefits

Why should my organization join mediaX to form relationships at Stanford University?
Programs at Stanford University through mediaX focus on how the relationship between people, media and technology can be enhanced, augmented and improved. mediaX takes its strength from Stanford's thought leadership — the faculty, students, courses, and the research programs that receive support from federal agencies and private foundations. **At Stanford, we are able to explore deeper and farther than is practical for most companies.**

What type of organizations are a good fit for a relationship with mediaX at Stanford University?
ALL organizations that want to expand their thinking about the future are an excellent match. Companies that thrive with mediaX have top executives who appreciate the sustainable advantage of open innovation and new ways of thinking.

What are my membership options for joining the mediaX and Stanford Community?
There are multiple ways to get involved with mediaX, including Strategic, Institutional, Associate & Affiliate Memberships and Visiting Scholars.

What are the benefits of being a mediaX Member?
All mediaX members are invited to attend mediaX Conferences, Symposia, Workshops and Seminars. These events provide opportunities for informal idea exchanges among industry representatives and mediaX affiliated researchers.

Associate, **Institutional** and **Strategic** mediaX members receive curated access to mediaX-sponsored research and formal presentations by faculty and students on new and ongoing research.

Strategic Memberships enable members to delve deeply into their relationship with Stanford, working with mediaX to establish Discovery Collaborations on Research Themes, with Stanford thought leaders, faculty, labs and students. Through Strategic Memberships, organizations can leverage the Stanford network to enhance existing expertise, identify needs for new expertise, and engage with current research methods and results at Stanford, stimulating new insights on their company's questions.

Strategic Members work with the mediaX leadership team to articulate research themes and challenges, which are fielded throughout Stanford University. These research challenges encourage concept-proving projects that focus on critical questions with a three to five year time horizon. Professors, researchers and labs from multiple disciples propose innovative research approaches to the challenge. The Discovery Collaboration process identifies novel research pathways and new ideas about how to pursue critical issues, while lowering the risk of exploration. With rapid iteration on the mediaX research themes at Stanford, organizations can externalize risk and know what will work, sooner.

Associate Members of mediaX can participate in a Theme Day organized around a question or topic of special interest.

Institutional Members can participate in extended Theme Days for their constituent stakeholders and also help mediaX tailor a Workshop or Conference to a subject or theme of special interest.

The **Affiliate Membership** is an opportunity for Start-Ups and Non-Profits to join the community of mediaX at Stanford University. Affiliate Members have networking access to the mediaX community and invitations to a year around calendar of events.

The **Visiting Scholar** program enables a researcher from a member organization to be hosted by a mediaX-affiliated lab at Stanford. This relationship is generally established for a year, although in many cases the scholar comes and goes for various periods during that time. The program is intended to build relationships for collaboration through mutually beneficial intellectual exchanges. Teams in the Stanford host labs anticipate learning from mediaX Visiting Scholars, as well as sharing knowledge from their labs. A Visiting Scholar is a recognized position at Stanford, and includes a Stanford ID card, which allows the visitor to enjoy the privileges of regular Stanford employees.

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When can my organization get started?
Memberships are annual and they can begin at any time.

Photo Credit: ©Stanford University

OUR GREATEST OPPORTUNITY FOR MUTUAL BENEFIT IS TO DO SOMETHING TOGETHER THAT NEITHER OF US CAN DO ON OUR OWN.

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Thanks

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mediaX Distinguished Visiting Scholars

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Bruce Cahan
David Evans
Walter Greenleaf
Kendall Haven
Chuck House
Jennifer House
Kimi Iwamura
Neil Jacobstein
Timothy Kasbe
Aman Kumar
Martin Lee
Peter Norvig
Neerja Raman
Paul Saffo
Steve Sims
Susan Stucky
Hiroshi Tomita
Esther Wojcicki

mediaX Visiting Scholars

Jianming Dong
Yuki Higuchi
Takayuki Kamata
Kiyoshi Sakamoto

mediaX Distinguished Visiting Scholars Alumni

Scott Z. Burns
Douglas Carmichael
Elizabeth Churchill
Parvati Dev
Marc Goodman
Ted Kahn
Davis Masten
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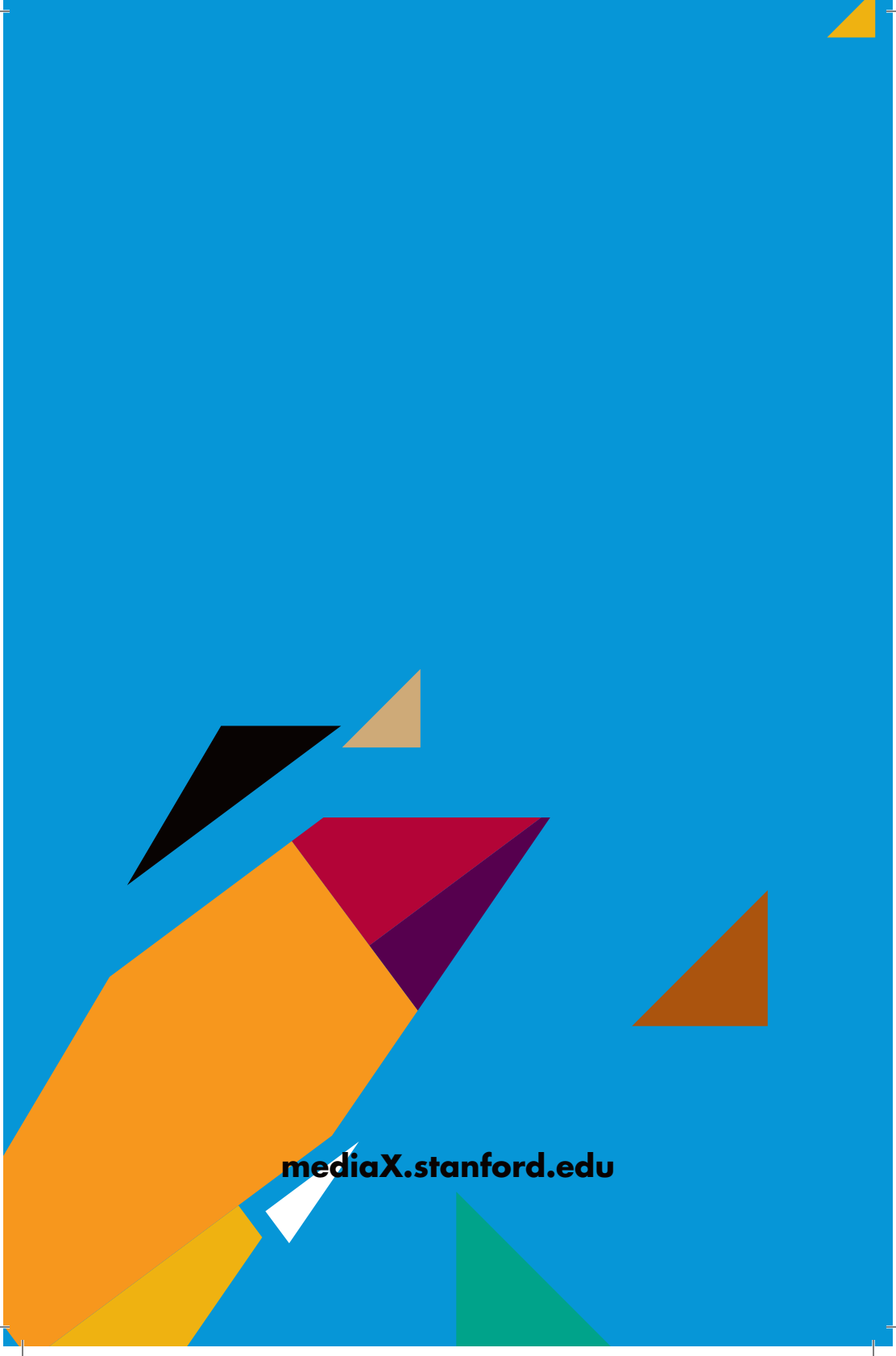
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