



H-STAR Annual Report September 1, 2016 – August 31, 2017

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1. Overview and Mission

What: H-STAR is a Stanford interdisciplinary research institute reporting to the Dean of the Graduate School of Education.

Focus: H-STAR focuses on advancing the human sciences, often in the context of their application to the design and uses of information technology and their influences on people, with a particular emphasis on education and learning. H-STAR programs conduct research at the intersection of human sciences and information technology in the areas of learning, mobility, collaboration, entertainment and commerce.

Breadth: H-STAR is the only organizational unit on campus focusing on the multi-disciplinary core of theory, research, and methods that are needed for world-class work on the central topics in K-12 learning sciences and technology design.

Sponsored research: During the twelve-month period of this report, H-STAR provided all administrative and financial management and support for 11 sponsored research projects (9 of them in the Graduate School of Education), with a total budget of \$16,617,789. (Section 4.)

Core AC faculty: Seven Academic Council faculty carry out research supported in a substantial way by H-STAR, five of them in the School of Education. (See list in Section 5a.)



Affiliated Academic Council faculty: An additional 62 Academic Council faculty have research projects within H-STAR, or participate actively in one or more H-STAR programs. (Listed in Section 5b.)

Other researchers (not Academic Council): A further 10 Stanford and Stanford-associated faculty and researchers without Academic Council status have a significant affiliation with H-STAR. Several of them have received funding through H-STAR (often through our mediaX Industry Affiliates Program). (Section 5c.)

Campus need met: Most of the faculty supported by H-STAR (listed in Section 5) are based in social science and humanities-affiliated departments (rather than engineering and research-equipment intensive disciplines such as physics). Those disciplines typically do not have the extensive infrastructure needed to support the large scale interdisciplinary research projects they wish to pursue. As a result, H-STAR meets an important campus need that would otherwise go unfilled.

U/G education: While the primary mission of H-STAR is university research, H-STAR affiliated faculty members are among campus leaders in undergraduate education.

H-STAR membership criteria: Having a broad scope of interest that has commonalities with every School, H-STAR is defined by research mission rather than permanent faculty affiliation; we facilitate, fund, and support research within our mission anywhere on the campus. All Stanford faculty are potentially H-STAR researchers. To date, over 80 Stanford researchers from all five schools have carried out H-STAR supported research or hosted a visiting H-STAR researcher from another university. (See lists in sections 5 and 7 for current affiliated faculty.) In addition, over 90 Stanford faculty have received over \$2.5M in research support through H-STAR's mediaX Industry Partners Program. (See Section 8.)

Activities: We pursue our mission in a number of ways: we organize and service interdisciplinary grants, contacts, and other funding opportunities; we bring together faculty to work collaboratively on projects — both across the campus and in collaboration with faculty at other universities around the world; and we organize events such as lectures, small seminars, workshops and conferences, sometimes through our mediaX program.

Support of faculty collaboration: We provide full service support (visa procurement, travel, logistics, housing, schools for children, space, etc.) to Stanford faculty who want to invite a collaborator from an overseas university. During the period 2016-17, we arranged visits of 24 foreign researchers who came to Stanford to work with Stanford faculty. (Itemized in Section 7.)

Staff: H-STAR employs 7 academic staff, 11 regular staff, and 2 postdoctoral scholars, who perform shared administrative support functions, such as research administration, financial, human resources, and building management in Ventura Hall. We also currently have 7 temporary employees. In addition, between September 2016 and August 2017, we supported 5 graduate students as part-time academic staff.

Budget (research): The total volume for federal and non-federal sponsored research funding awarded to H-STAR in FY17 was \$1,404,762, of which \$440,133 was F&A (indirect cost charges). See Section 4 for a complete listing of all sponsored projects.

Budget (administration): The FY17 total administrative costs for H-STAR were approximately \$450K.

Funding sources: The primary source of funding for H-STAR research is the normal system of federal and foundation grants. The infrastructure costs (primarily support-staff salaries) required to support the institute's research and outreach activities and to ensure compliance are approximately \$450K. 40% of these infrastructure costs were covered through participation in sponsored projects and revenue generating activities.

2. How H-STAR works

Faculty support: H-STAR provides affiliated faculty (and their students and research assistants) and visiting researchers with limited-term office space, physical and "virtual" meeting rooms (via IP videoconferencing), lecture rooms, lab space, seminars and lectures, printing and copying facilities, secretarial services, the services of administrative, financial and technical support personnel, assistance with identifying and securing funding for research, and, through the mediaX program, contacts with industries relevant to their research pursuits.

Regular research funding: The primary means for funding H-STAR research is external grants, secured by the faculty and affiliated researchers. The administrative and financial support staff of H-STAR provides help and support for faculty in proposal preparation and grant management. During the period covered by this report, H-STAR we managed 11 sponsored faculty projects, totaling \$16.7M. These are itemized in Section 4.

Major research projects: H-STAR also works with faculty to secure large-scale, institute-level, sponsored research funding for multi-year projects involving many faculty members. We helped initiate and then managed two such projects during the period covered by this report, totaling \$11.7M in funding:

- US Dept of Energy, \$8,461,360: Large-Scale Energy Reductions through Sensors, Feedback, and Information Technology (01/14/10 – 11/30/16), PI James Sweeney (MS&E) and Byron Reeves (Communication)
- USAID, \$3,256,518: Resilience Africa Network (RAN) (11/08/12 – 09/30/17), PI James Fishkin (Communication)

Space: H-STAR has administrative offices and research space in Ventura Hall, which comprises 8 administrative offices, 2 rooms used as administrative offices and shared labs, 1 research lab, and 1 large room devoted to international research projects.

3. Major research programs within H-STAR during 2016-17

3a. Energy Project. This \$8.5M, six-year project (funded in two successive parts), which commenced in January 2010, focuses on the development of technologies that encourages people to learn to be more energy efficient at home. The funding came from the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) supplemented by matching grants from Stanford and the California Energy Commission.

3b. USAID RAN Project. The Resilient Africa Network (RAN), funded by USAID, is a partnership of 20 African universities in 16 countries. RAN seeks to strengthen the resilience of communities by nurturing and scaling innovations from the different universities. The RAN Project, funded at \$3,256,518 over five years, applies science and technology to strengthen the resilience of African communities against natural and man-made stresses. It is led by Makerere University with Tulane University's Disaster Resilience Leadership Academy, Stanford University's H-STAR Institute, and the Center for Strategic and International Studies (CSIS) as

partners. RAN is one of seven development labs under the Higher Education Solutions Network (HESN) in the Office of Science and Technology (OST), USAID. H-STAR is developing online democracy tools and a form of online education (involving MOOC-like elements) to support the RAN initiative.

3c. ChangeLabs is a program in H-STAR directed by Prof Banny Banerjee. Stanford ChangeLabs has been pioneering world-class thinking on innovation methodology aimed at complex, scaled, and multi-outcome challenges such as global food security and Climate Change. The “System Acupuncture” Innovation methodology is based on an underlying theory that combines systems thinking, resilience theory, behavior change theory, organization change, business innovation, and design thinking. Institutions such as the World Economic Forum and the United Nations are already adopting this methodology. ChangeLabs is involved in conducting trans-disciplinary research, and classes taught at the d.school integrating rubrics across disciplinary boundaries.

ChangeLabs has played a leading role in the USAID-funded Resilient Africa Network project (RAN) that has caused the establishment of 19 Resilience Innovation Labs across 13 African nations, and the establishment of new innovation methodologies and programs to address pressing sociological, environmental, and economic regional challenges such as agricultural failure due to climate change, and financial access in distributed rural communities. ChangeLabs has been working closely on the Global 2030 Goals, also known as the Sustainable Development Goals (SDGs). ChangeLabs has been working with various U.N agencies and national governments to set up a Global SDGs Innovation Platform which includes a system of national and state level innovation and policy labs, a protocol at the U.N. level for their instantiation across the 193 member nations, a system of institution level innovation labs, the development of a systems based innovation process for the SDGs, and a global community of practice and leadership. Some of the following 2017 Stanford ChangeLabs events are indicative of the nature of the work being carried out. Banny Banerjee is also a member of the World Economic Forum Global Futures Council on Systems and Platforms and has been helping shape the framework for Systems Leadership, to be framed in Davos 2018.

SAMPLE LIST OF 2017 STANFORD CHANGELABS ACTIVITIES

MEETING	PARTNER	LOCATION
SDGs Workshop	U.N. Armenia	Yerevan Armenia
Impact Investment Summit	U.N. Armenia	Yerevan Armenia
Systems Leadership training	U.N. Staff College	Turin, Italy
SDGs Innoation Platform workshop	U.N.D.P	Arusha, Tanzania
Large Scale Transformation workshop	Tata Foundation	Mumbai, India
System Transformation Workshop	UNICEF	Lusaka, Zambia
Rural Impact Strategy	Reliance Foundation	Mumbai, India
System Transformation Workshop	UNDP, Kenya	Nairobi Kenya
System Leadership Plenary Presentation	Aspen Institute	Aspen, Colorado
RAN 2.0 SDGs Strategy Meeting	RAN	Kampala, Uganda
RAN Partner’s Meeting	RAN	Kampala, Uganda
Design Partnership with ThinkPlace with Better by Design Program, Government of NZ	Government of New Zealand	Wellington, New Zealand
10 Year Forecast Event	IFTF	Oakland CA
Danish Design Council Advisory Meeting	Danish Design Center	Copenhagen, Denmark
World Economic Forum Impact Summit	World Economic Forum	Geneva, Switzerland
SDGs Partnership	University of Queensland	
SDGs National Innovation Lab Meeting	U.N.D.P; Office of the Secretary General	U.N. HQ New York

Future of Innovation Summit: The Structure and Scaling of the Global SDGs Innovation Labs Platform	Rockefeller Foundation, Harvard; various UN agencies, Govts of Egypt, Armenia, Slovenia, Somalia, Sweden, Denmark	Bellagio, Italy
U.N. Egypt Impact Investment Partnership	Govt of Egypt	Stanford
Systems Initiative Leadership Training	World Economic Forum	Geneva
Fourth Industrial Revolution Technology Seminar	Danish Innovation Council	Palo Alto, California
Global Futures Council Meeting	World Economic Forum	4IR, Center, San Francisco, CA
Global Leadership Forum Training	World Economic Forum	4IR Center, San Francisco, CA
System Transformation Presentation	International Labor Organization	Turin, Italy
Global Futures Council System Leadership workshop	World Economic Forum	Stanford, CA
Transformative Leadership Training	SCPD	Stanford University
Young Global Leaders – Transforming Systems at Scale	Young	
Scaling Impact: Ideal Village Summit	School of Medicine, Stanford	Stanford University

3d. mediaX. H-STAR’s primary industry partnership program, mediaX, is a self-funded program that seeds campus-wide research and coordinates industry interest. The program currently includes 32 industry members. The program supports and funds research initiatives on domains involving people and technology, rather than by discipline. Since the program began in 2001, mediaX has supported more than \$5M of Stanford research, spread across over 110 Stanford faculty PIs, receiving over 240 proposals, representing faculty from all seven schools, and involving over 130 graduate students. *Over three-quarters of research proposals received and over half of the awarded projects have included topics related to learning and education.*

Research funding from mediaX has been in the form of seed grants to support early investigation of promising ideas that show likelihood of leading to larger projects. mediaX research funds are open to all researchers in the Stanford community, and preference is given to novel interdisciplinary collaborations. Many of these “seed” funded projects leverage large federal and foundation grants (bringing faculty and student work closer to societal impact through commercial diffusion.) A significant number have led to new interdisciplinary proposals for federal and foundation grants that build on the mediaX seed projects. (See Section 8 for more details about mediaX.)

4. H-STAR managed funded research projects

The total funding amount for projects active in the period September 2016 – August 2017 is \$16,617,789.

4a. Projects that have a budget over \$1M

Four projects, total funding amount \$14,486,048.

1. Byron Reeves / James Sweeney: US Dept of Energy (01/14/10 – 11/30/16) \$8,461,360. Large-scale Energy Reductions through Sensors, Feedback, and Information Technology I
2. Daniel Schwartz: US Dept of Education (07/1/14 – 06/30/18) \$1,367,916. Designing Contrasting Cases for Inductive Learning

3. Daniel Schwartz: National Science Foundation (07/14/15 – 07/13/18) \$1,400,254. Improving and assessing learners' preparation for future learning in science
4. James Fishkin: USAID (11/8/12 – 9/30/17) \$3,256,518. African Resilience Initiative

4b. Project with a budget of \$1M or less

Seven projects, total funding amount \$2,131,741.

1. Daniel Schwartz: NSF (09/15/16 – 08/31/19) \$650,190. DD: C2STEM: Learning by Modeling: A Collaborative and Synergistic Approach to K-12 Computing and STEM Education
2. Daniel Schwartz: NASA (01/04/16 – 01/03/21) \$756,479. Real World, Real Science: Using NASA Data to Explore Weather and Climate
3. Kenji Hakuta: Central Valley Foundation (05/13/13 – 05/12/17) \$80,500. Data Dialogues: Data Augmentation to the Stanford ELL Leadership Network
4. Kenji Hakuta: S. H. Cowell Foundation (07/01/14 – 04/30/17) \$390,000. The Stanford ELL Leadership Network: Improving Instructional programs, Practices and Policies for Secondary English Language Learners
5. Daniel Schwartz: Heising Simons Foundation (03/01/17 – 06/30/17) \$17,000. 2017 Cubberley Lecture with Jacqueline Woodson
6. Daniel Schwartz: University of Colorado (07/17/15 – 11/30/17) \$200,000. Pioneering Next-Generation Assessments of Science Learning II
7. Brigid Barron: Bezos Family Foundation (05/01/17 – 04/30/18) \$37,572. FamLAB Innovation

5. Faculty and researchers supported by H-STAR

5a. Faculty supported substantially by H-STAR

The following 7 Academic Council faculty carry out research supported in a substantial way by H-STAR:

1. Barron, Brigid (School of Education)
2. Fishkin, James (Department of Communication)
3. Hakuta, Kenji (School of Education)
4. Pea, Roy (School of Education)
5. Schwartz, Daniel (School of Education)
6. Reeves, Byron (Department of Communication & School of Education)
7. Sweeney, James (Management Science & Engineering)

5b. Affiliated Stanford Faculty

The following additional 62 Academic Council faculty have some research projects within H-STAR, or participate actively in one or more H-STAR programs. Those that have received research funding from H-STAR (often through the mediaX program) are marked with an asterisk.

1. Altman, Russ (School of Medicine)
2. Agrawala, Maneesh (Computer Science)*
3. Bailenson, Jeremy (Department of Communication)*
4. Bailey, Diana (Department of Management Science and Engineering)
5. Barron, Brigid (Graduate School of Education)*
6. Berman, Russell (Department of Comparative Literature)
7. Bernstein, Michael (Computer Science)*

8. Blikstein, Paulo (Graduate School of Education)*
9. Boaler, Jo (Graduate School of Education)*
10. Brown, Bryan (Graduate School of Education)*
11. Chafe, Chris (CCMRA)
12. Chu, Larry (School of Medicine)
13. Clark, Herbert (Department of Psychology)
14. Cook, Karen (Department of Sociology)
15. Cutkosky, Mark (Department of Mechanical Engineering)
16. Das, Rhiju (Biochemistry)*
17. Dee, Thomas (Graduate School of Education)*
18. Diaconis, Persi (Mathematics)
19. Dweck, Carol (Department of Psychology)*
20. El Gamal, Abbas (Department of Electrical Engineering)
21. Eshel, Amir (Comparative Literature)*
22. Fischer, Martin (Civil and Environmental Engineering)*
23. Genesereth, Michael (Department of Computer Science)
24. Guibas, Leonidas (Department of Computer Science)
25. Hamilton, Jay (Department of Communication)
26. Hanrahan, Pat (Department of Computer Science)
27. Heer, Jeffrey (Computer Science)*
28. Heller, Craig (Department of Biology)
29. Hinds, Pamela (Management Science and Engineering)*
30. Iyengar, Shanto (Department of Communication)
31. Jenkins, Nicholas (English)*
32. Johari, Ramesh (Management Science and Engineering)*
33. King, Abby (Health Research and Policy)*
34. Klemmer, Scott (Department of Computer Science – no longer at Stanford)*
35. Koltun, Vaden (Department of Computer Science)
36. Krawinkler, Helmut (School of Engineering)
37. Laughlin, Robert (Physics)*
38. Law, Kincho H. (Dept of Civil and Environmental Engineering)*
39. Leifer, Larry (Department of Mechanical Engineering)*
40. Levis, Philip (Department of Computer Science)
41. Levoy, Marc (Department of Computer Science)
42. Lewenstein, Marion (Emeritus, Department of Communication)
43. Luhrman, Tanya (Anthropology)
44. Lunsford, Andrea (Department of English)
45. Musen, Mark (School of Medicine)
46. Nass, Clifford (Communication)*
47. Ng, Andrew (Computer Science)
48. Okamura, Allison (Mechanical Engineering)*
49. Pea, Roy (Graduate School of Education)*
50. Perry, John (Department of Philosophy)
51. Reiss, Allan (Psychiatry)*
52. Riedel-Kruse, Ingmar (Bioengineering)*
53. Salisbury, Kenneth (Departments of Computer Science and Surgery)
54. Schnapp, Jeffrey T. (Stanford Humanities Laboratory)
55. Sheppard, Sheri (Engineering)
56. Srivastava, Sakti (Surgery)*i
57. Turner, Fred (Department of Communication)*
58. Wagner, Anthony (Department of Psychology)
59. Wandell, Brian (Department of Psychology)
60. Wheeler, Christian (Graduate Business)
61. Willinsky, John (Graduate School of Education)*
62. Winograd, Terry (Department of Computer Science)

5c. Stanford researchers in H-STAR

The following 10 researchers (all senior scholars with doctoral degrees) have a significant affiliation with H-STAR:

1. Bannerjee, Banny (H-STAR)
2. Devlin, Keith (H-STAR, CSLI)
3. Flora, June (H-STAR)
4. Fogg, B.J. (H-STAR)
5. Fruchter, Renate (Engineering)
6. Horn, Robert (Computer Science and H-STAR)
7. Ju, Wendy (Mechanical Engineering)
8. Russell, Martha (mediaX)
9. Sirkin, David (Mechanical Engineering)
10. Winter, Sandra (Medicine)

6. International research collaborations

H-STAR has several international collaborations with universities and industries throughout Europe and Asia. The most active during the period 2016–17 are listed below:

6a. Finland H-STAR has had close ties with Finnish universities for several years, focused on research on education and the human-centered design of technology, both areas where both Finland and Stanford have international reputations. For many years, the Finnish government technology agency (TEKES) funded Stanford’s infrastructure costs in supporting research collaborations on the Stanford campus between university scholars from Finnish universities, working on projects with Stanford faculty PIs. A change in TEKES’ national funding priorities led to non-renewal of the program, apart from funding ad hoc visits from Finnish university researchers. In 2017, we began negotiations with TEKES to re-establish some form of regular partnership during 2018.

6b. Japan H-STAR has had a number of partnerships with Japanese research entities going back over many years. (One such formed the impetus and much of the original funding for the launch of mediaX.) The year 2016-17 saw the continuation of the partnership initiated the year before with NHK, the large Japanese government-funded electronic media company. With academic leadership provided by Prof Jay Hamilton in the Communications Department, this H-STAR program organized and hosted visits from seven media researchers, who each spent two months at Stanford, spread throughout the year. The focus was on identifying emerging trends in the world of media. The NHK visitors interacted with a variety of different Stanford faculty and researchers. They are listed below:

1. Takeaki Yoda, *Jan 3–Feb 28, 2017*
2. Susumu Uchida, *Jan 30–Mar 30, 2017*
3. Naoki Hosoda, *Feb 1–Mar 31, 2017*
4. Hirokazu Arai, *Mar 1–Apr 30, 2017*
5. Akito Iga, *April 10–June 9, 2017*
6. Daichi Takahashi, *April 1–May 31, 2017*
7. Takahisa Miyaji, *May 22–July 21, 2017*

6c. Germany H-STAR has supported a number of Stanford research collaborations with German academics. In 2016-17, we hosted a visit from a senior scholar from the Institute for Performance Management at Leuphana University of Lüneburg. Her visit was arranged at the request of Prof Larry Leifer in the School of Engineering.

- Visiting Prof Larry Leifer (Engineering): Sabine Remdisch, Institute for Performance Management, Leuphana University of Lüneburg, Germany (*February 5 – March 31, 2017*).

6c. Estonia H-STAR has a research partnership with Tallinn University of Technology in Estonia for several years, during which period a number of Estonian academics have spent time here working with Stanford faculty. During 2016-17, we established a similar partnership with Tartu University. The first visiting scholar from Tartu is scheduled to arrive in the spring of 2018 to work with Prof Brigid Barron of the Graduate School of Education.

6d. France Apart from some industry connections with mediaX, H-STAR has had little organized interaction with France, but 2016-17 saw two new initiatives. First, the President of the European Innovation Academy, based in Nice, signed a (standard) visiting scholar partnership agreement with H-STAR, under which he spent a month of an intended four-month stay at Stanford working with Prof Shared Goel of the MS&E Department, but had to cut short his stay due to events that required his attention back in France. He intends to return in 2017-18 to complete his stay.

- Visiting Prof Sharad Goel (MS&E): Alar Kolk, President, European Innovation Academy, Nice, France (*Feb 20 – Jun 20, 2017*).

Second, we entered negotiations with the Attaché for Science and Technology at the Consulate General of France in San Francisco, who is interested in establishing a visiting scholars partnership program with H-STAR. This led to Devlin meeting with the President of the University of Bordeaux and two of his team in San Francisco for some exploratory discussions, but as yet there is no formal agreement.

7. International visiting researchers

In addition to H-STAR's formally established international collaborations, we occasionally act on behalf of Stanford faculty to organize and support visitors who wish to collaborate with Stanford faculty. During the period of this report, we organized and supported two H-STAR visitors from overseas.

- Visiting Prof Jay Hamilton (Communications): Serge Reymond, Head of the Paid Media Division, member of the Management Board, Tamedia, Zurich, Switzerland (*Jul 10 – Aug 11, 2017*).
- Visiting Ashish Goel (MS&E): Subramaniam Vincent, Oorvani Media PVT LTD, Bangalore (*Jun – Oct, 2016*)

Visitors who are admitted through the mediaX program are listed in Section 8.

8. mediaX Industry Partners Program

mediaX is an industry affiliate program of the H-STAR Institute. It acts as a forum, an incubator of ideas, and a programmatic framework to support multi-disciplinary relationships. mediaX initiatives explore how a better understanding of people can improve the design of technologies and services, particularly in education and learning, but also with relevance for entertainment and commerce.

mediaX programs explore issues at the intersection of human sciences and information technologies, in which media – broadly conceived – is a key consideration. They connect faculty and graduate students in the Graduate School of Education, across Stanford University and in the mediaX member community – on issues, questions, methods and insights that include both people and IT.

MEMBERSHIPS

mediaX is supported entirely by its external members. In 2016-2017, the program received \$2M from its member organizations.

mediaX members include multinational corporations, local companies, organizations that serve business clients (such as consortia, university executive programs, etc.), and selected startups with synergistic interests. 5 Affiliate, 15 Associate, 2 Institutional, and 4 Strategic Members comprise the external constituency and sponsorship of mediaX at Stanford University. (* indicates Continuing)

Affiliate Members:

*AiTaiji
OCAHT
*Sábia Experience
Hong Kong Productivity
Council
*Monty Toole Family
Foundation

Associate Members:

*AISIN AW
AISIN TCA
*Bluescape
*Cigna
*CISCO
*Conduent
*Huawei
*ITRI
*Japan-NET
Mosaic
*Nissan
*Omron
QiTian
*SESI/CNI
Vobile

Institutional:

*IBE/FGE
*HKUST

Strategic:

*Prudential
*Konica Minolta
SEST/SENAT of CNT
*VBP Orange

VISITING SCHOLARS AND RESEARCHERS

- Jianming Dong, Huawei, User Interface Research, Hosted by Professor Larry Leifer, Mechanical Engineering
- Erin Young, Oxford University, Interdisciplinary Research & Education, Hosted by Professor Roy Pea, Graduate School of Education
- Daisuke Takahashi, Konica Minolta, Design Research, Hosted by Professor Larry Leifer, Mechanical Engineering
- Kiyoshi Sakamoto, Konica Minolta, Smart Office Systems, Hosted by Michael Bernstein, Computer Science
- Yuki Higuchi, Konica Minolta, Haptics, Hosted by Allison Okamura, Mechanical Engineering

mediaX RESEARCH THEMES

mediaX Research Themes enable researchers from member companies to collaborate with Stanford researchers on leading-edge questions, which have a time horizon of three to seven years and often revolve around complex issues that are not yet well defined. Results of mediaX research projects are disseminated openly. In many cases, results validate a new question or method. They can also lead to significant research funding from public or private resources.

Research funds are awarded by mediaX as university research grants, following review by a faculty committee. They are intended as catalyst funds – to seed the trial of new collaborations, new questions, and new methods.

Results of previous mediaX-funded projects have provided insights which informed continuing conversations between Stanford thought leaders and mediaX member delegates. Current mediaX research themes address the broad contexts of education and learning.

In 2016-2017 mediaX funded graduate students and their research through \$460,000 awarded to 4 research awards on the theme of “Smart Office Work Flows” and 5 research awards on “Potential, Productivity and Performance.” These funds are used primarily to support graduate students.

- *Smart Office Work Flows (January 2017 to December 2017)*
<http://mediax.stanford.edu/pdf/mX-RFP-SmartOfficeWorkFlows-11-14-16>

Haptic Tether for Human Robot Communication

PI: Allison Okamura, Mechanical Engineering

This project will apply robotic technologies in offices and other work environments to create smart, automated environments.

DreamTeam: Computational Techniques for Adaptive Teams

PI: Michael Bernstein, Computer Science

This project will establish a new computationally empowered management practice for teams.

Real Time Knowledge Capture and Feedback in Design Workspaces

PI: Larry Leifer, Mechanical Engineering

Co-I: Wendy Ju, Mechanical Engineering

This project will develop a knowledge capture and reuse system that enables real-time analysis and feedback for design workspaces.

Making Noise Intentional: Capturing and Designing Robotic Sonic Expression

PI: Larry Leifer, Mechanical Engineering

Co-I: Wendy Ju, Mechanical Engineering

This project will develop design heuristics for the sounds that are a byproduct of interactive objects in the technologically advanced workplace of the future.

- *Potential, Performance, Productivity (September 2017 to March 2018)*
[http://mediax.stanford.edu/pdf/mediaX%20RFP_Potential,%20Performance and Productivity_11 June2017](http://mediax.stanford.edu/pdf/mediaX%20RFP_Potential,%20Performance_and_Productivity_11June2017)

Using Mobile Technology to Bring Social Psychological Interventions to the Workplace

PI: Geoffrey Cohen, Psychiatry and Graduate School of Education

This project will develop, refine, and test a mobile application (app) that delivers psychological interventions aimed at bolstering worker motivation and performance at moments of distress.

New Training Models for the Digital Workforce: The Case of Coding Bootcamps

PI: Melissa Valentine, Management Science and Engineering

This study will examine the process and outcome of a bootcamp model of professional training.

Where are the Breakdowns? Surveying Successful and Failed Uses of Data Analytics Across the Organization.

PI: Pamela Hinds, Management Science and Engineering

This field study employs qualitative research methods to illuminate the process and practices through which individuals from diverse professional backgrounds enact data analytics and provide essential insights into the conditions of successful and failed uses of data analytics for managerial decisions.

Vitae: Digital Hiring Halls for On Demand Workers

PI: Michael Bernstein, Computer Science

Co-I: Margaret Levi, Political Science

This project will design and evaluate a socio-technical system in which groups of workers can bind together into a community and trade on their collective reputation.

Coordinating Expert Flash Teams on the Biological Internet of Things

PI: Ingmar Riedel Kruse, Bioengineering

Co-PI: Michael Bernstein, Computer Science

This project will investigate how a team of distributed scientists (“Knowledge workers”) working with distributed instruments (“Internet of Things”) can be successfully coordinated and motivated to collaborate on complex and open-ended research projects.

SEMINARS

The mediaX Seminar Series continued in 2016-2017 with seminars given by academic and industry researchers.

Interactive Media and Games Seminars

Interactive media and games increasingly pervade and shape our society. In addition to their dominant roles in entertainment, videogames play growing roles in education, arts, science and health. These talks brought together a diverse set of experts to provide interdisciplinary perspectives on the history, technologies, scholarly research, industry, artistic value and potential future of the medium. As the speakers and title suggest, the series also provided a topical lens for the diverse aspects of our interactivity in the digital sphere. Interactive Media and Games Seminar is offered as a 1 credit course with Ingmar Riedel-Kruse as Faculty Lead. BIOE196. Video recordings of mediaX seminars are available online for free viewing by the public.

- *Interactive Media & Games Seminar Series (Fall QT September-December 2016)*
<http://mediax.stanford.edu/page/interactive-media-games-fall-2016>
Most watched video in entire series was done in the Fall 2016 QT: Ashly and Anthony Burch, Crumpets and Badonkadonks: Creating Tiny Tina (November 29 2016). 51,900 views and counting.

Speakers from Fall 2016:

9/27/2016; Shane Denson, Assistant Professor Film and Media Studies at Stanford University

10/4/2016; Sean Follmer, Assistant Professor Mechanical Engineering at Stanford University

10/11/2016; Douglas Wilson, Assistant Professor Game Design at RMIT University and Co-Owner Die Gute Fabrik

10/18/2016; Peter Krapp, Professor Film & Media at UCI

11/1/2016; Deborah Gordan, Professor Biology at Stanford University

11/8/2016; Catherine Herdlick, Creative Producer & Entrepreneur at the California College of Arts

11/15/2016; Tracy Fullerton, Professor & Chair Interactive Media & Games, School of Cinematic Arts at USC

11/29/2016; Ashly and Anthony Burch, Siblings, Writers, Actors, Producers

12/6/2016; Nathan Altice, Teaching Professor, Computational Media at UCSC

- *Interactive Media & Games Seminar Series (Winter QT January-March 2017)*
<http://mediax.stanford.edu/page/interactive-media-games-winter-2017>

Speakers from Winter 2017:

1/10/2017; Kaisa Still, Senior Scientist, VTT Technical Research Centre of Finland

1/17/2017; Jukka Huhtamäki, Business Data Research Group (DARE), Tampere University of Technology

1/24/2017; Tomer Perry, Research Associate Edmond J. Safra Center for Ethics, Harvard University

1/31/2017; Dan Milton Klein, Lecturer, Drama Department and GSB, Stanford University

2/7/2017; Yasaman Sheri, Core Designer Microsoft Hololens; Copenhagen Institute of Interaction Design

2/14/2017; Elizabeth Arredondo, Creative Writer for Television and Interactive Media

2/28/2017; Drew Davidson, Professor & Director Entertainment Technology Center, Carnegie Mellon University

3/7/2017; Alan Meades, Senior Lecturer, Media, Art and Design, CCC University

3/14/2017; Julien Mailland, Assistant Professor of Telecommunications at Indiana University's Media School

- *Interactive Media & Games Seminar Series (Spring QT April-June 2017)*
<http://mediax.stanford.edu/forums/interactive-media-games/seminar-series>

Speakers from Spring 2017:

4/4/2017; Jeffrey Ventrella, Software Artist in Artificial Life

4/11/2017; Randy Lee, Head of Business Development, North America, Tencent

4/18/2017; Antero Garcia, Assistant Professor Graduate School of Education, Stanford University

4/25/2017; Sirkka Jarvenpaa, Professor Information, Risk, and Operations, University Austin Texas

5/2/2017; Stone Librande, Lead Designer, Riot Games. Teacher Game Design, Carnegie Mellon University's ETC Program.

5/9/2017; Dennis Fong, Founder and CEO, Plays.tv

5/16/2017; Ian Samuel Cinnamon, Engineer, Entrepreneur and MBA Candidate GSB, Stanford University

5/23/2017; Whalen Rozelle, Co-leader, Riot eSports Global Team

5/30/2017; Allan Alcorn, Electrical Engineer and Computer Scientist

6/6/2017; Soraya Murray, Assistant Professor, Film & Digital Media Department, University of California, Santa Cruz

Software and Digital Content for Educational Technologies (May 24, 2017)

<http://mediax.stanford.edu/events/software-and-digital-content-for-educational-technologies>

mediaX Distinguished Visiting Scholar Dr. Jennifer House provided an update on the status of federal funding for K-12 education, the implementation of the Every Student Succeeds Act, and reauthorization of the Higher Ed Act. This update included timely news from the SIIA Education Policy Seminar and meetings in Washington DC with education stakeholders.

Pre-Release Screening of An Inconvenient Sequel: Truth to Power (June 19, 2017)

<http://mediax.stanford.edu/events/pre-release-screening-of-an-inconvenient-sequel-truth-to-power>

In conjunction with Paramount Pictures and Participant Media, mediaX partnered with the

Stanford Graduate School of Education, Stanford Woods Institute for the Environment, Center for Design Research, Stanford Energy Club, Precourt Energy Efficiency Center, JSK Fellowships, Bill Lane Center for the American West and the M.F.A for a very special pre-release screening of the new film: *An Inconvenient Sequel: Truth to Power*.

CONFERENCES

- *“Digital Identity in the New Landscape of Work” - in Tokyo (September 15, 2016)*
A mediaX event held for members in Japan. Information technologies record the minute traces of human behavior and intricate details in the flow of information. Human sciences help us understand how digital media might enable and constrain identity and social relations - at work, at home and in leisure. Together, insights from research in human sciences and information technologies open new horizons for personalized products and services in the new landscape of work.
- *“Digital Cities Summit” – with the Center for Global Issues and PARC (October 3-4, 2016)*
<https://gpc.stanford.edu/digital-cities-summit-presentations>
mediaX supported the first annual Digital Cities Summit hosted by Stanford’s Center for Global Issues and PARC, a Xerox company. This Summit brought together an elite group of ~200 global CEOs, SVPs, entrepreneurs, and policy makers at Stanford.
- *Sensing & Tracking for 3D Narratives Conference (October 24, 2016)*
<http://mediax.stanford.edu/news/sensing-and-tracking-for-3d-narratives-presentations-are-avaialble>
Stanford researchers and media innovation leaders gathered for a conference that delved into the narrative ecosystem within Virtual Reality (VR) and Augmented Reality (AR). The event was held in Tresidder Memorial Union Oak Lounge West and included keynote talks, panels and demos presenting Stanford academics’ and industry leaders’ insights.
- *mediaX Annual Conference: Sense-Making & Making Sense (April 20, 2017)*
<http://mediax.stanford.edu/news/mediax2017-conference-presentations-are-available>
Technology augments human senses, challenging our sense-making apparatus to filter signals, manipulate data, create representations, and construct meaning. The communication and social sciences are in fast pursuit of questions addressing these key challenges, fueled by massive data and novel algorithms. The learning, cognitive and neurosciences are entering a period of accelerated development. Thought Leaders in these fields showcased how each contributes a unique perspective and can inspire new insights.
- *International Conference on Distributed Smart Cameras (ICDSC, September 5-7 2017)*
<http://mediax.stanford.edu/events/international-conference-on-distributed-smart-cameras>
mediaX hosted the annual conference of this international IEEE-affiliated organization, which had its early start with a mediaX-hosted conference in 2008, and The Journal of

Ambient Intelligent Environments, launched shortly after. Smart camera networks are becoming a fundamental component of our intelligent cities, buildings and homes, progressively inserting themselves into our lives. From smart surveillance systems composed of a multitude of smart camera nodes to small wearable cameras able to render a visual log of our daily experience, these devices interact with each other and with a wealth of other smart things, and of course the internet. Their rapid development is possible due to the convergence of several technologies and understandings of people.

MEMBER WORKSHOPS

- *Middle Class Sustainability and Workforce Development (September 1, 2016)*
<http://mediax.stanford.edu/events/middle-class-sustainability-and-workforce-development>
Inspired by a gift from the Monty Toole Family Foundation, mediaX conducted a preliminary study of the important issue of middle class sustainability and work skill development, including an examination of notable initiatives (corporate, NGO and governmental). This study identified successful digital initiatives that support adult work force development, with a focus on exemplary programs that leverage intergenerational learning programs for parents and children, and articulate pathways for success across the life cycle.
- *Insights at the Intersection of People and Information Technologies: Leadership and Innovation in the 21st Century (October 10-13, 2016) with member, SESCON*
The mediaX Executive Workshop is an intense four-day program, designed to stimulate and inspire through presentations by Stanford thought leaders and visits to innovation organizations in Silicon Valley. The program builds on Stanford's multidisciplinary expertise at the intersection of people and information technology and features a human science and information technology lens on issues related to Leadership, Innovation, Marketing, Design Thinking and Future Trends. Presenters included:
 - Chuck House, mediaX Distinguished Visiting Scholar, *Enabling Enterprise Intrapreneurship*
 - Keith Devlin, Executive Director, H-STAR Institute, Stanford University: *Mathematical Thinking*
 - Renate Fruchter, Founding Director of the Project Based Learning Laboratory (PBL Lab): *Collaboration Technologies*
 - Bruce Cahan, mediaX Distinguished Visiting Scholar, CEO and co-founder of Urban Logic, Consulting Professor, Department of Civil and Environmental Engineering and CodeX Fellow, Center for Legal Informatics: *Sustainable Finance*
 - Martha Russell, Executive Director, mediaX at Stanford University: *Introduction to Stanford University and Silicon Valley*
 - Jeff Hancock, Professor, Department of Communication, Stanford University: *Truth, Trust and Technology*
 - Neerja Raman, mediaX Distinguished Visiting Scholar: *World Smart Perspectives*
 - Aman Kumar, Office of the CEO at SAP, mediaX Distinguished Visiting Scholar: *Finance and Entrepreneurship*
 - Kevin Hsu, Scientist at Disney Research; Lecturer, Urban Studies at Stanford University: *Sustainable Global Cities*

- Tamara Carleton, CEO, Innovation Leadership Board: *Exercises in Foresight and Innovation*
- *Building Digital Estates: New Technology for Creating Business, Social and Physical Identities (October 21, 2016)*
<http://mediax.stanford.edu/events/building-digital-estates>
 The variety of human experiences available digitally will continue to grow as more and more items – from refrigerators to shoes to food to car parts – get their own IP addresses that link them to the so-called “internet of things.” Presenters: Professors Fred Turner, Jeff Hancock and Byron Reeves discussed intellectual and practical issues enlightened by their collaboration on a 2007 mediaX grant in the Digital Estates Research Theme
- *Global Innovation Workshop; The Future of Talent (February 15-17, 2017)*
<http://mediax.stanford.edu/events/the-future-of-talent-workshop>
 In the fast-changing global context, the enterprises that will prevail tomorrow are those whose employees can learn the fastest. Facilitated by the Stanford Foresight and Innovation Program, the mediaX Global Innovation Leadership Workshop on The Future of Talent was designed to build innovation leadership skills, articulate challenges and propose solution models that bridge the perspectives of human resource professionals, educators, innovation executives, and technology leaders. This workshop was an intense, three-day experiential program of skill-building and networking, designed to stimulate and practice foresight, leadership, and user-centered design through presentations by Stanford thought leaders and active engagement of workshop participants.
- *Human Sciences and Information Technologies for Innovation and Training for Brazil's Transportation Infrastructure (July 24-26, 2017) in Brazilia*
 The objective of this workshop was the demonstration and practice of foresight, leadership, and user-centered design skills grounded on insights from Stanford thought leaders and the active engagement of workshop participants. With stimulation from Stanford thought leaders, participants gained insights, tools and processes to construct a long-term plan and roadmap for the transformation of Brazil's transportation training infrastructure.
- *Innovation in Human Science & Information Technologies for the Experience Economy (August 13-18, 2017) with member, HKUST EMBA Program*
 The mediaX Executive Leadership Workshop for HKUST is designed to stimulate and inspire through presentations by Stanford thought leaders with a focus on the Experience Economy. The program builds on Stanford's multidisciplinary expertise at the intersection of people and information technology and features a human science and information technology lens on issues related to Motivation, Innovation, Design Thinking, Sustainability and Future Trends. Presenters included:
 - Martha Russell, Executive Director, mediaX at Stanford University: *Introduction to Silicon Valley and Stanford University*
 - Jeff Hancock, Professor, Department of Communication, founder Stanford Social Media Lab: *Online Social Infrastructure*

- Greg Kress, Founder, Radicand: *Design Thinking Interactions*
 - Tamara Carleton, Foresight and Innovation Forum: *Engagement with Strategic Foresight & Innovation*
 - Bruce Cahan, CEO and co-founder of Urban Logic, Consulting Professor, Department of Civil and Environmental Engineering, CodeX Fellow, Center for Legal Informatics & mediaX Distinguished Visiting Scholar: *Value Systems Thinking*
 - Walter Greenleaf, mediaX Distinguished Visiting Scholar and VHIL: *How VR and AR will Transform Healthcare*
 - Michael Bernstein, Assistant Professor, Computer Science: *The User Experience and the Future of Work*
 - Chuck Eesley, Assistant Professor and Morgenthaler Faculty Fellow in the Department of Management Science and Engineering: *Networks of Entrepreneurs*
- *Innovating at the Intersection of People and Information Technologies* (August 13-18, 2017), with member IBE/FGV
 The mediaX Executive Leadership Workshop for IBE-FGV is an intense four-day program, designed to stimulate and inspire through presentations by Stanford thought leaders and visits to innovation organizations in Silicon Valley.
 The program builds on Stanford's multidisciplinary expertise at the intersection of people and information technology and features a human science and information technology lens on issues related to Leadership, Innovation, Marketing, Design Thinking and Future Trends. Presenters included:
 - Martha Russell, Executive Director, mediaX at Stanford University: *Introduction to Silicon Valley and Stanford University*
 - Robert Burgelman, Edmund W. Littlefield Professor of Management, Executive Director of the Stanford Executive Program (SEP): *Strategic Leadership in Dynamic Environments*
 - Michael Shanks, Professor of Classics and a senior faculty member of the Hasso Plattner Institute of Design: *Employee Experiences in the Libidinal Economy*
 - Chuck House, mediaX Distinguished Visiting Scholar: *Innovation at the Computer History Museum*
 - Jeff Hancock, Professor, Department of Communication, founder Stanford Social Media Lab: *Online Social Infrastructure*
 - Bruce Cahan, CEO and co-founder of Urban Logic, Consulting Professor, Department of Civil and Environmental Engineering, CodeX Fellow, Center for Legal Informatics & mediaX Distinguished Visiting Scholar: *Human/ Technology Value Systems*
 - Greg Kress, Founder, Radicand: *Design Thinking*
 - Barbara Karanian, Founder, Design Entrepreneurship Studio, Lecturer, previously Visiting Professor, Mechanical Engineering Design Group: *Finding Your Story*
 - Michael Bernstein, Assistant Professor of Computer Science: *Collective Intelligence and the Future of Work*
 - Chuck Eesley, Assistant Professor and Morgenthaler Faculty Fellow in the Department of Management Science and Engineering: *Entrepreneurial Mindset*
 - Walter Greenleaf, mediaX Distinguished Visiting Scholar and VHIL: *How VR and AR will Transform Healthcare*
 - Neerja Raman, mediaX Distinguished Visiting Scholar: *World Smart Perspectives*

MEMBER THEME DAYS

Theme Days are in-depth brainstorming sessions with Stanford faculty and industry researchers from a member organization. Follow-up activities between industry affiliates and the faculty members who attended the intimate, in-depth discussions about issues of common concern during the Theme Days have led to faculty speaking engagements, hiring graduating students, expanded mediaX member relationships, and collaborative submission of proposals.

During the 2016-2017 period, 9 Theme Days were held for mediaX member organization by mediaX at Stanford University.

Written Summaries

A written summary of the presentations and conversations was prepared for each Theme Day:

1. Contextual Futures for Smart Personal Devices (September 2016)
2. Innovations in Computer Vision at the Intersection of Human Sciences and Technology (September 2016)
3. Attentiveness in the Automotive Experience (September 2016)
4. Human/Machine Interaction in the IoT Space – Innovations at the Intersection of Human Sciences and Technology (October 2016)
5. Mobile and Digital Interactivity for Seniors (January, 2017)
6. Human/Machine Interaction in the IoT Space – Innovations at the Intersection of Human Sciences and Technology (April 2017)
7. Research at the Intersection of Human Sciences and Information Technologies for Performance and Professional Development (May, 2017)
8. Exploring the Future of Education at the Intersection of Human Science and Information Technologies (August, 2017)
9. Human Machine Interaction at the Intersection of Human Science and Information Technologies (August, 2017)

Faculty Involvement:

- **Maneesh Agrawala**, Professor of Computer Science and Director of the Brown Institute for Media Innovation at Stanford University (x2)
- **Jeremy Bailenson**, Professor, Communication, Virtual Human Interaction Lab, Stanford
- **Brigid Barron**, Professor of Education and the Learning Sciences at Stanford's Graduate School of Education (GSE). Co-Lead of TELOS (Technology for Equity in Learning Opportunities) Initiative.
- **Michael Bernstein**, Assistant Professor, Computer Science
- **Sean Follmer**, Assistant Professor of Mechanical Engineering, and by Courtesy, of Computer Science.
- **Sharad Goel**, Assistant Professor of Management Science & Engineering, and, by courtesy, Sociology and Computer Science
- **Pamela Hinds**, Professor of Management Science and Engineering, Director of the Center on Work, Technology and Organization
- **Doug James**, Professor of Computer Science, and, by courtesy, of Music at Stanford University.
- **James Landay**, Professor of Computer Science at Stanford University
- **Prashant Loyalka**, Assistant Professor at the GSE and Research Fellow at the Freeman Spogli Institute for International Studies (FSI).

- **Harikesh Nair**, Professor of Marketing at the Graduate School of Business
- **Allison Okamura**, Professor, Mechanical Engineering, and, by Courtesy, of Computer Science. Director of the CHARM (Collaborative Haptics and Robotics in Medicine) Lab
- **Roy Pea**, Professor of Education, 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)
- **Byron Reeves**, Professor, Communication; Founder and Faculty Director Emeritus of mediaX
- **Ingmar Riedel Kruse**, Assistant Professor, Bioengineering
- **Daniel Rubin**, Associate Professor of Radiology, of Medicine, of Biomedical Data Science, and, by Courtesy, of Ophthalmology, Stanford
- **Greg Walton**, Associate Professor, Psychology (Omron Sept 2016)
- **Gordon Wetzstein**, Assistant Professor of Electrical Engineering and, by courtesy, of Computer Science; Leader, Stanford Computational Imaging Group

Additional Stanford Affiliates:

- **Brett Alpert**, Associate Dean of Career Education & Director of Career Ventures
- **Tanya Aitamurto**, Postdoctoral Fellow at the Brown Institute for Media Innovation at the School of Engineering at Stanford
- **Suzanne Burrows**, Strategy Implementation Manager, Center to Support Excellence in Teaching (CSET)
- **Vinay K. Chaudhri**, Program Director, Artificial Intelligence (AI) Center at SRI International.
- **Geoffrey Cox**, Senior Associate Dean, Graduate School of Education
- **Karin Forssell**, Director, Learning, Design & Technology Program, Graduate School of Education
- **Megan French**, PhD Candidate, Communications, working with Dr. Jeff Hancock, Professor, Communications
- **Renate Fruchter**, Founding Director of the Project Based Learning Laboratory (PBL Lab) and Senior Research Engineer at the Department of Civil and Environmental Engineering at Stanford University (x5 - -Prudential, Omron)
- **Walter Greenleaf**, Distinguished Visiting Scholar with mediaX and the Virtual Human Interaction Lab (VHIL)
- **Wendy Ju**, Senior Research Engineer, Mechanical Engineering; Executive Director, Interaction Design Research (Attentiveness in Automotive Experience) (Fujitsu – mobile and digital interactivity for Seniors) (Contextual Futures for Smart Personal Devices)
- **Rene Kizilcec**, Director of Digital Learning Research, Stanford University, Assistant Research Professor, Arizona State University
- **Poruz Khambatta**, PhD Student, Organizational Behavior, Graduate School of Business
- **Paul Kim**, Chief Technology Officer and Assistant Dean of the Graduate School of Education at Stanford University
- **Ranjay Krishna**, PhD Candidate/Researcher in the Artificial Intelligence Laboratory, co-advised by Professors Fei-Fei Li and Michael Bernstein. (Omron Oct 2016 and April 2017)
- **Fernando Lopez Lezcano**, Lecturer, Stanford University Center for Computer Research In Music and Acoustics (CCRMA)
- **Romain Michon**, PhD Candidate, Stanford University Center for Computer Research In Music and Acoustics (CCRMA)
- **Chris Proctor**, PhD Candidate, Learning Sciences Technology & Design, Stanford Graduate

School of Education

- **Scott Rozelle**, Senior Fellow at FSI, Co-Director of the Rural Education Action Program
- **Niloufar Salehi**, PhD Student, Human Computer Interaction
- **Erik Santoro**, Manager, Mind & Body Lab at Stanford University x 2 (Omron Oct 2016)
- **David Sirkin**, Research Associate, Center for Design Research x 3 (Omron Oct 2016 and April 2017)
- **Andrea Stevenson Won**, Graduate, Virtual Human Interaction Lab, Stanford
- **Catalin Voss**, Founder, Stanford Autism Glass Project (x2)
- **Cathy Williams**, Co-Founder and Executive Director of youcubed.org
- **Sandra Winter**, Research Associate, Stanford Prevention Research Center
Director, Well Living Laboratory
- **Nette Worthey**, Administrator, Stanford University Center for Computer Research In Music and Acoustics (CCRMA)
- **Esther Wojcicki**, mediaX Distinguished Visiting Scholar

EXECUTIVE WEBINARS

Executive webinars have been introduced for mediaX members for whom group travel to Stanford for the benefits of a Theme Day has not been possible.

- Keith Devlin: “The Power of Mathematical Thinking”
- Byron Reeves: “Identify Informatics and Implications for Work, Play and Relationships”

PUBLICATIONS

It is the objective of mediaX to empower Stanford researchers to generate high quality published research and insights. In addition, several opportunities to document work conducted in the process of offering mediaX programs led to papers written by mediaX staff.

White Papers:

“Digital Transitions for Skilling and Reskilling American Middle Class Workers”
http://mediax.stanford.edu/pdf/2016_Digital_Transitions_Report
Dr. Karina Alexanyan, Dr. Martha Russell, Jason Wilmot, mediaX at Stanford University

Conference Paper Submission

“University-Industry Programs as Platforms: A Case Study of Multi-Disciplinary Network Development”
Arash Hajikhani, Erin Lorelie Young, Karina Alexanyan, Jason Wilmot, and Martha Russell.
Submitted to Hawaii International Conference on System Sciences, January 4-7, 2018. Accepted.

Research Summaries and Write-Ups

mediaX research grants serve as catalysts for novel research initiatives. Funding is modest and time frames are generally short. In many cases continued research by the project teams is necessary to carry the research to an academically reportable conclusion. In order to provide mediaX members with a summary of progress on the research questions, mediaX works with the

Stanford researchers to provide an interim summary of progress and findings.

Updates on completed projects for “Future Context of Smart Mobile Devices”

Enabling Impromptu Interaction Through a Robotic Water Cooler

PI: Larry Leifer, Mechanical Engineering

Co-I: Wendy Ju, Mechanical Engineering

This project involved developing a robotic water cooler to enable socially evocative behaviors in work environments

Contextual Futures of Situated Schools

PI: Paulo Blickstein, GSE

This project explores the design of effective and empowering digitally mediated learning environments, with a focus on the factors that drive engagement and encourage learning.

Interaction Archetypes in Global Teamwork

PI: Kincho Law, Civil and Environmental Engineering

Co-I: Renate Fruchter, Civil and Environmental Engineering

Arche is a concept proving project uncovering interaction archetypes in global teamwork, with a focus on project based learning contexts that educate the next generation workforce.

Updates on completed projects for “Smart Office Work Flows”

Haptic Tether for Human Robot Communication

PI: Allison Okamura, Mechanical Engineering

This project will apply robotic technologies in offices and other work environments to create smart, automated environments.

DreamTeam: Computational Techniques for Adaptive Teams

PI: Michael Bernstein, Computer Science

This project will establish a new computationally empowered management practice for teams.

Real Time Knowledge Capture and Feedback in Design Workspaces

PI: Larry Leifer, Mechanical Engineering

Co-I: Wendy Ju, Mechanical Engineering

This project will develop a knowledge capture and reuse system that enables real-time analysis and feedback for design workspaces.

Making Noise Intentional: Capturing and Designing Robotic Sonic Expression

PI: Larry Leifer, Mechanical Engineering

Co-I: Wendy Ju, Mechanical Engineering

This project will develop design heuristics for the sounds that are a byproduct of interactive objects in the technologically advanced workplace of the future.

OUTREACH

Online Research Briefs of mediaX-sponsored Research Projects

Currently, mediaX is working on creating one-page summaries for all of its funded projects. Out of the over 110 projects, summaries of 42 have been completed and can be accessed from the mediaX website.

Website Analytics

From Sept 1, 2016 to Sept 1, 2017 vs Sept 1, 2015 to Sept 1, 2016
(Up for the 3rd straight year)

Overall Sessions Up .18%

Users Up 4.6%

% of New Sessions Up 4.55%

Email Campaigns:

58 email communications to members

Social Platforms:

Facebook, Twitter, Instagram, YouTube all with increased audience

Presentations and Visits with External Groups

mediaX gave presentations on innovation in human sciences and information technology applied in education, commerce and entertainment to local, national and international organizations from industry, government and educational sectors and their delegates. Some presentations were given at the home location of the organization (denoted by “*”).

During the period *September 2016 to August 2017* these included 39 outreach presentations/visits:

1. *September 1: Atmosphaera. BRAZIL*
2. *September 4: Nanjing Municipal Science and Technology Commission. CHINA*
3. *September 19: CERTI Foundation and Sapiens Park. BRAZIL*
4. *September 27: Tsingua University. CHINA*
5. *September 30: University of Helsinki. FINLAND*
6. *October 6: South African University delegation. SOUTH AFRICA*
7. **October 27: Samsung. SOUTH KOREA*
8. **November 3: Yuto. CHINA*
9. **November 3: Huawei. CHINA*
10. **November 3: HKUST Shenzhen Incubation Center. CHINA*
11. *November 4: Swiss Media. SWITZERLAND*
12. *November 4: Delta Electronics. TAIWAN*
13. *November 16: Wondler. NORWAY*
14. *November 17: DARPA*
15. *November 28-29: Airbus. FRANCE*
16. *December 7: Tyco/Johnson Controls. USA*
17. *December 15: PwC. DUBAI*
18. *December 16: Teijin. JAPAN*
19. *December 19: Nokia. FINLAND*
20. *December 19: CEIBS*
21. *January 25: NBC Universal*

22. January 27: VTT. FINLAND
23. February 9: MetLife. USA
24. February 16: Paribus. FRANCE
25. March 8: DARPA. USA
26. March 13: Mosaic, subsidiary of Oracle. USA
27. March 13: The Warehouse Group. NEW ZEALAND
28. March 17: Dow Jones. USA
29. April 3: Iceland Marketing Association. ICELAND
30. April 17: Haufe. GERMANY
31. April 20: DARPA
32. May 10: CapGemini. USA
33. June 7: Chinese Mayors Association, CHINA
34. June 8: Next Bank Europe. FRANCE
35. June 9: Maersk. DENMARK
36. June 14: Ctrl Group China. CHINA
37. June 13: Sony Bank. JAPAN
38. June 20: Skolkovo EMBA. RUSSIA
39. August 9: University of Melbourne. AUSTRALIA

Invited and peer-reviewed presentations to Professional Associations included:

- *October 3: Digital Cities Summit, Stanford University, in conjunction with Center for Global Issues.*
- “Leveraging Digital City Data,” Panel moderation and Presentation by Martha Russell*
- *October 24-26: 3D Forum, Seoul.*
- Presentation by Martha Russell, “Put Me in the Story”*
- *January 4-7: HICSS, Hawaii.*
- Paper moderation, “Managing Platforms and Ecosystems” and Presentation by Martha Russell, “Innovation Ecosystems vs. Innovation Systems in Terms of Collaboration and Co-creation of Value”*
- *August 3-5: Academy of Management, Atlanta.*
- Panel Moderation “Visualizing the Systemic Nature of Systems” and Presentation by Martha Russell, “Orchestrating Ecosystem Change”*

OVERALL SUMMARY MEDIA X 2016-2017

- 39 Outreach Presentations / Visits
- 37 Seminars and Executive Webinars
- 32 Members
- 9 Research Projects Funded
- 9 Member Theme Days
- 7 Member Workshops
- 5 Day-long Multi-member Conferences
- 2 White papers
- 7 Research Summary Reports
- 42 one-page research briefs

GSE IMPACT

Aside from the direct impact of funding/supporting GSE researchers, a large part of mediaX impact is effected in the presence created on and off campus and in the dialogues created

between GSE researchers and researchers working on education related topics in other schools/departments. Our various events – theme days, conferences, and research themes promote conversations, information sharing, learning and cross-pollination of ideas – among scholar and across departments in the colleges at Stanford University: GSE, H&S, CoE, Med, Law, GBS. They highlight research and contributions in settings and contexts inside the GSE and across Stanford. They also connect the GSE with innovative research from other departments, colleges and industry, that advances education and learning, serving to foster a vibrant interdisciplinary network.

GSE Faculty member receiving mediaX research grants

- Geoffrey Cohen, *“Using Mobile Technology to Bring Social Psychological Interventions to the Workplace”*
- Paulo Blikstein, *“Contextual Futures of Situated Schools”*

GSE faculty, researcher and student participation in mediaX events

- **Brigid Barron**, Professor of Education and the Learning Sciences at Stanford’s Graduate School of Education (GSE). Co-Lead of TELOS (Technology for Equity in Learning Opportunities) Initiative.
- **Suzanne Burrows**, Strategy Implementation Manager, Center to Support Excellence in Teaching (CSET)
- **Geoffrey Cox**, Senior Associate Dean Graduate School of Education
- **Karin Forssell**, Director, Learning, Design & Technology Program, Graduate School of Education
- **Paul Kim**: Chief Technology Officer and Assistant Dean of the Graduate School of Education at Stanford University
- **Rene Kizilcec**, Director of Digital Learning Research, Stanford University, Assistant Research Professor, Arizona State University
- **Roy Pea**, Professor of Education, 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)
- **Chris Proctor**, PhD Candidate, Learning Sciences Technology & Design, Stanford Graduate School of Education
- **Cathy Williams**, Co-Founder and Executive Director of youcubed.org

9. H-STAR Faculty and Staff Publications and Awards in AY 2016-2017

Award:

2017: H-STAR Director Roy Pea was named Inaugural Fellow of The International Society for the Learning Sciences.

Publications:

Banerjee, B. & Ceri, S. (eds) (2017) *Creating Innovation Leadership*, Springer Publications

Banerjee, B. (to appear) Design Transitions, to appear in Yee, J. (ed) *Design Transitions*.

Banerjee, B. (to appear) Large Scale Integrated Innovation, to appear in Bason, C. (ed) *Design for Policy*, Ashgate Publishing Co.

Cardier, B., Sanford, L., Goranson, H., Lundberg, P., Ciavarra, R., **Devlin, K.**, Casas, N. & Erioli, A. (2017), Modeling the Restitution of Memory in Neurobiology and Narrative, *AAAI 2017 Spring Symposium on Science of Intelligence: Computational Principles of Natural and Artificial Intelligence*, Technical Report SS-17-07

Devlin, K. (2017). *Finding Fibonacci: The Quest to Rediscover the Forgotten Mathematical Genius Who Changed the World*. Princeton University Press.

Fishkin, J. S., Mansbridge, M. (2017). The Prospects & Limits of Deliberative Democracy, Introduction. *Daedalus*, 146(3): 6-13. doi:10.1162/DAED_x_00442.

Fishkin, J. S., Mayega, R.W, Atuyambe, L., Tumuhameye, N., Ssentongo, J., Siu, A., Bazeyo, W. (2017). Applying Deliberative Democracy in Africa: Uganda's First Deliberative Polls. *Daedalus* 146(3): 140-154. doi: 10.1162/DAED_a_00453.

Fishkin, J. S., Senegés, M., Donahoe, E., Diamond, L., Siu, A. (2017) Deliberative polling for multistakeholder internet governance: considered judgments on access for the next billion. *Information, Communication & Society*. 1-14. doi: 10.1080/1369118X.2017.1340497.

Thomas-Sunesson, D., **Hakuta, K.** & Bialystok, E. (2016): Degree of bilingualism modifies executive control in Hispanic children in the USA, *International Journal of Bilingual Education and Bilingualism*, DOI: 10.1080/13670050.2016.1148114

Hakuta, K., & Pecheone, R. (2016). Supporting English Learners and treating bilingualism as an asset. In M. Hansen & J. Valant (Eds.), *Memos to the President on the Future of U.S. Education Policy*. Washington, DC: Brookings Institution. <https://www.brookings.edu/blog/brown-center-chalkboard/2016/12/20/supporting-english-learners-and-treating-bilingualism-as-an-asset/>

Hakuta, K. (2017). Psychologists in Schools of Education. In R. Sternberg (ed.), *Career paths in psychology* (pp. 51-62). Washington, DC: American Psychological Association.

Hakuta, K. (2017). Policy-Impactful Research to Improve Elementary and Secondary Education Act Reauthorizations into the Future (Commentary). *American Educational Research Journal*, 54 (AERA Centennial Issue): 279S-281S.

Hakuta, K. and Pompa D. (2017). Including English Learners in Your State Title I Accountability Plan. Washington DC: Council of Chief State School Officers.

Goldschmidt, P. & **Hakuta, K.** (2017). Incorporating English Learner Progress into State Accountability Systems. Washington DC: Council of Chief State School Officers.

Evanini, K., Hauck, M. & **Hakuta, K.** (2017). Approaches to Automated Scoring of Speaking for K-12 English Language Proficiency Assessments. ETS Research Report No. RR-17-18

Nasir, N.S., Lee, C. & **Pea, R.** (Eds), (2017, in preparation.) *Handbook of the Cultural Foundations of Learning*. Routledge Press.

Pea, R. D. (2017, in preparation). *Foundations of The Learning Sciences*.

Lewis, S., Lindgren, R., Wang, S., & **Pea, R.** (2017, in press). Learning with media: Harnessing viewpoint and motion to generate fields of potential action. *Journal of Media Psychology*.

Schneider, B., & **Pea, R.** (2017). Real-time mutual gaze perception enhances collaborative learning and collaboration quality. In M. Orey & R.M. Branch (Eds.), *Educational media and technology yearbook, Volume 40*, pp. 99-125. New York: Springer.

Schneider, B., Sharma, K., Cuendet, S., Zufferey, G., Dillenbourg, P., & **Pea, R.** (2016, December). Using mobile eye-trackers to unpack the perceptual benefits of a tangible user interface, *ACM Transactions on Computer-Human Interaction*, 23(6), pp. 39:1-23.

Grover, S., & **Pea, R.** (2016, June). Designing a blended, middle school computer science course for deeper learning: A design-based research approach. *Proceedings of the 12th International Conference of the Learning Sciences (ICLS), Vol. 1*, pp. 695-702, Singapore.

Schneider, B., Sharma, K., Cuendet, S., Zufferey, G., Dillenbourg, P., & **Pea, R.** (2016, June). Detecting Collaborative Dynamics Using Mobile Eye-Trackers. In *Proceedings of the 12th International Conference of the Learning Sciences*, Singapore (No. EPFL-CONF-223610, pp. 522-529).

Yeykelis, L., Cummings, J.J., & **Reeves, B.** (2016). Task Switching on Personal Computers: The Influence of Motivational Differences in How Long and How Much People Switch Between Entertainment and Work Content. (Submitted for publication).

Cummings, J., **Reeves, B.** & Yeykelis, L. (2016). Fragmentation of Tasks on a Laptop Computer: Moment-by-moment Analysis of Task-Switching and Writing Performance. (Submitted for publication).

Reeves, B. and N. Ram (with Stanford Professors Laura Carstensen, Thomas Robinson, Michael Bernstein, and Lee Giles, Pennsylvania State University, Deborah Estrin, Cornell Tech, and Leo Yeykelis, Google). The Interdependence and Fragmentation of Life Experiences Across Cyber-Social Systems. (In progress).

Ram, N., & Reeves, B. (2016). Time sampling. In M. Bornstein (Ed.), *The SAGE encyclopedia of lifespan human development*. New York: Sage (in press).

Hancock, J., **Reeves, B.** & Turner, F. (2016). Living in Media: The Challenge of Identity Informatics. (Submitted for publication).

Li, J., Ju, W and **Reeves, B.** (2016). Touching a Mechanical Body: Tactile Contact with a Humanoid Robot is Physiologically Arousing. (Submitted for publication.)

Li, J., Cuadra, A., Mok, B., **Reeves, B.**, Kaye, J. and Ju, W. (2016). Communicating a minimal robot's intelligence, dominance and status through motion paths. *Journal of*

Human-Robot Interaction. (In press).

Reeves, B., Hancock, J. & Liu, S. Social Robots as Media: Meta-Analysis of Robot Features Related to Effectiveness in Human-Robot Interactions. (In preparation).

Smorodinskaya, N., **Russell, M.G.**, Katukov, D. (2017) Innovation ecosystems vs. Innovation systems in terms of collaboration and co-creation of value. *Proceedings of HICSS, January 4-7, 2017*.

Huhtamäki, J., Basole, R.C., Still, K., **Russell, M.G.** and Seppänen, M. (2017). Visualizing the geography of platform boundary resources: the case of the global API ecosystem, *Proceedings of HICSS, January 4-7, 2017*.

Basole, R.C., **Russell, M.G.**, Huhtamäki, J., Still, K. (2016) Visual decision support for business ecosystem analysis, *Expert Systems with Applications*, Vol. 65, December, 271-282.

Basole, R.C., **Russell, M.G.**, Huhtamäki, J., Park, H.P., Still, K., Rubens, N. (2016) Enabling the wide lens: a comparative study of visual decision support for complex ecosystem analysis, *Decision Support Systems Journal*, 65, 271-282, <http://dx.doi.org/10.1016/j.eswa.2016.08.041>.

Russell, M.G., Still, K., Huhtamäki, J., Rubens, N. (2016) Visualizations of relational capital for shared vision, *World Technopolis Review*, 5:47-60.

Huhtamäki, J., **Russell, M.G.**, Still, K. (2017) Processing data for visual network analytics: innovation ecosystem experiences, in Eds., Bendoly, E., and Clark, S. *Visual Analytics for Management: Translational Science and Applications in Practice*, Routledge: New York.

Russell, M.G., Still, K., Huhtamäki, J. (2017) Network visualisations of knowledge assets: their value and user experiences for innovation development," *International Journal of Management and Enterprise Development*, 16:3, 2017.

Cutumisu, M., & **Schwartz, D. L.** (2017). The impact of critical feedback on students' revision, performance, and memory. *Computers in Human Behavior*.

Chin, D. B., Blair, K. P., & **Schwartz, D. L.** (2016). Got game? A choice-based learning assessment of data literacy and visualization skills. *Technology, Knowledge, and Learning*, 21(2), 195-210.

Cutumisu, M., Blair, K. P., Chin, D. B. & **Schwartz, D. L.** (2016). Assessing whether students seek constructive criticism: The design of an automated feedback system for a graphic design task. *International Journal of Artificial Intelligence in Education*, 27(2). doi:10.1007/s40593-016-0137-5.

Chin, D. B., Chi, M., & **Schwartz D. L.** (2016). A Comparison of two methods of active learning in physics: Inventing a general solution versus compare and contrast. *Instructional Science*, 44, 177-195.

Cutumisu, M. & **Schwartz, D. L.** (2016) Choosing versus receiving feedback: The impact of valence on learning from an assessment game. *Educational Data Mining*.