



Human  
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STANFORD UNIVERSITY

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January 6, 2009

To: Ann Arvin, Vice Provost and Dean of Research

From: Roy Pea, Co-Director, H-STAR  
Byron Reeves, Co-Director, H-STAR  
Keith Devlin, H-STAR Executive Director

Subject: Annual Report for H-STAR for FY 2007–2008<sup>1</sup>  
(Response to memo of November 11, 2008)

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<sup>1</sup> Some confidential personnel and financial details have been deleted from this posted version.



## 1. Overview

H-STAR is an interdisciplinary research institute, with independent lab status. It includes a research center, SCIL (Stanford Center for Innovations in Learning, established in 2002), with its own faculty director (Roy Pea), and runs an industry partners' program, Media X.

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. All H-STAR programs conduct research at the intersection of human sciences and information technology in the areas of learning, mobility, collaboration, entertainment and commerce.

We pursue this 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 Media X program.

The total volume for federal and non-federal sponsored research in H-STAR in FY08 was \$7.72M, of which \$3.66M was F&A (indirect cost charges).

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. Nevertheless, H-STAR does have a *de facto* core faculty. A total of 8 Stanford University Academic Council faculty carry out research wholly or principally within H-STAR, and an additional 37 faculty have one or more projects within H-STAR or else are actively involved in H-STAR activities. H-STAR also provides the research base for 21 (non-faculty) Stanford researchers (predominantly senior researchers with doctoral degrees) who are working on projects led by faculty PIs.

H-STAR researchers produced 163 research papers and 17 books in the past FY. A complete list is provided as an appendix to this report.

H-STAR employs 22 regular staff (academic and non-academic FTE), of which 6 employees are performing shared administrative support functions, such as research administration, financial, human resources, and building management in two locations, Wallenberg Hall and Cordura Hall. We also currently have 31 casual and temporary employees. In FY08, under academic staff, we supported 26 graduate students. (None of these figures include CSLI.)

The primary source of funding for H-STAR research is the normal system of federal and foundation grants.

## 2. H-STAR's mission and its relation to the Stanford Challenge

H-STAR's primary research focus is on people and technology — how people use technology, how to better design technology to make it more usable (and more competitive in the marketplace), how technology affects people's lives, and the innovative use of technologies in research, education, art, business, commerce, entertainment, communication, national security, and other sectors of society. H-STAR is also the locus of basic research into the nature of information processing by humans and machines. Among the large, complex, global problems that are at the heart of the H-STAR research agendas are:

- **Reducing complexity of technology** to enable its universal and creative uses for work, learning and other vital sectors of life
- **Closing digital divides** across class, race, gender, age, languages and nations, so that access to and fluencies with technologies can provide equal opportunities to learn and work productively for personal and societal well-being
- **Accelerating innovation** in the creation and diffusion of products and services that better identify and meet human needs
- **Solving security and trust problems** of computing, communications, and information systems at home, work and in governmental affairs
- **Ensuring pervasive safety and health** of people over the lifespan with human-centered technology innovations

Of the eight specific targets listed in the Stanford Challenge, four are highly central to the activities of H-STAR:

1. *Multidisciplinary Research Across the University.* H-STAR's mission is to promote and support interdisciplinary research campus-wide. Over the past six years, H-STAR's Media X program has used income from industry partnership fees to fund around \$2.5M of (predominantly interdisciplinary) faculty research across five Schools.
2. *International Initiative.* See Section 7 of this report for the list of H-STAR's extensive activities in the international arena.
3. *Improving K-12 Education.* 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. See also section 8a for a description of the NSF funded LIFE Center's research on these issues.
4. *Extending the Renaissance in Undergraduate Education.* While the mission of H-STAR is university research, the H-STAR faculty members are among campus leaders in undergraduate education.

### 3. How H-STAR works

H-STAR provides affiliated Stanford faculty and researchers with 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 Media X program, contacts with industries relevant to their research pursuits. Most of the faculty in H-STAR are in social science and humanities-affiliated departments (rather than engineering and research-equipment intensive disciplines such as physics), which do not have the extensive infrastructure needed to support the interdisciplinary research projects they wish to pursue.

The primary means for funding H-STAR research is external grants, secured by the faculty and researchers. The administrative and financial support staff of H-STAR provides help and support for faculty in proposal preparation and grant management. H-STAR also takes the initiative to secure large-scale, institute-level research funding that provides support to many

institute faculty members when the opportunity arises. For example, we are currently planning the second five-year period of the LIFE Center (Learning in Informal and Formal Environments), a \$25 million, ten-year NSF-funded project that established one of the first three national Science of Learning Centers (SLCs) in partnership with the University of Washington and SRI International. The National Science Board will review and make a decision in early February 2009 on the Site Visit Report recommendation in Summer 2008 for continued funding for the LIFE Center.

H-STAR supports and funds activities across the campus, but the main loci of research are in Wallenberg and Cordura Halls. H-STAR has its administrative offices in Wallenberg Hall and Cordura Hall. In Cordura Hall, in addition to three administrative offices, H-STAR has five multi-person offices devoted to research projects. SCIL is housed in Wallenberg Hall. Media X has two offices and an administrative staff workstation in Wallenberg Hall. An open area of the top floor of Wallenberg Hall is currently used by H-STAR and Media X to house some research projects (for limited periods of time).

#### **4. Major programs within H-STAR**

**4a. SCIL.** SCIL conducts scholarly research to advance the science, technology and practice of teaching and learning. It has a strong focus on the multi-disciplinary core of theory, research, and methods that are needed for world-class work on the central topics in learning sciences and technology design. Recognizing that the processes of knowledge creation, discovery and communication in the disciplines make continually deeper uses of technologies that are transforming the very nature of inquiry and scholarly practice, SCIL seeks to make transformative advances in learning and teaching with technologies by bringing together disciplinary faculty to work with experts in education and the sciences of learning as well as with leading designers and technologists.

**4b. Media X.** H-STAR's industry partnership program, Media X, is a self-funded program that seeds campus-wide research and coordinates industry interest. The program currently includes 16 industry partners. The program supports and funds research initiatives on domains involving people and technology, rather than by discipline. Since the program began in 2001, Media X has supported more than \$2.8M of Stanford research, spread across over 80 Stanford faculty PIs, receiving over 200 proposals, representing faculty from all seven schools, and involving over 100 graduate students. Research funding from Media X has been in the form of seed grants to support early investigation of promising ideas that show likelihood of leading to larger projects. Media X 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 Media X seed projects. (See *Section 10* for more details about Media X.)

**4c. WGLN II, III - Wallenberg Global Learning Network II, III.** The mission of WGLN (<http://www.wgln.org/>) is to help students achieve better learning outcomes, to support faculty investigators in producing new knowledge for best learning practices, and to develop pedagogic and technical solutions suitable for innovative use in a variety of university and pre-college settings. To achieve this mission, WGLN offers competitive faculty grants, awarded by an impartial faculty review panel from academic institutions in Sweden and the U.S. The funded projects represent close collaborations between Swedish and Stanford faculty, with the goal of

improving teaching and learning.

WGLN I and II were established in 1999 and 2004, respectively, as part of a larger gift from the Knut and Alice Wallenberg Foundation, which helped create Wallenberg Hall's advanced resource classrooms and research space. The awards process for WGLN III began in January 2008.

*WGLN III* is scoped as a three-year-program. The first RFP was issued in January 2008, resulting in the awarding of \$604,877 to five projects, three in mathematics education and two in environmental science education. These projects started in September 2008. Requests for proposals are open to faculty at Stanford and all Swedish universities. In broad terms, projects have two collaborating partners – one in Stanford and one in Sweden. Each partner, in its turn, consists of a university-based research team and a team from schools located near Stanford and schools from any location in Sweden. Where relevant, the project partners can work with an affiliated partner at another university to make more efficient use of existing resources.

During FY08, the final year of WGLN II, a total of \$1,752,531 in grant funds was awarded, split roughly equally between Stanford and Sweden. This amount comprised 4 grants in Medicine and Biological Science, 2 in Engineering/Computer Science/Physics, 1 in Humanities, and 2 in Pre-college Education.

The WGLN Board of Directors includes Stanford Professor of Biological Sciences H. Craig Heller as Chair; Stanford Dean of the School of Education Deborah Stipek, former Stanford Dean of Research, Arthur Bienenstock; Stanford President and Professor Emeritus Donald Kennedy, and Dr. Hakan Mogren, Dr. Bjorn Svedberg and Mr. Johan Stålhand of Sweden.

**4d. CTEL/CLAD** is a pioneering new program of technology-enhanced learning, taught by Stanford faculty Hakuta and Valdez and operated by H-STAR, that leads to a professional K-12 teaching certificate (<http://ellib.stanford.edu/enroll>) concerning how to support English language learning for California youth. CTEL stands for California Teachers of English Learners, and the State of California acronym CLAD stands for Cross-cultural, Language and Academic Development. CTEL/CLAD course participants analyze videos of real practice in real classrooms, and engage in carefully selected readings through three online courses, to learn about the latest methods in teaching English language learners in addition to standards-based, content area learning. Students are introduced to education policy and the scientific fields of linguistics, human learning and anthropology as they pertain to English language learners. Since it began in 1999, CLAD has graduated some 450 teachers with the CLAD certification.

## **5. Faculty and researchers in H-STAR**

### **5a. Core faculty members of H-STAR**

The following 8 Academic Council faculty carry out research wholly or principally within H-STAR:

1. Bailenson, Jeremy, (Department of Communication)
2. Barron, Brigid (School of Education)
3. Goldman, Shelley (School of Education)
4. Hagström, Stig (Materials Science and Technology)
5. Nass, Cliff (Department of Communication)
6. Pea, Roy (School of Education)

7. Reeves, Byron (Department of Communication)
8. Schwartz, Daniel (School of Education)

**5b. Affiliated Stanford Faculty**

The following additional 37 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 are marked with an asterisk.

1. Altman, Russ (School of Medicine)\*
2. Bailey, Diana (Department of Management Science and Engineering)\*
3. Berman, Russell (Department of Comparative Literature)
4. Bienenstock, Arthur (Wallenberg Research Link)
5. Carstensen, Laura (Department of Psychology)
6. Chafe, Chris (CCMRA)\*
7. Clark, Herbert (Department of Psychology)
8. Goldman, Shelley (School of Education)
9. Cook, Karen (Department of Sociology)
10. Cutkosky, Mark (Department of Mechanical Engineering)\*
11. El Gamal, Abbas (Department of Electrical Engineering)\*
12. Guibas, Leonidas (Department of Computer Science)\*
13. Hakuta, Kenji (School of Education)
14. Hanrahan, Pat (Department of Computer Science)\*
15. Heller, Craig (Department of Biology)
16. Hinds, Pamela (Management Science and Engineering)\*
17. Iyengar, Shanto (Department of Communication)\*
18. Klemmer, Scott (Department of Computer Science)
19. Koller, Daphne (Department of Computer Science)
20. Koltun, Vladen (Department of Computer Science)\*
21. Krawinkler, Helmut (School of Engineering)\*
22. Law, Kincho H. (Department of Civil and Environmental Engineering)\*
23. Leifer, Larry (Department of Mechanical Engineering)
24. Lessig, Lawrence (Law School)
25. Levis, Philip (Department of Computer Science)\*
26. Levoy, Marc (Department of Computer Science)\*
27. Lewenstein, Marion (Emeritus, Department of Communication)
28. Lunsford, Andrea (Department of English)
29. Perry, John (Department of Philosophy)\*
30. Salisbury, Kenneth (Departments of Computer Science and Surgery)\*
31. Schnapp, Jeffrey T. (Stanford Humanities Laboratory)\*
32. Valdes, Guadalupe (School of Education)
33. Wagner, Anthony (Department of Psychology)
34. Wandell, Brian (Department of Psychology)
35. Willinsky, John (School of Education)
36. Wineburg, Sam (School of Education)
37. Winograd, Terry (Department of Computer Science)

### **5c. Stanford researchers in H-STAR**

The following 21 Stanford and Stanford associated researchers (the majority of whom are senior scholars with doctoral degrees) have a significant affiliation with H-STAR (an asterisk indicates that the researcher has received funding from H-STAR, mostly through Media X):

1. Barbagli, Federico (Computer Science)\*
2. Bennetsen, Henrick (Stanford Humanities Lab)\*
3. Chen, Helen (SCIL)
4. Chin, Doris (SCIL)
5. Devlin, Keith (H-STAR, CSLI, and Consulting Prof. in Mathematics)
6. Fern, Veronica (SCIL)
7. Fogg, B.J. (H-STAR and Consulting Prof. in Computer Science)
8. Frampton, Matthew (SCIL)
9. Fruchter, Renate (Engineering)\*
10. Go, Janet (SCIL)\*
11. Grossman, David (Center for Design Research)\*
12. Huang, Camillan (SCIL)
13. Kunz, John (Civil and Environmental Engineering)\*
14. Kwong, Henry (SCIL)
15. Levitt, Raymond (Civil and Environmental Engineering)\*
16. Martin, Caitlin (SCIL)\*
17. Rosen, Joseph (SCIL)\*
18. Rosenberg, Duska (Royal Holloway University, London)
19. Van der Loos, H.F. Machiel (CDR)\*
20. Varma, Sashank (SCIL)\*
21. Verplank, William (Computer Science and CCRMA)\*

Much of the research carried out at H-STAR is conducted under faculty guidance by doctoral level researchers, postdocs, graduate students, and academic and industrial visitors who are based in Wallenberg or Cordura Hall.

### **6. International activity**

H-STAR has several international activities, with ongoing academic and industrial research collaborations throughout Europe and Asia. The most significant today are listed below:

#### **6a. The Wallenberg Research Link**

Led by special assistant to Stanford's president for federal research policy (and former Dean of Research), Arthur Bienenstock, the Wallenberg Research Link serves as a contact center to initiate and support contacts with Swedish researchers, Swedish students and their counterparts at Stanford.

#### **6b. Baltic Research Partnerships**

Over the past four years we have developed several collaboration initiatives with a number of countries in the Baltic region, known for their world leadership role in the human-centered design of technology that forms a major component of H-STAR's research focus. In FY08, government technology agencies of Finland (TEKES) and Denmark (DASTI) funded Stanford's infrastructure costs in supporting research collaborations on the Stanford campus between university scholars from Finnish and Danish universities, working on projects with Stanford faculty PIs.

The collaborative projects conducted in FY08 were primarily in two general areas: ***Technology in Interaction, Communication and Learning***, with six overseas collaborators, and ***Technology-led Innovation in Business and Society***, with seven. The Stanford faculty involved in these collaborations are:

- Russell Berman, Dept of Comparative Literature
- Karen Cook, Dept of Sociology
- Stig Hagström, SCIL
- Pamela Hinds, Dept of Management Science and Engineering
- Larry Leifer, Center for Design Research
- Roy Pea, School of Education
- Byron Reeves, Dept of Communication
- Thomas Wasow, Dept of Linguistics
- John Willinsky, School of Education
- Terry Winograd, Dept of Computer Science.

### **6c. Germany**

Several H-STAR researchers have strong links to colleagues at German universities. H-STAR faculty have also co-developed and participated in an international series of research workshops, funded by NSF in the USA and the DFG in Germany, on network-supported collaborative learning, which have led to joint publications and enriched mutual influences across a knowledge network of 10 American universities and 7 German universities (University of Cologne, University of Münster, University of Tübingen, Knowledge Media Research Center-Tübingen, University of Mannheim, University of Duisburg-Essen, University of Freiburg). One new journal, the *International Journal of Computer-Supported Collaborative Learning* (iJCSCL, published by Springer/Kluwer) was initiated as a result of these developments, and H-STAR Co-Director Roy Pea is on its Editorial Board. In addition, during the last few years, Professor of Computer Science Wolfgang Effelsberg, from Germany's Mannheim University, spent a half-year sabbatical at SCIL, and was followed by postdoctoral fellow Dirk Farin and doctoral candidates Nicolai Scheele and Anja Wessels – all contributing actively to ongoing programs of H-STAR research. Finally, Roy has been collaborating with Professors Friedrich Hesse and Carmen Zahn of the large DFG-funded Knowledge Media Research Center in Tübingen, and a number of research publications and scientific conference symposia continue to develop from these collaborations.

### **6d. Netherlands**

Philips Research Labs in the Netherlands joined Media X as an affiliate in 2004. In FY08, three researchers from Philips, with university affiliations in the Netherlands, spent periods of time at Stanford working with Stanford faculty.

### **6e. Japan**

Following Roy Pea's visits and keynote addresses in Japan during November 2006, a subsequent visit to Stanford by Keio University Vice President Jun Murai has led to a gift of approximately \$150K of computer hardware and displays to SCIL in 2007 to establish a Stanford University node in the Japanese government funded project called "Global Studio" – uses of a high-resolution broadband Internet teleconferencing solution for fostering international discussions to promote a creative and innovative global society. A recent Global Studio event linked together sites and academic talks from Stanford, Tokyo (Keio University), and Beijing (Tsinghua University) with public audience participation at the Tokyo site. The Global Studio facility at Stanford has been developed to be 'mobile' (on carts) – and can be



setup anywhere on campus that faculty or university leadership would like to establish a broadband interactive presence with global academic institutions and faculty at other Global Studio sites (<http://www.dmc.keio.ac.jp/en/studio/globalstudio.html>).

#### **6f. Taiwan**

Through SCIL, H-STAR developed a partnership with the Center for Learning Sciences and Technology at Taiwan's National Central University, invited by Center Director Professor Tak-Wai Chen and a delegation to Stanford including Taiwan's Deputy Director of the Ministry of Education. H-STAR co-Director Roy Pea has advised Center Director Tak Wai-Chen in his formation of the G1:1 initiative, in which we are a partner. G1:1 is a global one-to-one computer to learner initiative with participation for over twenty countries, a devoted website to projects, results, tools and datasets, and a sponsor of over about a dozen conferences on the subject with professional societies such as IEEE. The aim is developing global collaborative research models on 1:1 personal (and increasingly mobile) computer learning (<http://www.g1on1.org/>). This partnership spawned the international conference on computer-supported collaborative learning (CSCL-05) in June 2005 at the Taiwan campus, with strong Stanford representation in leadership and paper presentations. The G1:1 network has spawned a large number of IEEE workshops on wireless mobile ubiquitous technologies for education (WMUTE) on which Chen and Pea and colleagues from other nations have served on program committees, with WMUTE now a thriving interdisciplinary area of scholarship.

#### **7. The LIFE Center**

The National Science Foundation (NSF) is funding Science of Learning Centers (SLCs) in order to extend the frontiers of knowledge on learning of all types and create the intellectual, organizational, and physical infrastructure needed for the long-term advancement of learning research. The Learning in Informal and Formal Environments (LIFE) Center, a ten-year research collaboration between the University of Washington in Seattle, H-STAR, SRI, and other partnering institutions, was one of the first four Science of Learning Centers to be funded, in the Fall of 2004.

The purpose of the LIFE center is to develop and test principles about the social foundations of human learning in informal and formal environments, including how people learn to innovate in contemporary society, with the goal of enhancing human learning from infancy to adulthood.

After its fourth full year, the LIFE Center (see <http://life-slc.org>) is engaged in many interdisciplinary studies of learning, incorporating diverse methodologies such as brain imaging, comparative experimentation, ethnographic inquiry and virtual reality.

LIFE has two Missions to achieve its Purpose:

- To identify and investigate underlying principles of how people learn socially by strategically sampling learning across settings, domains, and ages, and by using multiple methodologies (neurobiological, cognitive, developmental, and socio-cultural) to spark conceptual collisions and syntheses among viewpoints.
- To foster research and education collaborations with individual and institutional partners, and to promote qualitative improvements, both theoretical and practical, in our collective capacities for understanding and supporting human learning.

Stanford faculty leading LIFE projects include LIFE leadership group Professors Brigid Barron, Roy Pea (Stanford Co-PI), Byron Reeves, and Daniel Schwartz (LIFE Co-Director), and contributing faculty Professors Jeremy Bailenson, Shelley Goldman, and Anthony Wagner. Over twenty doctoral students, postdocs and staff are involved in LIFE Center research work each year as well. The fourth-year budget for this project in FY08 was \$1.39M.

The LIFE leadership team consists of Brigid Barron, Philip Bell, John Bransford, Patricia Kuhl, Andrew Meltzoff, Na'ilah Suad Nasir, Roy Pea, Byron Reeves, William Penuel, Nora Sabelli, Dan Schwartz, Reed Stevens, and Nancy Vye. They are joined by an exceptional group of graduate students, post-doctoral scholars, faculty researchers, and staff in LIFE Center activities. The Center is directed by UW's Patricia Kuhl.

## **8. Community outreach**

### ***The Summer Institute at Wallenberg Hall***

In July-August-September of 2008 we held the fifth Summer Institute at Wallenberg Hall, a multi-week program for researchers and practitioners to explore the important issues at the crossroads of learning, physical space and technology. The purpose of the Institute was public outreach and education, as well as the development of new contacts and collaborative relationships. In addition, we view the Summer Institute as a potential source of revenue for faculty and program support. Most of the courses are co-directed by a Stanford researcher and a colleague from a collaborating institution.

The 2008 Institute consisted of eight courses, doubling the offering of 2007, and providing deep level subject matter to roughly 200 attendees:

|                 |   |
|-----------------|---|
| July 31 – Aug 1 | <i>Social Media Classroom</i> , directed by Howard Rheingold (Stanford)   |
| July 31 – Aug 1 | <i>Engaging Global Teams Across Distance, Time and Culture</i> , directed by Pamela Hinds (Stanford) and Eleanor Wynn (Intel) |
| August 1        | <i>Mobile Video Stories and Narration</i> , directed by Roy Pea (Stanford) and Jari Multisilta (U of Tampere)                 |
| Aug 4–5         | <i>Monetizing Audience Engagement in New Media</i> , directed by Martha Russell (Stanford) and Kate Niederhoffer (Nielsen)    |
| Aug 4–5         | <i>Remote Collaboration, Interaction and Telepresence</i> , directed by Renate Fruchter (Stanford) and Maribeth Back (FXPAL)  |
| Aug 7–8         | <i>Social Media Collaboratory</i> , directed by Howard Rheingold (Stanford)   |
| Aug 7–8         | <i>Preserving Knowledge in Virtual Worlds</i> , directed by Henry Lowood (Stanford) and Cynthia Pickering (Intel)             |
| Sept 26         | <i>Workshop Protocols for Networked Teams</i> , directed by Stanley Rosenschein (Stanford) and Gloria Marks (UC Irvine)       |

A monograph of the 2007 Workshop, Building Effective Virtual Teams, was produced.

### ***Media X Innovation Workshop for the United States Department of Defense***

In September, Media X collaborated with SRI International, IBM, Google, and other regional organizations in offering a 3-day program on Innovation for 30 policy-level leaders in the United States Department of Defense and staff from the Secretary of the Air Force.

### ***Research with local schools and teacher preparation***

H-STAR faculty and students are active in conducting research on learning, teaching, and new technologies with partnerships that take them into public schools from elementary to high school, from Redwood City and East Palo Alto to San Francisco and beyond, to charter schools, as well as in after-school clubs and community centers. H-STAR faculty are also actively involved in contributing to SUSE's teacher preparation programs, the Teachers for a New Era initiative jointly funded by the Carnegie Corporation and the President's Office, and are engaged in planning and pursuing the campus-wide "K-12 Initiative." Several H-STAR faculty have been conducting Stanford K-12 Initiative-funded projects (Barron; Goldman; Lunsford; Pea; Schwartz; Wineburg).

### **10. Wallenberg Hall**

H-STAR has principal responsibility for the research and research-related activities that take place in Wallenberg Hall, a facility funded (by the Swedish Wallenberg Foundation), designed and built explicitly to enable research into different forms of education, taking advantage of new technologies and flexible, novel architectural features, and paying particular attention to international educational initiatives and collaborations. Wallenberg Hall has (thus) become a locus of activity for at least three distinct constituencies: faculty and students at Stanford University; researchers located at Stanford, in Sweden, and beyond (e.g., H-STAR affiliated faculty, Media X, LIFE Center collaborators, and WGLN projects); and a global array of industrial, commercial and academic enterprises with interest in the intersections between Silicon Valley and Stanford. ICT serves both as an H-STAR research medium, and to mediate teaching across states and international boundaries.

For ***faculty and students at Stanford***, Wallenberg Hall is a place to explore and use advanced technologies for teaching and learning. For up to 12 hours most days, teachers and students take advantage of Wallenberg's state-of-the-art spaces to enhance learning in a multitude of ways. Video conferencing, in-class laptops, tablet PCs, Stanford-developed collaborative iRoom software and DIVER Video Tools, reconfigurable furnishings and multiple Webster "interactive" boards provide some of the tools and both physical and representational infrastructure in the rooms that helps make good teaching even better.

Since September 2002, Wallenberg Hall has played host to more than 460 regular Stanford courses in more than 30 academic disciplines as well as to the University's Program in Writing and Rhetoric. For many Stanford faculty and students, Wallenberg Hall has become an indispensable tool for doing the work of education better, faster, and in newly transformative ways than is possible elsewhere on campus. The additional benefit of these users from the perspective of the research and development community is that they demand that the technology work *now*, and that it work to support learning activities. H-STAR is the organization that supports the technology staff that makes Wallenberg Hall work, and that guides research that evaluates technology innovations used in the hall.

For ***researchers at Stanford, Sweden, and elsewhere***, Wallenberg Hall is a workplace and a laboratory for explorations in the application of technology to learning. On the fourth floor of Wallenberg Hall, H-STAR provides support to faculty-led research projects funded by the NSF, WGLN and other funding agencies such as the Mellon Foundation, National Endowment for the Humanities, and other private foundations and corporate sponsors.

For **industrial, commercial, and academic enterprises** with interests in education and technology, Wallenberg Hall provides a gateway to Stanford's remarkable resources as a world-class university located in the world's most fruitful incubator of technological innovation. We continue to attract globally distributed visitors to learn about our ideas, methods, findings, technologies and teaching. H-STAR faculty and staff were instrumental in helping plan the new learning technology facilities at Stanford's Medical School, among many other efforts in the US and abroad. These visits are consequential in many ways: (1) as an efficient method for communicating to colleagues and decision-makers results from the research and the teaching that we support; (2) as providing potential collaborators for multi-institutional and international projects; and (3) in providing Stanford researchers with opportunities for scholarly exchanges about current thinking about technology and education in a concrete context of demonstrations. We continue to find Wallenberg Hall to be a vibrant hub for attracting and sustaining a far-flung network of researchers and practitioners in the U.S., Sweden, and elsewhere.

For the **campus community** as a whole, Wallenberg Hall provides ideal facilities and support for special events. H-STAR administers the staff that makes these events possible, many of which involve complex logistic planning and execution. Among the many varied activities that took place in Wallenberg Hall during FY08 (often with support from Wallenberg Hall staff) are:

|              |  |
|--------------|--|
| September 07 | Sophomore College  |
| 7-Sept-07    | Undergraduate Admissions Office (100 prospective students and parents) |
| 14-Sept-07   | Undergraduate Admissions Office (100 prospective students and parents) |
| 15-Sept-07   | Mozilla Japan "Global Studio" event                                    |
| Repeating    | Stanford Webmasters Meetings   |
| 2-Oct-07     | Stig Hagstrom Symposium – Reception and announcement of fellowship     |
| 3-Oct-07     | Alpha Kappa Psi's Fall Rush event                                      |
| 4-Oct-07     | Google Info Session  |
| 8-Oct-07     | Media X – Intuit Focus Day   |
| 10-Oct-07    | Vera Grant Speaker Event   |
| 11-14 Oct    | Reunion Homecoming Tours and Classes without Quizzes                   |
| 13-Oct-07    | Institute for Research in the Social Sciences Speaker Event            |
| 17-Oct-07    | Swedish Poetry and Music event   |
| 18-Oct-07    | Retirement Party for Parvati Dev                                       |
| 19-Oct-07    | Swim Team 'teambuilding' event – HALO                                  |
| 25-Oct-07    | Deloitte Consulting recruitment event                                  |
| 4-Nov-07     | Lively Arts – Idan Raichel Post Performance Reception                  |
| 5-Nov-07     | Media X Autumn Lecture – Nina Bhatti, HP Labs                          |
| 8-Nov-07     | Media X – BP Focus Day   |
| 8-Nov-07     | Media X Autumn Lecture – Brian Ralphs, BP Labs                         |
| 8-Nov-07     | NanYang Girls High School, Singapore (28 students) for a tour          |
| 8-Nov-07     | Metaverse Speaker Event  |
| 13-Nov-07    | Program in Writing and Rhetoric Open House                             |
| 14-Nov-07    | Intro to the Humanities Open House                                     |
| 15-Nov-07    | ITServices Stress Management Seminar                                   |
| 15-Nov-07    | MobileMetrix Launch Event  |
| 19-Nov-07    | MediaX – Awardee Lunch   |
| 19-Nov-07    | MediaX Autumn Lecture – Jim Schuyler, Dalai Lama Foundation            |
| 6-Dec-07     | BioMedIn212 – Special Presentations                                    |
| 6-Dec-07     | Symbolic Systems – Bridge Event  |
| 8-Dec-07     | BizBuzz 07 event   |
| 9-Dec-07     | Santa Lucia Party – Scandinavians at Stanford event                    |
| 11-Dec-07    | Office of Development event – Creative Reality                         |
| 13-Dec-07    | CCRMA Presentations  |

|              |   |
|--------------|---|
| 18/19-Dec-07 | KPCB.com "Off Site Event"   |
| 4-Jan-08     | Office of Development event – Creative Reality                          |
| 15-Jan-08    | MediaX Winter Lecture – Stan Rosenchein                                 |
| 18-20 Jan    | Global Collaboration KickOff Event                                      |
| 28-Jan-08    | MediaX Winter Lecture – Claudia L'Amoreaux – Second Life Goes to School |
| 4-Feb-08     | MediaX Winter Lecture – Davis Masten – Postcards From the Future        |
| 6-Feb-08     | Microsoft TechFest  |
| 11-Feb-08    | MediaX Winter Lecture – Bob Horn –                                      |
| 21-Feb-08    | MediaX Member Event   |
| 22/23-Feb-08 | Parents Weekend Classes and Tours                                       |
| 24-Feb-08    | Social Entrepreneurship Day Event                                       |
| 25-Feb-08    | MediaX Winter Lecture – Neerja Raman                                    |
| 25-Feb-08    | Stanford Humanities Lab Exhibition Event                                |
| 29-Feb-08    | ASES E-Week Venture Capitalist Speed Dating Event                       |
| 3-Mar-08     | Innovation Journalism Welcome Reception                                 |
| 7-Mar-08     | Scandinavians at Stanford Film Event                                    |
| 10-Mar-08    | MediaX Winter Lecture – Doug Carmichael                                 |
| 27-Mar-08    | ScanCor Conference Dinner   |
| 2-Apr-08     | Innovation Journalism/Silicon Vikings Speaker Event                     |
| 11-April-08  | Stanford Institute for Creativity in the Arts (SiCa) Speaker Event      |
| 16-April-08  | MediaX Spring Lecture – Chuck House                                     |
| 18-April-08  | Introduction to the Humanities Colloquium 2008                          |
| 23-April-08  | MediaX Spring Lecture – Martha Russell                                  |
| 25-April-08  | John Bravman – Admit Weekend Event                                      |
| 28-April-08  | Innovation Journalism Conference Brainstorming                          |
| 28-April-08  | MediaX Spring Lectures – Douglas McDavid                                |
| 2-May-08     | SiCa – Speaker Event  |
| 3-May-08     | Bing Overseas Studies Program   |
| 5-May-08     | Apple Photography Event   |
| 3-Jun-08     | MediaX/Law School Seminar   |
| 4-Jun-08     | CCSRE Speaker Event   |
| 10-Jun-08    | European Cup Soccer Game on HD TV                                       |
| 11-Jun-08    | Roy Pea/Ray Pecheone Speaker Event                                      |
| 11-Jun-08    | Robert Plummer's CS Software Faire                                      |
| 25-Jun-08    | CAAEE Conference  |
| 21-Jul-08    | Cammy Huang – Teacher Workshop  |
| 25-Jul-08    | David Katzenstein Speaker Event   |
| 30-July-08   | Internal Medicine Event   |
| 31-Jul-08    | Summer Institute at Wallenberg Hall 2008 through August 8 inclusive     |
| 31-Jul/1-Aug | Engaging Global Teams Across Distance, Time and Culture                 |
| 31-Jul/1-Aug | Social Media Classroom  |
| 1-Aug        | Social Mobile Media Workshop  |
| 4/5-Aug      | Monetizing Audience Engagement in New Media                             |
| 4/5-Aug      | Remote Collaboration, Interaction and Telepresence                      |
| 7/8-Aug      | Knowledge Management in Virtual Worlds                                  |
| 7/8-Aug      | Social Media Collaboratory  |
| 1-Aug-08     | Silicon Vikings Speaker Event   |
| 6-Aug-08     | Bill Lane Center/Spatial History Speaker Event                          |
| 27-Aug-08    | Bill Lane Center/Spatial History Speaker Event                          |

In addition we have been pleased to host, on multiple dates:

- Videoconference connections for PAC10 Meetings, various PhD Oral Defenses, Woods Institute, Residential & Dining Enterprises, Concert Hall Planning Meetings,

- Job searches for Drama, and the Dean of Research
- Auditions and rehearsals for Stanford Shakespeare Society
- Meetings for Stanford Student Groups, including: Forum for American-Chinese Entrepreneurs (FACES), ISIS, Green Dorm Project, Brainstorming India, Scandinavians at Stanford
- President and Provost Faculty Workshops/meetings

## 10. Media X Industry Partners Program

The Media X program is staffed by Executive Director, Charles (Chuck) House (a well known leading Silicon Valley executive and entrepreneur), Associate Director, Dr. Martha Russell, and Office Manager, Amy Atkinson. During the past six years 90 Stanford professors have submitted research proposals for Media X funding. During 2008, seven new research projects initiated by Media X in response to a Media X RFP on “The Fusion of Virtual and Real Worlds” were completed and reported through papers and presentations. Two research projects initiated under prior Media X RFPs were extended. Several of these projects attracted additional research support and have become ongoing research initiatives.

- *Virtual Sensornets*: Pat Hanrahan, Philip Levis, Vladlin Koltun. Attracted two substantial NSF grants.
- *SPEED*: Jeffrey Schnapps, Henrick Bennetsen. Attracted over \$300,000 in a subcontract from a Museum partner in Denmark
- *Multitasking*: Attracted \$35K in funding from NSF and matching funds from private donor for a June workshop on Multitasking for Young People, to frame a research agenda.

The 6<sup>th</sup> Media X Annual Meeting, held on March 3-4, 2008, attracted 220 representatives from companies and other research organizations. An exclusive day-long session was held for Media X members. The day and a half annual meeting, “Transformative Insights,” held at Arrillaga Alumni Center featured presentations by Stanford faculty members and industry affiliates, as well as exhibits by related innovators and poster sessions by Stanford graduate students sponsored by Media X.

The Media X Seminar Series was continued in 2008, with 25 seminars given by academic and industry researchers, co-sponsored with other Stanford units, including: Symbolic Systems, Center for Integrated Facilities Engineering, Stanford Program for Regional Innovation and Entrepreneurship, Center for Human Interactive Media, Stanford Humanities Laboratory, Human computer Interface Group, the Bay Area CHI Group. Video tapes of Annual Meeting presentations and Media X Seminars are available online for viewing by the public.

Eight Focus Days (in-depth brainstorming sessions with Stanford faculty and industry researchers from a member organization) were held in 2008 on themes of: Open Source Virtual Worlds; Role of Cell Phones and Cars as New Information Hubs; Mobile Collaboration Tools for Virtual Teams; Social Awareness and Presence in Collaboration with a Focus on Wellbeing, Coaching and Monitoring; Virtual Worlds; The Fusion Of Virtual And Physical Worlds For Advanced Human Communications; Human-Machine Interaction; and Sensing; Video and Collaboration.

Follow-up activities between industry Members and the faculty members who attended the intimate, in-depth discussions about issues of common concern during the Focus Days have led to faculty speaking engagements, hiring graduating students, expanded Media X member relationships, and discussions about collaboration.

Media X hosted a one-day industry-sponsored Round Table Workshop on Video and Collaboration. Eighteen industry researchers and 6 Stanford researchers met at Stanford to discuss and prioritize research opportunities on the use of video communications for work team collaboration. A prioritized research agenda for this topic was produced.

Media X hosted a 2008 Industry Visiting Scholar from Intel, whose on-campus activities spanned Civil and Environmental Engineering, Libraries, Computer Science and Electrical Engineering and focused on the use of virtual worlds for business teams. The Visiting Scholar gave several presentations and co-hosted a workshop while in residence at Stanford.

Media X also hosted seven Media X Distinguished Visiting Scholars during 2008. These Scholars were active in giving presentations and seminars, contributing to proposal development and meeting with existing and potential Media X members.

The Media X membership model was restructured in 2008, opening the opportunity for members at either the Affiliate or Associate Membership levels to: individually or collaboratively contribute to Media X research initiatives, to sponsor Media X Visiting Scholars, and to sponsor Round Table Workshops.

- Affiliates (\$50K per year)
- Associates (<\$25K or in kind support)
- Visiting Scholar (\$75K per year)
- Round Table Workshop Sponsor (\$10-20K)
- Summer Workshop Sponsor (\$10-25K)
- Seminar Series Sponsor (\$25K per quarter)
- Research Sponsorship (minimum \$50K contribution)

The total income from membership fees for FY08 was \$545,000. The bulk of this money was used to run the program and support faculty research. Previous Media X members continue to be involved in seminars and meetings. Media X members in 2008 include:

**Affiliate Partners (\$50K per year)**

- BP (United Kingdom)
- Intel (Santa Clara, CA)
- Konica Minolta (USA)
- Motorola (USA)
- Philips (Eindhoven, Netherlands)
- SAP Labs (Palo Alto, CA and Germany)
- Sun Microsystems (Palo Alto, CA)
- Tekes (Finland)

**Associate Partners (<\$25,000 or in kind support)**

- Accel Partners (Palo Alto, CA)
- Association of Convenience and Petroleum Retailers, NACS, (Washington D.C.)
- FXPAL (Palo Alto, CA)
- KenesisSurvey (Austin, TX)

- Learning.com (Portland, OR)
- NCast (Mountain View, CA)
- Qwaq Forums (Palo Alto, CA)
- Swivel Media (San Francisco, CA)

Media X continues to broaden the intellectual exchanges for the campus through funding and collaboration opportunities, as well as through seminars and Focus Days. Media X is aggressively pursuing both new partner development activities and related faculty interests.

Plans for outreach and cultivation in 2009 include the continuation of the Media X Seminar Series, a winter meeting co-sponsored with Accel Partners, and five or workshops in conjunction with the Summer Institute at Wallenberg Hall.

### **11. Affiliated Masters and Doctoral Programs: LSTD and LDT**

In late 2001, H-STAR co-Director Roy Pea collaborated with colleagues in the School of Education (SUSE) and elsewhere on the campus to establish an interdisciplinary doctoral program in Learning Sciences and Technology Design (LSTD), which now has a cohort of approximately 30 full-time students. These students are active in H-STAR Institute research activities, commonly found on the 4<sup>th</sup> floor of Wallenberg Hall, and are typically funded by H-STAR and Media X faculty research grants. A related program, established by SUSE in 1997, is Learning Design and Technology (LDT), with an engaging project-focused curriculum that attracts 12-20 masters' students for its full-year duration. Together, the LSTD (PhD) and LDT (MA) programs provide a vital "people" contribution to the interdisciplinary research, teaching, and apprenticing activities of the H-STAR Institute. Many of the students convene in the technology and video resource enabled workspaces of Wallenberg Hall for conducting their work activities, meetings with faculty and one another, and for group analysis of videorecordings associated with their research studies.

### **12. Brief history**

Since this is a transition year for H-STAR, a brief summary of the institute's history is appropriate.

H-STAR was created in FY06 by merging two independent centers, CSLI and SCIL. The rationales for this merger, as described in last year's institute report, were threefold:

1. The research interests and faculty advisors of CSLI and SCIL had considerable overlaps.
2. Media X had been created in 2002 as a joint CSLI–SCIL industry partners program.
3. As a result of a need to eliminate duplication of administrative work, and thereby achieve (significant) cost savings, in 2003 CSLI and SCIL had combined their administrative support units into a single Shared Services Unit.

From around 1990 onwards, CSLI had comprised two connected but essentially different subgroups, described in the 2000 *CSLI Bulletin* as "Cognitive Science Lab" and "Interface Lab", with the former focusing on CSLI's 1983 founding disciplines of logic, linguistics, and philosophy, and the latter conducting research on technology-related issues, particularly human-computer interface. Following the creation of H-STAR (whose name reflected the second of those two areas), the newly appointed CSLI director, linguist Tom Wasow, refocused CSLI on cognitive science disciplines.

In September 2008, linguist Stanley Peters took over as CSLI director, and elected for the newly refocused CSLI to split off as an independent center once again, to further develop the



cognitive sciences. The part of CSLI that had since 1990 focused on technology and interface issues remained part of H-STAR. In effect, this meant that the CSLI of the period 1990–2006 was split into roughly equal halves, along the lines described in the 2000 *Bulletin*.