THE GRADUATE SCHOOL
UNIVERSITY OF WASHINGTON

Box 353770 G-1 Communications Seattle, WA 98195-3770
Telephone: 206-543-5900 Fax: 206-685-3234 Web: http://grad.washington.edu

June 14, 2011

Dr. Randy Spaulding. Director
Academic Affairs
Higher Education Coordinating Board
917 Lakeridge Way
Olympia, WA 98504

Dear Dr. Spaulding:

Please find enclosed the proposal to establish the Master of Human-Computer Interaction and Design at the University of Washington. Evaluations of the proposal were conducted by Dr. James Oliver, Professor of Mechanical Engineering at Iowa State University, and by Dr. Mookesh Patel, Associate Professor in The Design School at Arizona State University. These evaluations are enclosed as an appendix to the proposal along with the program's response to the external reviewers' comments.

Please contact Robert Corbett at (206) 616-0657 or by email at rcorbett@u.washington.edu with any questions you may have regarding these proposals.

Sincerely,

Gerald J. Baldasty
Vice Provost and Dean

James Soto Antony
Associate Vice Provost and Associate Dean for Academic Affairs

Enclosures

cc: Douglas J. Wadden, Executive Vice Provost for Academic Affairs and Planning, Office of the Provost
Judith A. Ramey, Professor, Department of Human Centered Design and Engineering
James A. Landay, Associate Professor, Department of Computer Science and Engineering
David Canfield-Budde, Academic Program Specialist, The Graduate School
Robert Corbett, Coordinator of New Programs, Office of Undergraduate Affairs and Office of Academic Affairs, The Graduate School

FORM 2

COVER SHEET
NEW DEGREE PROGRAM PROPOSAL

Program Information

Program Name: Professional Master's Degree in Human-Computer Interaction and Design

Institution Name: University of Washington

Degree Granting Unit: Graduate School
(e.g. College of Arts & Sciences)

Degree: Master of Human-Computer Interaction and Design
(e.g. B.S. Chemistry)

Level: Master
(e.g. Bachelor)

Type: N/A
(e.g. Science)

Major: Human-Computer Interaction and Design
(e.g. Chemistry)

CIP Code: 30.3101 (Human-Computer Interaction)

Minor: N/A
(if required for major)

Concentration(s): _____
(if applicable)

Proposed Start Date: Autumn 2012

Projected Enrollment (FTE) in Year One: 30 (#FTE)

At Full Enrollment by Year: 2012 ; 30 (# FTE)

Proposed New Funding: $1,192,559

Funding Source: ☐ State FTE ☒ Self Support ☐ Other

Mode of Delivery / Locations

☒ Campus Delivery — University of Washington, Seattle
(enter locations)

☐ Off-site _____
(enter location(s))

☐ Distance Learning _____
(enter formats)

☐ Other

Note: If the program is the first to be offered at a given site or location, the submission must also include the information required for the establishment of a new teaching site as outlined in section B.1 of the Program and Facility Approval Policy and Procedures.

Scheduling

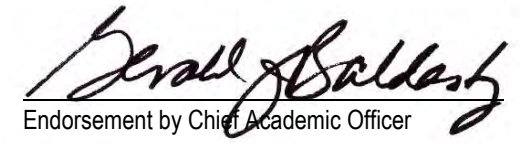
☒ Day Classes ☐ Evening Classes ☐ Weekend Classes
☐ Other *(describe)*

Attendance Options

☒ Full-time
☐ Part-time
Total Credits 46 ☒ Quarter ☐ Semester

Contact Information (Academic Department Representative)

Name:	James Landay, Computer Science and Engineering Judy Ramey, Human-Centered Design and Engineering
Title:	Professor
Address:	Box 352350
Telephone	206-685-9139
Fax:	
Email:	landay@cs.washington.edu jramey@uw.edu



Endorsement by Chief Academic Officer

June 14, 2011
Date

Professional Master's Degree in Human-Computer Interaction & Design

Overview

The Design:Use:Build Graduate School Interdisciplinary Committee proposes a new professional master's degree, the Master of Human-Computer Interaction and Design (MHCI+d). This will be a self-sustaining degree, offered through UW Educational Outreach/Professional and Continuing Education, and it will be administratively housed in the UW Graduate School. The proposed start date for the new program is Autumn Quarter 2012. This degree will educate the designers and engineers who will design, prototype, and evaluate the user interfaces to all types of software and hardware produced in the state of Washington, from office applications to games to medical devices to phones to aircraft cockpit controls and displays.

Many people find their lives are too busy, too fast, too inundated with information, and too burdened by poorly designed technologies that complicate, rather than simplify, their lives. They are challenged to find time for the activities they value (e.g., staying physically fit, caring for aging loved ones, and making better decisions with respect to conservation). Innovative systems can be designed to support such activities, but computing education and research instead remains focused on the same types of information processing tasks that have been explored for almost three decades. However, over the last seven years, an interdisciplinary team at the University of Washington (Design:Use:Build, or dub; dub.washington.edu) has been working to create devices and systems that help people with long-term, high-value, everyday personal activities that are important to them without regard to computing, but which computing can enhance. Our proposed master's program will educate designers and engineers who will be equipped with the interdisciplinary skills and perspectives to meet the growing need in Washington's high-tech industries to produce technologies scaled to human activities.

Examples of this new wave of technologies include monitoring elder physical activities, prescription compliance, eating, and overall well-being. Additional examples include ambient displays that make it easy for individuals to monitor and make simple changes to improve their personal impact on the global environment (e.g., driving, electricity usage, garbage generation). In general, computing-infused technologies pervade our society and take many forms, such as objects of fashion, entertainment, enrichment, and communication. We can now leverage advances in fundamental technologies (e.g., sensing, embedded computation, and machine learning) to create everyday applications that transform our lives, not just our work. But all of these computing devices require thoughtful human-centered *design*, as the users of these devices are not computing specialists, but everyday people who demand satisfying and successful experiences with their technologies.

A new generation of Designer is needed, one who combines the creative aspects of Design Studios with the analytical techniques from engineering-oriented Human-Computer Interaction (HCI) to create technologies that satisfy demanding usage, situational, and social constraints.

Both nationally and in Washington State, there are not enough designers trained to create the useful and usable products our society needs, and the designers and engineers that are being trained are not getting the skills necessary to solve tomorrow's problems. The practice-oriented MHCI+d's emphasis on applications in the fields of health and sustainability fits well with the priorities of the university (e.g., a major emphasis on collaborations with the School of Medicine, the recent creation of the new College of the Environment, and the sustainability mission that is part of the university's strategic plan) as well as the priorities of the State of Washington. For example, Washington State is one of the few states with laws on sustainability. Having designers who are knowledgeable of how to develop products that encourage sustainable lifestyles would be helpful in our society reaching such goals.

The educational approaches of existing programs are still divided among disciplines. Individual courses are generally unidisciplinary, focusing primarily on social science, cognitive science, design, computer science, or human factors. This forces a separation between technology and human behavior, and these traditions fall short when applied in a non-integrated way to the important human-computer interaction and design problems we must solve. Our proposed Master of Human-Computer Interaction and Design will deeply integrate these various aspects of design, technology, and the study of human behavior, creating students who can work seamlessly across these boundaries.

In attempting to create applications in support of human activities, we face new problems of scale: much larger numbers of users interacting with our technological artifacts; broader range of situations in which users operate (e.g., mobile technologies are used out in the world, not always in predictably comfortable office workplace settings); the longer-term nature of people's interactions with technology (e.g., using a computer to learn a language takes months or years, not hours). These changes in scale, environment, people, and duration precipitate *fundamental* changes in how HCI and Design is carried out. Our proposed program will train students to address these complexities of scale through the use of multiple approaches, new tools, and new technologies.

The Desing:Use:Build Graduate School Interdisciplinary Committee includes educators with diverse competencies, demonstrated vision, and a track record of mentoring students and producing scholarship. It has key expertise in studio-based innovation, prototyping and implementation, *in situ* field data collection, and data-based critical analyses. Our team also includes leaders in engineering education and design process research. No single discipline can satisfy the needs of this diverse program. Our Masters Planning committee includes eight faculty from across the core participating departments for this program (CVs included in the appendix). Most of the needed instructors will come from this core group.

The participation of top designers and researchers from and the opportunity for project partnerships at Microsoft (Redmond and Beijing) and Telefonica (Barcelona) will help ensure that the program produces the type of innovators with a global view that are needed by Washington State industry today and in the future.

The proposed program will seek opportunities to increase student body diversity in this program. The audience for this program is comprised of early- and mid-career professionals who typically already work in the computer software, hardware, web, or telecommunications industries. They will have been exposed to HCI and Design in their existing jobs, but are interested in additional education that will allow them to develop the deeper skills and knowledge necessary to perform as a interaction/user experience designer, user interface engineer, or usability/user research specialist. These skills can only be learned by practicing them with a multi-disciplinary team on large projects. Thus a professional Masters degree is the most cogent way to offer this type of education.

As mentioned earlier, the MHCI+d will be a self-sustaining program. Therefore, no state funds are requested to offer the program. The rationale for this self-sustaining strategy is based on significant program need from both a national and an international audience.

Relationship to Institutional and Unit Priorities

Over the past decade there has been a continuing market demand for usable and pleasing software and hardware-based computing products. This is most easily observed in the incredible market demand for Apple's consumer products over the last 10 years: from laptops to phones to MP3 players. At the same time there have been fundamental advances in the techniques, tools, and methods to create better-designed products. These developments have added to the national economic competitiveness as the company that designs usable, compelling products often retains over 90% of the revenue stream (i.e., it has been estimated that Apple retains a significant portion of the revenue from the sale of each iPhone even though the device is manufactured overseas).

Although the four key participating units in this program (CSE, Division of Design in the School of Art, Human-Centered Design and Engineering, and the Information School) all have Masters programs, these

programs are either targeted as a step toward the PhD (CSE) or they are terminal Masters focusing on only the core discipline of the department (e.g., CSE PMP, iSchool MSIM, MFA, or HCDE PMP).

Through the MHCI+d offering, these four units seek to fulfill the University of Washington's role and mission of offering a state, national, and international-class education tailored to an audience now underserved. We seek to prepare MHCI+d graduates to understand and apply design techniques and novel technologies for addressing complex problems that involve tradeoffs among economic, social, health, and environmental issues.

Need for the Degree

There is a documented demand for a new Professional Masters program in Human-Computer Interaction and Design from both employers, documented in the state's HECB Master Plan and Regional Needs Assessment, and students. At the same time, the field itself is showing substantial growth in academic interest.

Workforce demand and relationship to HECB Master Plan

"I have been a Human-Computer Interaction (HCI) professional at Microsoft since the inception of the program in the late 1980s. As I have watched the HCI (aka User Experience) community grow at Microsoft to be one of the largest in the world (approximately 760 employees currently), I have anecdotally noticed students from the UW not faring as well in the hiring process as some other universities who have mature, multi-disciplinary masters programs. With strengths in HCI across 4 units, the UW is uniquely poised to create an interdisciplinary program that graduates top-tier HCI students at the masters level. I am extremely pleased to offer my support for the proposal you are reading because it fulfills the promise of what the UW can do in the HCI field. The whole will truly be much, much greater than the sum of the parts, and Microsoft will be but one of many beneficiaries."

Kent Sullivan
Principal User Experience Researcher
Engineering Excellence Group
Microsoft

As the above testimonial demonstrates, the demand from local employers for an HCI and Design workforce educated by the UW is strong. Large local companies such as Microsoft and Amazon are now judged by the quality of the user experience with their products and these attributes are only becoming more important as they try to compete with companies that are known for the superior user experience of their products (e.g., Apple). Many other local employers, including startup software and mobile computing companies, game houses, and biotech and aviation firms, are dependent on quality user experiences for both the users of their products as well as their own employees during the creation of their products. At present, they often hire this expertise from outside the state; this proposed program would provide these companies with a strong cadre of Washington residents uniquely well-trained to meet their needs.

Because job titles such as user researcher, interaction designer, user experience designer, human-computer interaction specialist, information architect, and others related to this emerging field are not tracked yet by the major workforce indexes, we must rely on statistics related to the umbrella disciplines of computer science/engineering, software and systems design, design, etc. As reported by the 2009 Washington State Labor Market and Economic Report[1], "computer software engineers, applications and computer software engineers, systems software are among the top 10 occupations for growth rate, level

[1] http://www.careervoyages.gov/emerging-main.cfm

of employment, and earnings. All require higher levels of education." The same site reports that "computer and mathematical type jobs offered the highest median wage in the spring of 2009 at $28.85 per hour." The US Bureau of Labor reports that "the computer systems design and related services industry is among the economy's largest and fastest sources of employment growth. Employment increased by 616,000 over the 1994-2004 period, posting a staggering 8.0-percent annual growth rate. The projected 2004-14 employment increase of 453,000 translates into 1.6 million jobs."[2]

The most recent *HECB State and Regional Needs Assessment* (2006, revised) documents the fact that "the number of graduate and professional degrees awarded over the past three years in the state has increased overall, but the number of degrees awarded in math, physical science, health, and engineering has declined." The report recommends that "the higher education system must increase the number of graduates with the skills required to meet the employer needs in a number of key occupational areas. Institutions should develop strategies to increase the numbers of students prepared to fill positions in the high-demand areas of computer science, engineering, [and] software engineering . . . In addition, institutions in the state need to increase the numbers of students enrolled in graduate and professional programs to meet employer needs." This matches the 2008 HECB Master Plan's overall goal of "promoting economic growth and innovation by focusing on the skills and knowledge needed for prosperity in the 21st century."

The proposed MHCI+d is a professional degree that offers new opportunities for those already working in Washington state's high technology industry. By making the program a concentrated one year of study, as opposed to the two years required by many of our competitors, this new program will be more attractive to those who are already employed, as they will only forego a year from their jobs rather than two years. This also supports another aspect of this master plan goal, namely, supporting lifelong learning.

The proposed MHCI+d also clearly focuses on the second of the two key goals of the strategic master plan. As HCI & Design are directly focused on encouraging innovative thinking and finding innovative new ideas and solutions, this program will help promote "economic growth and innovation." The students in our existing undergraduate courses already commonly come up with ideas that we often see start-ups pursuing 2 or 3 years later. Masters level students taking our proposed curriculum will take this to the next level and we expect that new start-up companies will regularly be hatched over the year-long projects students pursue in our program. In addition, our programs focus on applications in health and the environment will also be important for future economic growth of both the Puget Sound region and the entire State of Washington. It is crucial that there be skilled professionals who are knowledgeable about designing for these domains as both health and the environment affect every citizen of this country.

The State and Regional Needs Assessment includes two recommendations that relate directly to this proposed degree:

Recommendation #1: "Public colleges and universities must grow to… meet demand resulting from population pressure and increased demand for degrees."

In King County and the Puget Sound region demand is high, and this program would add an additional degree opportunity.

Recommendation #2: "Institutions should develop strategies to increase the numbers of students prepared to fill positions in the high demand areas of computer science, engineering, software engineering and architecture, and health care occupations. In addition, institutions in the state need to increase the number of students enrolled in graduate and professional programs to meet employer needs."

The user interface is critical to almost any software or hardware application that will be created by companies in Washington, and especially so in the health care domain. Current graduate curricula have

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[2] http://www.doleta.gov/BRG/Indprof/IT_profile.cfm

not traditionally covered much of the interdisciplinary material proposed in this degree. Engineers and designers who know how to create usable and pleasurable applications and devices are and will continue to be in great demand at the firms hiring in the aforementioned positions.

In 2008 the HECB released a document to assist with implementing the strategic master plan[3]. The implementation document identifies four priorities. Implementation of the MHCI+d addresses all four priorities as follows:

1. Continue the progress we have made by sustaining current levels of support for higher education.

MHCI+d addresses priority number 1 by implementing the program as a self-sustaining activity, thereby not drawing upon any state funds.

2. **Build a larger 'pipeline'** to postsecondary education that captures more students radiating from our K-12 schools and more working adults.

The MHCI+d program addresses priority 2 through a program that focuses on professionals who have already been in the workforce, enhancing their ability to contribute to a knowledge society. As a one-year full-time program, the MHCI+d program will enable students to complete studies in a reasonable amount of time.

3. **Expand on demand** by targeting growth and tailoring institutional plans to respond to know demographic, regional and workforce needs.

MHCI+d addresses priority 3 by focusing on the design of computing and information technologies, which are among the significant emerging employment sectors of the decade according to the department of labor[4].

4. **Redesign the delivery system for higher education** by creating a new process to determine when and where to build new campuses or centers, develop new programs, expand eLearning and other delivery modes, and change college and university missions.

The MHCI+d program addresses priority 4 by breaking the traditional one-to-one department-to-degree linkage. The program is not "owned" by any one department and is instead organized by the Design:Use:Build Graduate School Interdisciplinary Committee.

There is a corresponding need for growth in design education. Richard Grefé, executive director, AIGA (the professional association for design[5]), emphasizes that there is "a very deep need, nationwide, for designers to be trained in interaction design with a particular understanding that designers will be asked to solve problems with solutions that are medium agnostic, socially responsible, culturally sensitive, human centered, collaborative and global. This challenge is both an opportunity to equip young designers with the capacity to create value for clients and society in the future, but also meet the imperative of US business, which will be seeking this contribution for design to sustain its competitive advantage over time" (personal email to Prof. Karen Cheng, member, MHCI+d Planning Committee).

Student demand

There is similarly a strong student demand for a new Master's degree in HCI and Design. First, enrollment in the interdisciplinary HCI undergraduate concentration (designed by faculty from the four units proposing this degree; officially approved so far by two of the units, HCDE and the iSchool) is the fastest growing segment of students in both the iSchool and HCDE at UW. For instance, of the 88 undergraduates who elected to take one of the two concentrations offered in the undergraduate Informatics degree in the iSchool (Information Architecture or Human-Computer Interaction), 67 of them

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[3] Opportunities for Change: Implementing the 2008 Strategic Master Plan for Higher Education http://www.hecb.wa.gov/news/documents/Opportunities-Implementation-printversion.pdf

[4] http://www.careervoyages.gov/emerging-main.cfm

[5] http://www.aiga.org

chose the HCI concentration. Also, Gian Bruno, Director of Student Services for HCDE, reported that in the last two years, the department has had an almost 90% increase in applications, with the biggest increase coming from students interested in HCI within the undergraduate major. All of these students would be prospective applicants to the new program. This area is also experiencing much growth at the undergraduate level in CSE and Design. Second, although we have not made any public announcement of plans for this program, we are already getting email asking when this new Masters program will start. Third, there is much evidence that women are attracted to computing when the emphasis is placed on the social impact of applications and other human-centered activities, such as education or healthcare[6]. Thus, our program will help reverse a well-known imbalance in the computing profession and bring a much needed alternative perspective to many design and engineering projects.

The above estimates of employer and student demand for this new MHCI+d are further supported by the HECB *State and Regional Need Assessment*, which states that "Majors identified by institutions [as impacted] include architecture, business, communications, computer science and informatics, engineering, elementary education, nursing, and psychology." The unique combination of computer science and informatics, human behavior (psychology), and design (communications) in our new program will meet some of this demand. The report goes on to state that "Demand in specific occupations is not met by current supply. Matching with the ultimate demand measure, current degree production only meets 67 percent of the need in engineering, software engineering, and architecture and 56 percent of the need in computer science." Our program would be one piece that will go towards meeting these needs. In addition, healthcare is another major need cited in the state report. A significant health focus in many of the problems our students will attack, especially in assistive technology and technology for aging, will also fit well with what Washington state needs from both an employer and a community perspective.

In fact, the growing importance of this area is underlined by the fact that last year (2010), the Association for Computing Machinery (ACM) has announced the addition of an annual conference devoted to the topic: "ACM is proud to sponsor a new conference, which is being planned to become the premier community forum for health informatics researchers and practitioners. The ACM International Health Informatics Symposium (IHI 2010) will focus on the application of computing principles and technology to address problems in healthcare, public health, the delivery of healthcare services, and consumer health also including topics related to social and ethical issues in that space."

Demand survey results

To assess demand for the program, we had a survey executed by UW Professional and Continuing Education. 159 individuals responded to the survey in February 2011. The majority of the respondents (102) were UW alumni of the existing degree programs from UW CSE, the iSchool, HCDE, and Design. The remainder were recruited from the mailing lists of professional organizations. Given the strong response from a set of individuals much broader than our target population (e.g., only a subset of MS/BS CSE grads are going to be interested in this program), we believe the demand for this new program will be strong. That is to say, of the total set of graduates from CSE, MSIM, etc., many will have technical interests unrelated to human-computer interaction/design. Nevertheless, 42.1% of the respondents indicated that they would be "very interested" or "interested" in this program. Also, fully 36% of the respondents indicate that they would be willing to leave work for a year to pursue the program, and among those who are "very interested" in the program, 53% indicated that they would pay the proposed tuition or more.

The complete results are in Appendix B. Some highlights include:

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[6] Cuny, J. and W. Aspray, Recruitment and Retention of Women Graduate Students in Computer Science and Engineering, in Report of a Workshop. 2001, Computing Research Association: Washington, DC.

1. **Interest in pursuing additional education in Human-Computer Interaction & Design is high**. More than two-thirds of respondents indicated that they plan to, or might, enroll in additional education in this field.
2. **Respondents perceive the proposed program to be valuable.** Over three-quarters agreed that a Master's in HCI+d would make graduates more attractive to employers, and that graduates would be able to contribute more to overall financial performance of their employer.
3. **Overall demand for the proposed UW Master's Degree in Human-Computer Interaction & Design is moderate [among the broad sample used in this survey]**. This indicates a strong demand among the target audience, but also the need to make sure to market to the key sample of potential students interested in HCI and Design rather than simply CS or Informatics.
4. **For those who are very interested in the proposed program (n=15) over one-half indicated they would pay the proposed UW tuition or more.**

Our planned student outreach and recruitment efforts will include contacting faculty that teach undergraduate courses in HCI and Design at other universities in Washington State, sending email and brochures to corporate contacts at local employers as well as to the local chapters of design and HCI professional societies, and targeted recruitment of top UW undergraduates.

Growth in academic focus on the field

In addition to employer and student demand, there is also substantially increased interest in HCI & Design as an academic discipline. In a 2005 summary of a workshop on graduate education in human-computer interaction (Foley et al., "Graduate Education in Human Computer Interaction", CHI 2005, pp. 2113-2114), the authors report that "perhaps the best-known work on HCI education is the 1992 report of the SIGCHI Curriculum Development Group [1]. At the time of that report, few if any graduate programs were dedicated to the study of human-computer interaction; since that time, many programs have been developed. The HCI Bibliography[7] lists over 60 programs of which well over half are graduate programs." This was written in 2005, and currently the HCIbib lists 85 programs. But even now in 2011, the key characteristic that differentiates our proposed professional master's program from this growing number of programs is our insistence on the primary role that design thinking must play.

Programs at Other Universities

At the University of Washington, there are four Masters degrees most relevant to the proposed Master of Human-Computer Interaction and Design. The four degrees come from the four organizing departments of the proposed degree, and this new degree offers an interdisciplinary combination of the features most relevant to HCI and Design of each of the Masters degrees, in a shared curriculum with a universally recognized and sought-after degree name. In the School of Art, a focus within the MFA program on Interaction Design is the closest to the proposed degree. This program offers many of the design studio components of the new degree, but does not include the analytical components of human-computer interaction. In Computer Science & Engineering, the closest degree is the M.S. in Computer Science (MSCS). This more technically-focused degree is only offered as a professional evening master's program and contains many class requirements (e.g., operating systems, programming languages, etc.) that are unnecessary for someone focusing on HCI and Design. In the Information School, the M.S. in Information Management (MSIM) is the closest degree, but this degree contains elements not necessarily relevant to an HCI and Design student, such as information organization and database design. Finally, in Human Centered Design & Engineering, the M.S. in Human Centered Design & Engineering covers the usability and user-centered design aspects of the proposed degree, but does not include the technical

[7] http://www.hcibib.org/education/#PROGRAMS

components from the MSCS and the MSIM degree, nor any of the studio design tradition of the MFA. Thus, the proposed Master of Human-Computer Interaction and Design will offer the ideal combination of the four degrees for someone dedicated to the field of human-computer interaction and design.

The proposed program will not draw resources away from the state-supported programs, but on the contrary will, through reciprocal teaching arrangements and other mechanisms, enrich the underlying programs by bringing in expertise and coursework in design. Doctoral students in the underlying departments who take courses taught by our design faculty through reciprocal teaching arrangements ("swaps" and course buyouts) can then generate design-based research questions for further study. Also, the Teaching Assistants we support (drawn from doctoral students in the underlying programs) can also have an enriched research perspective based on that experience. Finally, we believe that the existence of the program, given that it will be offered in a format (fulltime, day) that won't be appropriate for all students, may very well lead some highly-qualified applicants to discover and apply to the underlying departments' existing evening programs.

There are similar programs at several top schools across the United States. The closest degrees come from Carnegie Mellon University, Georgia Institute of Technology, Indiana University, University of Maryland, and the Rochester Institute of Technology. Because our research program, and thus broader reputation, in is in the same tier or higher than these institutions, our program would likely draw from similar applicant pools. These other universities offer highly selective programs and turn down admission to a large number of highly qualified applicants. Thus, while we will compete with these institutions for applicants, we believe there are enough students demanding this degree to meet our needs. We also provide the design studio curriculum in combination with a traditional curriculum, which aside from Carnegie Mellon, no other programs do. In addition, our close proximity to a number of companies looking to hire people with this expertise in Seattle and the wider region will give us an edge over these competing schools. Finally, our 1-year program will be an attractive and relatively inexpensive alternative over the 2-year programs at Georgia Tech, Maryland, Indiana, and Rochester.

Finally, after a close examination of the universities within the state of Washington, we have determined that there is no equivalent area of study or degree program at either the undergraduate or graduate level at Washington State University (all campuses), Central Washington University, Western Washington University, Eastern Washington University, UW Tacoma, or UW Bothell. There are a few single course offerings in Computer Science and the Art Departments at several institutions, but no comprehensive degree programs, degree specializations, concentrations, or minors relating to human-computer interaction. Although similar departments to our four core departments and traditional discipline-specific degrees exist at some of these universities, the program we are proposing is shorter (12 months) and has a more specific focus (design, development, and implementation of usable and socially beneficial information/digital technologies). The program we are proposing is also interdisciplinary (involving faculty from CSE, iSchool, HCDE, and Design), whereas the existing programs across the state of Washington are discipline specific (e.g., exclusive study with CS or Design faculty).

Program Description

To excel at solving problems and building knowledge in advancing long-term human activities, our masters students require a new educational experience that incorporates both an innovative design approach and innovative pedagogy. Our *design approach* integrates engineering-style data collection and problem-solving with creative ideation and peer critique from the studio design tradition, brought together in an "Analytical Design Studio." Our *pedagogical strategy* creates a rich understanding of the domain by supporting "laddering" from apprenticeship to mastery as a group activity, reinforced by portfolio-based reflection. The combination of our design approach and pedagogical strategy will produce a new generation of designer who can create technologies that satisfy the demanding usage, situational, and social constraints sketched above.

Design Approach: The Analytical Design Studio method is a central feature of our program. Drawing on engineering-style data collection methods, it supports making design decisions based on the analysis of field data and *in situ* testing of prototypes. At the same time, it draws on the creative energy of the studio environment, while being aware of the technology's impact on the local environment, social relationships, and needs of target users. This new model for technology design melds the best aspects of the HCI and Design Studio traditions. Because new, off-desktop, everyday activities are very different from traditional information processing applications, designing to support these activities requires new creative thinking. The rapid ideation of the Analytical Design Studio is the perfect tool for exploring the broader design space that everyday activities open up.

Pedagogical Strategy: Our approach to educating designers to succeed in this new paradigm draws on leading-edge research in design education. With individual and group portfolio construction as a key piece of the process, we will lead students through careful, structured reflection about the design challenges they are grappling with and their individual and group values, design processes, and assessments of their work.

Curriculum

Program Structure: The program is a self-sustaining one-year daytime program (see Figure 1). It is designed to be completed in four consecutive quarters and requires that students complete 46 total credits. In this non-thesis only degree, students will meet or exceed the Graduate School minimum requirements (see http://www.grad.washington.edu/policies/masters/requirements.shtml).

Students begin the program with a one-week Fall Kickoff event immediately preceding the beginning of autumn quarter. During the academic year, students take a three-quarter Interdisciplinary HCI+d Seminar, a three-quarter Analytical Design Studio, a three-quarter core course sequence, and additional advanced elective coursework. During the final summer quarter, they take the capstone Summer Project Studio. Each of these components is described below.

KICKOFF	Q1 – AUTUMN	Q2 – WINTER	Q3 – SPRING	Q4 – SUMMER
One Week Orientation *Led/coordinated by Design Instructor with participation by CSE, I-School, HCDE and other Design faculty*	1cr **HCI+d (DUB) Seminar** *organized by Design Instr.*	1cr **HCI+d (DUB) Seminar** *organized by Design Instr.*	1cr **HCI+d (DUB) Seminar** *organized by Design Instr.*	1cr **HCI+d (DUB) Seminar** *organized by Design Instr.*
	5cr **Analytical Design Studio 1: Ideation** *co-taught by Design (possibly Director) and (CSE or HCDE) faculty*	5cr **Analytical Design Studio 2: Prototyping** *co-taught by CSE (possibly Landay) and (I-school or HCDE) faculty*	5cr **Analytical Design Studio 3: Evaluation** *co-taught by Design (possibly Director) and (I-school or HCDE) faculty*	9cr **Summer Project Studio** *taught or co-taught by Design (possibly Director) with participation of faculty from CSE, I-school or HCDE*
	3cr **DIS: Designing Interactive Systems** *taught by Design faculty*	3cr **UIST: User Interface Software Technology** *taught by CSE, I-school or HCDE faculty*	3cr **U/UR: Usability/ User Research** *taught by I-school or HCDE*	
	3cr **UW Elective** *provide 5-8 seats in several existing courses at $1.5–2K per student*	3cr **UW Elective** *provide 5-8 seats in several existing courses at $1.5–2K per student*	3cr **UW Elective** *provide 5-8 seats in several existing courses at $1.5–2K per student*	
	12cr TOTAL	12cr TOTAL	12cr TOTAL	10cr TOTAL

Figure 1. The entire 1-year MHCI+d curriculum and proposed teaching assignments.

Fall Kickoff: Participants begin the year by attending a one-week Fall Kickoff. New students will meet their cohort and faculty, take part in exercises to learn the engineering and design strategies used in the program, and learn to build portfolios. In the focal activity, interdisciplinary student teams will engage members of an under-served population to identify a problem that can be addressed by activity-based

support. In this activity, students will work closely with a client organization, which may be commercial, nonprofit, a charity, or a public sector entity.

Interdisciplinary HCI+d Seminar: Session topics of the seminar will range from project presentations to technology previews to guest talks by outside speakers. The seminar will introduce the students to a broad range of interdisciplinary perspectives as well as to leading designers and professionals from related disciplines in local/regional companies and organizations and, together with the Fall Kickoff and Summer Studio, help them integrate what they are learning in their classes and studio work.

Analytical Design Studio: The Analytical Design Studio sequence consists of three graduate-level, project-oriented one-quarter courses. Each has a distinct emphasis, but all three address the interwoven, iterative processes of data collection, visualization, insight, design, prototyping, and evaluation. Each course will include a final public presentation to a general audience, helping train students in communicating their work.

Analytical Design Studio I: Ideation has interdisciplinary student teams pursuing problems important to a community client (perhaps one of the clients with whom they worked in the Fall Kickoff). The teams engage in project definition, data collection, and visualization to both inform their early design ideas and to provide a basis for design decisions as they iterate through cycles of design and evaluation towards a more finished design. The remainder of the quarter involves student teams iterating on designs (sketches and mock-ups) that address the criteria established through community participation. The main focus in this first course is on user-centered design.

Analytical Design Studio II: Prototyping asks student teams to take the previous quarter's designs and create working electronic prototypes, informed by a variety of evaluation techniques involving users from the target population. Teams convert evaluation data into visualizations to inform the studio design activity. The emphasis of the second course is on prototyping.

Analytical Design Studio III: Evaluation. The work of the previous two quarters culminates at the start of the third quarter in an *in situ* deployment of the prior quarter's prototype with target users, leading to the creation of a final prototype. As part of this activity, students debrief the deployment participants, present their final design to other community representatives, and construct reflective portfolios that capture and explicate their experiences. The main emphasis of the third course is on evaluation.

Core Courses: The core course sequence consists of three graduate-level, one-quarter courses that go hand in hand with the studio courses. These three courses introduce many of the topics used hands-on in the studio, but also cover more of the theory and related work of the field.

DIS: Designing Interactive Systems covers issues relating to the design of interactive systems, favoring design thinking in lieu of implementation concerns. Skills covered include design processes, design rationale, abductive reasoning, structured brainstorming, design techniques, and design critique. Low fidelity prototyping techniques may also be covered.

UIST: User Interface Software and Technology covers issues relating to the implementation of user interface software and hardware. This includes a thorough understanding of user interface software tools, such as windowing systems, toolkits, and user interface development environments, as well as novel hardware for input, output, and environmental sensing.

U/UR: Usability/User Research covers issues relating to both the discovery of user needs and the evaluation of systems in view of those needs. Usability topics cover both empirical evaluation and expert inspection methods. User research topics cover needs-finding, design ethnography, contextual inquiry, interviews, surveys, and other social scientific research methods.

Additional Advanced Coursework: The MHCI+d advanced coursework offerings give students flexibility in choosing advanced courses to reinforce their integrative and studio experience. Many of these courses are currently offered in the home departments of our dub Graduate School Interdisciplinary Committee members, but have never been team-taught by cross-department faculty or linked as the foundation for the comprehensive study of computing to support human activities. Access to these courses by MHCI+d students and reimbursement to the home departments for the extra load has been negotiated and the details are included in the attached memorandum of understanding letters from each of the home

departments involved in this proposal. Other courses will be created as needed by the program at the 500+ level. Examples of some existing courses include: Fundamentals of Interface Design (ART 483), Introductory HCI (CSE 440), Advanced HCI (CSE 441), Advanced Topics in HCI (CSE 510), Design Methods for Interaction & Systems (IMT 540), Usability Testing (HCDE 517), Collaborative & Social Software (INSC 547), Assistive Technology & Inclusive Design (INSC 546), Value Sensitive Design (INSC 554), Human Interaction with Intelligent Systems (CSE 599), and User-Centered Design Processes (HCDE 518).

Summer Project Studio: This final 9-week intensive summer course will give the graduates a deeper, focused time to continue on the iterative design, prototyping, and evaluation process. They will focus on a project that they have developed over the course of the year, and they will create a portfolio to record their process and product. Projects will be focused in the important domains of health, the environment, education, and assistive technology. Possible projects include a home monitoring system that allows a family to make sure an elder living alone is safe as well as taking care of their own health (e.g., taking prescribed medications, eating, and getting social contact). Another project might be to create a mobile phone application that allows a student to learn a second language by teaching them vocabulary that is contextually related to their location throughout the day (e.g., automatically learning words about travel when waiting at the airport and words about food when in a restaurant). A project might include building a handheld navigation system for blind individuals so that they can more easily navigate an unknown city on their own.

Faculty Profile

The key teaching faculty for this program will come from the eight member Masters Planning committee, which includes two faculty from each of the four core participating departments for this program (CVs included in the appendix). Additional faculty will come from the broader Design:Use:Build Graduate School Interdisciplinary Committee. Finally, we will hire a new Associate Program Director, who will have a non-tenure track appointment in HCDE or the i-School. As a senior lecturer, this individual will be eligible for Graduate Faculty status. This faculty member will be responsible for oversight of the program as well as co-teaching 3 of the 11 program courses. We will also hire a second senior lecturer (also housed in HCDE/iSchool) who will be responsible for co-teaching 5 courses in this program or a combination of courses in this proposed program and in the participating units in return for a faculty member from the participating units teaching in the new MHCI+d program. This lecturer will also be eligible for Graduate Faculty status. Note that the lecturers will almost exclusively be employed in co-teaching situations with a regular, tenure-line faculty member.

Students

This program is primarily intended to attract students from the following disciplines and professions: Computer Science, Industrial and Visual Design, Information Management, Usability, User Research, and those interested in user interface design, development, and evaluation. This would include students who took the HCI concentration at UW in the undergraduate Informatics and HCDE majors as well as undergraduate degree holders in Interaction Design and Computer Science. Students will indicate a background and interest in four different areas: technologists, designers, usability/user researchers, and generalists.

Admissions

Students admitted to the program will go through an application and admissions process. The admissions committee will be comprised of at least four faculty members, one from each of the four participating core departments. The admissions committee reviews prior academic transcripts, GRE scores, recommendation letters, statements of interest, professional experience, resumes, and portfolios (for design students). Applications for the program will be evaluated in the same time frame as other graduate applications in the core departments and decisions will be made based on overall applicant quality as well as balancing the class between the four areas mentioned previously. In some cases, potential students will be interviewed in person or over the telephone and a record of those findings will be transferred to the

admissions committee. So it is expected, but not required that students will have a prior undergraduate degree in areas such as computer science/engineering, electrical engineering, information science, visual or industrial design, or communications. Many students might have already had work experience in areas such as software development, web design, usability, or technical communications.

Diversity plan

Recruitment, mentoring, and retention of students, especially those from under-represented groups, present significant challenges for new interdisciplinary programs, even beyond the challenges encountered by established programs and disciplines. Finding candidate students with disabilities as well as those in other under-represented groups, making them aware of the new program, exciting them about the opportunity, motivating them to apply to the program, and then mentoring and retaining them, requires focused coordination of numerous resources. We will therefore take a multi-pronged approach to recruitment, mentoring, and retention, drawing on institutional resources as well as resources in the participating units, outside partners, and the broad personal networks and resources of the participating faculty, developed over years of work with organizations that support the inclusion of under-represented groups in graduate education.

In addition to our efforts to attract students from under-represented minorities, we also focus both our recruiting and our project selection on two other under-represented groups: people with disabilities and women. This special focus is based, first, in an awareness of the limited opportunities available to people with disabilities due to a lack of access to technology and employment. Second, design for people with disabilities has a history of improving access to technology for all (e.g., screen readers led to email via phone). Third, everyday activities often involve families; women and children have a different perspective that has often been ignored in the design of technology. Maintaining a connection to these communities is a key to our strategy to attract and retain underrepresented students.

We will take advantage of the NSF LSAMP award to UW. This $2.6 million grant created a Pacific Northwest regional alliance (Idaho, Oregon and Washington) to double the number of degrees awarded to minorities in technical fields, which will further expand the pipeline of candidates for graduate education. We will seek LSAMP students as potential applicants to this new program. We also will publicize the program to the whole range of student chapters of affinity organizations: Society for Women Engineers, National Society of Black Engineers, American Indian Science and Engineering Society, and Society for Hispanic Professional Engineering. To further build a pipeline of undergraduate under-represented student interest within the university, we will also publicize the program to the undergraduate advising programs in the participating colleges, for instance the College of Engineering Student Academic Services.

In addition, we have partnered with organizations that have a goal of broadening participation in science and engineering careers by students with disabilities and women. We will work with the UW Disability Services Office and the award-winning UW DO-IT program to ensure that students with disabilities are aware of the special focus of our program and learn about opportunities to take part. The DO-IT program promotes the use of computing to increase independence and participation in education and employment by people with disabilities. Since one of the focuses of our program is on health and that several of the participating faculty already have many collaborations with DO-IT on assistive technology research, we expect this tie to be especially strong for our program's recruitment efforts from this population. We will also work with The Alliance for Access to Computing Careers, which is funded by NSF and is centered at the UW. The goal of this organization is to significantly increase the number and success of students with disabilities who seek computing careers at all levels.

Recruiting undergraduates to get involved with the summer studio projects will be coordinated with the College of Engineering Summer Undergraduate Research Program. The COE summer undergraduate research program recruits students from minority serving institutions. Our project will connect MHCI+d students to the undergraduate student researchers in mentoring activities and presentations aimed at interesting them in working as interns on the project teams. For example, in our Summer Studio and Fall Kickoff, the projects will provide several different channels for participation. A design project in a given year might focus for instance on mobility-impaired people, and a mobility-impaired student might

volunteer to be a member of our target-audience consultancy group. Now aware of the program, the student might take part in an REU experience in the following year, and ultimately might decide to pursue graduate education in the field. This student then might be a future MHCI+d student in the program.

We also have deep personal resources in this area. Of the over 20 faculty in the dub Graduate Group, 7 are women. Thus we can model STEM gender diversity for our MHCI+d students. Among the participating faculty are James Landay and Jacob Wobbrock, who have done extensive work on accessibility technology; and Judy Ramey, who as department chair created the HCDE Diversity Board.

In addition, the program will work with the following diversity programs at UW for both recruitment and retention of under-represented students:

Graduate Opportunities and Minority Achievement Program (GO-MAP): GO-MAP's three main areas of focus are 1) Outreach, recruitment, and retention, 2) Enhancing scholarship and research, and 3) Building community, on and off campus.

Minority Scholars Engineering Program (MSEP): Open to all students, MSEP promotes academic excellence, facilitates leadership skills, and fosters community of engineering scholars. Programs include academic support, ALVA, Intel REU, and HP Scholars.

Promoting Equity in Engineering Relationships (PEERs): PEERs works with students, faculty, and staff to increase diversity in science, technology, engineering, and mathematics. A PEERs course teaches students to teach their peers to be change-agents for increased diversity. Students can earn internship credit by becoming a PEERs leader and helping with presentations. We will make sure to arrange a PEERs presentation to our students at the start of the year.

Women in Science & Engineering (WiSCE): WiSE provides social connection, mentoring, advising, and tutoring for women in science and engineering. Programs include academic support, Bridge, the WiSE Conference, and the Pre-Major and Pre-Professional programs.

Administration

The MHCI+d program will have an Executive Committee (EC) with operational authority. The Desing:Use:Build Graduate School Interdisciplinary Committee will have oversight authority over the program. Finally, we will appoint an external Advisory Board made up of industrial partners as well as key faculty members at other universities who will offer annual external review and advice to the program. The EC will be chaired by the Interdisciplinary Program Director, as appointed by the Graduate School Dean (to start the program off on a strong footing we recommend Professor James Landay and Professor Judy Ramey as initial Co-Directors – in the future this role could be filled by one individual). The Program Director will serve for a four-year term. The Dean, informed by the recommendations of the EC, will appoint the next Program Director. The Associate Director, described above, will report directly to the Program Director. The Program Director will be responsible for overseeing the MHCI+d training program and related activities while the Associate Director will be responsible for day-to-day management of the program. The EC will be composed of four other faculty members from the dub Graduate School Interdisciplinary Committee, one each from the four core departments. Membership may rotate on and off the EC after two-year terms so that more faculty members can participate in the decision-making process.

The EC will be responsible for monitoring the progress of MHCI+d students (and will also make up the admissions committee). They will also provide input into the content of courses, review program evaluations, and propose and implement program changes. The EC members will also be responsible for serving as liaisons between their departments and the MHCI+d program. This will be important for dealing with course buyouts for teaching in the MHCI+d or payment for seats in home department elective courses.

An external Advisory Board chaired by Dr. Mary Czerwinski of Microsoft Research will provide guidance for our education and human resource development programs. The Advisory Board will include representatives from potential employers and industry partners. The Executive Committee will report annually to the Advisory Board and present program data, assessment results, and student outcomes. A written annual assessment will be compiled by the Advisory Board, to be forwarded to the Executive

Committee, the Chairs and Deans from all participating departments and schools, and the Vice-Provost for Research.

We have also included both a program manager (administrator) and advisor to help manage the MHCI+d program application process, organize the Fall Kickoff week and Summer Studio, and help coordinate graduate student outreach, graduate student recruitment, and job placement activities. This program manager will also provide logistical and clerical support for program activities and funding.

Resources/Infrastructure

The UW College of Engineering and the Computer Science and Engineering departments will both provide space for this program (see attached letters). In particular, they will provide space for an office for the Program Director, lecturer, and administrator; shared space for the adviser, technical staff, and marketing person; a student lounge, and a team work room/studio space. Any other necessary equipment or space will be purchase or rented by the program.

Accreditation

There is currently no accreditation organization for programs in Human-Computer Interaction or Design, so we plan no accreditation process at this time.

Assessment

Our proposed MHCI+d program includes both student and program assessment.

Student assessment

The plan for ongoing assessment of the program is primarily goal-based and is centered on measuring student learning outcomes. Based on what we expect our students to know and be able to do by the time they graduate, we have developed a common set of learning goals/evaluation rubrics (for all MHCI+d instructors) to be used to measure student learning. Upon completion of the program, students will be able to:

Leverage **technical** skills to:

- Create low-fidelity prototypes in a variety of media, including paper, cardboard, foam core, clay, images, and video;
- Build high-fidelity functioning user interface prototypes on a variety of computing platforms, including desktop, mobile, and Web-based platforms;
- Understand existing interface technologies at a deep level and be able to work with such technologies;
- Work with quantitative data using statistical and other techniques to make sense of this data for purposes of design;

Leverage **design** skills to:

- Discover design opportunities based on data acquired from users;
- Envision numerous design alternatives using divergent thinking and structured brainstorming;
- Communicate designs in a variety of visual forms, including sketches, images, and video;
- Critique existing designs or designs of others in a constructive, informative way;

Leverage **leadership** skills to:

- Lead a design or development group in the creation of a new product or service;
- Enable teamwork to successfully occur in themselves and in others;
- Bring empathy for users into the design process for themselves and their team;
- Coordinate through project management skills the execution of a significant design project.

The Masters of Human-Computer Interaction & Design (MHCI+d) program is a course-and-project based professional degree with a heavy design-studio component. As such, we will assess student learning and achievement in a variety of ways, including:

1. **Course-Embedded Assessment in Core and Elective Classes**. Students will be assessed in traditional core and elective courses based largely on assignments, group projects, and examinations. Courses in Human-Computer Interaction and Design tend to involve real-world design and engineering teamwork, and thus are often project-based involving small groups of students, with possibly multiple small projects per quarter. Student teams will be expected to demonstrate group-work skills in addition to technical and domain knowledge of Human-Computer Interaction and Design. Such group-work skills include leadership, teamwork, empathy, coordination, and project management. In most cases, project presentations will provide for summative evaluations at the end of project-based core and elective courses. Students will also be expected to assess their teammates at the end of year.

2. **Year Long Continuous Course Assessment in the Analytical Design Studio Sequence.** The Analytical Design Studio is a contiguous three-quarter (9 month) series in the MHCI+d program. The Studio will transition through three foci (one per quarter) from designing interactive systems (DIS), to user interface software & technology (UIST), to usability and user research (U/UR) (See Figure 1).
   Each student will have a personal interview with course instructors at the end of each quarter to discuss their past performance and their goals for year-long growth and improvement. Instructors from previous Studio quarters will meet with incoming instructors prior to each quarter to discuss the course and general/specific student outcomes. This "handoff" will facilitate a smooth transition and strong student development during the three quarters of the Analytical Design Studio.

3. **Performance in Student Capstone Presentations.** The major feature of student work in the MHCI+d is the Capstone project with a corporate or non-profit client. This project starts during the year and finishes at the end of the Summer Studio. As a culminating event for the Capstone projects, students will present their work at the end of the summer before degree conferral. Presentations will be publicly announced and involve members from client organizations, teaching and research faculty affiliated with the MHCI+d, and fellow MHCI+d students. In addition, students from related programs at the University of Washington will be invited to attend. *In addition to faculty and peer assessments of each student's individual and group performances*, a joint academic/industry panel of experts in Human-Computer Interaction and Design will also formally judge these public Capstone presentations.

4. **Feedback from Capstone Clients.** Regular informal and formal feedback will be solicited from Capstone project clients with whom our student teams work. Informally, clients will have regular ongoing conversations with faculty in the MHCI+d, particularly the program director. Formally, feedback will come from surveys issued to our students' client organizations. Also, clients will be invited to attend the final Capstone presentations and to issue a final evaluation of students' work.

5. **Design and Innovation Awards.** Students whose work in class projects, in the Analytical Design Studio, or in the Capstone project is exemplary will be encouraged to submit it to various design

competitions or for design awards. Although such instances may be more of the exception than the norm, we anticipate enrolling only the most talented students in Human-Computer Interaction and Design who will be clear contenders for such awards. Examples of award competitions include the Microsoft Imagine Cup, the AbilityOne Network Design Challenge, the Microsoft Research's Faculty Summit Design Expo, and the ACM CHI Conference Student Design Competition.

6. **Hiring and Placement.** We will track the job placement outcomes achieved by our MHCI+d graduates in an effort to understand what employers and industries are hiring our students and to remain responsive to the job climate in Human-Computer Interaction and Design. The four main contributing units to the MHCI+d each have extensive local networks for job opportunities that can be leveraged by the MHCI+d program.

7. **Entry and Exit Interviews.** Entry surveys of students help to assess student expectations and goals. Exit surveys will ask specific questions related to: program structure, pedagogies, and content; satisfaction with the program; degree to which the program met student expectations and goals; and perceptions of the degree to which program classes, studios and the capstone research project improved the abilities of students to achieve their future plans, including future graduate studies and/or professional employment prospects.

8. **One-Year Post-Graduation Follow-up Surveys.** In addition to tracking immediate hiring and job placement outcomes for our MHCI+d graduates, we will conduct a survey one year after graduation. This survey will enable us to gather data on graduates' longer-term reflections and employment situation after completing the MHCI+d.

9. **Student Course Evaluations.** UW Course Evaluations assess student satisfaction with content and pedagogical approach in the MCHI+d program. Additionally, the University of Washington Center for Engineering Learning and Teaching (CELT), which has faculty members associated with the Department of Human Centered Design and Engineering (HCDE), and the University of Washington Office of Educational Assessment (OEA), with faculty members associated in the College of Arts & Sciences / School of Art / Division of Design, both offer in-class assessments that rely heavily on student feedback concerning their own performance and the performance of the instructor. As two of the four founding "dub departments" for the MHCI+d are from the College of Engineering, CELT will be willing to provide its services to this program. Similarly, the OEA is also willing to provide assistance.

10. **Student Portfolio Evaluations.** Since portfolio creation and critique is an important part of our program, we will also assess students by conducting a formalized review of student portfolios to assess preparation and career readiness.

Other measurements of student assessment include student retention, student success in transitioning to advanced studio/design projects, and the ability to attract high proficiency students (in terms of academic, technical and design skills. Less formally, feedback from program faculty, administrator and academic advisors will also be valuable. Data from all of the above measures will be used to assess and revise, as needed, content and curriculum of program. For example, topics covered in the program could be modified in response to student expectations and program satisfaction data.

Program assessment

Reviews of all academic units (including this proposed MHCI+d program) are required at least every ten years and are conducted jointly by the Dean of the Graduate School and the Dean of Undergraduate

Academic Affairs in cooperation with the relevant School or College Dean (in this case, the Dean of the Graduate School). In addition, this and all new graduate degree programs undergo academic program review after five years. Among the outcomes of the above reviews should be a clearer understanding of the academic unit's:

1. Quality of instruction, research, and public service.
2. Value to students' general education and preparation for society.
3. Role within the University and effectiveness in fulfilling that role.
4. Resource requirements.
5. Future objectives and changes necessary to achieve them.

In addition to this on-campus evaluation, the MHCI+d program industry advisory committee, compromised of professionals in the fields that employ program graduates, will meet quarterly and review how well industry contacts believe that program outcomes are being met. As recommended by an external program reviewer, an annual Employer Survey will also be included as a key assessment method.

In conjunction with faculty, administrators and student assessment, advisory committee feedback will be used to make program changes in the continuous improvement process. Assessment information will also be used to guide ongoing recruitment and marketing efforts.

Program Financials and Size

These budget projections are based on a 1-year program of 12 courses (average 4 credits/course; 46 credits to degree) over 4 quarters, approximately 30 students per annual cohort. All indications point to a high demand for the program, one that will be self-supporting through tuition revenue. Our projected tuition to degree is $40,020 ($870/cr). This is highly competitive with similar HCI and Design programs at peer institutions (e.g., RPI, CMU, and RIT), which charge $39,750 to $52,500. Our total annual tuition income would be about $1,200,000. Additional income may be generated through a special industry relations program (similar to CMU's) that involves students working on capstone projects based in part on industrial suggestions and sponsorship. Any such additional income will be targeted to funding additional student benefits and to raise the national and global visibility of the program.

Major program expenses include a full-time design faculty member who serves as program director, teaching faculty (provided through reimbursement, at $21,000/course, to academic units or combining reimbursed costs to cover new hires), academic and IT support staff, teaching assistants, travel for students to the ACM CHI Conference on Human Factors in Computing Systems (CHI), and UW/UWEO overhead costs. The budget is balanced and flexible in that it can be adjusted to meet the differing needs of the participating academic units. Revenue would also be used to improve the program and support the ongoing dub interdisciplinary graduate group initiatives. Any surplus revenue would be held in "escrow" for the program to offset any unanticipated expenses or provide program amenities.

Appendix A: Program Faculty

Appendix B: External Reviews and Program Response

Appendix C: Master's Degree in HCI+Design Feasibility Study – (*Not attached; available upon request*)

Appendix D: HEC Board Forms

Appendix A: Program Faculty

James A. Landay
Biographical Sketch

A. Professional Preparation

University of California, Berkeley, CA (8/1985-5/1990)

B.S. in Electrical Engineering/Computer Science with High Honors (1990)

Carnegie Mellon University, Pittsburgh (8/1990-12/1996)
Ph.D. (1996) and M.S. (1993) in Computer Science
Dissertation: *Interactive Sketching for the Early Stages of User Interface Design*

B. Appointments

Professor (9/2010-present)
Associate Professor (8/2003-present)
Computer Science and Engineering Department, University of Washington, Seattle

Associate Professor (7/2002-7/2003)
Assistant Professor (1/1997-6/2002)
Department of Electrical Engineering and Computer Sciences, University of California, Berkeley

C. Selected Publications

1. T. Scott Saponas, Desney Tan, Dan Morris, Jim Turner, and **James A. Landay**. **Making Muscle-Computer Interfaces More Practical**. In *Proceedings of CHI 2010: ACM Conference on Human Factors in Computing Systems*, Atlanta, GA, April 2010.
2. Jon E. Froehlich, Leah Findlater, and **James A. Landay**. **The Design of Eco-Feedback Technology**. In *Proceedings of CHI 2010: ACM Conference on Human Factors in Computing Systems*, Atlanta, GA, April 2010. **Best paper winner**.
3. Pedja Klasnja, Sunny Consolvo, David W. McDonald, **James A. Landay**, and Wanda Pratt**. Using Mobile & Personal Sensing Technologies to Support Health Behavior Change in Everyday Life: Lessons Learned**. In *Annual Conference of the American Medical Informatics Association*, 2009.
4. Jon Froehlich, Sunny Consolvo, Tawanna Dillahunt, Beverly Harrison, Pedja Klasnja, Jennifer Mankoff, and **James A. Landay**. **UbiGreen: Investigating a Mobile Tool for Tracking and Supporting Green Transportation Habits.** In *Proceedings of CHI 2009: ACM Conference on Human Factors in Computing Systems*, Boston, MA, April 2009.
5. Tanzeem Choudhury, Gaetano Borriello, Sunny Consolvo, Dirk Haehnel, Beverly Harrison, Bruce Hemingway, Jeffrey Hightower, Pedja Klasnja, Karl Koscher, Anthony LaMarca, **James A. Landay**, et al. **The Mobile Sensing Platform: An Embedded System for Capturing and Recognizing Activities**. In *IEEE Pervasive Computing*, 7(2), April 2008, pp. 32-41.
6. Yang Li and **James A. Landay**. **Activity-Based Prototyping of Ubicomp Applications for Long-Lived, Everyday Human Activities**. In *Proceedings of CHI 2008: ACM Conference on Human Factors in Computing Systems*. Florence, Italy, April 2008, pp. 1303-1312.
7. Consolvo, S., McDonald, D.W., Toscos, T., Chen, M.Y., Froehlich, J., Harrison, B., Klasnja, P., LaMarca, A., LeGrand, L., Libby, R., Smith, I., and **Landay, J.A.**, **Activity Sensing in the Wild: A Field Trial of UbiFit Garden,** In *Proceedings of CHI 2008: ACM Conference on Human Factors in Computing Systems*. Florence, Italy, April 2008, pp. 1797-1806.
8. Sunny, Consolvo, Beverly Harrison, Ian Smith, Mike Y. Chen, Katherine Everitt, Jon Froehlich, **James A. Landay**, **Conducting In Situ Evaluations for and with Ubiquitous Computing Technologies**. In *International Journal of Human-Computer Interaction*, 2007, 22(1), pp. 107-22.
9. Jon Froehlich, Mike Y. Chen, Sunny Consolvo, Beverly Harrison, and **James A. Landay**, **My Experience: A System for In Situ Tracing and Capturing of User Feedback on Mobile Phones**, In *Proceedings of the 5th International Conference on Mobile Systems, Applications, and Services (MobiSys 2007)*. San Juan, Puerto Rico, June 2007, pp. 57-70.
10. Yang Li, Jason I. Hong, and **James A. Landay**, **Topiary: A Tool for Prototyping Location-Enhanced Applications**. In UIST 2004, ACM Symposium on User Interface Software and Technology, *CHI Letters*, 6(2): pp. 217-226.

D. Synergistic Activities (5)

1. **Design Tools:** My students and I have created and released several interface design tools, Silk for GUIs, Denim for web sites (see dub.washington.edu/denim), The Designers' Outpost for information architectures (see dub.washington.edu/outpost), Suede for speech user interfaces (see dub.washington.edu/suede), Damask for cross-platform design (see dub.washington.edu/damask), Topiary for location-enhanced interfaces (see dub.washington.edu/topiary), and ActivityDesigner for activity-based applications (see dub.washington.edu/activitydesigner). These tools have had impact in both the research and design communities (e.g., Denim has been downloaded over 110,000 times). I also co-developed the Intel Mobile Sensing Platform (MSP), which is one of the leading activity inference platforms available today (see seattle.intel-research.net/MSP).
2. **Evaluation Tools:** My graduate students and I created and released MyExperience (see myexperience.sourceforge.net), a system for *in situ* tracing and capturing of user feedback on mobile phones. It allows context-aware capture of objective and subjective data as it is experienced. My students and I also created and released WebQuilt (see dub.washington.edu/webquilt), a proxy-based remote web usability tool that offered professional usability engineers a way to test web sites that were not under their control without requiring special software downloads of the test participants. The system also provided a novel visualization interface that allowed the analysis of the resulting data.
3. **Educational Computing:** I have carried out several projects in educational computing. NotePals (see dub.washington.edu/notepals) explored the use of informal interfaces for collaborative note taking and K-Sketch (see dub.washingon.edu/k-sketch) lets student sketch and animate complex ideas.
4. **Assistive Technology & Outreach:** I have worked in the area of computer-support for the disabled. The IC2D system addresses the problem of computer-aided drawing for the visually impaired without using special purpose devices (see dub.washington.edu/ic2d). As part of the Vocal Joystick project, we have built a non-language speech UI that can give disabled users continuous control of a computer interface (e.g., to move the mouse) (see ssli.ee.washington.edu/vj). I was the graduate supervisor for two blind students. I have also taken on undergraduate student researchers in the Berkeley SUPERB and Re-Entry programs, helping to build the women and minority pipeline to graduate school in CS.
5. **Commercial Activity:** I am a co-author of the best-selling user interface design patterns book, *The Design of Sites* (see http://designofsites.com). I was the co-founder and Chief Scientist of NetRaker, the first firm to offer online, remote usability testing tools (now a subsidiary of Keynote Systems.)

E. Collaborators & Other Affiliations (last 48 months)

Prof. Gregory Abowd (GA Tech), Prof. Jeff Bilmes (U. of Washington), Prof. Gaetano Borriello (U. of Washington), Prof. John Canny (UC Berkeley), Dr. Sunny Consolvo (Intel), Prof. Anind Dey (CMU), Dr. Steven Drucker (Microsoft), Dr. Darren Edge (Microsoft), Prof. James Fogarty (U. of Washington), Dr. Beverly Harrison (Intel), Dr. Anthony LaMarca (Intel), Prof. David MacDonald (U. of Washington), Prof. Jennifer Mankoff (CMU), Prof. Shwetak Patel (U. of Washington), Prof. Judy Ramey (U. of Washington), Dr. Bill Schilit (Google), Prof. H. Scott Stevens (CMU), Dr. Desney Tan (Microsoft), Dr. Roy Want (Intel), Prof. Jacob Wobbrock (U. of Washington), Dr. Chen Zhao (Microsoft)

Graduate Advisors

Prof. Brad Myers and Prof. James Morris, Carnegie Mellon University

M.S. & Ph.D. Thesis Advisees & Postdoctoral Advisees (over last 5 years)

Richard Davis (Ph.D., faculty at Singapore Mngt. U.), Katherine Everitt (Ph.D., Microsoft), Jon Froehlich (7^{th} year Ph.D., U. Washington), Susumu Harada (Ph.D., IBM Research), Jeff Heer (M.S., faculty at Stanford), Jason Hong (Ph.D., faculty at CMU), Jonathan Huang (M.S., DemandTec), Xiaodong Jiang (M.S., start-up), Hesham Kamel (Ph.D., faculty at UAE U.), Scott Klemmer (Ph.D., faculty at Stanford), Francis Li (M.S., Tiny Pictures), Yang Li (postdoc, Google), Jimmy Lin (Ph.D., Google), Chris Long (Ph.D., Global InfoTek), Mark Newman (Ph.D., faculty at U. Michigan), Kayur Patel (6^{th} year Ph.D., U. Washington), T. Scott Saponas (Ph.D., Microsoft Research), Anoop Sinha (Ph.D., Danoo Inc.), Wai-ling Ho-Ching So (M.S., McKesson), Michael Toomim (6^{th} year Ph.D., U. Washington), Miriam Walker (M.S., Shift), Sarah Waterson (M.S., LiveOps)

Total graduate students advised: 22 Total postdoctoral scholars sponsored: 1

Judith Ramey

Biographical Sketch

Professional Preparation

The University of Texas at Austin, B.A., M.A., Ph.D., 1969, 1971, 1983

Appointments

Professor, Department of Human Centered Design & Engineering (formerly Technical Communication), University of Washington, 1998-present
Adjunct Professor, Information School, University of Washington, 2007-present
Adjunct Professor, Industrial and Systems Engineering, University of Washington, 1999-present
Chair, Department of Technical Communication, University of Washington, 1997-2008
Director, UW Laboratory for Usability Testing and Evaluation (LUTE), 1989-present
Associate Professor, Dept. of Technical Communication, University of Washington, 1988-98
Assistant Professor, Dept. of Technical Communication, University of Washington, 1983-88

Five Related Publications

Taylor, C., Samuels, N., and Ramey, J. (2009). "Always On: A Framework for Understanding personal Mobile Web Motivations, Behaviors, and Contexts of Use," *International Journal of Mobile Human Computer Interaction*, 1(4), October-December 2009, pp. 21-37.

Turner, A., Ramey, J. and Lee, S (2008). "Connecting Public Health IT Systems with Enacted Work: Report of an Ethnographic Study," *Proceedings of the Conference of the American Medical Informatics Association (AMIA*), Washington DC, November 2008. Nominated for conference Distinguished Paper Award.

Turns and Ramey (2006). "Active and Collaborative Learning in the Practice of Research: Credit-Based Directed Research Groups," J. Turns and J. Ramey, *Technical Communication* (archival journal of the Society for Technical Communication), August 2006. pp. 296-307.

Guan et al. (2006). Guan, Zhiwei, Shirley Lee, Elisabeth Cuddihy, and Judy Ramey, "The Validity of the Stimulated Retrospective Think-Aloud Method as Measured by Eye-tracking," technical paper in *Proceedings of CHI 2006*, Montreal, Canada, April 2006.

Kremer, Cecilia; Ramey, Judith; and de Souza, Clarisse Sieckenius. (2003) Approaching Online Self-Representation in a Community of Practice. In Harris, Don, Duffy, Vincent, Smith, Michael, and Stephanidis, Constantine (eds.), Human-Centred Computing: Cognitive, Social and Ergonomic Aspects (Volume 3 of the *Proceedings of HCI 2003*, 22-27 June 2003, Crete, Greece). Lawrence Erlbaum and Associates. pp.769 - 773.

Five Other Significant Publications

Boren, Ted, and Judith Ramey, "Thinking Aloud: Reconciling Theory and Practice, "*IEEE Transactions on Professional Communication*, special issue on usability research methods, September 2000, Ramey and de Jong, guest editors. pp. 261-278.

Schulz, Erin, Judith Ramey, Maarten van Alphen, and William Rasnake, "Discovering User-Generated Metaphors through Usability Testing," *IEEE Transactions on Professional Communication*; Dec. 1997.

Jong, Menno de, and Judith Ramey, "Introduction: New Perspectives on Document Evaluation Methods," *IEEE Transactions on Professional Communication*, guest editors, special issue on usability research methods, September 2000. pp. 237-241.

Wixon, Dennis, and Judith Ramey, editors, *A Field Methods Casebook for Software Design*, Wiley 1996. A collection of 17 essays on field research by practitioners in the field. 342 pp.

Ramey, Judith, "Usability Evaluation and its Relationship to Traditional Approaches in Research and Design," *IEEE Transactions on Professional Communication* (Guest Editor), Dec 1989, pp. 207-209. Award 1990: Best Collection of Essays in 1989, NCTE.

Synergistic Activities

Professor of Human Centered Design & Engineering (formerly Technical Communication) in the UW College of Engineering (department chair, 1997-2008). As chair, fostered interdisciplinary research and educational relationships among my faculty and rest of the college and university; led creation of the TC PhD program and certificate in User-Centered Design. 2. Director of the UW Laboratory for Usability Testing and Evaluation (LUTE); develop usage of lab for research and education by numerous units across campus: CSE, I-School, School of Nursing, Public Health, etc. Lab awarded 2007 Diana Award, ACM SIGDOC. 3. Investigator with CDC-sponsored Center for Excellence in Public Health Informatics; work with faculty from Public Health, Nursing, BHI, etc. 4. Leader, TC Directed Research Groups in qualitative data analysis, eye-tracking technologies in usability research, and mobile technologies; attracted corporate sponsors of the groups by Microsoft Research, Intel Research, and Motricity. 5. Active participant in the DUB human-computer interaction (HCI) campus-wide interdisciplinary interest group; helped organize UW receptions at the three most recent CHI international conferences, participated with others in the group in proposal submission planning, etc.

Collaborators

UW: Brent K. Stewart, Mark Oberle, Sherrilynne Fuller, Anne Turner, Bill Lober, David Chou, Mark Haselkorn, David Farkas, Jan Spyridakis, Jennifer Turns, Tom Williams, Gerry Philipsen, James Landay, Richard Ladner, Eve Riskin, Alan Borning, Suzanne Weghorst. University of Twente, The Netherlands: Menno de Jong, Thea van der Geest, Michael Steehouder. Pontifical Catholic University of Rio de Janeiro: Clarisse Sieckenius da Souza.

Graduate and Postdoctoral Advisors

Ernest Kaulbach, University of Texas

Advisees

Doctoral students advised (committee member): Ron Merryman, Kurt Sahl, Joey King, Keiko Tanaka, Bruce Havelock, Cecilia Kremer da Cunha, Chris Halaska, Pramod Mohadev, Sharon Kromhout Schiro. Doctoral students currently supervised (TC launched its PhD program in 2002): Zhiwei Guan, Elisabeth Cuddihy (co-advised).

James A. Fogarty
Computer Science & Engineering
University of Washington

A. Professional Preparation

Virginia Tech, Blacksburg, VA (9/1996-5/2000)
B.S. in Computer Science, Summa Cum Laude, with Honors Thesis

Carnegie Mellon University, Pittsburgh, PA (9/2000-9/2006)
Human-Computer Interaction Institute, School of Computer Science
Ph.D. in Human-Computer Interaction
Constructing and Evaluating Sensor-Based Statistical Models of Human Interruptibility

B. Appointments

Assistant Professor (9/2006-present)
Department of Computer Science & Engineering
University of Washington, Seattle, WA

C. Related Publications

Best Paper Nominee Welbourne, E., Balazinska, M., Borriello, G., and Fogarty, J. (2010). Specification and Verification of Complex Location Events with Panoramic. *Proceedings of the International Conference on Pervasive Computing* (Pervasive 2010), To Appear. *(Acceptance Rate: 17%)*

Best Paper Winner Dixon, M. and Fogarty, J. (2010). Prefab: Implementing Advanced Behaviors Using Pixel-Based Reverse Engineering of Interface Structure. *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2010), To Appear. *(Acceptance Rate: 22%)*

Best Paper Nominee Froehlich, J., Larson, E., Campbell, T., Haggerty, C., Fogarty, J., and Patel, S.N. (2009). HydroSense: Infrastructure-Mediated Single-Point Sensing of Whole-Home Water Activity. *Proceedings of the International Conference on Ubiquitous Computing* (UbiComp 2009), pp. 235-244. *(Acceptance Rate: 12%)*

Best Paper Nominee Hoffmann, R., Amershi, S., Patel, K., Wu, F., Fogarty, J., and Weld, D.S. (2009). Amplifying Community Content Creation with Mixed-Initiative Information Extraction. *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2009), pp. 1849-1858. *(Acceptance Rate: 24%)*

Best Paper Winner Fogarty, J., Ko, A.J., Aung, H.H., Golden, E., Tang, K.P., and Hudson, S.E. (2005). Examining Task Engagement in Sensor-Based Statistical Models of Human Interruptibility. *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2005), pp. 331-340. *(Acceptance Rate: 25%)*

D. Other Significant Publications

Amershi, S., Fogarty, J., Kapoor, A., and Tan, D. Overview-Based Example Selection in End-User Interactive Concept Learning. (2009). *Proceedings of the ACM Symposium on User Interface Software and Technology* (UIST 2009), pp. 247-256. *(Acceptance Rate: 18%)*

Patel, K., Fogarty, J., Landay, J.A., and Harrison, B. (2008). Investigating Statistical Machine Learning as a Tool for Software Development. *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2008), pp. 667-676. *(Acceptance Rate: 22%)*

Fogarty, J. and Hudson, S.E. (2007). Toolkit Support for Developing and Deploying Sensor-Based Statistical Models of Human Situations. *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2007), pp. 135-144. *(Acceptance Rate: 24%)*

Adar, E., Dontcheva, M., Fogarty, J., and Weld, D.S. Zoetrope: Interacting with the Ephemeral Web. (2008). *Proceedings of the ACM Symposium on User Interface Software and Technology* (UIST 2008), pp. 239-248. *(Acceptance Rate: 19%)*

Best of UIST Invitee

Fogarty, J. and Hudson, S.E. (2003). GADGET: A Toolkit for Optimization-Based Approaches to Interface and Display Generation. *Proceedings of the ACM Symposium on User Interface Software and Technology* (UIST 2003), pp. 125-134. *(Acceptance Rate: 21%)*

E. Synergistic Activities

Student Mentoring and Minorities in Science & Engineering

Mentor for the University of Washington's Minority Scholars Engineering Program (MSEP), advising undergraduate research projects with the goal of improving retention and increasing the diversity of students participating in research.

Faculty panelist for UIST 2006 Doctoral Symposium, mentoring students from the UIST community.

Bridging HCI and Related Communities

Co-organized the IJCAI 2009 Workshop on Intelligence and Interaction, which brought together top researchers from the human-computer interaction and artificial intelligence communities.

Commitment to Dissemination through Technology Transfer

Worked with interdisciplinary student team around our research on infrastructure-mediating sensing of home water activity that won the *Grand Prize* in the *2009 University of Washington Environmental Innovation Challenge* as well as a *Finalist Prize* and the *Best Clean-Tech Idea Award* in the *2009 University of Washington Business Plan Competition*.

Our CueFlik research directly informed Microsoft's December 2008 *Show Similar Images* feature for Live Image Search (now Bing Image Search). Google deployed a similar feature in April 2009.

Technical Program Committee Member

UIST 2010, CHI 2010, CHI 2009, IUI 2009, UIST 2008, Graphics Interface 2008, CHI 2008, UbiComp 2007, Graphics Interface 2007, UIST 2006, and Graphics Interface 2006.

F. Recent Collaborators

Les Atlas (UW), Daniel Avrahami (Intel), Magda Balazinska (UW), Alan Borning (UW), Gaetano Borriello (UW), Anind Dey (CMU), George Demiris (UW), Mira Dontcheva (Adobe), Steven Drucker (Microsoft), Oren Etzioni (UW), Jodi Forlizzi (CMU), Beverly Harrison (Intel), Eric Horvitz (Microsoft), Jason Hong (CMU), Scott Hudson (CMU), Ashish Kapoor (Microsoft), Tadayoshi Kohno (UW), Robert Kraut (CMU), James Landay (UW), Ed Lazowska (UW), Jen Mankoff (CMU), Shwetak Patel (UW), Matthai Philipose (Intel), Desney Tan (Microsoft), Joe Tullio (Motorola), Dan Weld (UW), Jacob Wobbrock (UW)

G. Graduate Advisor

Scott E. Hudson, Carnegie Mellon University

H. Graduate Students Advised in Past 5 Years

Saleema Amershi, Advisor for Ph.D. in Computer Science, University of Washington, 2007-present.
Adrienne Andrew, Co-Advisor for Ph.D. in Computer Science, University of Washington, 2007-present.
Lydia Chilton, Advisor for Ph.D. in Computer Science, University of Washington, 2009-present.
Morgan Dixon, Advisor for Ph.D. in Computer Science, University of Washington, 2008-present.
Hao Lü, Advisor for Ph.D. in Computer Science, University of Washington, 2007-present.
Kayur Patel, Co-Advisor for Ph.D. in Computer Science, University of Washington, 2007-present.
Ryder Ziola, Advisor for Ph.D. in Computer Science, University of Washington, 2009-present.

Biographical Sketch
Julie A. Kientz

A. Professional Preparation

Georgia Institute of Technology, Atlanta, GA (8/2003-8/2008)
Ph.D. (2008) in Computer Science
Dissertation: *Decision Support for Caregivers through Embedded Capture & Access*

University of Toledo, Toledo, OH (8/1998-12/2002)
B.S. in Computer Science & Engineering with High Honors (2002)

B. Appointments

Assistant Professor (9/2008-present)
Human Centered Design & Engineering, University of Washington, Seattle, WA
The Information School, University of Washington, Seattle, WA

Adjunct Assistant Professor (9/2008-present)
Computer Science & Engineering, University of Washington, Seattle, WA

C. Publications

(i) Most relevant

1. Kientz, J.A., R.I. Arriaga, G.D. Abowd. Baby Steps: Evaluation of a System to Support Record-Keeping for Parents of Young Children. In the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '09). Boston, MA, USA. 2009. pp. 1713-1722.
2. Kientz, J.A. and G.D. Abowd. KidCam: Toward an Effective Technology for the Capture of Children's Moments of Interest. In the Proceedings of Pervasive 2009. Nara, Japan. 2009.
3. Kientz, J.A., R.I. Arriaga, M. Chetty, G.R. Hayes, J. Richardson, S.N. Patel, and G.D. Abowd. Grow and Know: Understanding Record-Keeping Needs for Tracking the Development of Young Children. In the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '07). San Jose, California, USA. April 28 – May 3, 2007. pp. 1351-1360.
4. Kientz, J.A., G.R. Hayes, T.L. Westeyn, T. Starner, and G.D. Abowd. Pervasive Computing and Autism: Assisting Caregivers of Children with Special Needs. IEEE Pervasive Computing. Special Issue on Pervasive Healthcare. January 2007. pp. 28-35.
5. Kientz, J.A., S. Boring, G.D. Abowd, and G.R. Hayes. Abaris: Evaluating Automated Capture Applied to Structured Autism Interventions. In the Proceedings of Ubicomp 2005: The 7th International Conference on Ubiquitous Computing. Tokyo, Japan, September 11-14, 2005. pp. 323-339.

(ii) Five other significant publications

6. Kientz, J.A., G.R. Hayes, G.D. Abowd, and R.E. Grinter. From the War Room to the Living Room: Decision Support for Home-based Therapy Teams. In the Proceedings of 2006 20th Anniversary Conference on Computer Supported Cooperative Work (CSCW '06). Banff, Alberta, Canada. November 4-8, 2006. pp. 209-218.
7. Kientz, J.A., S.N. Patel, A.T. Tyebkhan, B. Gane, J. Wiley, and G.D. Abowd. Where's My Stuff? Design and Evaluation of a Mobile System for Locating Lost Items for the Visually Impaired. In the Proceedings of the 8th international ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '06). Portland, Oregon, USA. Oct. 23-25, 2006. pp. 103-110.

8. Patel, S.N., J.A. Kientz, G.R. Hayes, S. Bhat, and G.D. Abowd. Farther Than You May Think: An Empirical Investigation of the Proximity of Users to their Mobile Phones. In the Proceedings of Ubicomp 2006: The 8th International Conference on Ubiquitous Computing. Orange County, California, USA. September 17-21, 2006. pp. 123-140.
9. Hayes, G. R., J.A. Kientz, K.N. Truong, D.R. White, G.D. Abowd, and T. Pering. Designing Capture Applications to Support the Education of Children with Autism. In the Proceedings of Ubicomp 2004: The 6th International Conference on Ubiquitous Computing. Nottingham, United Kingdom, September 7-10, 2004. pp. 161-178.
10. Mankoff, J., A.K. Dey, G. Hsieh, J.A. Kientz, S. Lederer, and M. Ames. Heuristic Evaluation of Ambient Displays. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '03). Ft. Lauderdale, Florida, USA, April 5 – 10, 2003. pp. 169-176.

D. Synergistic Activities

1. **Technology & Autism** - Co-founder of Early Detection of Autism project at Georgia Tech: Originated idea to begin work on using technology to support the early detection of autism by helping parents to identify early warning signs (2005-Present). Designer & developer of the Abaris project: Abaris is a tool for supporting therapists of children with autism. The project has since been studied at 2 universities and is still an ongoing area of research (2003-Present).
2. **K-12 Outreach** – Motivational lectures on careers in science and technology for Bellevue City Schools and Expanding Your Horizons Conference (2009-Present).
3. **Minorities in Science & Engineering** – Faculty participant in the University of Washington's Women in Science & Engineering (WiSE) program (2008-Present) and BRIDGE program (2009-Present), encouraging women and minorities in engineering. Graduate mentor for Intel Scholars Program (2004-2006), which advises at-risk undergraduate minority students in research projects with goal of retention of students and increasing diversity of students participating in research.
4. **Computing for Individuals with Disabilities** – Faculty participant at 2008 NSF-sponsored Access Computing Workshop designed to increase representation of individuals with disabilities in computing.

E. Collaborators & Other Affiliations (last 48 months)

Gregory D. Abowd (Georgia Institute of Technology), Rosa I. Arriaga (Georgia Institute of Technology), Michael Eisenberg (University of Washington), Rebecca E. Grinter (Georgia Institute of Technology), Mark Harniss (University of Washington), Gillian R. Hayes (University of California, Irvine), James Landay (University of Washington), Elizabeth D. Mynatt (Georgia Institute of Technology), Shwetak N. Patel (University of Washington), Susan Sandall (University of Washington), Thad Starner (Georgia Institute of Technology), Khai N. Truong (University of Toronto), William Walker (University of Washington), Nathanial Watson (University of Washington)

Graduate Advisor

Ph.D. Advisor at Georgia Institute of Technology: Dr. Gregory D. Abowd

M.S. & Ph.D. Thesis Advisees (Total currently advised: 5)

Jared Bauer (Ph.D., University of Washington), Eun Kyoung Choe (Ph.D., University of Washington), Amanda Fonville (M.S., University of Washington), Priya Rao (M.S., University of Washington), Dawn Sakaguchi (M.S., University of Washington)

Biographical Sketch

Axel Roesler
Division of Design, School of Art
University of Washington, Box 353440
Seattle, WA 98195

A. Professional Preparation

Burg Giebichenstein, Hochschule für Kunst und Design (University of the Arts) Halle, Germany (10/1994-06/2000)
Diplom (equivalent to M.A.) in Industrial Design

The Ohio State University, OH (09/1998-06/2001)
Department of Design
M.F.A. in Industrial Design Research and Development (2001)

The Ohio State University, OH (07/2001-08/2005)
Institute for Ergonomics, Department of Industrial Systems Engineering
Ph.D. in Cognitive Systems Engineering with a specialization in Human-centered Design
Dissertation: *A New Model for Perspective: The role of Point of Observation in Virtual and Remote Perspective-taking*

B. Appointments

Assistant Professor for Interaction Design (8/2005-present)
Division of Design, School of Art, University of Washington, Seattle

Adjunct Assistant Professor, (9/2009-present)
Department of Human Centered Design and Engineering

C. Related Publications

Roesler, A. (2009). Lessons from Three Mile Island: The Design of Interactions in a High-Stakes Environment. *Visible Language* 43.2/3 Special Issue on Design Error and Communication Failure, 170-195.

Roesler, A. and Woods, D.D. (2007). Designing for Expertise. In: Schifferstein, R. and Hekkert, P.: Product Experience - A Multidisciplinary Approach; Elsevier, Oxford, UK.

Woods, D.D. and **Roesler, A.** (2007). Connecting Design and Cognition: Representation and Context. In: Schifferstein, R. and Hekkert, P.: Product Experience - A Multidisciplinary Approach; Elsevier, Oxford, UK.

Roesler, A. ,Woods, D. D. & Feil, M. (2005). Inventing the Future of Cognitive Work. Proceedings of the 6th International Conference of the European Academy of Design, University of the Arts, Bremen, Germany, March 29-31 2005.

Hoffman, R.R., **Roesler, A.** and Moon, B. (2004). What is Design in the Context of Human-Centered Computing? IEEE Intelligent Systems, July/August, 89-95.

D. Other Selected Publications

Olberg, C., Farkas, D., Karreman, J., Kieras, **A., Roesler**, A., Steehouder, A., Baker, R., Brunet, D., Dalal, N., Keener, W. (2008): The New Face of Procedural Content: A Real World Approach. CHI 2008: ACM Conference on Human Factors in Computing Systems, Florence, Italy, April 2008.

Woods, D.D. and **Roesler, A.** (2007). Connecting Design and Cognition: Representation and Context. In: Schifferstein, R. and Hekkert, P.: Product Experience - A Multidisciplinary Approach; Elsevier, Oxford, UK.

Woods, D. D., Tittle, J., Feil, M. and **Roesler, A.** (2004). Envisioning Human-Robot Coordination for Future Operations. IEEE SMC Part C, 34(2), 210-218.

Feltovich, P. J., Hoffman, R.R., Woods. D.D. and **Roesler, A.** (2004). Looking at Cognitive Engineers Doing Cognitive Engineering: Implications of the Reductive Tendency for the Design of Complex Sociotechnical Systems. IEEE Intelligent Systems, May/June, 90-94.

E. Synergistic Activities:

• My training combines visual design, technology development and human factors engineering, enabling me to infuse advanced design methods into large scale design and development efforts, both tailored to technology-intense development in high stake domains and consumer domains where technology is expected to have severe social impact. Areas of expertise:

• My areas of expertise include: human-centered design approaches for novice and expert domains, techniques for design ideation in interdisciplinary teams, storytelling techniques and scenario development for projected design impact and adaptation, coordination of multiple perspectives in collaborative design and development, view control architectures for shared views into remote and virtual spatial settings, and representational and interaction design for procedural and declarative content for self-help online systems.

• Projects that address these lines of inquiry are inherently interdisciplinary in nature and draw from collaborations between designers, software developers, usability engineers, cognitive systems and human factors specialists, ethnographers, psychologists, and technical communication experts. Key techniques applied include design field observation, cognitive task analysis, functional decomposition, facilitating participatory ideation sessions, diagramming, scenario techniques, simulations at different stages of prototyping, and usability evaluation.

• Community Activities: Reviewer for journals and proceedings: Advances in Human-Centered Interaction, IEEE Systems, Man & Cybernetics, CHI 2009 and 2010, Cumulus Design Conference 2007.

F. Recent Collaborators

Dr. Patrick Baudisch (Microsoft), Dr. Keith Butler (Microsoft),
Dr. Roger Chapman (Collaborative Work Systems), Prof. David Farkas (U. Washington),
Dr. Robert Hoffman (University of West Florida), Dr. Barbara Holder (Boeing)
Dr. Michael von Korff (Group Health), Prof. James Landay (U. Washington), Dr. Mark Nikolic (Boeing),
Prof. David D. Woods (The Ohio State University), Dr. Gregory Simon (Group Health)
Prof. Philip Thurtle (U. Washington), Dr. James S. Tittle (Resilient Cognitive Solutions)

G. Graduate Students Advised in Past 5 Years

Callie Neylan, University of Washington
Mark Parson, University of Washington
Luke Woods, University of Washington
Kelly Almon, University of Washington
Kristopher Martin, University of Washington

Jacob O. Wobbrock, Ph.D.
The Information School
University of Washington
Mary Gates Hall, Suite 370 Box 352840
Seattle, WA 98195-2840
Phone: (206) 616-2541; Fax: (206) 616-3152
wobbrock@u.washington.edu

A. Professional Preparation

Stanford University	Symbolic Systems	B.S. 1998
Stanford University	Computer Science	M.S. 2000
Carnegie Mellon University	Human-Computer Interaction	Ph.D. 2006

B. Academic Appointments

Assistant Professor	Information School	University of Washington	2006-present
Adjunct Asst. Professor	Computer Science & Engineering	University of Washington	2006-present

C. Publications

(i) Five publications related to this proposal

Wobbrock, J.O., Fogarty, J., Liu, S., Kimuro, S. and Harada, S. (2009). The Angle Mouse: Target-agnostic dynamic gain adjustment based on angular deviation. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '09)*. New York: ACM Press, 1401-1410. http://portal2.acm.org/citation.cfm?id=1518701.1518912

Wobbrock, J.O., Cutrell, E., Harada, S. and MacKenzie, I.S. (2008). An error model for pointing based on Fitts' law. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '08)*. New York: ACM Press, 1613-1622. ***Best Paper Award.***★ http://portal.acm.org/citation.cfm?id=1357054.1357306

Gajos, K.Z., Wobbrock, J.O. and Weld, D.S. (2008). Improving the performance of motor-impaired users with automatically-generated, ability-based interfaces. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '08)*. New York: ACM Press, 1257-1266. ***Best Paper Award.***★ http://portal.acm.org/citation.cfm?id=1357054.1357250

Gajos, K.Z., Wobbrock, J.O. and Weld, D.S. (2007). Automatically generating user interfaces adapted to users' motor and vision capabilities. *Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '07)*. New York: ACM Press, 231-240. http://portal.acm.org/citation.cfm?id=1294211.1294253

Wobbrock, J.O. and Myers, B.A. (2006). Trackball text entry for people with motor impairments. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '06)*. New York: ACM Press, 479-488. ***Best Paper Award.***★ http://portal.acm.org/citation.cfm?id=1124772.1124845

(ii) Five other publications

Wobbrock, J.O., Morris, M.R. and Wilson, A.D. (2009). User-defined gestures for surface computing. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '09)*. New York: ACM Press, 1083-1092. ***Best Paper Nominee.***★ http://portal2.acm.org/citation.cfm?id=1518701.1518866

Kane, S.K., Avrahami, D., Wobbrock, J.O., Harrison, B., Rea, A., Philipose, M. and LaMarca, A. (2009) Bonfire: A nomadic system for hybrid laptop-tabletop interaction. *Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '09)*. New York: ACM Press, 129-138. http://portal.acm.org/citation.cfm?id=1622176.1622202

Kane, S.K., Wobbrock, J.O. and Smith, I.E. (2008). Getting off the treadmill: Evaluating walking user interfaces for mobile devices in public spaces. *Proceedings of the ACM Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '08)*. New York: ACM Press, 109-118. ***Best Paper Award.***★ http://portal.acm.org/citation.cfm?doid=1409240.1409253

Wobbrock, J.O., Myers, B.A., Aung, H.H. and LoPresti, E.F. (2004). Text entry from power wheelchairs: EdgeWrite for joysticks and touchpads. *Proceedings of the ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '04)*. New York: ACM Press, 110-117. ***Best Paper Award.***★ http://portal.acm.org/citation.cfm?id=1028650

Wobbrock, J.O., Wilson, A.D. and Li, Y. (2007). Gestures without libraries, toolkits or training: A $1 recognizer for user interface prototypes. *Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '07)*. New York: ACM Press, 159-168. http://portal.acm.org/citation.cfm?id=1294211.1294238

D. Synergistic Activities

Statewide Website Advisory Group, Washington State Access to Justice Board.
Journal Associate Editor: Advances in Human-Computer Interaction (Hindawi Press).
Conference Committees: CHI 2010, 2011.
Program Committees: CHI 2008, 2009; UIST 2007, 2009; ASSETS 2008; Pervasive 2007.
Doctoral Consortium Advisor: ASSETS 2007.

E. Collaborators and Other Affiliations

(i) Collaborators (last 48 months)

Kurt L. Johnson, University of Washington; Daniel S. Weld, University of Washington; Richard Ladner, University of Washington; Eve Riskin, University of Washington; Andrew J. Ko, University of Washington; James A. Fogarty, University of Washington; James A. Landay, University of Washington; Jeffrey Bilmes, University of Rochester; David M. Levy, University of Washington; Scott E. Hudson, Carnegie Mellon University; Jennifer Mankoff, Carnegie Mellon University; Brad A. Myers, Carnegie Mellon University; I. Scott MacKenzie, York University; Meredith Ringel Morris, Microsoft Research; Andrew D. Wilson, Microsoft Research; Edward Cutrell, Microsoft Research; Eric Horvitz, Microsoft Research; Patrick Baudisch, Hasso Plattner Institute; Beverly Harrison, Intel Research Seattle; Daniel Avrahami, Intel Research Seattle; Andrew T. Duchowski, Clemson University; Alfred W. Kaszniak, University of Arizona.

(ii) Graduate Advisors

Dr. Brad A. Myers, Carnegie Mellon University (Ph.D. advisor)
Dr. Terry Winograd, Stanford University (M.S. advisor)

(iii) Thesis Advisor and Postgraduate-Scholar Sponsor

Leah Findlater, Advisor for Postdoctoral Fellowship, Information School, 2009–.
Shiri Azenkot, Co-advisor with Richard Ladner for PH.D. in Computer Science, 2009–.
Kristen Shinohara, Advisor for Ph.D. in Information Science, 2008–.
Eun Kyoung Choe, Co-advisor with Julie A. Kientz for Ph.D. in Information Science, 2008–.
Parmit K. Chilana, Co-advisor with Andrew J. Ko for Ph.D. in Information Science, 2008–.
Shaun K. Kane, Advisor for Ph.D. in Information Science, 2006–.
Susumu Harada, Co-advisor with James A. Landay for Ph.D. in Computer Science, 2006–.
Krzysztof Z. Gajos, Co-advisor with Daniel S. Weld for Ph.D. in Computer Science, 2006-2008.

Appendix B: External Reviews and Program Response

IOWA STATE UNIVERSITY
Institute for Physical Research and Technology

Virtual Reality Applications Center
2274 Howe Hall, Room 1620
Ames, Iowa 50011-2274
515 294-3092
FAX 515 294-5530
http://www.vrac.iastate.edu
vrac@iastate.edu

May 15, 2011

Dr. James S. Antony
Associate Vice Provost and Associate Dean for Academic Affairs
University of Washington
The Graduate School
G1-Communications, Box 252770
Seattle, Washington 98195-3770

Dear Dr. Antony:

I am writing to provide my assessment of the proposal for the University of Washington's new Master of Human-Computer Interaction and Design degree prepared by your colleagues Professors Ramey, Landay and Canfield-Budde. I have reviewed the proposal and supplemental materials you provided and feel it provides a very compelling case for the new degree program.

I lead an interdepartmental graduate program in Human Computer Interaction (HCI) at Iowa State University. Like the proposed program at the UW, ours reports directly to the Graduate College and acts like a virtual department with a diverse faculty contributing to varying degrees, while maintaining primary responsibility to their academic home departments. Despite the administrative challenges it presents, the benefit of this approach (as compared to most computer science-based HCI programs) is it gives us a very broad disciplinary breadth. Our program offers PhD, MS, and Professional Certificate degrees and admitted its first students in fall 2003. There are now more than 140 students enrolled (more than 50 are PhD candidates) with substantial growth in recent years coming from on-line MS and certificate degrees. About two thirds of our MS students are seeking a terminal degree for professional development, and the remainder continue into PhD programs.

Although I do not know any of the principles leading the proposal, I have been aware of the HCI group at the UW for some time. The proposal they prepared is well written and very thorough, covering all aspects of the evaluation criterion outlined by the Washington State Higher Education Coordinating Board that you provided. I was particularly impressed by the data gathered addressing demand of potential students and employers, national competitors, and alignment with the State workforce development recommendations. The resources requested appear to be adequate and the proposed administration and management of the program is solid.

The most innovative aspect of the proposed degree program is its emphasis at the intersection of HCI and design. In my experience, this is indeed a unique skill set that is underserved by existing graduate degree programs and in high demand across a wide spectrum of industries. In fact, we are actively seeking to bolster the design aspects of our HCI degree programs, and have several very active colleagues in our program from the College of Design and College of Engineering engaged in curricular revisions to address this very need. One of the most difficult challenges in accommodating this aspect, and one very well considered by the UW proposal, is the integration of design studio experience and group projects. The proposal clearly outlines student learning outcomes and the program as proposed would provide students with a unique blend of HCI and design training that should prepare them well for successful careers.

The emphasis on design also reflects a broader trend underway at several visionary research universities. In particular, Stanford, Northwestern, and the University of Michigan have all established complimentary research and degree programs that provide a design-focused element across a wide of spectrum of disciplines. If the UW undertakes a similar broad initiative, the HCI-d program could become an integral element for its success.

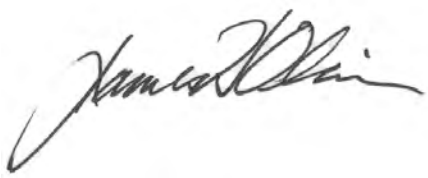
The program as proposed captures a nice balance between the technical aspects of HCI and more personal and creative aspects of design. The required courses are offered in a rational sequence, capped by an integrative and cumulative design project experience during the summer. The proposal also outlines very comprehensive plans for student and program assessment.

Aside from our own, the closest competitive program that I am aware of is the professional Masters degree offered by the HCI Institute at Carnegie Mellon University. It is my understanding that the CMU program is completely funded by industrial sponsors, and can thus be extremely selective among its applicants. The proposed UW HCI-d program provides more flexibility for admitting students; self funded or otherwise, and further distinguishes itself with the strong design content. Thus, I am confident it will have no trouble meeting its enrollment targets.

My only suggestion for further consideration is the balance between required and elective course credits. The program as proposed allows only 9 of 46 credits (20%) as electives. By comparison, our master's program has only 12 of 30 credits of required course work. With 9 credits for a Masters thesis or other creative component, that leaves us with 9 credits, or 30% of the curriculum, open to elective courses. Given the diversity of disciplinary reach, we find this gives students the opportunity to customize their programs to better suit their interests and career goals.

Overall, I find this proposal to be a timely, thorough and compelling case for an exciting new degree program at the UW that serves a community with high demand and outstanding career opportunities. I commend the leaders for their vision and hard work in conceiving the program and strongly recommend its adoption by university administration.

Sincerely,



James H. Oliver, PhD, ASME Fellow
Director, Virtual Reality Applications Center
Director, Graduate Program in Human Computer Interaction
Larry and Pam Pithan Professor, College of Engineering
Professor of Mechanical Engineering

9 May 2011

James S. Antony
Associate Vice Provost and Associate Dean for Academic Affairs
University of Washington
The Graduate School
G-1 Communications
Box 353770
Seattle
Washington 98195-3770

Thank you for the opportunity to participate in the review procedure for a new Master of Human-Computer Interaction and Design degree program from the Design:Use:Build Interdisciplinary Committee at the University of Washington, Seattle. This letter addresses your request for the review and determination of the quality, originality, and impact of the proposed degree program. I will answer your request in the order asked:

1
Does the program demonstrate a coherent design, reflecting appropriate depth and breadth, curriculum, sequencing of courses, synthesis of learning, and assessment of learning outcomes?

The Program Proposal:

University of Washington-Seattle Graduate School proposes the Master of Human-Computer Interaction and Design (MHCI+d) that educates the designers and address the design process, prototyping and testing, and evaluation of the user interfaces. They will also address all types of software and hardware production in the state of Washington, from office applications to games to medical devices to phones to aircraft cockpit controls and displays. The proposal rests on the interdisciplinary team's [Design:Use:Build's (dub)] recent work and experiences. This work focuses on helping people with long-term, high-value, personal activities that are critical in living a better life. The successes of this work promotes the notion of educating designers and engineers with high level of interdisciplinary skills and perspectives that meet the growing need in Washington's high-tech industries that aspires to produce technologies scaled to common day-to-day human activities.

Demonstration of coherent design:

The proposed program is an intense forty-six credit hour work scheduled for four quarters (figure 1). It is a sound proposal in current economic environment to service and educate students quickly and effectively. It is certainly advantageous for students and faculty alike.

Nonetheless, it is also paramount to consider the "mental burn-out factor" from the perspective of both the students and the faculty in such proposals. Designers and engineers have the *Perfectionist Tendencies*. Striving to do their best is the central goal on either side of the aisle that leads to excellence. However, excessive stress in such an intense environment may be crippling. Another alternative may be to spread out the program in six quarters.

It is argued that "The practice-oriented MHCI+d's emphasis on applications in the fields of health and sustainability fits well with the priorities of the university (e.g., a major emphasis on collaborations with the School of Medicine, the recent creation of the new College of the Environment, and the sustainability mission that is part of the university's strategic plan) as well as the priorities of the State of Washington."

However, when we review the offered course contents, the emphasis on the applications in the fields of health and sustainability rarely elaborated and emphasized:

Fall Kickoff: emphasizes meeting with cohort and faculty, learning the engineering and design strategies used in the program, and learning to build portfolios. The focal activity emphasizes engagement with under-served population as within commercial, nonprofit, charity, or public sector entities.

Interdisciplinary HCI+d Seminar: emphasizes project presentations, technology previews, and guest speakers who introduce the students to a broad range of interdisciplinary perspectives.

Analytical Design Studio: emphasizes the interwoven, iterative processes of data collection, visualization, insight, design, prototyping, and evaluation.
Analytical Design Studio I: Ideation The main focus in this first course is on user-centered design.
Analytical Design Studio II: Prototyping The emphasis of the second course is on prototyping.
Analytical Design Studio III: Evaluation. The main emphasis of the third course is on evaluation.

Core Courses: emphasizes hands-on in the studio, theory and related work.
DIS: Designing Interactive Systems covers issues relating to the design of interactive systems, design thinking, design processes, design rationale, structured brainstorming, design techniques, and design critique, and low fidelity prototyping techniques.
UIST: User Interface Software and Technology covers issues relating to the implementation of user interface software and hardware.
U/UR: Usability/User Research covers issues relating to both the discovery of user needs and the evaluation of systems in view of those needs.

Additional Advanced Coursework: facilitates flexibility in choosing advanced courses to reinforce their integrative and studio experience. Examples of some existing courses include: Fundamentals of Interface Design (ART 483), Introductory HCI (CSE 440), Advanced HCI (CSE 441), Advanced Topics in HCI (CSE 510), Design Methods for Interaction & Systems (IMT 540), Usability Testing (HCDE 517), Collaborative & Social Software (INSC 547), Assistive Technology & Inclusive Design (INSC 546), Value Sensitive Design (INSC 554), Human Interaction with Intelligent Systems (CSE 599), and User-Centered Design Processes (HCDE 518).

Summer Project Studio: emphasizes advance studies in iterative design, prototyping, and evaluation process, portfolio to record their processes and products. These projects focus on the important domains of health, the environment, education, and assistive technology.

Inclusion of courses that specifically addresses Life Cycle Assessment (LCA), will broadly advantage the coherence of the proposed program. LCA is one common way to assess environmental impacts that considers the full range of a product's environmental impacts, from resource extraction to manufacturing and then through installation and ultimate disposal. The analysis of cost to the manufacturer and cost to society realistically represent the impact of the recovery options at the product's end-of-life. This type of analysis facilitates comprehensive and multidimensional product comparisons.

Reflection of depth and breadth:
Firstly, the proposal comes close to addressing what is "good" for the common people. However, it does not go all the way to firmly adhere its academic footing to high-level personal activities. For example, it is not about the cell phone interaction/interface but the context of the cell phone from the perspective of how "good" it is for the common people and specifically the environment. Design, development, and implementation of usable and socially beneficial information/digital technologies must have a sound footing in material selection methodology and the environmental cost analysis. The candidates of this program must be able to compare product design alternatives to reach acceptable, consistent and environmentally conscious design decisions.

Secondly, it appears that "sustainability" is the core to the philosophy of the proposal, yet there is no evidence of its deliberate integration within the curriculum. Faculty expertise is mainly in the area of electrical engineering, human centered design, computer science, industrial design, and interaction design. Inclusion of faculty expertise in sustainable product development will enhance the depth and breadth of the proposed program.

Curriculum sequencing of courses:
The deliberate design of the curriculum is intense and rigorous for graduate level studies as mentioned earlier. The sequencing is sound and appropriate. The proposed design studio environment is certainly attractive for prospective candidates. There are very few peer academic institutions that offer intensive studio environments where bright minds can work together for the greater good of the society and the environment for a single year and then graduate.

However, the sustainability of the student graduation rate and core faculty productivity needs careful evaluation. It is true, that peer institutions such as Carnegie Mellon University, Georgia Institute of Technology, Indiana University, University of Maryland, and the Rochester Institute of Technology offer programs structured for more than one year and surely for a reason.

Synthesis of learning:

It is safe to assume that the graduates of the proposed program will have high level of ambition, vigor, enthusiasm, and the ability to lead as collaborators. They will have appropriate skills to address interactivity, human centered design, electrical engineering, and industrial design, as they will study under and mentored by well-trained and nationally reputed faculty members in these disciplines. It is wise to add sustainability to this configuration and ensure a unique program.

Assessment of learning outcomes:

The proposal outlines the assessment of course-and-project based student learning and achievements as follows:

- Course-Embedded Assessment in Core and Elective Classes.
- Year Long Continuous Course Assessment in the Analytical Design Studio Sequence.
- Performance in Student Capstone Presentations.
- Feedback from Capstone Clients.
- Design and Innovation Awards.
- Hiring and Placement.
- Entry and Exit Interviews.
- One-Year Post-Graduation Follow-up Surveys.
- Student Course Evaluations.
- Student Portfolio Evaluations.

These are appropriate and standard academic assessment methodologies. The critical method is *one-year post-graduation follow-up surveys*. This method allows the faculty and administrators alike to continually redefine the program based on the successes and challenges encountered by the graduates. *Employer survey* may be an additional method that may strengthen the decision making process for future development and growth of the program.

2

How does the program compare to other institutions' programs?
Is it traditional?
Is it innovative ("cutting edge") in some way(s)?

As already stated in the proposal, there are similar programs at several top schools across the United States such as Carnegie Mellon University, Georgia Institute of Technology, Indiana University, University of Maryland, and the Rochester Institute of Technology.

The proposed program is comparable to those offered by these institutions. Most of these peer programs are selective two-year programs ranging from 46 to 60 credit hours. One-year 46 credit hour intense programs are rare. Therefore, considering current economic environment it is wise to service and educate students quickly and effectively. The proposed one-year intense program that is relatively inexpensive will certainly gain popularity. The highly qualified applicants with engineering and design background are sure to take advantage of such fast paced and intense graduate program. The studio based curriculum with appropriate space and equipment is an added attraction and may be considered as innovative and/or "cutting edge". Thus the proposed program is traditional in one facet and innovative in the other.

3

Does the program respond to current trends in the field?

It is extremely difficult to systematically understand the nature of human-centered design (HCD) and interaction design (IxD) considering its scope and current trends to describe its future orientation. However, scholars and professionals alike continue to understand HCD and IxD in broader frameworks and try introducing specific perspectives. Many fact-based approaches are investigated in as part of this trend within academic and professional environments. The Eastern world has made a significant progress in this respect. US researchers and industry needs an appropriate academic platform to not only catch up but to advance at a much higher pace.

The MHCI+d proposal is therefore not only timely but meets vital necessity.

4
Are student-learning outcomes appropriate and clearly defined?
Yes. The student-learning outcomes are appropriate and clearly defined. The program will be unique with added emphasis on *sustainable product development* as recommended earlier.

The proposed MHCI+d clearly address *HECB State and Regional Needs Assessment* (2006). The recommendation of this report is firstly to increase the number of graduates with the skills required to meet the employer needs in a number of key occupational areas within the State of Washington and secondly to institutionally develop strategies to increase the numbers of students prepared to fill positions in the high-demand areas of computer science, engineering, software engineering, etc. The proposed MHCI+d program directly focuses on encouraging innovative thinking and finding innovative new ideas and solutions. The program will help promote "economic growth and innovation." Graduates of this program are more likely to ease new start-up companies that may directly spin off from the yearlong projects that students pursue in the program.

5
Is the student assessment system adequate, stellar, and innovative? Why?
As iterated above, the student assessment system is adequate, appropriate, and follows standard academic assessment methodologies. The critical method is *one-year post-graduation follow-up surveys*. This method allows the faculty and administrators alike to continually redefine the program based on the successes and challenges encountered by the graduates. *Employer survey* may be an additional method that may strengthen the decision making process for future development and growth of the program.

The periodic measurement of student assessments will be the key for program quality sustenance and thereby its reputation and demand. Innovative program development exclusively depend on gradate performances and their professional assessments.

6
Is the program assessment system adequate, stellar, and innovative? Why?
The program assessment system is adequate, appropriate, and follows standard academic assessment methodologies. Academic program reviews clubbed with accreditation reviews are sound measures of the quality of a program. The MHCI+d program advisory committee will play a major role in program assessment, in future development, and advancement of the program. This approach is innovative and rarely implemented by other programs similar to MHCI+d.

7
Are the resources (faculty, administrative, facility, and equipment) appropriate?
The College of Engineering and the Computer Science and Engineering departments provide the studio and workspace.

The proposed MHCI+d program is self-supporting through the revenues generated from tuition (approximately1.12 million) with anticipated additional income generated through industry project sponsorships.

The projected resources are appropriate and adequate for anticipated studio equipment, program director, technical staff, and marketing staff.

Well-trained and nationally reputed faculty with high productivity is certainly adequate. Immediate addition of a faculty member with expertise in *sustainable product development* will fill the gap and make the program unique. The academic standards and degree requirements meet national and international standards. The 24/7-studio environment will enhance student-faculty interactions and foster welfare, leadership, and high levels of achievement.

8

What are the program's strengths and weaknesses?

Strengths:

- An intense forty-six credit hour work scheduled for four quarters (1 year)
- Evident opportunity considering industry demands and current economic environment
- Supported and mentored by The MHCI+d program advisory committee (local industry representatives)
- One of the few trans-disciplinary program supported by stellar academic scholars and renowned professional and industry representatives on US west coast
-

Weaknesses:

- Lack of emphasis on *sustainability* and *sustainable product development* within the proposed curriculum

9

What are your recommendations?

The recommendation is to fully support and approve the MHCI+d proposal with minor modifications as stated below:

A.

Immediately hire or identify (from the recent creation of the new College of the Environment) and include an additional faculty with expertise in *sustainable product development* within the core faculty that will teach MHCI+d.

B.

Include a core course emphasizing *sustainable product development* that addresses principles of sustainability such as Life Cycle Assessment (LCA), etc.

I hope I have answered all your questions adequately and I appreciate the opportunity provided.

Thank you.

Sincerely,

Mookesh Patel
Associate Professor

Visual Communication Design

Response to Reviews

We were lucky to have two high-qualified reviewers carefully look at the proposal for this new professional mater's degree, The Master of Human-Computer Interaction and Design (MHCI+d). Although the reviews were quite supportive, especially noting the innovative nature of the program and the positive potential impact on the Washington State economy, there were a few misconceptions that we would like to correct as well as areas pointed out by the reviewers that we can improve upon in the final program.

Intensity of Program

Both reviewers point out that a 12-month program with this much content can be challenging to say the least. We have been careful to make much of the work during the year project work, not simply course work that can become boring and tedious. All of the material in the classroom will be applied in the design studio and in the field. Our program borrows this 12-month design from the highly successfully CMU Masters of HCI, which currently produces Masters graduates that are the most sought after in the field. As one of the reviewer points out, "considering [the] current economic environment it is wise to service and educate students quickly and effectively. The proposed one-year intense program that is relatively inexpensive will certainly gain popularity." We will allow students who have a personal need to extend the program by 1-2 quarters to do so by petition, though this will not be encouraged in general as it is important to have balance in the numbers of students as well as to build a true class cohort with all of the positive social attributes that go along with the esprit de corps generated by this model.

Overemphasis on Required Courses

The second review argues that we have too many required courses and not enough flexibility in terms of electives. Given our desire to make this a 12-month program, we agree that there is a bit less flexibility in terms of electives so that we can ensure that students are taking the core material required by this degree. This is an intensive program with specific goals to be met in 12 months, and the format is required because of the large role of the key, central studio activity. The studio sequence, paired with the content sequence, is the heart of the program and as such allowing only a small number of electives (three out of 10 courses) is a tradeoff that we think is quite reasonable to make.

Sustainability Core

One of the reviewers notes that "sustainability is core to the philosophy of the proposal, yet there is no evidence of its deliberate integration within the curriculum…" and that we should "immediately hire or identify (from the recent creation of the new College of the Environment) and include an additional faculty with expertise in sustainable product development within the core faculty that will teach MHCI+d."

We believe that this reviewer has taken our desire to make sustainability a key application theme a bit stronger than we intended and in fact this reviewer's comments show more of an orientation towards physical product design (as would be emphasized in an industrial design program) than we intend. Although we envision our graduates working on some hardware/physical product design, the emphasis of the proposed program is on software/interface design. As such, an entire required course on Life Cycle Assessment (LCA) is a bit of overkill for the proposed program as this technique is much less valuable in software situations. Nonetheless, we will attempt to hire into the Associate Director or Design Lecturer positions one or more individuals who have sustainable product design experience. In addition, we will ensure at least 1-2 lectures in the program will cover LCA. These lectures will either be taught by the new hire with a background in this area or from a faculty member associated with Professor Dan Schwartz's Bioresource-based Energy for Sustainable Societies IGERT program, which has a prominent LCA component.

In addition, Professor Landay has published several key papers on sustainability in interaction design and one of his graduate students is currently finishing a Ph.D. in this area. In addition, as the College of the

Environment starts to hire more faculty in this and related areas, we will work to include these new faculty members in the proposed program as appropriate. Although an application focus, along with health and education, sustainability is not the core focus of the proposed program. These application domain areas will mainly be covered in the projects and the studio content, but will also be spread throughout the accompanying courses rather than be offered as the focus in one particular course.

Employer Survey

Finally, one reviewer noted that an “Employer survey may be an additional method that may strengthen the program.” The omission of an employer survey was simply an oversight and we will definitely add this as one of our key assessment methods. In fact, we have done some informal, preliminary surveys in advance of the program development to make sure our program ideas were on the right track for our industry partners.

Form 4

REQUIRED COURSE WORK
Part I

Include this form with new degree program proposals. Staff will post this information and the program proposal on the HECB Web site during the public comment period.

Prerequisite Courses		
Course Number	**Course Title**	**Credits**
	Total Credits	

Program Requirements		
Course Number	**Course Title**	**Credits**
New	**Analytical Design Studio 1: Ideation**	**5**
New	**Analytical Design Studio 2: Prototyping**	**5**
New	**Analytical Design Studio 3: Evaluation**	**5**
New	**DIS: Designing Interactive Systems**	**3**
New	**UIST: User Interface Software Technology**	**3**
New	**U/UR: Usability/User Research**	**3**
New	**Summer Project Studio**	**9**
CSE 590j	**HCI+d (DUB) Seminar x 1 credit x 4 quarters**	**4**
Various	**Elective x 3 credits x 3 quarters**	**9**
	*** note all new courses will be at the 500 level**	
	Total Credits	**46**

Form 5

ENROLLMENT AND GRADUATION TARGETS
Part I

Include this form with a new degree program proposal or a Notice of Intent to extend an existing program. Staff will post this information to the HECB Web site during the comment period.

Year	1	2	3	4	5
Headcount	30	30	30	30	30
FTE	30	30	30	30	30
Program Graduates	0	30	60	90	120

Form 6

PROGRAM PERSONNEL

Available upon request. Please contact Mark Bergeson at markb@hecb.wa.gov or 360-753-7881.

Form 7

SUMMARY OF PROGRAM COSTS AND REVENUE

Available upon request. Please contact Mark Bergeson at markb@hecb.wa.gov or 360-753-7881.