WE PUT PEOPLE FIRST
MESSAGE FROM THE CHAIR

Dr. David W. McDonald, Associate Professor & Chair

Welcome to the 2015 issue of "Designing Up," our annual recap of events and special highlights of Human Centered Design & Engineering (HCDE) students, faculty and alumni.

Looking back on the past year, several accomplishments stand out to me. HCDE students have taken on leadership roles. Within the HCDE Student Association, students participated in key outreach activities to introduce others to the field of study. The Graduate Student Association organized career preparation workshops, bringing industry leaders to the department. HCDE students continue to be innovative. This year three HCDE undergraduate student teams won Capstone Design Awards from the UW College of Engineering. Additionally, HCDE students received regional recognition for their projects in two different competitions sponsored by Zillow and the City of Seattle. HCDE PhD students Cynthia Bennett and John Robinson won prestigious Graduate Research Fellowships from the National Science Foundation. Both of those students have been awarded multi-year support for their research.

HCDE faculty have also been busy. Assistant Professor Dr. Daniela Rosner has won a prestigious NSF CAREER award to support her research. HCDE Professor Dr. Mark Haselkorn launched the CoSSaR center, a cross-campus center to study and design systems to build more resilient socio-technical systems. And Professors Dr. Cindy Atman and Dr. Jennifer Turns were awarded a $4M award to study reflection and reflective activities in the education of engineering students. Please see the HCDE website at hcde.uw.edu/news for many more achievements of this dynamic faculty.

A significant strength of HCDE is our diversity. The multiplicity of perspectives and experiences certainly contributes to what our students learn and the creative ways they develop innovative solutions to human-centered technology design. Across all of our programs more than 50% of our students are female. In the coming years HCDE is committed to broadening participation from underrepresented communities across our programs.

This was my first year as HCDE Department Chair and it has been a pleasure to serve the department and the broader HCDE community in this role. I am already looking forward to the great things the next year will bring!
HCDE ACADEMICS

Students in HCDE learn to prioritize human needs and interests as they design and engineer solutions to today’s problems.

DOCTOR OF PHILOSOPHY IN HCDE

The Doctor of Philosophy (PhD) in HCDE provides unparalleled depth and experience for students interested in studying the conception, design, implementation, evaluation, and effects of technologies. The HCDE doctoral program prepares students for careers as scholars and researchers through relevant coursework, mentorship from faculty, and collaboration with peers. More at hcde.uw.edu/phd

GRADUATE CERTIFICATE IN USER-CENTERED DESIGN

The User-Centered Design (UCD) Certificate is an evening, graduate-level program for students who want to explore a wide range of issues in user-centered design. Students learn methods for planning and developing intuitive, user-friendly product designs. This four-course certificate focuses on usability studies, user-centered design theories, visual communication and information visualization, and web design. More at hcde.uw.edu/ucd
**BACHELOR OF SCIENCE IN HCDE**

The Bachelor of Science (BS) in HCDE enables students to build a strong foundation in designing user experiences and interfaces, creating information visualizations, conducting user research, designing for the web, and building web technologies through a deep understanding of people and their contexts. Students graduate from the program with engineering degrees.

HCDE admits undergraduate students who have completed significant coursework. High school students also have the option to apply for Direct Freshman Admission to the major on their UW application. More at [hcde.uw.edu/bs](http://hcde.uw.edu/bs)

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**MASTER OF SCIENCE IN HCDE**

The Master of Science (MS) in HCDE prepares its graduates for professional and leadership roles in user experience research and design, interface design, interaction design and prototyping, product design, human-computer interaction, human centered engineering, and program management.

HCDE MS courses focus on research, design, and engineering. Students take 48 credits of required core and elective courses and participate in faculty led Directed Research Groups, Capstone Projects, and optional internships. HCDE MS courses are offered in the evening to accommodate a diverse cohort of full time and part time students. More at [hcde.uw.edu/ms](http://hcde.uw.edu/ms)
HCDE RESEARCH

Faculty and students in HCDE conduct research to advance the study and practice of engineering and improve people’s experience with technology

INFLUENCING BEHAVIOR, THINKING, AND AWARENESS

As designers, we have the ability to create interventions that support or prompt changes in people’s everyday lives, ideally for the better. We study how interventions affect people’s behavior, thinking, or awareness. In addition, we design and assess new tools for making these changes. Focus areas include health and wellness, education, civic engagement, politics, social influence, persuasive technology, behavior change, reflection and mindfulness, awareness, incentives, and motivation.

DATA VISUALIZATION AND ANALYSIS

We focus on the design, implementation, and evaluation of human-centered systems and techniques, such as visual analytics and infrastructures, in support of collaborative activities in environments that generate and require very large and complex data sets.

LEARNING IN PROFESSIONAL AND TECHNICAL ENVIRONMENTS

We study learning, with an emphasis on professional and technical activities. This work occurs across areas such as professional development and identity, translation of knowledge into action, expertise in problem framing, representation of design contexts, digital interfaces, reflection, language learning, and learning from text.
DESIGN FOR EMERGENT COLLABORATIONS AND ORGANIZATIONS

We study and build digital technologies that people use to coordinate, collaborate, and interact in other ways. Our work typically focuses on emerging uses, practices, capacities, and organizational arrangements associated with collaborative technologies. We understand, influence, design, implement, and assess sociotechnical systems. Our research spans multiple contexts such as decision making, leisure, work, volunteerism, creativity, and innovation.

LOW RESOURCE AND UNDERSERVED POPULATIONS

Using human-centered design methods, we design and evaluate technologies for resource-constrained environments and deploy those technologies to support vulnerable populations. Our work is motivated by a commitment to ensuring the world enjoys the benefits of diverse technological solutions that can serve multiple populations. Areas of research include low-resource environments, high-risk and safety-critical environments, complex systems, crisis informatics, disaster and humanitarian response, humanitarian relief, information and communication technologies for development, and human-computer interaction for development.

MATERIAL AND EMBODIED TECHNOLOGIES, AND UBIQUITOUS COMPUTING

We do research on material and embodied technologies as well as ubiquitous computing. We are interested in the overlap and collision of atoms and bits, looking at how emerging technologies involve and affect the material and physical worlds. We look at a range of platforms and form factors, and we are especially interested in how computing augments and transforms other technologies as well as social relationships, institutions, and communities. Areas of research include physical computing, sensors, natural user interfaces, tangible computing, mobile computing, robotics, open source hardware, e-textiles, natural interactions, wearable computing, digital fabrication, sociomaterial practices, and infrastructure studies.
COSSAR
A Q&A with HCDE Professor Mark Haselkorn, director of UW’s Center for Collaborative Systems for Security, Safety, and Regional Resilience (CoSSaR)

Q: WHAT IS THE PRIMARY MISSION OF COSSAR?

MH: The primary mission of CoSSaR is to provide a regional capability for facilitating coordinated planning and response from the very diverse set of agencies and organizations that play major roles in the safety, security, and regional resilience of the Puget Sound region.

This requires CoSSaR to be a neutral party among groups with diverse missions, languages, systems, and cultures, and to help facilitate agreements among them. We are a place where a sheriff from a neighboring county could sit at the same table with a regional tribal leader and Coast Guard LCDR and together they could explore possibilities of information sharing and collaborative action.

Q: HOW DOES COSSAR FIT INTO HCDE?

MH: Since 9/11, the federal government has made huge investments in both reorganization and technology to help us break down the silos that inhibited us from preventing the terrorist attacks. Unfortunately, these investments haven’t been designed as a whole system of systems, leaving us with disparate data that can’t be integrated, communication devices that don’t communicate, etc. Imagine a police officer walking around with four radios because none of them speak to each other. By designing for people first, CoSSaR is aligning the investment to support the way this community wants and needs to work. In HCDE we design incredible human-centered systems. In CoSSaR, we are designing the system by which our region designs safety and security. We aren’t doing this from scratch, but we are designing interventions that lead to better outcomes.

Q: WHAT INSPIRED YOU TO LAUNCH COSSAR?

MH: Design as problem-solving is exciting to me. And by designing regional systems that understand people first, we are solving problems that haven’t even been looked at before. With CoSSaR, everyone is a stakeholder. We are empowering everyone involved to have their voices heard and—even more powerfully—have their voices speak together. Of course encouragement from regional stakeholders, the College of Engineering, State Legislature, and community, and make their concerns our concerns.

In the long-term, we hope to be a resource for Washington State that helps align federal investments with state security and the region’s needs and desires. We want to give the state a bigger voice in how federal resources are applied and maintained. Relationships are critical for this. Our longer-term goals also include expanding CoSSaR’s focus into land and air in addition to the maritime systems we are already working on.

Q: WHAT ARE THE SHORT- AND LONG-TERM GOALS OF COSSAR?

MH: In the short-term, we are building a trusting relationship with regional stakeholders. We are part of their community, understand the
Federal agencies has been a critical piece of the puzzle.

Q: **COSSAR HAS BEEN AWARDED OVER $1,200,000 IN FEDERAL FUNDING. WHAT WILL THIS FUNDING ENABLE YOU TO DO?**

MH: Thanks to funding from the Department of Homeland Security’s Interagency Operations Center program for port security, the National Maritime Intelligence Integration Office, and the Program Manager for the Information Sharing Environment, we have already been able to spend a full year embedding ourselves in the community and understanding how it works. We’ve found that in these complex systems people tend to work in independent and informal ways. Our next step is to help each person in the community better understand their role in the larger system and figure out how technology can empower them to work better together.

Q: **HOW WILL HCDE STUDENTS BE INVOLVED WITH THIS WORK?**

MH: CoSSaR has been running Directed Research Groups with a variety of UW students for over a year now. In teams, students interview community members, and gain experience coding and analyzing the interviews for various themes. These research groups are a great way for students to gain real-world experience in ethnographic research.

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**HCDE RESEARCH LABS & CENTERS**

- **CENTER FOR COLLABORATIVE SYSTEMS FOR SECURITY, SAFETY, AND REGIONAL RESILIENCE (COSSAR)** // Dr. Mark Haselkorn
- **CENTER FOR ENGINEERING LEARNING & TEACHING (CELT)** // Dr. Cynthia Atman
- **COMMUNICATIVE PRACTICES IN VIRTUAL WORKSPACES LABORATORY** // Dr. Mark Zachry
- **COMPUTER SUPPORTED COLLABORATION (CSC) LAB** // Dr. Charlotte Lee
- **COMPUTING FOR HEALTHY LIVING AND LEARNING (CHILL) LAB** // Dr. Julie Kientz
- **EMERGING CAPACITIES OF MASS PARTICIPATION (EMCOMP) LAB** // Dr. Kate Starbird
- **HUMAN CENTERED DATA SCIENCE (HCDS) LAB** // Dr. Cecilia Aragon
- **INTERNET BASED USER EXPERIENCE LABORATORY (IBUXL)** // Dr. Jan Spyridakis
- **LABORATORY FOR HUMAN CENTERED ENGINEERING EDUCATION (LHCEE)** // Dr. Jennifer Turns
- **LABORATORY FOR INFLUENCE IN SOCIOTECHNICAL SYSTEMS (LISTS)** // Dr. Sean Munson
- **SOCIAL COMPUTATIONAL SYSTEMS (SCS) LAB** // Dr. David McDonald
- **THE PROSOCIAL COMPUTING LAB** // Dr. Gary Hsieh
- **THE TACTILE AND TACTICAL (TAT) DESIGN LAB** // Dr. Beth Kolko & Dr. Daniela Rosner
HCDE students and faculty organize outreach efforts to engage K-12 students in STEM activities and spark an early interest in Human Centered Design & Engineering.

**COMPUTING OPEN HOUSE**
At Computer Science & Engineering’s annual Computing Open House, middle and high school students and their families visit the University of Washington campus to explore the various computing degree programs offered at UW. HCDE student volunteers talk to visiting students and parents about the latest research in the department and demo their current projects.

More at cs.uw.edu/openhouse

**MATH ACADEMY**
The College of Engineering’s Math Academy is a four-week residential program for high school students who are entering their senior year, and helps develop the math and problem-solving skills necessary to succeed in engineering. HCDE Professors Julie Kientz, Sean Munson, Gary Hsieh, and Senior Lecturer Andrew Davidson are among the faculty who prepared design-thinking lessons for the 2014 students—giving them a glimpse into college as an engineering student.

More at engr.uw.edu/mathacademy

**ENGINEERING DISCOVERY DAYS**
Each Spring, students and faculty from all UW Engineering departments open their doors to visiting students, teachers, families, and the community at the two-day Engineering Discovery Days event. HCDE student volunteers coordinate hands-on engineering activities and talk to visitors about what it is like to be a student in HCDE.

More at engr.uw.edu/discoverydays

**PAUL ALLEN COMPUTING CHALLENGE**
HCDE sponsors The Paul Allen Computing Challenge, an annual challenge that encourages high school students to learn about data science. HCDE students and faculty volunteer as mentors to help students analyze and create design projects around data sets. HCDE Assistant Professor Kate Starbird serves as the primary faculty mentor for all student teams.

More at pscsta.org/pacc
I was a high schooler in the process of applying to college when I attended the Computing Open House at UW to learn about the engineering and computer science departments. At the HCDE booth I met Andrew Davidson and a few students from the major and asked them what kind of things HCDE students do and study. I was blown away by how different HCDE was from any other major I had heard about. It combined some of the main things that I enjoyed: human interaction/psychology, computer science and technology, and design. The students at the booth told me that a lot of HCDE is about the user experience and making technology user friendly. That really stuck with me because I always seem to be helping my parents and grandparents navigate technology. I went to a short presentation about HCDE, learned about the high school math and science credits required, and I was sold. I put HCDE down as my preferred major on my UW application, and was happy to later find out I was accepted as a Direct Freshman Admit.

In the spring of my freshman year I enrolled in a Directed Research Group, FizzLab, led by Andrew Davidson and Daniela Rosner. Looking back on the class, it was one of the most challenging and rewarding experiences I have ever had. I joined three graduate students on a project that we worked on throughout the quarter. Together, we designed Story Sash, a technology-enhanced vest for children that teaches them about STEM through activities they complete while interacting with a story. I was able to learn to code with Arduino and did some of the more simple tasks for the sash.

HCDE has been such a welcoming community and has helped me become a stronger student overall. I have been challenged to take harder courses and participate in activities that I would consider outside my comfort zone. I am glad that I was able to jump into the major as early as I did because it has allowed me to have more time to explore classes and I have been able to plan ahead for future years. I also have more flexibility for things like studying abroad. Most importantly, HCDE is a major that sparks my passion for making the world a better place.
LAUNCHING INNOVATION

HCDE students collaborate across campus disciplines to launch 3-D printed rockets

HCDE senior Erin McLean has been experimenting with rocketry since her freshman year when she joined UW Professor Robert Winglee’s Rockets & Instrumentation Lab. The lab, housed in UW’s department of Earth & Space Sciences (ESS), attracts a multidisciplinary range of students from science and engineering disciplines. “We make rockets by hand in Winglee’s lab,” McLean describes, “so in addition to ESS students, we have students from aeronautics, mechanical, and electrical engineering, physics...really anyone who is interested and willing to learn and build.”

Every spring, the students take a trip to the Nevada desert to launch the rockets they spent the quarter building. Finding the materials heavy and the construction processes time-consuming, McLean wanted to try 3-D printing a lightweight rocket (drawing on skills she had previously learned in HCDE’s Hackademia lab). McLean printed a relatively small, 14” rocket in HCDE’s Design Lab, attached a simple motor to it, and tested it with her peers in the desert that year. “It launched much higher than anyone expected,” McLean recalls. “We figured we were on to something and wanted to see how tall of a printed rocket would make the launch.”

McLean recruited fellow HCDE senior Mark Stamnes, treasurer of UW’s WOOF 3-D Printing Club, to join the Rockets Lab. WOOF 3-D is a registered student association housed in the a Mechanical Engineering department. Stamnes led WOOF 3-D’s efforts to build a printer that let the students print rockets over 7’ tall. By 3-D printing the rocket designs, the team found that they had more control over the shapes of the rockets. “We could make iterations faster, giving us more things to test,” McLean described.

Both McLean and Stamnes agree that their experience working with students and faculty across UW disciplines have made them stronger students overall. “It’s like working in the real world,” Stamnes said. “We are the design-thinkers. The more perspectives you have at the table the better when you are trying to force innovation.”
DESIGNING THE DESIGN PROCESS

HCDE students reflect on their design process to inspire future projects

HCDE Professor Cynthia Atman, Director of the UW's Center for Engineering Learning & Teaching (CELT), researches how to improve student learning in the rapidly changing environment of Engineering classrooms. Atman recently hosted an HCDE Directed Research Group to examine how students define their own design process, and how the act of visualizing it can help them solve design problems more efficiently in the future. The research group used Design Process Timelines (graphical representations that display how a person allocates time across a set of design activities as they work on a design problem), a concept initially developed by Atman's colleague Janet McDonnell at Central Saint Martins, University of the Arts London.

In the research group, students practiced visually representing their design process in a timeline format and then created a memory aid of the process that they could carry forward and apply to future design projects.

HCDE undergraduate student Cheryl Wang began by dividing her design process into three color-coded stages: problem scoping, developing alternative solutions, and project realization (Figure 1). Wang filmed herself designing a poster from start to finish, and when she played the video back, she indicated her activity on three different timelines (one for each stage) (Figure 2). By condensing the three timelines into one (Figure 3), Wang identified areas of overlapping processes, usually early in the design stage, where she switches back and forth between activity with high frequency. For the physical representation of her design process, the memory aid, Wang created a mobile sculpture designed to hang from the ceiling and inspire her design process. “Professor Atman described our memory aid as an ‘earworm,’” Wang described. “Something to get stuck in our heads the next time we are working on a design problem.” Made with pieces of translucent paper cutouts, the mobile reflects colors on the wall when struck with light, influencing her transitions between design stages.

“This project really stuck with me. In fact I just called upon my process recently,” Wang said. “In my design projects now I know importance of framing a project from beginning to end so I can define the concrete steps I need to take to get there.”

Atman's research on designing the design process is ongoing.
HCDE AWARDS
HCDE celebrates the achievements of its world-class faculty and students in the 2014-2015 academic year; find information about all awards received at hcde.uw.edu/awards

HCDE PHD STUDENTS AWARDED NSF GRADUATE RESEARCH FELLOWSHIPS

Cynthia Bennett and John Robinson, both first-year PhD students in HCDE, have been awarded Graduate Research Fellowships from the National Science Foundation (NSF).

The NSF Graduate Research Fellowship Program recognizes and supports individuals selected early in their graduate careers based on their demonstrated potential for significant achievements in science and engineering. Each fellowship consists of three years of support during a five-year fellowship period.

Cynthia Bennett is advised by HCDE Associate Professor Julie Kientz and UW Computer Science & Engineering Professors Richard Ladner and Alan Borning; John Robinson is advised by HCDE Assistant Professor Kate Starbird.

JULIE KIENTZ & SEAN MUNSON WIN UW INNOVATION RESEARCH AWARD

HCDE Associate Professor Julie Kientz and Assistant Professor Sean Munson were awarded an Innovation Research Award from the UW for their project, “A Connected Approach to Personalized Mobile Health.” Additional investigators on the project are Shwetak Patel and James Fogarty, Associate Professors in Computer Science & Engineering; Jasmine Zia, UW Medicine's Division of Gastroenterology; and Roger Vilardaga (Psychiatry and Behavioral Sciences).

The team is building a set of digital tools that let patients easily enter data about their habits and behaviors related to a particular health problem. This data will help extend the reach of health care beyond the clinic, making it easier for physicians to make diagnoses and treatment plans.
SEAN MUNSON RECEIVES COLLEGE OF ENGINEERING TEACHING AWARD

HCDE Assistant Professor Sean Munson has won the 2015 faculty award for excellence in teaching from the Dean of the University of Washington’s College of Engineering.

The College of Engineering Awards acknowledge extraordinary efforts of the college’s teaching and research assistants, staff, and faculty members. Nominations are submitted by members of the student body, staff, and faculty, and the winners are selected by the Dean.

In November 2014, Munson was featured in the University of Washington Provost’s report “Leading Change in Public Higher Education,” highlighting his work to engage students through innovative use of technology in the classroom.

KATE STARBIRD RECEIVES 2-YEAR NSF AWARD

HCDE Assistant Professor Kate Starbird is the Principal Investigator for a two-year National Science Foundation (NSF) Award for the project “Detecting Misinformation Flows in Social Media Spaces During Crisis Events.”

More than ever before, people are turning to social media sites in the wake of disaster events. Using online networks, they can search for reports and share eyewitness accounts within seconds—creating a wealth of crowdsourced information that can help affected communities and emergency responders. However, once rumors are disseminated within those networks, relief efforts can be greatly impeded. Starbird’s research aims to identify misinformation and how it spreads by using the collective intelligence of social media users who challenge and correct questionable information, and to develop an algorithm that can identify and classify rumors.

DANIELA ROSNER WINS 5-YEAR NSF CAREER AWARD

HCDE Assistant Professor Daniela Rosner received a five-year, $500,000 CAREER Award from the National Science Foundation to support her research on computer-assisted fabrication and craft.

CAREER awards are the National Science Foundation’s most prestigious awards for junior faculty. They are awarded to teacher-scholars for their excellence in research and education, and the integration of the two.

Rosner’s research asks the question “How might integrating techniques for social communication into design tools enable novel forms of expressivity, engagement and understanding?” Through this work, she will investigate current practices behind making with the goal of enabling the development of next-generation digital craft.

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HCDE undergraduate students organize the Puget Sound region’s inaugural Women in User Experience (WiUX) Conference

By Gail Thynes, Senior in Human Centered Design & Engineering

“I am a strong believer in the power of community. When people come together, we can accomplish great things that would be impossible alone. I recently applied that belief to solve a problem I perceived at UW.

I noticed there weren’t many opportunities for undergraduate students to meet and mingle with User Experience (UX) professionals outside of career fairs. I had attended a few of the HCDE Graduate Student Association workshops and wanted to do something similar for undergraduate HCDE students. I approached a few professionals at World Usability Day, and from those conversations was inspired and encouraged to create an event for women in UX who need help preparing for and planning their careers. I organized a similar event two years ago while at Seattle Central Community College, so I had just enough experience to get the ball rolling.

“When you want something, all the universe conspires in helping you achieve it.” This is one of my favorite quotes from Paulo Coelho’s The Alchemist and reminds me that when you’re doing the right thing at the right time, the right people will be put in your life to help make it happen. I pitched my crazy idea to Erin McLean, a fellow HCDE student, and everything started gaining momentum and falling into place. We approached the HCDE department for support and recruited our first faculty sponsor, David McDonald, and our departmental liaison, Cassie Atkinson-Edwards. Their support and guidance was vital to getting our idea off the ground. Once we had a date and venue booked, we began recruiting volunteers to help organize the event.
The schedule of events was ambitious. We arranged a keynote address, three panel discussions on topics like leadership and interview preparation, and three interactive workshops. We also provided students with opportunities to get portfolio and resume reviews and mock interviews with industry professionals.

Last but not least, we created two networking opportunities for students. In the registration room, event sponsors were provided tables in order to mingle with students between panels or while they were getting refreshments. There was also a social mixer at the end of the day in the new Co-Motion Makerspace.

Rebecca Destello, our keynote speaker for WiUX, described a few “dares” she took in her professional career that brought about change and growth in unexpected and rewarding ways. This sentiment strongly resonates with me and reflects my own personal experience as a returning student. It was a huge dare for me to return to school in my 40’s, learn computer programming, and enroll in HCDE and embark on an entirely new career path. It was a huge dare to start a student organization for Women in UX and pull together a conference of this size in less than 6 months. However, it was a great opportunity to learn, grow, and lead with my classmates.

An event like this requires a dedicated team that contributes to its success. I would like to thank my amazing Co-Chair Erin McLean and planning committee members Jennifer Kumura, Jennifer Wong, Jessica Bao, Jess Landquist, Yoanna Dosouto, and Cassie Atkinson-Edwards. Without this group of outstanding ladies, the event would never have happened.

I’d like to thank all of our industry volunteers for sharing their Saturday afternoon with us. Lastly, a huge thanks also goes to all of our sponsors: HCDE, Google, XX+UX, Blink, Expedia, UXPA, PSSIGCHI, Nordstrom, Design Thinking Boutique, User Research International, and Co-Motion Makerspace.

My heart was full throughout the day as I watched students and volunteers engaging in meaningful conversations and making connections. The following Monday in class I witnessed how inspired my classmates were by the presenters. As I said at the beginning, I believe strongly in the power of community. WiUX is a wonderful demonstration of what can be accomplished when we share our experience, knowledge, and ideas to build a strong diverse creative network. Together we can inspire the future leaders of our industry.
Like most young adults entering college, I had no idea what I wanted to major in or pursue as a career. To better reflect on my goals in college, I volunteered in my spare time, which led me to Interconnection. At Interconnection, a non-profit organization that refurbishes computers and sends them to developing countries, I saw how providing access to tools and information can empower and uplift people by creating academic, professional and economic opportunities. I realized then that my interest in technology was more than a small fascination but a true passion. I then explored what the University of Washington had to offer.

I meandered through various classes hoping to discover a major that resonated with my goals. I found Computer Science, but as I explored the field I realized that there was something lacking: people. My focus changed. I wanted to pursue a degree that focused both on technology and people. I discovered Human Centered Design & Engineering (HCDE), which is a challenging blend of computer science, informatics, art and design. HCDE provided the perfect niche for me and offered the best curriculum for my purposes. HCDE's multidisciplinary curriculum taught students about design and research principles as well as engineering concepts, but what I found most valuable are the opportunities available for students to be involved in the field. In my time in HCDE, both in the BS and MS programs, I was very fortunate to have worked closely with professors in Directed Research Groups and with corporate sponsors on "real-world" projects. The knowledge and experience from these projects helped me in my career path and I am where I am today because of my time in HCDE.

I am currently a Design Researcher at HTC, working on virtual reality. I'm very fortunate to be working under a director, Yihsiu Chen, who firmly sees the value of working with students. It was because of Yihsiu that I was able to work with HCDE students, both in the BS and MS programs, as a sponsor for Capstone projects and class projects. In my role as a sponsor, I think about how to be a great resource for the students. I reflect on my experience as an alumnus and give feedback and advice that I feel would help them in accomplishing their goals. HCDE has given a lot to me and I see working as a sponsor as a way to give back to the program and the community.
Students in HCDE’s Usability Analysis course (HCDE 517) gain real-world user research experience by learning how to effectively evaluate the usability of a product or system.

In Sean Munson’s Winter 2015 Usability Analysis course, HCDE graduate students Greg Bauwens, Karan Gupta, Wenqi Li, and Lucie Wu collaborated with HTC on a usability analysis of HTC’s RE Camera and its corresponding iPhone app. The HTC RE is a small, point-and-shoot video camera that streams photos straight to the user’s phone. HCDE alums Angela Sharer (MS 2011) and Brian Espinosa (BS 2012, MS 2014), both User Researchers at HTC, represented HTC on the project.

The team defined the HTC RE’s audience as active mobile phone photographers and recruited seven participants for their study. They designed a series of tasks and presented the participants with two scenarios—with and without the mobile app. They evaluated positive reviews and user pain points by mapping their findings on an affinity diagram, enabling them to identify prevalent themes.

The students presented their findings, including suggested product and interface improvements, to Espinosa and Sharer’s team at HTC at the end of the their course.
DESIGN FOR GOOD

HCDE students bring their UX skills to the city to solve problems for real people

It was the last Friday of Winter Quarter, the last day of finals week and the beginning of Spring Break. HCDE graduate student Allie Deford was feeling depleted of energy, but because she had committed to her friend Nick Bolten (a PhD student in UW's Electrical Engineering department), she mustered all the strength she could find and went downtown to Moz's headquarters to embark on the City of Seattle’s 48-hour civic hackathon, Hack the Commute.

Meanwhile, HCDE certificate student Veronika Spieeva was intrigued by the hackathon idea but wasn’t sure she would be welcome due to her lack of coding skills. “I mostly have experience in user research,” Spieeva explained, “but the announcement mentioned this hackathon focused on solving social problems, so I hoped my background would be useful. I figured I had to go down there and try.”

The hackathon sorted participants by interest area, including topics such as bicycle and pedestrian safety, transit data, and accessibility around transit technology. Spieeva found Deford and Bolton at the accessibility table, where they met a fourth teammate, Reagan Middlebrook, a senior in Computer Science and Systems at UW Tacoma. Alan Borning (a UW Professor of Computer Science & Engineering), and Anat Caspi (Director of UW’s Taskar Center for Accessible Technology), led a discussion around accessibility issues in Seattle, and the team decided to focus their weekend’s work on helping people with limited mobility navigate the City’s sidewalks.

Friday night, Spieeva took to the internet to research what sorts of obstacles people with limited mobility encounter on Seattle’s streets. She found a blog authored by a resident of Seattle’s Pioneer Square neighborhood who uses a wheelchair to get around, which detailed several common pitfalls he encounters. His stories were immensely helpful for the team to understand the magnitude and frequency of problems people who use wheelchairs face on a daily basis.

The team spent the next two days intensively researching pain points, meeting with advisors from Seattle’s Department of Transportation, mapping an interface for a trip planning app, and meeting with pitch coach mentors. Just in time for Sunday’s pitch round, the group had developed a prototype of a map overlaid with information about curb ramps and elevation changes across sidewalk segments.

The team pitched their idea to the other hackathon participants and a panel of judges on Sunday evening, and were surprised to find that they would advance as one of three finalists. “We were shocked,” said Deford. “We thought we were total underdogs.” They were told they had just over a month to develop their project further before the final round at Seattle’s City Hall in late April.

The team spent the following weeks integrating data into their map, including sidewalk and construction data from the City, elevation data from Google Maps, and information about bus stops from the local OneBusAway. They developed a functioning application for desktop and mobile settings that lets the
users search by location. They also met with the blog author who connected them to an active community of wheelchair user advocates to help test their app. “It has been incredibly rewarding to work with this community,” Deford said, noting how existing route planning applications seemed to have been mostly designed without this group’s needs in mind. “Even seemingly small feature implements to our maps make a huge difference to them. That’s just how underserved they are.”

On April 29, 2015, the students presented their developed product to a panel of judges at Seattle’s City Hall, where they were announced the Hack the Commute winners. “The City has shown so much support for our project, we’re going to keep iterating on it and testing it with users,” Deford said, adding that they are looking for other campus entities to collaborate with.

Deford and Sipeeva are both happy they decided to participate in the hackathon and encourage other students to seek out local events. “It’s really important to connect with the community when working in this field,” Deford said. “We can sometimes get stuck in an academic bubble here on campus; it’s important to get out in the real world when making things for real people.” Sipeeva also encouraged people who don’t have coding skills not to be afraid, saying that she felt highly valued for her research skills, and that the atmosphere of the hackathon was very welcoming. Deford agreed, saying “It’s so important to have unique voices at the table. A bunch of programmers tend to get tunnel vision on the technology problem, often making solutions that are technically beautiful but not useful. That’s why we’re studying HCDE, right?”
HCDE INNOVATION

The pursuit of discoveries and spirit of innovation drive HCDE students and faculty to develop ideas that change the world

BETH KOLKO’S SHIFT LABS LAUNCHES OUT OF Y COMBINATOR

HCDE Professor Beth Kolko and her medical technology startup, Shift Labs, spent Winter 2015 at Y Combinator with 80 other startup founders. Y Combinator provides seed funding and mentorship for early-stage startups, accepting two cohorts of roughly 80 startups each year. Well-known companies to grow out of Y Combinator include Reddit, Airbnb, and Dropbox.

Kolko’s Shift Labs prioritizes the needs of people (medical practitioners and patients alike) in the design of medical devices. They design elegant, low-cost solutions for the growing number of healthcare providers around the world who are unable to afford expensive medical devices. Their first product is Drip Assist, a low-cost, intuitive IV fluid monitor that runs on one AA battery.

HCDE’S TAT LAB DESIGNS APP TO FACILITATE GUIDED WANDERING

HCDE Assistant Professor Daniela Rosner and her students in the Tactile & Tactical Design (TAT) lab designed Trace, a mobile app that lets people send a secret shape in the form of an annotated map that is decipherable only by walking.

Rosner worked with graduate students Hidekazu Saegusa and Allison Chambliss, and recent graduate Jeremy Friedland, to study 16 people using Trace over a one-week period. The researchers are studying the social impacts of emphasizing guided wandering over destination-based walking, finding that using Trace pushes the boundaries of people’s desires for safety, efficiency, and control.
HCDE STUDENTS’ AIR-LIFT HAND TRUCK WINS 2015 SHOBE PRIZE

HCDE Master’s students Gina Donlin, Ariel Duncan, Letty Limbach, and Gabby Mehlman have won the 2015 Shobe Prize, HCDE’s annual startup competition sponsored by HCDE alumnus Matt Shobe (MS 1994).

The team’s winning project is a patented two-wheeled hand truck that uses air pressure to lift heavy loads quickly and quietly. The students are working to iterate on the prototype and conduct user research with the target population of heavy-load delivery providers.

Shobe Prize winning teams receive $5,000 in funding, desk space in UW's Startup Hall for the spring and summer, and one-on-one mentorship in order to develop their ideas into a prototype and refined sales pitch.

HCDE STUDENTS PRESENT STARTUP VISUALIZATION AT UW’S STARTUP HALL

Jordan Vincent, Lukas Eiermann, and Alison Chambliss, graduate students from Cecilia Aragon’s Information Visualization class (HCDE 511), were invited to present their class project to the Startup Hall community in January 2015.

The students designed StartupViz, an interactive visualization of the US startup landscape. Their tool provides a simple way for people to explore trends in startup sectors, geographical regions or funding sources. The students had previously gathered feedback from Startup Hall companies when developing their project. Not pictured team member: Arpita Kulkarni.

HCDE & ISCHOOL STUDENTS HACK HOUSING AT ZILLOW HACKATHON

SriHarsha Garuda (UW iSchool), Melanie Penney (HCDE MS), Karan Gupta (HCDE MS), Sonal Srivastava (UW iSchool), and Suryaprakash Vijayaraghavan (UW iSchool), teamed up at the Hack Housing Hackathon, sponsored by Zillow and UW's department of Computer Science & Engineering.

The students placed third at the hackathon for their project Zillow Wheeler—a version of the real estate database Zillow, optimized for the needs of people who use wheelchairs to get around. By researching housing pain points and needs people who use wheelchairs face, the team developed a persona and designed 19 new filter criteria, allowing the user to prioritize their own accessibility needs.
The HCDE Graduate Student Association (GSA) unites the student body and leaves a lasting legacy.

“It is also very important that we are a unified voice for the graduate students,” Mehlman added. “The GSA is a community where students can feel comfortable sharing their concerns and ideas, and we funnel those up to the department-level.”

The 2014-2015 GSA officers built an infrastructure and annual calendar around organizing workshops and student-led skillshares, and integrated first-year grad students as board members to amplify their efforts in the coming years.

More than 70 students attended the GSA’s first UX portfolio event that included panel discussions by industry guests and a portfolio workshop. “It’s really rewarding when we hear feedback from students about how valuable the workshops have been for them,” Mehlman said.

The GSA also taps into the diverse skillsets of their fellow classmates by instituting skillshares—events where current students host workshops teaching a particular software or tool. “We have been very fortunate to work with really dedicated students, alumni, and members of the community,” Mehlman said. “Everyone has been eager to help.”

When asked what she would say to encourage other students to be involved, Mehlman said, “There’s practical reasons. It’s a great way to network with each other and meet local professionals and alumni. Of course whatever we do to help make the department stronger in turn helps our resumes look better. But then there’s the less-practical but super important reason: it’s really fun!”

“We were just looking for a community when we started getting involved in the GSA last year,” Burns said. “Now, not only do we think we’ve left the department better than we found it, we’ve made some really great friends in the process.”

Other GSA Officers for the 2014-2015 academic year include Susan Oldham, Treasurer; Gina Donlin, Logistics Officer; Margaret Quin Lyons, User Research Officer; Joe DeMaria, Community Relations Officer; Monica Caraway, Professional Societies Liaison; Denise Borges, Content Designer & Social Media Officer; and Allan Liuk, HCDE Alumni Liason. Learn more at hcde.uw.edu/GSA.
Passion Never Rests

Dr. Emma Rose (MS 2002, PhD 2011) credits HCDE with giving her the connections to design for social good

Emma Rose joined HCDE as a Master’s student in Technical Communication in the year 2000, armed with an undergraduate degree in English, an interest in technology, and a passion for making the world a better place.

“I had been working in web development but didn’t necessarily see myself as ‘just a coder,’” Rose recalls. Looking for a way to use her technical skills to impact social change, she enrolled in Professor (now Emeritus) Judy Ramey’s class on usability testing. “It was in that class when I thought: ‘I found it.’ I found what I needed to be doing. Listening to people and making things work better—usability integrated so many things that I was passionate about.” Rose put usability research and testing into practice while doing her Master’s thesis, where she evaluated the usability of digital transportation information for the Washington State Department of Transportation.

After Rose graduated, Professor Ramey connected her with Suzanne Boyd—HCDE Affiliate Professor and CEO of Anthro-Tech. Rose spent 10 years at Anthro-Tech, a user-centered design consultancy and a member of HCDE’s Corporate Affiliates Program. She conducted research and lead user-experience projects for non-profits and government agencies as a consultant and as the Director of Research. At the same time, she was visiting campus in the evenings to teach classes in technical writing and usability for the department, sharing her industry perspective as a practicing UX professional with HCDE students.

Rose also continued her studies by returning to HCDE as a student in 2006, this time to work on her PhD. She became increasingly interested in improving technologies for resource-constrained populations. “Completing my doctorate in HCDE was very eye-opening,” Rose said. “I had the opportunity to delve deeper into research in human computer interaction. This including working with Professor Beth Kolko researching mobile phone usage in developing countries and conducting ethnographic research in Kyrgyzstan which became part of my dissertation.”

Today, Rose is an Assistant Professor at UW Tacoma in the School of Interdisciplinary Arts and Sciences and a Research Associate at the Center for Data Science. Teaching courses in Writing Studies and Communication, she helps students make connections between writing, design and usability. “I’m always reminding my students that human-centered design is about understanding people and delivering communication that works for that audience—it’s the same philosophy of rhetoric and writing.” In her research, she continues to look for ways that design and research can support and empower resource-constrained populations. One of her current research projects looks at how students decide to pursue Science, Technology, Engineering, and Math (STEM) activities, and what types of programs can increase the participation of underrepresented students (including women and people of color). She remains highly connected to HCDE: she visits the department as a guest lecturer; she serves on HCDE PhD committees; she sponsors student projects; and she is working with Andrew Davidson’s research group to create and package a participatory design curriculum that teaches high-schoolers about the user centered design process.

Rose reflects on her history with the department, saying “HCDE taught me the importance of paying attention to people’s voices, whether in the classroom, when designing, or when conducting research. “Without the education, connections, and opportunities the department has provided me with, I wouldn’t be where I am today.”
In the HCDE Capstone course, students apply the skills and knowledge gained throughout their degree program to address one of today’s problems by understanding people and their contexts. Students form teams around an identified problem—either submitted by a project sponsor or selected by the students themselves—and as a group they decide on the research process, milestone activities, and deliverables. Depending on the roles required for each project (e.g., designer, researcher, prototyper, developer), leadership opportunities emerge within a student’s area of specialization.

In 2015, HCDE graduate students Tony Corneto, Lisa Lowery, Bipin Mathew, Gabrielle Mehlman, and Ian Wyosnick partnered with Healium (members of HCDE’s Corporate Affiliates Program) for their Capstone project designing a streamlined workflow experience for emergency physicians. Healium uses next-generation wearable and mobile technology to digitally deliver healthcare providers all of the information they need, enabling them to work in a hands-free and face to face manner.

Based on interviews and usability tests with ER experts, the students designed an integrated workflow experience for Healium that lets doctors review patient details, document patient interaction, dictate notes, and order medications, all while on the go.

“We were very, very, impressed with the quality and thoughtfulness of their efforts,” said the Capstone project sponsor, Healium’s CEO Carl Spitzer, MD. “The physician workflow in the emergency department is complex and highly variable. In a short period of time, the team was able to analyze that workflow through interviews and direct observation, identify relevant pain points, iteratively attack those pain points, mock up software solutions, create a professional-quality video to illustrate their work, and back it up with a comprehensive deck. Kudos and thanks to the team, and to the HCDE department for addressing very relevant issues in clinical IT.”

All Capstone teams present their final projects to the HCDE Community at the HCDE Capstone Showcase at the end of their course. If you are interested in sponsoring a Capstone project, learn more at hcde.uw.edu/capstone.
HCDE Associate Professor Charlotte P. Lee struggles with the notion that while Human Centered Design & Engineering is about people at its core, it’s often a difficult field for people to easily understand.

With a newfound personal interest in comics herself, Lee recruited Jeremy Kayes (Founder and Organizer of the Seattle Indie Comic and Game Artist Meetup group) to bring comic design to HCDE. Lee and Kayes co-taught a Directed Research Group to explore how the sequential storytelling format of comics can be used to make science and engineering more accessible.

Students from HCDE’s undergraduate, master’s and PhD programs enrolled in the course, which began by brainstorming ways to describe human-centered design to people who are unfamiliar with the field. Students learned comic drawing skills and techniques, and practiced graphically organizing their thoughts on paper.

Student comics described the HCDE student experience, reasons for choosing the field of study, and the importance of putting people at the forefront of the design process. Students in the group also gained hands-on experience in the process of book publishing, as they compiled their stories into a comic anthology, Have the Humans Grow More Arms.

Lee describes the importance of the HCDE comics project in the introduction to Have the Humans Grow More Arms, writing: “Universities can seem daunting to outsiders and the language of academics can seem like a foreign language. Comics, being so accessible and perfect for mass distribution, give us an excellent platform for reaching so many more people.”

The HCDE comics authors presented their book to the HCDE community at a book launch party in Spring 2015, where they welcomed guests to try drawing their own comics and sold the books for $12 apiece. Information about how to purchase Have the Humans Grow More Arms is available at hcde.uw.edu/comics.
DRIVEN TO DISCOVER

AN HCDE Directed Research Group puts children first to design age-appropriate technology

By PhD student Alexis Hiniker, Associate Professor Julie Kientz, and HCDE students

More mobile apps are created for children under 5 than for any other age group, yet designers targeting young children routinely draw on interaction design paradigms created for adults. As these Interface decisions don’t always translate well, one HCDE Directed Research Group spent the fall of 2014 exploring new design solutions to make children’s apps more developmentally appropriate.

The group began with a review of the current app space, selecting a random set of popular mobile apps for preschoolers and systematically coding their features. Building on existing academic literature and the trends in interaction design that the team uncovered during their review, they decided to conduct two investigations. They first focused on the way apps prompt children to perform specific gestures; the second focused on informal symbolism in app interfaces.

Over two months, the team designed and implemented a set of mini-apps which include the commonly used interface elements that they planned to investigate—such as progress bars, audio recordings, visual feedback, and demonstrations by cartoon characters. The team created all of the audio and graphical assets for the apps and implemented them for an Apple iPad. They went through a series of design iterations and enjoyed welcoming preschool-aged user testers as guest attendees at research meetings. The team designed and scripted a study protocol to carefully manipulate isolated elements of these mini-apps in order to test the effect of different UI components on very young children’s tablet experiences.

The group partnered with a local preschool and recruited 34 children between the ages of 2 and 5 to complete a series of tasks on a mobile device together with a researcher. Kids and researchers alike had a blast filling up on-screen cups with water from a faucet, building a virtual bridge across a river, and playing ball with “Luna,” the canine protagonist of the game (named for Professor Kientz’s Goldendoodle).

This data yielded many new findings about the way young children learn to use technology. For example, the youngest preschoolers were unable to follow audio instructions from an app despite their ability to follow verbal instructions from a physically present adult. Children spontaneously
and correctly interpreted traditional progress bars but were unable to use progress bars when they were embellished with visual detail to make them match the theme of the app. By age three-and-a-half, children easily recognized that a cartoon hand performing an action on screen indicated what they should do with their hands; younger children failed to make this connection.

The group will be publishing their first set of findings in a full-length paper (in press) at the 14th annual conference on Interaction Design and Children, the premiere international conference for research on children’s technologies. The team continues to collaborate and is currently preparing a second manuscript that documents how designers use symbols in interfaces for children and how these are interpreted by child users.

The group was led by PhD student Alexis Hiniker and sponsored and advised by Professor Julie Kientz. It included five HCDE Master’s and PhD students as well as an outside consultant who specializes in child development. This work supports Hiniker’s doctoral dissertation on understanding how children and their families use digital media.
REMEMBERING TOM WILLIAMS

HCDE was saddened by the death of Emeritus Professor Tom Williams. He passed away on January 12, 2015, after a long battle with illness with his extended family around him.

Williams was dedicated to teaching and research, and advancing the profession and academic discipline of technical communication. His research and teaching focused on visual information processing and visual media, and he pioneered gaze-tracking research in the department.

Williams earned three degrees from the UW: a BS in Communication, an MS in Communication, and a PhD in Educational Psychology. His dissertation research focused on the effects of advance organizers on retention. Tom’s faculty role at the University spanned 32 years; he retired in 2009.

Williams presented at many conferences in the field, e.g., at the STC Annual Conference, the IEEE IPCC, and Winwriters UA. Tom was also a long time Fellow of STC, serving as president of the Puget Sound Chapter of STC. He has left a lasting legacy on the department.
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Many thanks to our friends who support the mission of HCDE. Included below are people and corporations who have given to the department in the past year.

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