

2019 iSchool Research Fair

6:30-8 p.m., March 14

University of Washington | Husky Union Building, South Ballroom



Research Fair

The Research Fair is our annual event for sharing and celebrating the work of our vibrant research community. We hope you will enjoy exploring how iSchool research is pushing boundaries, responding to significant real-world challenges, and making a difference in the lives of people and communities. At the iSchool, WE MAKE INFORMATION WORK.

New this year: We are including researchers' lightning talks. In addition, we have flagged (🚩) projects that have research opportunities for students.

Agenda

6:00–6:30 p.m.: Dean's Reception

6:30–8:00 p.m.: Open poster session and interactive demonstrations

Research Areas

- Data Science
- Digital Youth
- Health and Well-Being
- Human-Computer Interaction
- Indigenous Knowledge
- Information & Society
- Learning Sciences
- Library & Information Science
- Sociotechnical Information Systems

Current Areas of Strategic Visibility

- Data for Social Good
- Future of Libraries
- Human-Computer Interaction for the Social Good
- Native North American Indigenous Knowledge

Research Groups

- Code & Cognition Lab
- DataLab
- Digital Youth Lab
- GAMER Group
- iMed
- iNative
- Knowledge Organization
- Mobile + Accessible Design (MAD) Lab
- Social Media (SoMe) Lab
- Technology & Social Change Group (TASCHA)
- User Empowerment Lab
- Value Sensitive Design (VSD) Research Lab

Affiliated UW Groups

- DUB Group
- Tech Policy Lab

Posters and Demonstrations

1. Code & Cognition Lab

Andrew J. Ko, Greg Nelson, Kyle Thayer, Amanda Swearngin, Benjamin Xie, Yim Register, Alannah Oleson, and Patrick Old

The code & cognition lab investigates interactions between people and code, and in particular, effective, equitable, and scalable ways of learning computing. Our research particularly focuses on learning about programming, design, and data science.

🚩 Undergraduate

2. Scout: Mixed-Initiative Exploration of Design Variations through High-Level Design Constraints

Amanda Swearngin, Andrew J. Ko, and James Fogarty

Scout lets designers rapidly explore layout alternatives for user interfaces. Designers express their interface elements and a set of high-level constraints, and Scout then generates alternative layouts satisfying their constraints, applying techniques from constraint solving and program synthesis.

🚩 Undergraduate

3. Reconceptualizing Superwork for Improved Access to Popular Cultural Objects

Jin Ha Lee, Hyerim Cho, Travis Windleharth, and Thomas Disher

In the context of popular culture, a successful work or a work with broad cultural or scientific impact often prompts the publication of many derivative works

across multiple formats and by multiple creators, works that share elements with the original work such as topics, characters or universes. We argue for reconceptualization of the “Superwork” entity to aggregate these relevant works into a single bibliographic entity about which facts in the form of metadata, exploitable by library users, can be recorded.

🚩 Undergraduate, Master's, Ph.D.

4. Understanding Users of Cross-Media Information: Context, Gratifications, and Features Focusing on Visual Narrative Materials

Hyerim Cho

Libraries and information experts play key roles in facilitating access to multimedia objects, and the importance of their expertise has increased with the growth of digital libraries. This study contributes to improving multimedia access by focusing on three different types of visual narrative materials and their users: printed visual narrative, visual narrative with a moving image, and interactive visual narrative. By better identifying and understanding users of visual materials, my contributions may improve recommendations and reference services for multimedia materials, encourage media trans-literacy, and serve as a foundation for developing enhanced organization and retrieval systems for multimedia information.

🚩 Undergraduate, Master's, Ph.D.

5. Organizing and Curating Collections of Video Game Development Artifacts

Jin Ha Lee, Marc Schmalz, Frank Cifaldi, Kelsey Lewin, Kylie Snyder, Stephen Keating, and Jeewon Ha

While game preservation has gained popularity among academics and institutions dedicated to preserving our cultural heritage, few have yet to focus on development artifacts, such as artwork, game design documents, musical scores, test builds, and marketing materials. As with other media, game development artifacts are vital for understanding and appreciating the history and context of produced works. To aid those attempting to preserve these endangered materials, we aim to produce and test a conceptual data model and metadata schema for representing artifacts related to the development of video games. This will contribute to a theorized understanding of how to represent complex media objects and enable curators and catalogers to effectively describe and represent game-related materials through standard descriptions.

🚩 Undergraduate, Master's, Ph.D.

6. Virtual Reality in Public Libraries

Negin Dahya, Jin Ha Lee, Kung Jin Lee, W.E. King, Hekma Yassin, and Megha Goel

This project involved a six-month study of VR usage in seven libraries across Washington state, including interviews with librarians (n=36) and patrons (n=39), patron user experience surveys (n=185), and field notes from site visits. Our work explores what it means to bring VR into the public library with a focus on informal learning and community engagement. Our findings address perceived and actual demographics of VR users in the library, beliefs about VR as part of video game culture, and practical considerations about having VR in the library.

7. Designing Health-Related Features for Pokémon GO from Game Players' Perspectives

Yoojung Kim, Arpita Bhattacharya, Julie A. Kientz, and Jin Ha Lee

In recent years, several mobile games have been released with health-related features, but with little attention to gamers' perspectives. In this paper, we present opportunities and challenges to integrate gamers' interests and health promotion through the case of Pokémon GO, a popular location-based mobile game. By conducting surveys and design workshops with 20 active Pokémon GO players, we found the important health features to them to be 1) diverse goals and rewards, 2) a strong bond between a gamer and game characters, and 3) collaborative play. We discuss current challenges, including the tension between engagement, sustainability, and data accuracy.

8. Autism Ready Libraries: Improving Inclusion in Public Libraries

Emily Romeijn-Stout and Hala Annabi

Despite being longtime advocates for underserved and underrepresented populations, public libraries have been slow to provide services for children with autism and their families. The Autism Ready Libraries project investigates how libraries can best support, serve, and welcome children with autism and their families. The study utilizes exploratory focus groups, interviews, and participatory design sessions to identify the barriers that children with autism and their families experience in accessing the library, and the challenges and training needs of the librarians serving them. This research contributes to our theoretical understanding of library services and develops evidence-based training resources, early literacy programs, and support mechanisms to prepare Autism Ready Libraries that welcome and include families with autism.

9. ConnectedLib: Helping Librarians Use Digital Media to Make Learning Connections with Youth

Katie Davis, Ligaya Scaff, Saba Kawas, Emily Romeijn-Stout, Mega Subramaniam, and Kelly Hoffman

Project ConnectedLib aims to build public librarians' capacity to incorporate digital media into their work with youth to promote connections across their learning contexts. We have developed a free professional development toolkit in the form of learning modules that support librarians from a broad range of public libraries in their efforts to leverage new media technologies and promote youth's connected learning experiences in libraries. We are excited to disseminate the toolkit widely to libraries serving diverse youth across the country.

10. Interest-Centered Design Framework: Can a Mobile App Spark Children's Interest in Nature? Exploring an Interest-Centered Design Framework for Mobile Technologies to Re-connect Children with Nature

Saba Kawas, Sarah Chase, Josh Lawler, and Katie Davis

What if we could harness children's excitement for mobile technologies to promote their interest in exploring the natural world? Through embodying our interest-centered design framework, the NatureCollections app seeks to do just that! We derived the set of interest-centered design principles and strategies from theory related to interest development and co-design sessions with children. Additionally, we conducted an evaluative case study of the app with 18 children ages 7-11 in an outdoor setting. Our findings suggest that NatureCollections' features (i.e. curating nature photos into collections and identifying the elements in their photos) sparked children's interest in nature by (1) directing their attention to and promoting close observation of the natural elements in their

surroundings, and (2) promoting playful interactions with peers and parents around nature.

11. Digital Badges for STEM Education: From Design to Implementation ... and Back Again

Caroline Pitt, Adam Bell, Edgar Onofre, Ari Hock, and Katie Davis

What makes badge systems so difficult to implement? In this research-practice partnership, we engage in long-term design and implementation of a digital badge system with the Pacific Science Center Discovery Corps to evaluate the barriers such technologies might face when used in informal educational settings. Through our work, we found that digital badge systems faced sociotechnical, sociocultural, and technical challenges to implementation that required resolution for the system to be effective. Not only does the technology itself require careful design, but so do the structures and routines surrounding it, which require substantial stakeholder buy-in.

Undergraduate, Master's, Ph.D.

12. Community Learning at Family Science Nights

Jason Yip, Caroline Pitt, Diana Griffing, Daniel Pauw, and Hannoori Jeong

How can understanding how communities learn science help us increase scientific literacy? To explore how community groups explore science within and between family units, we are examining several years of Family Science Night data, including videos, annotations, application posts, and field notes. The data set focuses on the Washington site of the project and involves a diverse group of families from our partner school community. We are coding the data to see when and how families work together to explore scientific concepts during Family Science Nights, exploring the roles that different community members take on.

Undergraduate, Master's

13. Laughing is Scary, but Farting is Cute: A Conceptual Model of Children's Perspectives of Creepy Technologies

Jason Yip, Kiley Sobel, Xin Gao, Allison Marie Hishikawa, Alexis Lim, Laura Meng, Romaine Flor Ofana, Justin Park, and Alexis Hiniker

In human-computer interaction, adults' concerns about technologies for children have been studied extensively. However, less is known about what children themselves find concerning in everyday technologies. We examine children's technology-related fears by probing their use of the colloquial term "creepy." To understand children's perceptions of "creepy technologies," we conducted four participatory design sessions with children (ages 7-11) to design and evaluate creepy technologies, followed by interviews with the same children. We found that children's fear reactions emphasized physical harm, stalking, and threats to their relationships (particularly with attachment figures). The creepy signals from technology the children described include: deception, control, mimicry, visual appearance, and unpredictability. Children acknowledged trusted adults will mediate the relationship between creepy technology signals and fear responses.

14. Children as Informal Healthcare Advocates: How Latino Families Engage in Health-Related Online Search and Brokering

Laura R. Pina, Carmen Gonzalez, Carolina Nieto, Wendy Roldan, Edgar Onofre, and Jason Yip

With the emergence of digital health resources, children will increasingly play a role in managing the health-related needs of their parents or other family members. This will particularly be the case among immigrant families, in which bilingual children often act as intermediaries by translating or interpreting information. Through the lens of joint media engagement, this research examines how bilingual

families engage in health-related online searching and brokering and how privacy is negotiated when children take on the role of informal health-care advocates. In-home interviews and search tasks with Latino parents and their children reveal that connectivity can impact the disclosure of private health information during intergenerational online information seeking. When children are tasked with addressing a health goal that is directly related to their parents' well-being, the precariousness of privacy management is heightened as the searching and brokering process complicates traditional notions of caregiving.

15. Participatory Design of Children's Library Programming

Jason Yip, Jin Ha Lee, Kung Jin Lee, Hitomi Bloom, Kelly Chandler, Alice Erickson, Cynthia Graff, Brianne Hawes, and Cherise Fuselier

We used Participatory Design (PD) as a way to fully incorporate the voice of children in the development of children's library programming. Using KidsTeam UW as a model, we worked for 10 weeks with a group of eight 6- to 9-year-old children, with each week focusing on a different aspect of 3D printing. Data in the form of session notes, photos, and video recordings were analyzed to determine important elements and best practices for a printing program, as well as guidelines for librarians to incorporate the practice of PD in their own program development.

Undergraduate, Master's

16. Gamification and Flipping in a Large Classroom

Bob Boiko

Intro to Social Networking Technologies (INFO 101) is an iSchool class for lower-division students. Over the last 5 years, we have developed and honed a gamified, flipped, scaffolded, automated and data-driven learning system that uses next-generation technology

to teach more than 450 students per year about the systems they use. Our students complete more than twice as much work as the previous version of the course. They consistently do 10-30 percent more work than is needed to get an A. Davis et al. (2017) found that a supermajority of the INFO 101 students surveyed found significant value in the methods used in the course.

17. Literature Review of Data for Decision-Making Frameworks and Resources

Hanna Navarro, Yoshi Ota, and Chris Rothschild

Despite the multitude of resources that are designed to improve the ability of organizations, government agencies, and communities to use data for decision-making, the majority of these resources are not adequately developed for environments with nascent and emerging data cultures. This limits their practical application by diverse groups who seek to create and use knowledge in ways that meet their own needs while also contributing to broader data-collection efforts. This poster presents early findings of a literature review of frameworks and resources for improving data for decision-making, with an interest in conceptualization and design for diverse communities, organizations, and contexts.

🚩 Undergraduate, Master's, Ph.D.

18. OptiGain: Automatically Discovering the Optimal Mouse Gain Setting for People with Limited Hand Function through Everyday Computer Use

Ather Sharif and Jacob O. Wobbrock

The mouse cursor control-display (C-D) gain determines how much movement of the mouse cursor results from corresponding physical movement in the world. Colloquially, C-D gain refers to the "sensitivity" of the mouse cursor. For most computer users, this

sensitivity is an afterthought, but for users with motor impairments causing limited hand function, the C-D gain can make a big difference in their ability to work efficiently at a computer. At the same time, most users are not aware of the C-D gain setting and, even if they are, might not pick the optimal value. To address these concerns, we are developing OptiGain, a software tool that runs in the background to analyze everyday pointing movements and adjust the C-D gain setting to optimize throughput, a measure of pointing efficiency. As part of this work, we also conducted a study that verified that optimal C-D gain settings do indeed exist for users. The results of this work and our OptiGain tool will help people with limited hand function to perform pointing tasks with increased efficiency and comfort.

19. NeuroTouch: Improving Touch Accuracy on Touchscreens Using Deep Learning

Martez Mott, Alex Mariakakis, Abdullah Ali, and Jacob O. Wobbrock

Touch input is the basis for one of the most ubiquitous forms of human-computer interaction today. However, people's ability to use a touchscreen can be diminished by intrinsic motor impairments or extrinsic situational impairments. We are exploring the use of deep learning to improve touch accuracy on smartphones and other touch-enabled surfaces. NeuroTouch, our proposed system, processes the entire capacitive sensing heatmap provided by the touchscreen to estimate the user's intended touch location. Our evaluation will explore the required properties of the training data and provide a comparison with current state-of-the-art algorithms. To the best of our knowledge, ours is the first exploration of deep learning as it applies to touch processing to date.

20. Keyboard Gestures for Mobile Text Editing

Mingrui “Ray” Zhang and Jacob O. Wobbrock

Text editing on mobile devices can be a painful process. To perform various editing operations, a user has to repeatedly move his or her fingers between the text input area and the keyboard, making multiple round trips and breaking the flow of typing in the process. In this work, we are designing a set of on-keyboard gestures that enable text editing so that users' fingers never have to leave the keyboard area. Our design includes a ring gesture and flicks for cursor control, bezel gestures for text selection, and four letterlike gesture shortcuts for copy, paste, cut, and undo operations. The result is a much more fluid and efficient mobile text entry experience.

21. An Epidemiology-Inspired, Large-Scale Analysis of Mobile App Accessibility

Anne Spencer Ross, Xiaoqi Zhang, James Fogarty, and Jacob O. Wobbrock

Our research provides for large-scale automated analyses of mobile application accessibility, with a goal of better understanding accessibility barriers at scale and over time. We base our analyses on a novel epidemiology-inspired framework that we developed for structuring the examination of mobile application accessibility. Just as epidemiology provides for the large-scale study of disease, our epidemiology-inspired framework provides for the large-scale study of mobile accessibility barriers. It frames accessibility as a result of multiple factors within an ecosystem in which applications are created, maintained, and used. Our completed work applies our framework by conducting large-scale analyses of an existing dataset of more than 5,000 Android applications, assessing them for label-based accessibility barriers on image-based buttons. Our future work will extend this research to analyze more applications at scale and expand the accessibility barriers that are tested for.

22. Combining Crowds and Machine Learning to Enable Distributed End-User Elicitation Studies at Scale

Abdullah X. Ali, Meredith Ringel Morris, and Jacob O. Wobbrock

End-user elicitation studies are a popular participatory design methodology. In such studies, end users view the outcomes of specific interactions and propose actions (e.g., gestures or commands) or symbols (e.g., icons or labels) that would cause those outcomes. There have been hundreds of published elicitation studies over the past decade. Despite their popularity, however, elicitation studies face some drawbacks. For example, they are typically limited to a lab setting, they require much effort and time to analyze, and they lack a formal methodology to validate their results. In this work, we are developing a platform and formulating methods to address these drawbacks. Our platform harnesses the power of online crowds to enable distributed elicitation studies at scale, enabling more and more diverse users to contribute while requiring a fraction of the time of conventional lab-based studies. Our platform combines input from crowd-workers with machine learning algorithms to perform many tedious tasks formerly required of researchers using this methodology. The result of this work is a fully-featured platform that researchers and practitioners can use to design, deploy, and analyze their own distributed end-user elicitation studies.

23. Just Ask Me: A Questionnaire-Based Approach to Identifying Individuals' Optimal Screen Target Sizes

Rachel Franz, Leah Findlater, and Jacob O. Wobbrock

Human performance trials where people come to a lab and interact with computing systems are a mainstay of research in human-computer interaction. Such trials might examine, for example, optimal pointing device configurations, screen layouts, or touch-keyboard

designs. Unfortunately, however, human performance studies are time-consuming, tedious, and fatiguing. The question arises whether “performance” is the only approach for a researcher to learn these outcomes, or whether another approach, like self-report, could suffice. To explore this possibility, we are exploring a questionnaire-based approach to modeling a user’s optimal target size on smartphones. We devised a questionnaire with 12 different target sizes and asked 16 participants which target size they think they could tap reliably without missing. We then conducted a test to objectively measure their optimal target size and compared it to the questionnaire-based approach. Although our findings are still preliminary, they suggest that repeated self-report can replace human performance, opening the door to numerous possibilities for remote assessment and applications to people with disabilities.

🚩 Undergraduate, Master’s

24. Enabling Post Hoc Pairwise Comparisons in the Nonparametric Aligned Rank Transform Statistical Procedure

Lisa Elkin, Matthew Kay, and Jacob O. Wobbrock

Formal statistical evaluations in human-computer interaction (HCI) often have multiple factors and data that cannot be properly analyzed using parametric ANOVA procedures. In such cases, nonparametric analyses are more appropriate, but widely known analyses do not handle factorial designs and interaction effects. To address this problem, Wobbrock et al. (2011) devised a tool for performing the little-known Aligned Rank Transform (ART) procedure, which performs a preprocessing step that enables nonparametric factorial analyses to be conducted using ANOVA procedures on aligned ranks. But neither that work nor the work by statisticians before it formulated an approach for post hoc pairwise comparisons, a necessary component of any complete statistical approach. In this work, we are devising post hoc

pairwise comparisons for use in the ART procedure. As a first step in validating the correctness of our post hoc ART procedure, we are creating synthetic data and comparing the results of known parametric contrasts to those of our post hoc ART procedure. Our preliminary results indicate that our post hoc ART procedure is mathematically correct and generalizable across between- and within-subjects factorial designs. We are also extending tools on Windows and in R to automate our post hoc ART procedure, making it available to researchers in HCI and beyond.

25. Would You Rather? Design Methodology for User-Centered Cybersecurity

Camille Cobb, Lucy Simko, Tadayoshi Kohno, and Alexis Hiniker

How can researchers learn about users’ thoughts on security and privacy issues? We’ve adapted the game “Would You Rather” (WYR) to focus on technology concepts and highlight users’ thoughts on a variety of security and privacy tradeoffs. Preliminary work on this project has involved developing WYR as a design methodology by conducting WYR activities in a variety of settings and contexts. In addition to sharing this in-progress work, you can learn about it directly during the iSchool Research Fair by participating in a WYR activity focused on Online Status Indicators.

26. Modeling the Engagement-Disengagement Cycle of Compulsive Phone Use

Jonathan Tran, Katie Yang, Katie Davis, and Alexis Hiniker

Many smartphone users engage in compulsive and habitual phone checking they find frustrating, yet our understanding of how this phenomenon is experienced is limited. We conducted a semi-structured interview, a think-aloud phone use demonstration, and a



◀ sketching exercise with 39 smartphone users (ages 14–64) to probe their experiences with compulsive phone checking. Their insights revealed a small taxonomy of common triggers that lead up to instances of compulsive phone use and a second set that end compulsive phone use sessions. Though participants expressed frustration with their lack of self-control, they also reported that the activities they engage in during these sessions can be meaningful, which they defined as transcending the current instance of use. Participants said they periodically reflect on their compulsive use and delete apps that drive compulsive checking without providing sufficient meaning. We use these findings to create a descriptive model of the cycle of compulsive checking, and we call on designers to craft experiences that meet users' definition of meaningfulness rather than creating lock-out mechanisms to help them police their own use.

27. Kindness Online: How Does the Design of a Social Media Platform Influence the Types of Conversations That Happen There?

Catherine Yoo, Jack Lo, Amulya Paramasivam, Sybil Wang, Ashley Zhou, and Alexis Hiniker

Online platforms have become one of the primary methods by which people communicate with one another. Regardless of conversation space, either online or offline, arguments can arise. Through our research, we are studying the ways in which the design of a platform influences the tenor of a conversation and the factors that lead to fights and reconciliation. We conducted in-depth interviews with 23 adults to understand how arguments arise and end online and received input for possible design ideas. Based on themes we uncovered through affinity diagramming and design suggestions from participants, we made sketches for potential design ideas that can be implemented in social media platforms to encourage constructive discourse. We are planning to use the design sketches to create prototypes to test with

participants for iteration, which we will describe in a research paper to share our findings and design ideas broadly.

▣ Undergraduate

28. Is an Emoji Worth a Thousand Words? Pediatric Inpatient Perspectives on Pictorial Modes of Emotional Subtext in Electronic Health Communication

Calvin Apodaca, Shefali Haldar, Sonali R. Mishra, Maher Khelifi, Ari H. Pollack, and Wanda Pratt

In increasingly strained health-care settings, effective communication is essential for establishing a rapport between patients and clinicians. We conducted semi-structured interviews with 12 hospitalized pediatric patients using low-fidelity mockups of a patient-focused health app. We examined attitudes on emojis as a tool for emotional communication and found that participants expressed interest in their ability to express pain and emotional subtext in conjunction with text.

29. Must We Bust the Trust?: Understanding How the Clinician-Patient Relationship Influences Patient Engagement in Safety

Sonali R. Mishra, Shefali Haldar, Maher Khelifi, Ari H. Pollack, and Wanda Pratt

Patients desire safe care but are reluctant to perform safety-related behaviors when they worry it could harm the relationships they have with clinicians. However, most patient-facing safety interventions ignore the influence of the clinician-patient relationship on safety behavior, instead focusing on helping patients access care-related information and report errors. We conducted semi-structured interviews with hospitalized patients to understand how patient-facing information systems can help patients prevent medical

errors. We found that different aspects of the clinician-patient relationship can either encourage or discourage patients and caregivers from engaging in patient safety behaviors.

30. Visually Encoding the Lived Experience of Bipolar Disorder

Jaime Snyder, Elizabeth Murnane, Caitie Lustig, and Stephen Volda

Issues of social identity, attitudes toward self-disclosure, and potentially biased approaches to what is considered “typical” or “normal” are critical factors when designing visualizations for personal informatics systems. This is particularly true when working with vulnerable populations like those who self-track to manage serious mental illnesses like bipolar disorder (BD). We worked with individuals diagnosed with BD to 1) better understand sense-making challenges related to the representation and interpretation of personal data and 2) probe the benefits, risks, and limitations of participatory approaches to designing personal data visualizations that better reflect their lived experiences.

🚩 Undergraduate, Master's, Ph.D.

31. Uncovering Datasets from the World We Wish We Had

Luke Rodriguez and Bill Howe

Synthetic datasets have long been thought of as second-rate, to be used only when “real” data collected directly from the real world is unavailable. But this perspective assumes that raw data is clean, unbiased, and trustworthy, which it rarely is. Rather than representing a departure from the true state of the world, we argue that properly generated synthetic data is a step toward responsible and equitable research and development of machine learning systems.

🚩 Master's, Ph.D.

32. GraviTIE: Exploratory Analysis of Large-Scale Heterogeneous Image Collections

Sean T. Yang, Luke Rodriguez, Jevin D. West, and Bill Howe

We present GraviTIE (pronounced “gravity”), an interactive visualization system for large-scale image datasets. GraviTIE operates on datasets consisting of images equipped with unstructured and semi-structured text, relying on multi-modal unsupervised learning methods to produce an interactive similarity map. Users interact with the similarity map through pan and zoom operations, as well as keyword-oriented queries. GraviTIE makes no assumptions about the form, scale, or content of the data, allowing it to be used for exploratory analysis, assessment of unsupervised learning methods, data curation and quality control, data profiling, and other purposes where flexibility and scalability are paramount.

🚩 Undergraduate, Master's

33. Delineating Knowledge Domains in the Scientific Literature Using Visual Information

Sean T. Yang, Po-shen Lee, Jevin D. West, and Bill Howe

We encode sets of images into a visual signature, then use distances between these signatures to understand how patterns of visual communication compare with patterns of jargon and citation structures. We find that figures can be as effective for differentiating communities of practice as text or citation patterns. We then consider where these metrics disagree to understand how different disciplines use visualization to express ideas. Finally, we further consider how specific figure types propagate through the literature, suggesting a new mechanism for understanding the flow of ideas apart from conventional channels of text and citations.

🚩 Undergraduate, Master's

34. The Effects of Suggested Tags and Autocomplete on Social Tagging Behavior

Chris Holstrom

Websites with social tagging features employ a variety of user interface features to support tagging, including suggested tags and autocomplete. This study used a custom-built tagging user interface to determine, in an experimental setting, how these features affect tagging behavior. We found that suggested tags did not have a significant effect on any of these behaviors. However, autocomplete significantly increased the number of tags provided, significantly decreased the seconds elapsed per tag provided, significantly decreased typos, significantly decreased the unique tags provided, and significantly increased the use of the controlled vocabulary. These findings suggest that autocomplete is an important aid in social tagging user interfaces and that deploying autocomplete can standardize tagging vocabulary.

35. Optimizing Scholarship Allocation to Improve Student Enrollment

Lovenoor Aulck, Dev Nambi, and Jevin D. West

Despite having an abundance of data, universities are not fully leveraging machine learning and data mining approaches to improve their enrollment management strategies. In this project, we use data at a large university to increase its student enrollment. We do this by first predicting the enrollment of admitted students using machine learning classifiers. We then use these results in conjunction with genetic algorithms to optimize scholarship disbursement. We show the effectiveness of this approach using actual enrollment metrics. After deploying the model, the university saw a 23.3 percent increase in enrollment yield. This resulted in millions of dollars in additional annual tuition revenue and a commitment by the university to employ the method in subsequent enrollment cycles.

36. Scholarly Usage Data: Inequality Trends in Research

Jason Portenoy, Jevin D. West, Katherine Stovel, and Lanu Kim

The way that scholars tend to choose which research to read has shifted as the size of the literature has increased and academic search engines like Google Scholar have gained traction. We explore, in the wake of these changes, how the concentration of scholarly attention has changed over time. We analyze article downloads on the online scholarly platform JSTOR to explore trends in inequality over the available papers. Is more attention increasingly going to a small set of top papers – that is, are the rich getting richer?

37. Tracing Networked Gender Discourse on Reddit

Leo Stewart and Emma Spiro

This research examines communities of gender ideology on Reddit moving within and across subreddits – specifically using feminist, trans and gender nonconforming, and manosphere/red pill discourse as vantage points. We use shared moderator ties between subreddits to examine epistemic relationships; mentions and links in metadata fields as indicators of awareness and implicit self-definition; and subreddit creation dates as evidence of how discourse evolved through time and digital space. We contribute empirical evidence for a dense shared moderator network, suggesting centralized discursive gatekeeping; incompatible constructs of feminism across gender ontologies; and structural traces of evolving discourse surrounding trans identities.

38. Lawmaker Oversight: Municipal Surveillance Regulation as Algorithmic Accountability in Practice

Meg Young, Michael Katell, and Peter Krafft

We conduct an ethnographic case study of the 2017 Seattle Surveillance Ordinance and examine similar ordinances in five other cities. While there are strengths to these regulations, including processes for public accountability, our key finding is that expert technologists in city government do not perceive the surveillance technologies they are tasked to review to be algorithmic systems, even as several qualify as such. This potentially leads to blind spots concerning algorithmic harms. Our finding suggests that automated functions within systems are often invisible to policy makers, threatening disparate algorithmic impacts for communities historically targeted with surveillance technology.

39. Judgment Call the Game: Using Design Fiction to Surface Ethical Concerns Related to Technology

Stephanie Ballard, Karen Chappell, and Kristen Kennedy

Artificial intelligence (AI) technologies are complex sociotechnical systems that, while holding much promise, have frequently caused societal harm. In response, corporations, non-profits, and academic researchers have mobilized to build more responsible AI, yet how to do this is not clear. Toward this aim, we designed Judgment Call, a game for surfacing ethical concerns using design fiction. Through two industry workshops, we found Judgment Call to be an effective way for product teams to identify ethical concerns and consider technology from multiple stakeholder perspectives. This work extends design fiction to ethical AI and demonstrates its effective use with industry product teams.

40. Algorithmic Reputation: Toward a Political Philosophy of Information Infrastructures

Michael A. Katell

Digital profiling can be understood as a new form of “reputation” constructed from surveillance, tracking, and other electronic data. Information products and services offer predictive assessments of individuals. These services claim to be more accurate and unbiased than humans, making them attractive to employers, landlords, judges, and other decision-makers. But are such systems truly objective and fair? Or are they at risk of reproducing and subsuming human politics through the values motivating their construction and use? By understanding digital profiling systems as algorithmic forms of reputation, we can normatively evaluate the values underlying their design choices and hold them accountable for fairness.

41. Diverse Voices: Working with Underrepresented Communities to Modernize the Washington State Access to Justice Technology Principles

Hannah Almeter, Batya Friedman, and Lassana Magassa

The Diverse Voices method uses short, targeted conversations about emerging technology with experiential experts from underrepresented groups to provide feedback on draft tech policy documents. In spring 2018, the Lab facilitated Diverse Voices panels to gather feedback on proposed revisions to the 2004 Washington State Access to Justice (AtJ) Technology Principles with experiential experts representing formerly incarcerated, immigrant, and rural communities, as well as legal professionals. Based on feedback from these panels, AtJ amended the proposed revisions, adding entirely new principles around human touch and language access.

42. Can We Smash It? Exploring Disassembly

Nick Logler, Jason Yip, and Batya Friedman

This work explores the processes and actions of disassembly. Building on existing research on bricolage, toy hacking, and un-crafting, we offer a tripartite study: a conceptual investigation into the meaning and processes of disassembly; a technical investigation of the disassembly of a physical artifact (i.e., a desktop printer); and an empirical investigation in the form of case study, where youth were asked to disassemble desktop printers. We conclude by considering how to design for disassembly and describing directions for future work.

43. Value Sensitive Design: Shaping Technology with Moral Imagination

Batya Friedman and David G. Hendry

A new book on value sensitive design, published by MIT Press. The book describes how we can use our moral and technical imaginations to create responsible innovations. It discusses theory, method, and applications for value sensitive design.

44. Documenting Aftermath: Information Infrastructures in the Wake of Disasters

Megan Finn

A new book on relations among institutions, infrastructures, and practices in the production, circulation, and use of information, published by MIT Press. The book is an examination of how changing public information infrastructures shaped people's experience of earthquakes in Northern California in 1868, 1906, and 1989 followed by an analysis of the institutions, policies, and technologies that shape today's post-disaster information landscape.

45. Programming Skills for Data Science

Michael Freeman and Joel Ross

A new book to help data scientists to learn foundational programming skills, published by Addison-Wesley Professional. A guide to writing code to wrangle, analyze, and visualize data with R.

46. The Big One (Simulated 2016): Informational, Technological, and Managerial Challenges for First Responders

Hans Jochen Scholl

The four-day Cascadia Rising exercise of 2016, which simulated a magnitude 9+ rupture of the Cascadian subduction zone, was one of the largest response exercises of a catastrophic incident ever conducted nationwide. It involved 23,000 professional responders in three states in the Pacific Northwest. The study investigated the numerous managerial challenges that responders faced. Communication and coordination challenges were found the most prevalent among other challenges. The research also uncovered the lack of standardization of response structures, processes, and procedures as major inhibitors of a more effective response, along with other inhibiting factors. The study provides recommendations for mitigating the problems discovered.

🚩 Undergraduate, Master's, Ph.D.

47. Smart Regulation of DLT, Blockchain, and Token Providers

Hans Jochen Scholl and Roman Pomeshchikov

Distributed Ledger Technology (DLT) is considered a disruptive technology that over the next 20 years might fundamentally reshape the way business is conducted in key areas of the economy such as the financial markets as well as in government. Based on Blockchain, a DLT implementation, cryptocurrencies

such as Bitcoin and Ethereum have debuted. While some governments try to ban cryptocurrencies, others have taken a laissez-faire approach, and yet others have regulated DLT providers. Refraining from stifling overregulation while simultaneously also protecting investors and the public interest is the regulatory challenge. The study compares and discusses current regulatory approaches and concludes that smart and flexible regulation might hold the promise of securing the potential benefits of DLT.

📖 Undergraduate, Master's, Ph.D.

48. Motivations for Humanitarian Action in the Context of Migration: Why Do People Leave Water for Migrants in the Desert?

Ricardo Gomez, Sara Vannini, and Bryce Newell

The displacement of unauthorized border-crossing to more remote regions causes increased preventable suffering and death of migrants at the U.S.-Mexico border. This has rekindled a movement of humanitarian response to help reduce death and suffering related to unauthorized migration. Volunteers leave water on the trails in the desert, with the hope of helping save someone's life. We wanted to know why. We offer this framework to understand the motivations that drive humanitarian volunteers, based on the differentiation of secular vs faith-based motivations, and of deontological vs moral virtue motivations.

📖 Master's

49. Community-Based Archival Reconciliation: Moving Toward Indigenous-Centered Archival Practice

Hannah E. Robinson and Clarita Lefthand-Begay

Archivists and Indigenous Peoples (IP) have worked together on reconciliation projects that have resulted in an abundance of scholarship. We selected three key papers that detail reconciliation work. Next, we operationalized articles found in the United

Nations Declaration on the Rights of IPs to develop a framework that can be used in the archival profession to realize human rights sought by IPs. We then examined case studies against these goals to show the archival profession what it means to fully engage with archival reconciliation. Finally, we encourage collaborations that truly benefit IPs and honor their ancestral cultural protocols.

📖 Master's, Ph.D.

50. Platform Analysis and Change: A New Look at Domain Analysis in Light of Subject Ontogeny Work

Joseph T. Tennis

Building on work in subject ontogeny and scheme versioning research, this poster inserts another unit of analysis, in mediation with domain analysis, called the platform. This points to the way in which the domain is documented in relation to indexing language design. With this platform identified, we can begin to contextualize change in new and interesting ways.

51. Critical Structured Data Studies

Joseph T. Tennis

This poster introduces an emerging research area at the intersection of linked data, classification theory, and digital humanities. It lists the inaugural community of Novemberists that met to explore this intersection. The poster also outlines next steps planned.

52. FASDA Classification Theory

Joseph T. Tennis

This poster outlines the ways in which S.R. Ranganathan's work evolved over time, comparing the technical changes he outlines moving from faceted classification theory toward analytico-synthetic and depth classification. It also contrasts these waves of classification theory with abstract classification.

53. Authenticity Metadata and the Integrity of Systems: An Empirical Study

Joseph T. Tennis and Corinne Rogers

This poster presents the results of case studies on authenticity metadata. The assumption, drawn from archival theory, is that we must retain and be able to inspect both identity and integrity metadata. However, there is a clear hierarchy present in the data from the case studies that ranks integrity metadata higher than identity metadata.

54. Advancing Open Data: Aligning Education with Public Sector Data Challenges

Carole L. Palmer, Nicholas Weber, Bree Norlander, and Kaitlin Throgmorton

The Open Data Literacy project prepares students to build infrastructure and to curate and sustain open data resources for the public, by advancing data curation and data science curricula and providing field experiences with public sector agencies. We are examining the data challenges faced by these organizations to determine the expertise needed to meet workforce demands. Based on student fieldwork, we find that data organization and access, data quality, and data visualization are areas of competency needed across organizations. We also find that additional competencies are required, including metadata standard usage and development, cloud services usage and evaluation, law and ethics, and public sector organization knowledge.

 Master's

55. Data Reuse and Reproducibility in Earth System Science: A Survey of Current Practices, Barriers, and Expectations

An Yan, Caihong Huang, and Carole L. Palmer

As Earth System Science (ESS) becomes more data-intensive, collaborative, and interdisciplinary, data reuse and reproducible research become increasingly important. This survey study examined the perspectives and practices of ESS researchers on data reuse and reproducibility to inform how to advance future data services in the field. The findings indicate a strong data sharing culture in ESS with high levels of reuse and commitment to open science. Data reuse and reproducibility of research would benefit most from better documentation and sharing of methods and research processes, and targeted improvements in data services and tools.

56. Clench Interaction: Novel Biting Input Techniques

Xuhai (Orson) Xu, Chun Yu, Anind K. Dey, and Jennifer Mankoff

People eat every day, and biting is one of the most fundamental and natural actions performed on a daily basis. We propose clench interaction that leverages clenching to facilitate interactions. We conducted a user study to investigate users' ability to control clench force. Users can easily discriminate three levels, and they can quickly confirm actions by unclenching. We developed a design space based on the results and investigated its usability. Participants preferred the clench over baselines. This technique can provide an additional input method in cases where users' eyes/hands are busy, augment immersive experiences such as VR/AR, and assist individuals with disabilities.

57. Leveraging Routine Behavior and Contextually Filtered Features for Depression Detection among College Students

Xuhai (Orson) Xu, Prerna Chikersal, Afsaneh Doryab, Daniella Villalba, Janine Dutcher, Michael Tumminia, Tim Althoff, Sheldon Cohen, Kasey Creswell, David Creswell, Jennifer Mankoff, and Anind K. Dey

The rate of depression in college students is rising. Researchers have used passive mobile sensing technology to assess mental health. We present a new method to extract contextually filtered features on passively collected, time-series data from mobile devices. We first employ association rule mining algorithms on two different user groups (e.g., depression vs. non-depression). We then introduce a new metric to select rules that identify distinguishing behavior patterns. Finally, we consider co-occurrence across the features to obtain contextually filtered features with which to train classifiers. Our results reveal that the best model significantly outperforms a standard model by 9.7 percent. We further verified the generalizability of our approach on a second dataset and achieved similar results.

58. Family, Language, and Identity: Exploring the Experiences of Asian and Pacific Islander Women in Introductory Computing Courses

Mina Tari and Hala Annabi

Asian and Pacific Islander (API) women are severely underrepresented in computing fields. However, there is often little attention given to the group because of the perceived overrepresentation of API students in computing, ignoring the intersection of gender or ethnic sub-group identities. Our study investigates the experiences API women have in their introductory computing courses. We explore how the intersection of ethnicity, identity, and nationality affects how API

women experience factors of inclusion and exclusion in the introductory computing courses. Initial findings suggest that API women face pressure from familial influence on career choices, language barriers leading to isolation, and complex relationships with “race” and “minority” status.

Undergraduate, Master's, Ph.D.

59. Pathways to Creating Meaningful Employment for Autistic People in the IT Industry

Hala Annabi, Andrew Begel, Liz Crooks, and Julia Bobrovskiy

It is estimated that only 14 percent of autistic individuals are employed for pay. To address the employment needs of the growing autism community, it is imperative that more organizations develop autism hiring programs. The academic and practitioner communities know little about how to best initiate, sustain, assess, and resource autism hiring programs across industry and company types. We conducted exploratory comparative case studies of four leading Autism @ Work employers, EY, JPMC, Microsoft, and SAP to understand how these firms established their programs and how they sustain them. We analyzed key organizational strategies, employment and resourcing models, and hiring and onboarding practices.

60. Building a Future Through STEM Learning for Children in Underserved Communities

Kathleen Campana, J. Elizabeth Mills, and Michelle H. Martin

Public libraries offer a variety of STEM learning opportunities for children and youth to allow them to experience emerging technologies in a hands-on, play-based manner. Opportunities like these are important for all children as research has identified ▶

◀ the importance of STEM learning in informal learning environments (Bell, Lewenstein, Shouse & Feder, 2009). However, a variety of barriers may prevent many children in underserved communities from taking advantage of the STEM opportunities that public libraries offer. Because of this, some libraries are taking their programs and services out to community locations to reach these children. This poster highlights findings from Project LOCAL, an IMLS-funded planning grant, around STEM learning opportunities offered by libraries out in community locations for children in underserved communities.

61. The Evolving Landscape of Children's Librarians' Use of New Media with Young Children and Their Caregivers: A Longitudinal Study

J. Elizabeth Mills, Kathleen Campana, Marianne Martens, and Claudia Haines

Technology is an integral part of our society and has taken root in various aspects of young children's lives. A 2014 nationwide survey of children's librarians' use of new media with young children and their caregivers established baseline results. An expanded version of this survey was administered in August 2018 to provide a longitudinal view of children's librarians' use of new media with young children and their caregivers as well as insight into their role as media mentors – guiding families and modeling effective practices in working toward a balanced media diet for today's youth. This poster will provide the 2018 survey design and findings that will speak to change in practices and prevalence of technology from 2014 and provide selections from the emergent data regarding various new areas of inquiry around diversity, attitudes, and evaluation.

62. Technology & Social Change Group (TASCHA): Exploring the Role of Digital Technologies in Building More Open, Inclusive, and Equitable Societies

Chris Coward, Michelle Fellows, Maria Garrido, Chris Jowaisas, Bree Norlander, Chris Rothschild, Stacey Wedlake, Jason Young, Sizhe Chen, Hanna Navarro, Rachel Ramey, Manisha Vyas, Katya Yefimova, Moonjung Yim, Kat Chung, Karen Hirst, and Rebecca Sears

The Technology & Social Change Group (TASCHA) at the UW Information School explores the role of digital technologies in building more open, inclusive, and equitable societies. This poster overviews the center's six areas of research: Public Libraries, Data Equity, Women and Technology, Essential Skills for Digital Life, Civic Engagement, and New Geographies of Knowledge.

63. Digital Skills for Digital Equity: Identifying Skills Covered in Digital Literacy Frameworks and Curricula

Stacey Wedlake, Karah Lothian, and Chris Coward

The City of Seattle's Digital Equity Initiative provides a roadmap to City of Seattle's vision of becoming a more digitally equitable city, where technology's opportunities equitably empower all residents and communities. As part of this initiative, Seattle IT contracted TASCHA to examine digital literacy frameworks and curricula in order to inform their digital equity program and investments. One part of this project addressed the question: what skills do digital literacy frameworks and curricula promote as needed to equitably participate in digital life? This poster gives an overview of what skills we uncovered and what skills are still missing from these resources.

64. Library Education as Public Libraries Transition from Collections- to Program-Orientation

Rolf Hapel

Digital development has led to a larger variety of media types, platforms, and formats in libraries. Book lending has decreased. Though e-lending and streaming of e-books has increased, it has not compensated for that decline in book lending. At the same time, we are seeing the rise of social media and the battle for truth, the loss of traditional authority, unprecedented opportunities for previously unheard voices, and a still larger gap between those who have and those who don't. Gaps and scratches in the fabric of society are arguably widening and the public sector seems to be in a permanent crisis. Many public libraries are offering new services and events, facilitating knowledge building tied to the needs and desires of the local community, mitigating societal challenges and bridging divides. The transformation of services and the stronger focus on programs and interactions in the physical library has huge consequences for the design and layout of library spaces – small or big, new or old. This project will explore the impact of this transition on public library spaces.

65. Public Library Spaces: The Impact of the Transformation from Collections- to Program-Oriented Institutions

Rolf Hapel

This project will explore the impact of the transition in public libraries from collections-based orientation to programs-based orientation. Key research questions include: What are the key professional competences that librarians should possess? Is it possible or desirable to formulate a 'generic' core skill set for a librarian of the 21st century? What expectations do leaders in the public library field have for the curriculum of Information Schools? Are there indications in Information School curricula that support a change toward a broader librarian role as facilitator of community knowledge creation and social convener?



Carole Palmer, Associate Dean for Research, would like to thank:

Crystal Welliver, Jennifer Phipps, Jenn Moore, Hilary Walker, Michele Norris, James Perez, Nick Dempsey, Maggie Foote, Doug Parry, Sue Morgan, Kelli Jo Fullan, Galen Guffy, Ellen Pearlman, Carmen Parisi, Dora Tkach, Sally Dee, Jan Boyd, Kate Kerschbaum, Bree Norlander, and our student volunteers.

