

AMANDA SWEARNGIN

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EDUCATION

University of Washington *Dec. 2019*
M.S., Ph.D. in Computer Science & Engineering

University of Nebraska - Lincoln *May 2012*
Master of Science in Computer Science

University of Nebraska - Lincoln *May 2010*
Bachelor of Science in Computer Science

RESEARCH EXPERIENCE

Apple May 2020 - Present
Senior Research Scientist *Seattle, WA*

- Currently developing evaluation pipelines and fine-tuning models for code generation and UI assessment.
- Trained production models and developed suite of grouping heuristics for Screen Recognition, the first on-device ML model to recognize and announce iOS app UI for VoiceOver, benefiting 20M+ blind users.
- Collected large-scale dataset (6k apps, 750k screens) for screen similarity modeling and trained production models used by app review to audit millions of app submissions.
- Developed a system to report accessibility issues for mobile apps, used for internal testing for 4+ prominent Apple apps. Evaluated with user study of 20+ participants, and described in publication (See Journal Publications).
- Led the release of an Xcode feature for multi-screen auditing in Accessibility Inspector, including the redesign and implementation of an improved HTML report.
- Published 10+ academic papers in collaboration with the UI & Code Understanding team and 6+ interns.

University of Washington Sept. 2015 - Dec. 2019
Graduate Research Assistant with Amy Ko and James Fogarty *Seattle, WA*

- Built *Scout*, a system to support rapid exploration of interface design alternatives using program synthesis and constraint solving techniques, and conducted qualitative interviews and a lab study with 18 user interface designers (See Demos, Conference Publications).
- Built *Rewire*, in collaboration with Adobe Research, which uses computer vision and machine learning to reverse engineer and create vectorized wireframes and design mockups from screenshots of user interfaces, and conducted an evaluation with 16 user interface designers (See Conference Publications).
- Built *Genie*, a framework that uses program analysis methods (static and dynamic) to reverse engineer, describe, and enable re-targeting of inputs to alternate modalities (See Conference Publications).

Microsoft Research June 2019 - Sept. 2019
Research Intern with Shamsi Iqbal *Redmond, WA*

- Designed and deployed a 60 participant survey on desktop and mobile information capture and reuse in the context of document creation.
- Designed and built a cross-application system (i.e., iOS app and Microsoft Word Addin), Scraps, to enable mobile capture and integration of resources during document creation, while collaborating with two separate product teams to make this experience a reality.
- Conducted an 11 participant user study of Scraps to understand its impact on document creation and reuse of collected resources.

Google Research June 2018 - Sept. 2018, Nov. 2018 - May 2019
Research Intern and Student Researcher with Yang Li *Mountain View, CA*

- Crowdsourced a dataset of over 20k labels, and constructed a deep neural network model (Tensorflow) to automatically predict and analyze tappability in mobile interfaces (See Conference Publications).
- Built a web application to showcase the capabilities of the model as a design analytics tool.
- Interviewed 15+ designers to gather project requirements and gather qualitative feedback on the tool.

Adobe Research, Creative Technologies Lab Sept. 2016 - Dec. 2016, June 2017 - Sept. 2017
Research Intern with Mira Dontcheva, Wilmot Li, Joel Brandt, and Morgan Dixon *Seattle, WA*

- Researched, designed, and prototyped a system using Computer Vision and Machine Learning to reverse engineer and create vectorized wireframes and design mockups from screenshots of user interfaces (See Conference Publications).
- Designed, planned, and conducted qualitative and quantitative user study of the system with 16 UX designers.

University of Nebraska - Lincoln

January 2010 - May 2012

Research Assistant with Dr. Myra Cohen

Lincoln, NE

- Developed *CogTool-Helper*, which uses automatic UI-model extraction and test case generation to automatically create storyboards and models for CogTool, a tool for predictive human performance modeling of user interfaces (See Conference Publications).
- Researched Combinatorial Interaction Testing (CIT) techniques and built interactive CIT web tutorials.

University of Nebraska - Lincoln

January 2010 - May 2010

Undergraduate Research Assistant

Lincoln, NE

- Assisted with research on Combinatorial Interaction Testing (CIT) techniques and developed several educational tutorials for the CIT web portal.

Holland Computing Center

Summer 2008 - Spring 2010

Undergraduate Research Assistant with Dr. David Swanson

Lincoln, NE

- Completed UCARE (Undergraduate Creative Activities and Research Experience) project designing and implementing an interactive web portal for viewing real-time computing statistics.

INDUSTRY EXPERIENCE

Microsoft Corporation

July 2012 - September 2015

Software Development Engineer II, SDET

Fargo, ND

- Designed, developed, and tested features for a new web client for Dynamics AX, Microsoft's new cloud-based ERP solution, and was the primary developer for client layout and UX patterns.
- Developed visual regression testing framework for validating the product across multiple browsers and environments, and integrated it into the build system.
- Was selected by team lead to mentor and onboard 3 new team members.

Cerner Corporation

Summer 2010

Software Engineering Intern

Kansas City, MO

- Conducted performance analyses and implemented C++ performance improvements that were put into production in Cerner's core application (PowerChart), and conducted static analysis runs to improve code quality.

Cerner Corporation

Summer 2009

Software Engineering Intern

Kansas City, MO

- Designed UI and built an interactive patient summary web app for the iPhone using JavaScript, CSS, and HTML.
- Implemented automatic script auditing framework for patient information retrieval in Cerner's SQL-like language.

REFEREED JOURNAL PUBLICATIONS

- [1] **Amanda Swearngin**, Jason Wu, Xiaoyi Zhang, Esteban Gomez, Jen Coughenour, Rachel Stukenborg, Bhavya Garg, Greg Hughes, Adriana Hilliard, Jeffrey P. Bigham, Jeff Nichols, *Towards Automated Accessibility Report Generation for Mobile Apps*. ACM Transactions on Computer-Human Interaction, (TOCHI), 2024.

REFEREED CONFERENCE PUBLICATIONS

- [19] Keen You, Haotian Zhang, Eldon Schoop, Floris Weers, **Amanda Swearngin**, Jeffrey Nichols, Yinfei Yang, and Zhe Gan. *Ferret-UI: Grounded Mobile UI Understanding with Multimodal LLMs*. European Conference on Computer Vision, (ECCV), 2024.
- [18] Jason Wu, Yi-Hao Peng, Amanda Li, **Amanda Swearngin**, Jeffrey P. Bigham, and Jeffrey Nichols. *UIClip: A Data-driven Model for Assessing User Interface Design*. ACM User Interface Software and Technology Symposium (UIST), 2024.
- [17] Maryam Taeb, **Amanda Swearngin**, Eldon Schoop, Ruijia Cheng, Yue Jiang, and Jeffrey Nichols. *AXNav: Replaying Accessibility Tests from Natural Language*. SIGCHI Conference on Human Factors in Computing Systems, (CHI), 2024.

- [16] Yue Jiang, Eldon Schoop, **Amanda Swearngin**, and Jeffrey Nichols. *ILuvUI: Instruction-tuned LangUage-Vision modeling of UIs from Machine Conversations.*, arXiv preprint arXiv:2310.04869, 2023.
- [15] Jason Wu, Rebecca Krosnick, Eldon Schoop, **Amanda Swearngin**, Jeffrey P. Bigham, Jeffrey Nichols. *Never-ending Learning of User Interfaces*. ACM User Interface Software and Technology Symposium (UIST), 2023.
- [14] Jason Wu, **Amanda Swearngin**, Xiaoyi Zhang, Jeffrey Nichols, Jeffrey P. Bigham. *Screen Correspondence: Mapping Interchangeable Elements between UIs*. Arxiv, 2022.
- [13] Jieshan Chen, **Amanda Swearngin**, Jason Wu, Titus Barik, Jeffrey Nichols, Xiaoyi Zhang. *Extracting Re-playable Interactions from Videos of Mobile App Usage*. Arxiv, 2022.
- [12] Jieshan Chen, **Amanda Swearngin**, Jason Wu, Titus Barik, Jeffrey Nichols, Xiaoyi Zhang. *Towards Complete Icon Labeling in Mobile Applications* SIGCHI Conference on Human Factors in Computing Systems, (CHI), 2022.
- [11] Shirin Feiz, Jason Wu, Xiaoyi Zhang, **Amanda Swearngin**, Titus Barik, Jeffrey Nichols. *Understanding Screen Relationships from Screenshots of Smartphone Applications*. Intelligent User Interfaces, (IUI), 2022.
- [10] **Amanda Swearngin**, Shamsi Iqbal, Victor Poznanski, Mark Encarnacin, Paul N. Bennett, Jaime Teevan. *Scraps: Enabling Contextual Mobile Capture, Contextualization, and Use of Document Resources*. SIGCHI Conference on Human Factors in Computing Systems, (CHI), 2021.
- [9] Xiaoyi Zhang, Lilian de Greef, **Amanda Swearngin**, Samuel White, Kyle Murray, Lisa Yu, Qi Shan, Jeffrey Nichols, Jason Wu, Chris Fleizach, Aaron Everitt, Jeffrey P. Bigham. *Screen Recognition: Creating Accessibility Metadata for Mobile Applications from Pixels*. SIGCHI Conference on Human Factors in Computing Systems (CHI), 2021.
- [8] **Amanda Swearngin**, Chenglong Wang, Alannah Oleson, Amy J. Ko, James Fogarty. *Scout: Rapid Exploration of Interface Layout Alternatives through High-Level Design Constraints*. SIGCHI Conference on Human Factors in Computing Systems (CHI), 2020 (acceptance rate: 24.31%).
- [7] **Amanda Swearngin**, Yang Li. *TapShoe: Modeling Mobile Interface Tappability Using Crowdsourcing and Deep Learning*. SIGCHI Conference on Human Factors in Computing Systems (CHI), 2019 (acceptance rate: 23.8%), with Google Research.
- [6] **Amanda Swearngin**, Wilmot Li, Mira Dontcheva, Joel Brandt, Morgan Dixon, Amy J. Ko. *Rewire: Interface Design Assistance from Examples*. SIGCHI Conference on Human Factors in Computing Systems (CHI), 2018, with Adobe Research.
- [5] **Amanda Swearngin**, Amy J. Ko, James Fogarty. *Genie: Input Retargeting on the Web through Command Reverse Engineering*. SIGCHI Conference on Human Factors in Computing Systems (CHI), 2017 (acceptance rate: 25%).
- [4] **Amanda Swearngin**, Myra B. Cohen, Bonnie E. John, Rachel K.E. Bellamy. *Human Performance Regression Testing*. Int'l Conference on Software Engineering (ICSE), 2013 (acceptance rate: 18.5%), with IBM Research.
- [3] **Amanda Swearngin**, Myra B. Cohen, Bonnie E. John, Rachel K.E. Bellamy. *Easing the Generation of Predictive Human Performance Models from Legacy Systems*. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI), pages 2489 - 2498, 2012 (acceptance rate: 23%), with IBM Research.
- [2] Sandeep Kaur Kuttal, Anita Sarma, **Amanda Swearngin**, Gregg Rothermel. *Versioning for Mashups — An Exploratory Study*. International Symposium on End User Development (IS-EUD), pages 25 - 41, 2011 (acceptance rate: 27%).
- [1] **Amanda Swearngin**, Berthe Y. Choueiry, Eugene C. Freuder. *A Reformulation Strategy for Multi-Dimensional CSPs: The Case Study of the SET Game*. Symposium on Abstraction, Reformulation, and Approximation (SARA), pages 107 - 116, 2011.

BOOK CHAPTERS

- [1] **Amanda Swearngin**, Yang Li. *Modeling Mobile Interface Tappability Using Crowdsourcing and Deep Learning*. Artificial Intelligence for Human Computer Interaction: A Modern Approach, Human-Computer Interaction Series, Springer, Nov, 2021.

DEMOS

Amanda Swearngin, Amy J. Ko, James Fogarty. *Scout: Mixed-Initiative Exploration of Design Variations through High-Level Design Constraints*, ACM User Interface Software and Technology Symposium (UIST), 2018.

SERVICE

Interns Supervised at Apple

- Jerry Zhang (University of Washington) - 2024
- Forough Mehrahlian (UC Irvine) - 2024
- Maryam Taeb (Florida State University) - 2023
- Yue Jiang (Aalto University) - 2023
- Rebecca Krosnick (University of Michigan) - 2022
- Jieshan Chen (Australian National University) - 2021

Committees

- Accessibility Chair - UIST 2021, 2022
- Program Committee Member - UIST 2021, 2023
- Associate Chair of Program Committee - CHI 2023-2025

Paper Reviewing

- Engineering Interactive Computing Systems (EICS) PACM - 1 Paper - 2018
- Transactions on Software Engineering (TSE) - 1 Paper - 2018
- Graphics Interface - 1 Paper - 2019
- Creativity and Cognition - 2 Posters - 2019
- Neurocomputing Journal - 1 Paper - 2023
- ICML - AI & HCI Workshop - 2023
- Conference on Human Factors in Computing Systems (CHI) - 25 Papers, 4 Extended Abstracts - 2019 - 2024
- User Interface Software and Technology (UIST) - 31 Papers - 2019 - 2024
- Designing Interactive Systems - 2021, 2024
- ISSTA (International Symposium on Software Testing and Analysis) - Student Research Competition - 2023
- Transactions on Human Computer Interaction - 2 Papers - 2023, 2024

PRESENTATIONS

Modeling and Understanding User Interfaces from Pixels, 8th European Summer School on Computational Interaction, University of Luxembourg, Belval campus, Luxembourg, June 2024

Expanding Interface Design Capabilities through Semantic and Data-Driven Analyses, Snap Research, Feb. 2020

Expanding Interface Design Capabilities through Semantic and Data-Driven Analyses, Apple Research, Feb. 2020

Scout: Mixed-Initiative Exploration of Design Variations through High-Level Design Constraints, UW CSE Affiliates Research Day, Nov. 2018

Reverse Engineering User Interface Structure to Enable Access and Design Reuse, Human-Computer Interaction Seminar, Berkeley Institute of Design, Sept. 2018.

Scout: Mixed-Initiative Exploration³ of Design Variations through High-Level Design Constraints, Pacific Northwest Programming Languages Workshop, May 2018.

An Update on COMET (Community Event-based Testing), Workshop presentation at TESTBEDS, co-located with ICST (International Conference on Software Testing, Verification, and Validation), March 2011.

ACADEMIC AWARDS & ACHIEVEMENTS

National Science Foundation Graduate Research Fellowship – 2016

Google Anita Borg Memorial Scholarship Finalist (One of 60 finalists out of 1200 applicants) – 2011

CRA-W Grad Cohort Participant – 2011, 2016

Grace Hopper Celebration of Women in Computing Scholarship Recipient – 2010

UCARE - Undergraduate Creative Activities and Research Experience Project Grant – 2009 - 2010

PATENTS

User Interface Creation from Screenshots, Morgan Dixon, **Amanda Swearngin**, Lubomira Dontcheva, Joel Brandt, US Patent App. No. 20180349730, Published Dec. 6, 2018.

Linking graphical user interface testing tools and human performance modeling to enable usability assessment, Rachel K. E. Bellamy, Myra B. Cohen, Bonnie E. John, Padmanabhan Santhanam, **Amanda Swearngin**, US Patent No. 8,903,691, Dec. 2014

TEACHING

Teaching Assistant, UW Computer Science & Engineering, *Introduction To HCI: User Interface Design, Prototyping, And Evaluation*, Fall 2019

Teaching Assistant, UW MHCID Program, *User Interface Software & Technology*, Winter 2019.

Tutor, UW Computer Science & Engineering – Discrete Math, Software Design & Implementation, 2015-2016

LEADERSHIP AND VOLUNTEER ACTIVITIES

Big Brothers Big Sisters of Puget Sound Mentor – 2022 - Present

CSE PhD Admissions Committee (reviewer) – UW Computer Science & Engineering – 2018

Prospective Student Committee – UW Computer Science & Engineering - 2016 - 2017

Volunteer – ChickTech Seattle, TEALS Puget Sound CS Fair, UW Graduate Women Organization – 2015 - 2016

Mentor – ChickTech Seattle, UNL Girl Empowerment and Mentoring for Computing Project – 2009, 2015 - 2016

Graduate Representative – UNL CS Curriculum Committee, Graduate Student Association – 2010 - 2012