

Andrew Head

Postdoctoral Scholar
Department of Computer Science
University of California, Berkeley

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RESEARCH MISSION

To help domain experts and learners keep up with the leading edge of knowledge in their fields. To build IDEs FOR IDEAS, interactive systems that help programmers, data scientists, and scientists write, and learners read, rich information artifacts.

AREAS OF SPECIALIZATION

Human-computer interaction · Programming languages · Data science · Applications of artificial intelligence.

ACADEMIC RESEARCH EXPERIENCES

2020–Present **University of California, Berkeley**
Postdoctoral Scholar
Advisor: **Marti A. Hearst**
Designed and assessed ScholarPhi, an intelligent, interactive reading tool that exposes definitions of terms and symbols in scientific papers.

2014–2020 **University of California, Berkeley**
Ph.D. Student
Advisors: **Björn Hartmann** and **Marti A. Hearst**
Introduced tools for Interactive Program Distillation, formative user research motivating their design, methods for their implementation, and usability studies verifying their power.
Thesis: [Interactive Program Distillation](#)

2013–2014 **University of Pittsburgh**
Bachelor's of Science Student
Advisor: **Jingtao Wang**

INDUSTRY RESEARCH EXPERIENCES

2019 **Allen Institute for AI**
Semantic Scholar Research Team
Research Intern
Advisor: **Daniel S. Weld**

Launched cross-institutional research collaboration to develop an intelligent interactive reading interface (continued as Postdoctoral Scholar at UC Berkeley, see above).

- 2018 **Microsoft Research**
Visualization and Interaction for Business and Entertainment Group
Research Intern
Advisors: **Robert DeLine** and **Steven M. Drucker**
Designed and implemented `CODE GATHERING TOOLS`, interactive extensions to computational notebooks to help data scientists find, clean, recover, and compare versions of code in notebooks.
- 2017 **Google**
Engineering Productive Research Team
Software Engineering Intern
Advisors: **Caitlin Sadowski** and **Emerson Murphy-Hill**
Studied shortcomings of API documentation in a massive industry code base. Methods consisted of an experience sampling study with hundreds of professional developers, and qualitative interviews with dozens of developers.
- 2010 **Intel**
Embedded Applications Group
Research Intern
Advisor: **Patricia Wang**

SELECTED FELLOWSHIPS AND AWARDS

- 2020 **Best of CHI Honorable Mention for Best Paper Award**
Awarded to top 5% of submitted papers.
- 2019 **Outstanding Graduate Student Instructor Award**
Awarded to 10% of graduate student instructors in the department.
- 2019 **Timothy B. Campbell Innovation Award**
Presented to computer science or electrical engineering undergraduate student who demonstrates a spirit of innovation, collaboration, and creativity through her or his research and personal life. Read more [here](#).
- 2019 **Best of CHI Best Paper Award**
Awarded to top 1% of submitted papers.
- 2018 **Best of CHI Honorable Mention for Best Paper Award**
Awarded to top 5% of submitted papers.
- 2016 **National Defense Science and Engineering Graduate Fellowship**
Awarded to about 200 of 3,000 scholarship applicants.
- 2016 **National Science Foundation Graduate Research Fellowship Honorable Mention**
- 2015 **Best Paper Nomination at VL/HCC**
Awarded to the top 11% of accepted papers.
- 2014 **National Science Foundation Graduate Research Fellowship Honorable Mention**
- 2014 **UC Berkeley EECS Departmental First-Year Fellowship**

- 2014 **Emma Locke Memorial Award Nomination**
- 2013 **Dietrich School of Arts and Sciences Summer Undergraduate Research Award**
- 2013 **University Scholar, Swanson School of Engineering**
- 2010 **University Scholar, Dietrich School of Arts and Sciences**
- 2010 **NSF International Research and Education in Engineering Grant**
- 2008 **Pitt Club of Greater Philadelphia Scholar**
- 2008 **University of Pittsburgh Honors College Full Tuition Scholarship**

SELECTED PUBLICATIONS

- CHI '21 **Augmenting Scientific Papers with Just-in-Time, Position-Sensitive Definitions of Terms and Symbols**
Andrew Head, Kyle Lo, Dongyeop Kang, Raymond Fok, Sam Skjonsberg, Daniel S. Weld, and Marti A. Hearst
ACM Conference on Human Factors in Computing Systems, 2021
To appear.
[Preprint](#) [Code](#) [Video](#)
- CHI '20 **Composing Flexibly-Organized Step-by-Step Tutorials from Linked Source Code, Snippets, and Outputs**
Andrew Head, Jason Jiang, James Smith, Marti A. Hearst, and Björn Hartmann
ACM Conference on Human Factors in Computing Systems, 2020
 Nominated for Best Paper Award
[PDF](#) [Supplemental Material](#) [Video](#)
- CHI '19 **Managing Messes in Computational Notebooks**
Andrew Head, Fred Hohman, Titus Barik, Steven M. Drucker, and Robert DeLine
ACM Conference on Human Factors in Computing Systems, 2019
 Best Paper Award
[PDF](#) [Website](#) [Slides](#) [Demo](#) [Code](#) [Video](#)

ADDITIONAL PUBLICATIONS

Peer-reviewed publications

- CHI '19 **Gamut: A Design Probe to Understand How Data Scientists Understand Machine Learning Models**
Fred Hohman, **Andrew Head**, Rich Caruana, Robert DeLine, and Steven M. Drucker
ACM Conference on Human Factors in Computing Systems, 2019
[PDF](#) [Website](#) [Video](#) [Teaser](#)

- CHI '18 **Interactive Extraction of Examples from Existing Code**
Andrew Head, Elena L. Glassman, Björn Hartmann, and Marti A. Hearst
ACM Conference on Human Factors in Computing Systems, 2018
[🏆](#) Nominated for Best Paper Award
[PDF](#) [Supplemental Material](#) [Slides](#) [Demo](#) [Video](#) [Teaser](#)
- UIST '18 **WiFröst: Bridging the Information Gap for Debugging of Networked Embedded Systems**
Will McGrath, Jeremy Warner, Mitchell Karchemsky, **Andrew Head**, Daniel Drew, and Björn Hartmann
ACM User Interfaces Software and Technology Symposium, 2018
[PDF](#) [Video](#)
- ICSE '18 **When Not to Comment: Questions and Tradeoffs with API Documentation for C++ Projects**
Andrew Head, Caitlin Sadowski, Emerson Murphy-Hill, and Andrea Knight
ACM International Conference on Software Engineering, 2018
[PDF](#) [Slides](#)
- L@S '17 **Writing Reusable Code Feedback at Scale with Mixed-Initiative Program Synthesis**
Andrew Head*, Elena Glassman*, Gustavo Soares*, Ryo Suzuki, Lucas Figueredo, Loris D'Antoni, and Björn Hartmann
ACM Conference on Learning at Scale, 2017
'' denotes equal contribution.
The first three authors contributed equally to this work
[PDF](#) [Slides](#)
- ICTD '17 **Can Human Development be Measured with Satellite Imagery?**
Andrew Head, Mélanie Manguin, Nhat Tran, and Joshua E. Blumenstock
International Conference on Information and Communication Technologies and Development, 2017
[PDF](#) [Slides](#)
- VL/HCC '17 **TraceDiff: Debugging Unexpected Code Behavior Using Trace Divergences**
Ryo Suzuki, Gustavo Soares, **Andrew Head**, Elena Glassman, Ruan Reis, Melina Mongiovi, Loris D'Antoni, and Björn Hartmann
IEEE Symposium on Visual Languages and Human-Centric Computing, 2017
[PDF](#) [Code](#)
- VL/HCC '15 **Tutorons: Generating Context-Relevant, On-Demand Explanations and Demonstrations of Online Code**
Andrew Head, Codanda Appachu, Marti A. Hearst, and Björn Hartmann
IEEE Symposium on Visual Languages and Human-Centric Computing, 2015
[🏆](#) Nominated for Best Paper Award
[PDF](#) [Website](#) [Slides](#) [Code](#)

- CHI '15 **Lamello: Passive Acoustic Sensing for Tangible Input Components**
Valkyie Savage, **Andrew Head**, Wilmot Li, Gautham Mysore, Dan B Goldman, and Björn Hartmann
ACM Conference on Human Factors in Computing Systems, 2015
[PDF](#) [Video](#)
- ITS '14 **ToneWars: Connecting Language Learners and Native Speakers through Collaborative Mobile Games**
Andrew Head, Yi Xu, and Jingtao Wang
International Conference on Intelligent Tutoring Systems, 2014
[PDF](#) [Video](#)

Lightly-reviewed workshop papers and posters

- SDP '20 **Document-Level Definition Detection in Scholarly Documents: Existing Models, Error Analyses, and Future Directions**
Dongyeop Kang, **Andrew Head**, Risham Sidhu, Kyle Lo, Daniel S. Weld, and Marti A. Hearst
EMNLP First Workshop on Scholarly Document Processing, 2020
[PDF](#)
- PLATEAU '20 **Static Analysis for Safer Notebook Interactions**
Stephen Macke, Hongpu Gong, Doris Jung-Lin Lee, **Andrew Head**, Doris Xin, and Aditya Parameswaran
SPLASH Workshop on the Intersection of HCI and PL, 2020
- WAPI '18 **Discovering API Usability Problems at Scale**
Emerson Murphy-Hill, Caitlin Sadowski, **Andrew Head**, John Daughtry, Andrew Macvean, Ciera Jaspán, and Collin Winter
ICSE Workshop on API Usage and Evolution, 2018
[PDF](#)
- CHI '17 **Exploring the Design Space of Automatically Synthesized Hints for Introductory Programming Assignments**
Ryo Suzuki, Gustavo Soares, Elena Glassman, **Andrew Head**, Loris D'Antoni, and Björn Hartmann
ACM Conference on Human Factors in Computing Systems, Late-Breaking Work, 2017
[PDF](#)
- FSE '17 **Social Health Cues Developers Use when Choosing Open Source Packages**
Andrew Head
ACM SIGSOFT International Symposium on the Foundations of Software Engineering, Student Research Competition, 2016
[PDF](#)

RESEARCH MENTORING

Capstone projects

- 2018 **Generating Explanations For Mathematical Notations**
Master's of Engineering, Computer Science, UC Berkeley
Students: Yujia Wang, Lysia Li, Tianhao Zhang
- 2018 **Improving the Software Package Search Experience for Developers**
Master's of Engineering, Computer Science, UC Berkeley
Students: Avery Nisbet, Joshua Choo, Mengshi Feng, Vivian Liu, Yidan Zhang

Doctoral mentoring

- 2020–Present Raymond Fok (UW, advised by Daniel S. Weld and James Fogarty)
2017–Present Nathaniel Weinman (UC Berkeley, advised by Marti A. Hearst and Armando Fox)

Master's mentoring

- 2020–Present Vivek Aithal
2020 Daniel McAndrew
2018–2019 Kunal Chadhary (now Chief Operating Officer, Co-founder at Banner)
Thesis: *Jupyter's Archive: Searchable Output Histories for Computational Notebooks*

Bachelor's mentoring

- 2020–Present Risham Sidhu
2019–Present Jason Jiang
2019–Present Jocelyn Sun
2019–2020 Zachary Kirby (now Frontend Developer at Productiv)
2019–2020 Jusheen Kim
2018–2019 Benjamin Barantschik (now at Google)
2018–2019 Luming Chen (now at Microsoft)
2018–2019 Nidhi Kakulawaram (now Fifth-year Master's student at UC Berkeley)
2018–2019 RJ Pimentel (now at Apple)
2018 Nathan Khuu (now Master's student at UC Berkeley)
2015–2016 Austin Le (now at Adobe)
2014–2015 Matthew Waliman (now Research scientist at UC Berkeley)
2013 Bill Wang (now at Accenture)

TEACHING

- 2019 **Lecturer**
CS160: User Interface Design and Development
UC Berkeley
With Sarah Sterman (co-lecturer).
[Syllabus](#)

- 2017 **Graduate Student Instructor**
CS 194-131: Designing Technology to Counter Violent Extremism
UC Berkeley
- 2015 **Head Graduate Student Instructor**
CS160: User Interface Design and Development
UC Berkeley
[Syllabus](#)
- 2009–2010 **Teaching assistant**
PHYS 0475: Honors Physics
University of Pittsburgh

INVITED TALKS

- 2020 **Practical Prototyping for Programming Tools**
Guest Lecture
UC Berkeley course CS 294-184, *Building User-Centered Programming Tools*
Host: Sarah Chasins
- 2020 **Tools for Transforming Creative Coding Messes into Helpful Example Programs**
Invited Talk
Arizona State University *Digital Culture Speaker Series*
Host: Suren Jayasuriya
[Watch it here](#)
- 2019 **Introduction to Human-Computer Interaction**
Guest Lecture
UC Berkeley course CS 10, *The Beauty and Joy of Computing*
- 2019 **Synopticon: Augmenting the Reading Experience for Scientific Papers from arXiv**
End-of-Internship Talk
Allen Institute for AI
- 2019 **Notebooks, Narratives, and 'Nteractions**
Invited Talk
Apple
Host: Dominik Moritz
- 2019 **Researching how developers use API docs**
Invited Podcast Interview
Write the Docs Podcast
[Watch it here](#)
- 2018 **Interactive Extraction of Examples from Existing Code**
Invited Keynote
PLATEAU workshop on the intersection of HCI and PL
Host: Sarah Chasins

- 2018 **Interactive Tools for Creating and Explaining Code Examples**
Invited Talk
 Brown Computer Science
 Host: Shriram Krishnamurthi
- 2018 **Bionic Tools for Documenting Code**
Invited Talk
 Mozilla *Emerging Technologies Speaker series*
 Host: Jofish Kaye
[Watch it here](#)
- 2018 **Bionic Tools for Documenting Code**
Invited Talk
 Microsoft *Program Synthesis using Examples (PROSE) group*
 Host: Gustavo Soares
- 2017 **To Doc or Not: Questions and Tradeoffs with API Documentation for C++ Projects**
End-of-Internship Talk
 Google
- 2017 **Creating Context-Relevant, In-Situ Help for Programming Learners**
Invited Talk
 Stanford HCI group lunch
 Host: Pablo Paredes
- 2017 **Writing Reusable Code Feedback at Scale with Mixed-Initiative Program Synthesis**
Invited Talk
 Harvard Data to Actionable Knowledge (DtAK) Lab
 With Elena L. Glassman.
 Host: Finale Doshi-Velez
- 2015 **3D Printing Interactive Devices**
Invited Lightning Talk
 Berkeley EECS Annual Research Symposium (BEARS)
 Host: Maneesh Agrawala
[Watch it here](#)

SERVICE

Academic service

- 2021 **Poster and Showpieces Co-Chair**
 IEEE Symposium on Visual Languages and Human-Centric Computing
- 2019 **Student Volunteer at Program Committee meeting**
 ACM User Interface Software and Technology Symposium
- 2016 **Student Volunteer**
 ACM Conference on Computer-Supported Cooperative Work and Social Computing
- 2016 **Student Volunteer**
 ACM Conference on Human Factors in Computing Systems

Reviewer

- 2020, 2016 ACM Conference on Human Factors in Computing Systems
- 2020, 2018 ACM User Interface Software and Technology Symposium
- 2020 ACM Interaction Design and Children Conference
- 2020 ACM Transactions on Computing Education
- 2018, 2020 IEEE Transactions on Software Engineering
- ACM Conference on Computer-Supported Cooperative Work and Social Computing
- 2016 Showpieces for the IEEE Symposium on Visual Languages and Human-Centric Computing
- 2016 IEEE Software

Departmental service

- 2015–2019 **Organizer and Host**
Berkeley Institute of Design Seminar
- 2017 **Master's of Engineering Admissions Committee**
UC Berkeley Computer Science Division
- 2016 **Organizer**
Berkeley Programming UX Reading Group
- 2016, 2015 **Area Activity Coordinator for Ph.D. Admit Visit Days**
UC Berkeley Human-computer interaction group
- 2015 **Makerspace Lab Assistant**
CITRIS Invention Lab

Outreach

- 2020–Present **Peer advisor**
Graduate Pathways to STEM, University of California
- 2018–2020 **CS Area Coordinator**
EECS Peers, UC Berkeley
- 2020 **Mentor**
Snap the Gap!, King Middle School
- 2014 **Lab activity mentor**
Students for Environmental Education Development, UC Berkeley

REFERENCES

Björn Hartmann

Associate Professor, UC Berkeley

Email: bjorn@berkeley.edu

Marti A. Hearst

Professor, UC Berkeley

Email: hearst@berkeley.edu

Daniel S. Weld

Thomas J. Cable / WRF Professor, University of Washington

Manager, Allen Institute for AI

Email: weld@cs.washington.edu

Rob DeLine

Senior Principal Researcher, Microsoft Research

Email: Rob.DeLine@microsoft.com

Margaret Burnett

Distinguished Professor, Oregon State University

Email: burnett@eecs.oregonstate.edu