

## RESEARCH STATEMENT

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My research aims to help end user programmers more effectively *author*, *understand*, and *reuse* code and data through the design of new languages and program visualization tools. New programming languages can raise the level of abstraction to focus on relevant domain-specific details. Improved tools can better align with and enrich end user programmers' mental models. Visualizing program state and behavior promotes program understanding, and can proactively surface surprising or incorrect results.

## EDUCATION

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### PHD STUDENT COMPUTER SCIENCE AND ENGINEERING

MS COMPUTER SCIENCE AND ENGINEERING, June 2016

Paul G. Allen School of Computer Science & Engineering

University of Washington (UW), Seattle, WA

Advisor: Jeffrey Heer

September 2014 - Present

### BS COMPUTER SCIENCE

Harvey Mudd College (HMC), Claremont, CA

Advisor: Ben Wiedermann

August 2010 - May 2014

## PUBLICATIONS

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Interactive Repair of Tables Extracted from PDF Documents on Mobile Devices.

**Jane Hoffswell** and Zhicheng Liu. *ACM Human Factors in Computing Systems (CHI)*, 2019.

Conditionally accepted to CHI 2019. <https://doi.org/10.1145/3290605.3300523>

Languages & Visualizations to Enable Effective End User Programming.

**Jane Hoffswell**. *ACM Human Factors in Computing Systems Extended Abstracts (CHI EA)*, 2019.

To appear at CHI 2019. <https://doi.org/10.1145/3290607.3299067>

SetCoLa: High-Level Constraints for Graph Layout.

**Jane Hoffswell**, Alan Borning, Jeffrey Heer.

*Computer Graphics Forum (Proc. EuroVis)*, 2018. <https://doi.org/10.1111/cgf.13440>

Augmenting Code with In Situ Visualizations to Aid Program Understanding.

**Jane Hoffswell**, Arvind Satyanarayan, Jeffrey Heer.

*ACM Human Factors in Computing Systems (CHI)*, 2018. <https://doi.org/10.1145/3173574.3174106>

Supporting Patient-Provider Collaboration to Identify Individual Triggers using Food and Symptom Journals.

Jessica Schroeder, **Jane Hoffswell**, Chia-Fang Chung, James Fogarty, Sean Munson, Jasmine Zia.

*ACM Computer-Supported Cooperative Work (CSCW)*, 2017. <https://doi.org/10.1145/2998181.2998276>

Visual Debugging Techniques for Reactive Data Visualization.

**Jane Hoffswell**, Arvind Satyanarayan, Jeffrey Heer.

*Computer Graphics Forum (Proc. EuroVis)*, 2016. <https://doi.org/10.1111/cgf.12903>

Reactive Vega: A Streaming Dataflow Architecture for Declarative Interactive Visualization.

Arvind Satyanarayan, Ryan Russell, **Jane Hoffswell**, Jeffrey Heer.

*IEEE Trans. Visualization & Comp. Graphics (Proc. InfoVis)*, 2016. <https://doi.org/10.1109/TVCG.2015.2467091>

## HONOS AND AWARDS

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- 2014 Jeff Dean - Heidi Hopper Endowed Regental Fellowship Recipient
- 2014 Harvey Mudd College Computer Science Clinic Poster Award
- 2014 Honorable Mention CRA Undergraduate Research Award Competition
- 2011-2014 Harvey Mudd College Dean's List
- 2010 International Baccalaureate

## PROFESSIONAL EXPERIENCE

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- Summer 2018  
SEATTLE, WA **RESEARCH INTERN, ADOBE RESEARCH**  
*Interactive Repair of Tables Extracted from PDF Documents on Mobile Devices*  
Advisor: Leo Zhicheng Liu. Conducted research on the future of dynamic PDF documents and the analysis and reuse of PDF tables for dynamic use cases on mobile devices.
- 2013-2014  
CLAREMONT, CA **PROJECT MANAGER, CAPSTONE PROJECT, HMC COMPUTER SCIENCE DEPARTMENT**  
*Visualizing and Exploring Performance Data alongside VMware*  
Advisor: Melissa O'Neill. Project Manager for a senior capstone project with VMware. Developed a dashboard for visualizing system performance using D3.js.
- Summer 2013  
CLAREMONT, CA **UNDERGRADUATE RESEARCH ASSISTANT, HMC COMPUTER SCIENCE DEPARTMENT**  
*Visualizing the Graphical Execution of Abstract Program Traces*  
Advisor: Ben Wiedermann. Modified the UC Santa Barbara JavaScript Abstract Interpreter to output information about the abstract program trace and implemented a tool for visualizing program traces using D3.js.
- Summer 2012  
CLAREMONT, CA **UNDERGRADUATE RESEARCH ASSISTANT, HMC COMPUTER SCIENCE DEPARTMENT**  
*Large Scale, Educational Video Games for Middle School Students*  
Advisor: Elizabeth Sweedyk. Developed a math-based game for the iPad that teaches children about ratios by taking advantage of the ratio-based behavior of mixing paint.

## TEACHING EXPERIENCE

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- 2016-2017  
SEATTLE, WA **TUTOR AND GRADER, UW PAUL. G. ALLEN SCHOOL OF COMPUTER SCIENCE & ENGINEERING**  
Professor: Jeffrey Heer. Graded coursework, held office hours, and led tutorial sessions for the graduate (Spring 2016) and undergraduate (Spring 2017) Data Visualization courses.
- Winter 2014  
SEATTLE, WA **TUTOR AND GRADER, UW MASTERS IN HUMAN COMPUTER INTERACTION + DESIGN**  
Professor: Jeffrey Heer. Helped to develop the course curriculum. Tutored and graded coursework for students studying User Interface Software & Technology (Winter 2014).
- 2012-2014  
CLAREMONT, CA **TUTOR AND GRADER, HMC COMPUTER SCIENCE DEPARTMENT**  
Tutored and graded classes on Programming Languages (Spring 2014), Artificial Intelligence (Spring 2014), Software Development (Spring 2013, Fall 2013), and the Principles of Computer Science (Fall 2012).

## LEADERSHIP AND VOLUNTEER EXPERIENCE

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- 2017-Present*     **REVIEWER** for Transactions on Visualization and Computer Graphics (TVCG 2018), IEEE Visualization Conference (VIS 2018), ACM Symposium on User Interface Software and Technology (UIST 2018, UIST 2017), and ACM Conference on Human Factors in Computing Systems (CHI 2019, CHI 2017).
- Winter 2018*     **HCI VISIT DAYS COORDINATOR, UW COMPUTER SCIENCE & ENGINEERING**  
SEATTLE, WA     Organized group activities and one-on-one meetings for admitted graduate students.
- Fall 2016*     **GRADUATE STUDENT ADMISSIONS VOLUNTEER, UW COMPUTER SCIENCE & ENGINEERING**  
SEATTLE, WA     Reviewed graduate student admissions applications.
- Fall 2015*     **NEW GRADUATE ORIENTATION LEADER, UW COMPUTER SCIENCE & ENGINEERING**  
SEATTLE, WA     Coordinated talks from current students and faculty for incoming PhD students. Organized activities and lead the two-day orientation.
- Fall 2015*     **PROJECT MANAGER, USLI ROCKETRY TEAM, HARVEY MUDD COLLEGE**  
SEATTLE, WA     Founder and project manager of a NASA sponsored University Student Launch Initiative (USLI) rocketry team that designed and launched a rocket with a scientific payload.

## WORKSHOPS AND PRESENTATIONS

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- Spring 2015*     **DEBUGGING VEGA THROUGH INSPECTION OF THE DATA FLOW GRAPH.**  
CAGLIARI, ITALY     Jane Hoffswell, Arvind Satyanarayan, Jeffrey Heer. *EuroVis Workshop on Reproducibility, Verification, and Validation in Visualization (EuroRV3), 2015.*
- Spring 2014*     **VISUALIZING THE GRAPHICAL EXECUTION OF ABSTRACT PROGRAM TRACES.**  
SAN DIEGO, CA     *Southern California Celebration for Women in Computing.*
- Fall 2013*     **VISUALIZING THE GRAPHICAL EXECUTION OF ABSTRACT PROGRAM TRACES.**  
LOS ANGELES, CA     *Southern California Programming Languages and Systems Workshop.*

## PROJECT SPOTLIGHT: AUGMENTING CODE WITH IN SITU VISUALIZATIONS TO AID PROGRAM UNDERSTANDING

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```
33  "name": "indexed_stocks",
34  "source": "stocks",
35  "transform": [{
36    "type": "lookup",
37    "as": ["index_term", "price"],
38    "on": "index",
39    "onKey": "symbol",
40    "keys": ["symbol"],
41    "default": {"price": 0}
42  }, {
43    "type": "formula",
44    "field": "indexed_price",
45    "expr": "datum.index_term.price > 0 ?
46  }]
```

A code snippet with in situ visualizations of program variables in Vega: a declarative visualization grammar. Histograms show the distribution of values for array variables, with the count and range shown on hover. The `symbol` variable is an array of five unique strings representing different companies (AAPL, AMZN, IBM, GOOG, and MSFT), one of which occurs less frequently in the dataset than the others (GOOG). The `indexed_price` variable is an array of numbers corresponding to the stock price. Whereas the `symbol` and `indexed_price` variables are both arrays of a simple type, the `index_term` variable is an array of objects; the histogram is colored orange to differentiate it from the others and shows only the value distribution for the `index_term.price` property.