PL and HCI: Better Together

Sarah Chasins, Elena Glassman, and **Josh Sunshine**

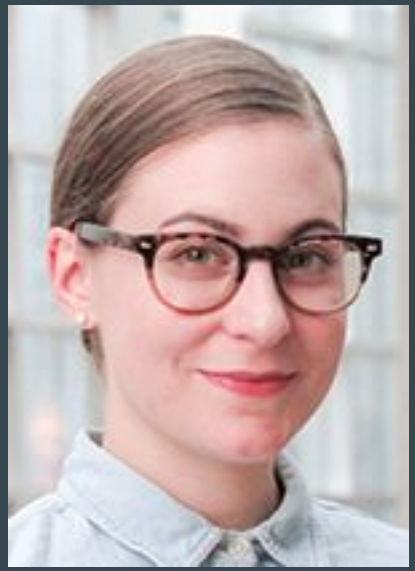
My story: PL → HCI

- Designed Plaid PL for enforcing ordering constraints
- Wanted to show effectiveness in preventing bugs
- Users failed to complete even simple tasks
- I now rely heavily on formative HCI methods

Elena Glassman's story: HCI → PL

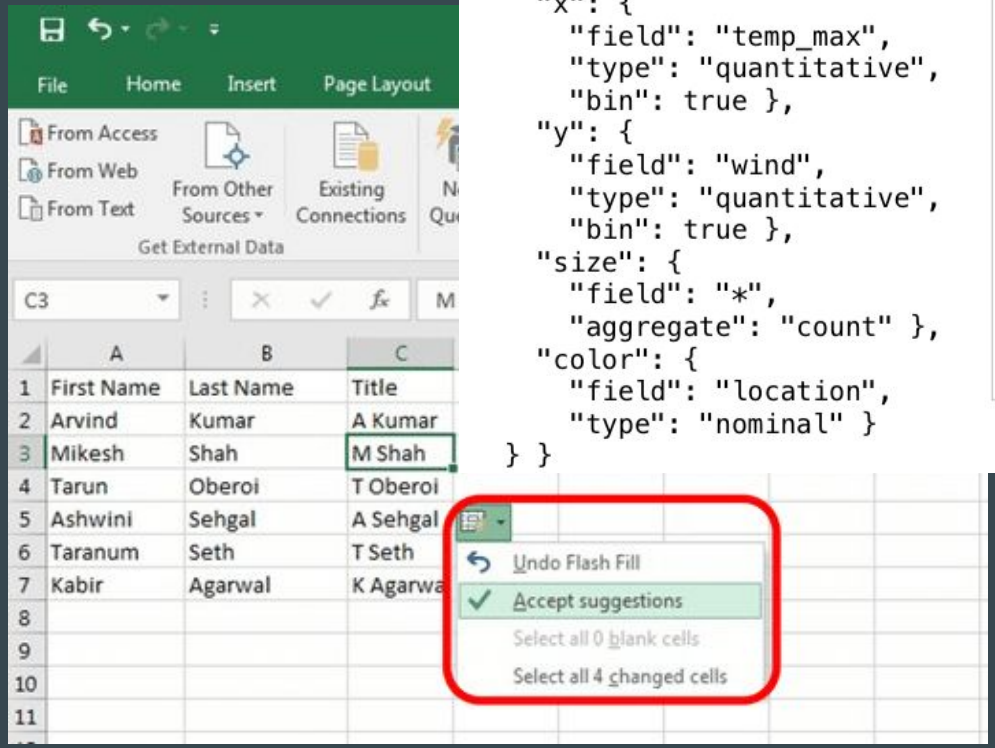
- HCI PhD student
- Visualization tool for student solutions
- Each assignment required new programs
- Discovered program synthesis in Postdoc and synthesized viz analyses

Sarah Chasin's story: PL ↔ HCI



- Social scientists: data on web, but scraping hard
- Programming by Demonstration tool for web scraping
- Continually refined and expanded using both HCI + PL techniques

Success stories

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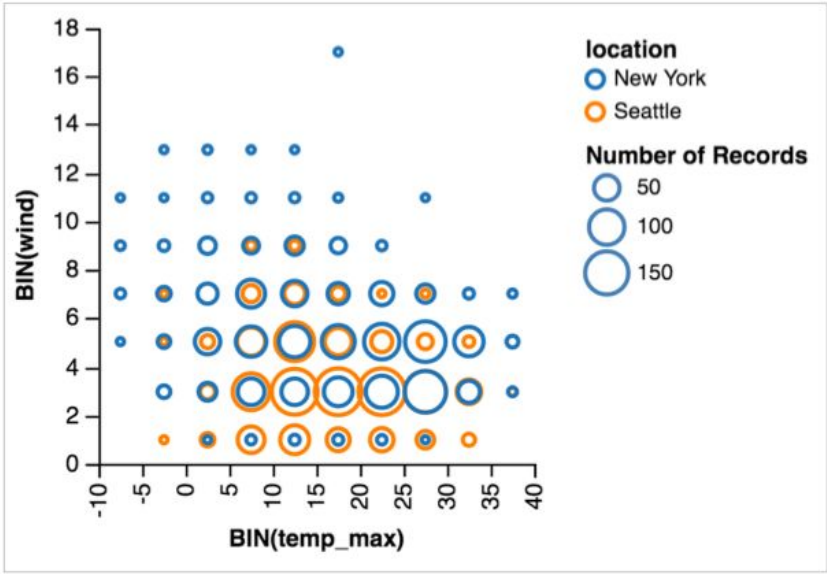

Common Misconceptions

- PL doesn't care about people
- PL just makes new general-purpose languages
- PL can't benefit from human factors research
- HCI is all about evaluation
- HCI is just implementing what users *say* they want
- Doing HCI is too hard

The power of PL backed interfaces

- Language is compositional
- Building PLs can be easy
- Using PLs can be easy
- We can help users use PLs correctly

Directions

To interface designers:	To language designers:
Give users PLs	Pick good problems,
But help them use PLs responsibly,	Develop theories of human capabilities and behavior,
And don’t expect code alone.	And get frequent feedback when you lack theory.

HCI: Interactive, user-centered design

- Theories of human cognition → design heuristics
- Not just users studies:
  - Low-cost heuristic methods
  - Deep, long-term case studies
  - Rigorous analysis of field data
  - Formative methods

Resources

- Sarah E. Chasins, Elena L. Glassman, and Joshua Sunshine. PL and HCI: Better Together. *Communications of the ACM (CACM)*, 2021.
- Michael Coblenz, Gauri Kambhatla, Paulette Koronkevich, Jenna L. Wise, Celeste Barnaby, Joshua Sunshine, Jonathan Aldrich, and Brad A. Myers. PLIERS: A Process That Integrates User-Centered Methods into Programming Language Design. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 2021.
- Amy J. Ko, Thomas D. LaToza, and Margaret M. Burnett. A practical guide to controlled experiments of software engineering tools with human participants. *Empirical Software Engineering* 20, no. 1 (2015): 110-141.
- Brad A. Myers, Andrew J. Ko, Thomas D. LaToza, and YoungSeok Yoon. Programmers are users too: Human-centered methods for improving programming tools. *IEEE Computer* 49, no. 7 (2016): 44-52.