

# **IN4MATX 241: Ubiquitous Computing**

**Class 8:**  
**Speech Interaction**

Daniel Epstein

# Conversation With and Through Computers

## About the author

- Susan Brennan
- Psychologist, SUNY Stony Brook
- Studies spoken language use & interpretation, in-person and sometimes through technology
- Not particularly involved in modern HCI, but did foundational work



# Conversation With and Through Computers

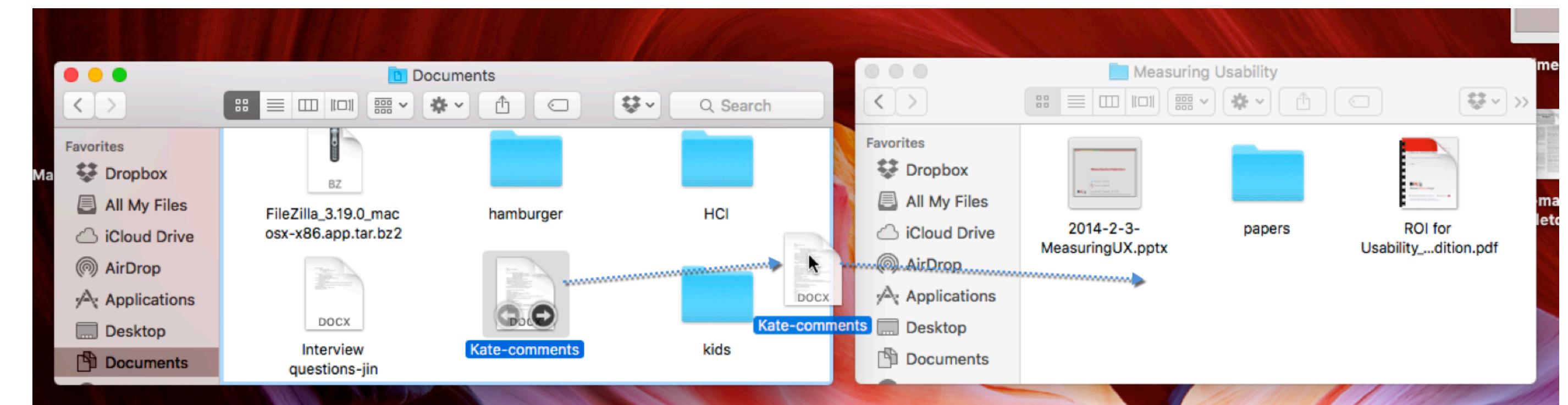
- UMUAI (User Modeling and User-Adapted Interaction)
- User Modeling: the idea of systems building up and modifying a conceptual understanding of the user over time
  - Often based on demographics or user profiles
  - Could be seen as a precursor to AI-generated models of a person
- For example, a newsfeed algorithm

[https://en.wikipedia.org/wiki/User\\_modeling](https://en.wikipedia.org/wiki/User_modeling)

# Conversation With and Through Computers

## Motivating work

- Pitched conversational interfaces as an alternative to “desktop interfaces”
- Prior HCI work argued for direct manipulation, or acting through physical actions whose effects are immediately viewable on-screen



<https://www.tandfonline.com/doi/abs/10.1080/01449298208914450>

# Conversation With and Through Computers

## Follow-on work

- Computer-mediated communication (CMC)
  - Broadly, any human communication occurring through digital devices
  - SMS, Email, forums, social networking sites...

[https://en.wikipedia.org/wiki/Computer-mediated\\_communication](https://en.wikipedia.org/wiki/Computer-mediated_communication)

# Like Having a Really Bad PA

## About the authors

- Ewa Luger
- Chancellor's Fellow  
(Assistant Professor?),  
Digital Arts & Humanities,  
University of Edinburgh
- Ethical issues surrounding  
machine intelligence
  - Explainable AI, consent



# Like Having a Really Bad PA

## About the authors

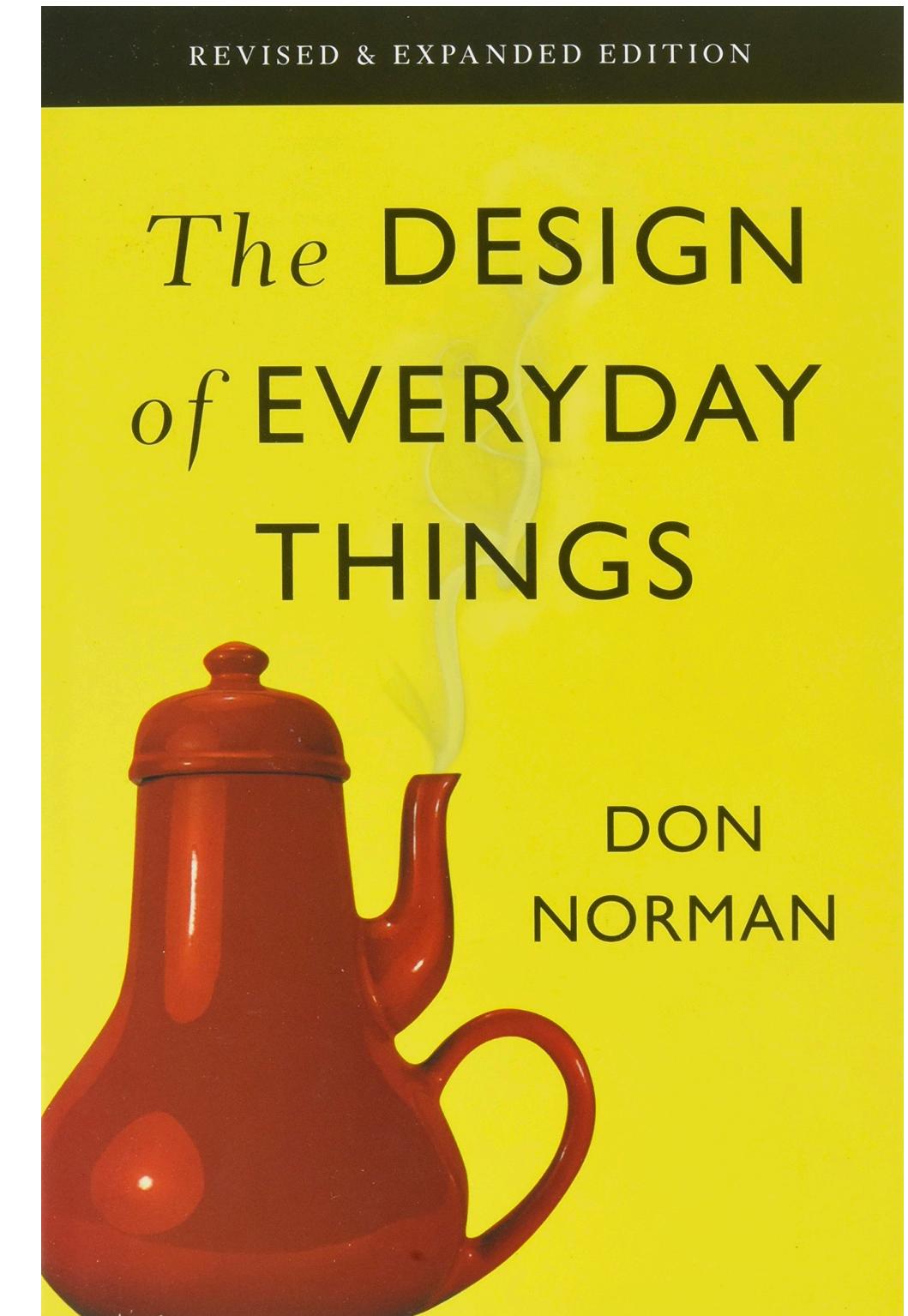
- Abigail Sellen
- Directs Microsoft Research Cambridge (UK)
- Primarily focuses on improving workplace experiences
- Elected to the CHI Academy in 2011



# Like Having a Really Bad PA

## Motivating work

- Gulf of execution
  - Gap between a user's goal for action and the means to execute that goal
  - e.g., Number of actions required to do something in an interface
- Gulf of evaluation
  - Gap between external stimulus and the time a person understands what it means
  - e.g., Challenges interpreting how an interface functions



# Like Having a Really Bad PA

## Motivating work

- ELIZA
- Early NLP system which used pattern-matching to support conversations
  - Not that “smart”, would just reflect back what a person said
  - But “smart enough” to potentially pass a Turing Test

```
Welcome to
      EEEEEE  LL      IIII  ZZZZZZ  AAAAAA
      EE     LL      II   ZZ  AA  AA
      EEEEEE  LL      II   ZZZ  AAAAAAAA
      EE     LL      II   ZZ  AA  AA
      EEEEEE  LLLLLL  IIII  ZZZZZZ  AA  AA

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

ELIZA: Is something troubling you ?
YOU: Men are all alike.
ELIZA: What is the connection, do you suppose ?
YOU: They're always bugging us about something or other.
ELIZA: Can you think of a specific example ?
YOU: Well, my boyfriend made me come here.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU: He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU: It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU: ■
```

<https://en.wikipedia.org/wiki/ELIZA>

# Like Having a Really Bad PA

## Follow-on work

- One of the first papers on commercially-available and widely-used voice assistants
  - Voice interfaces in everyday life: <https://dl.acm.org/doi/abs/10.1145/3173574.3174214>
- Brought up challenges relating to people's interactions with AI technologies
  - Guidelines for Human-AI Interaction: <https://dl.acm.org/doi/abs/10.1145/3290605.3300233>

# Assumptions Checked

## About the authors

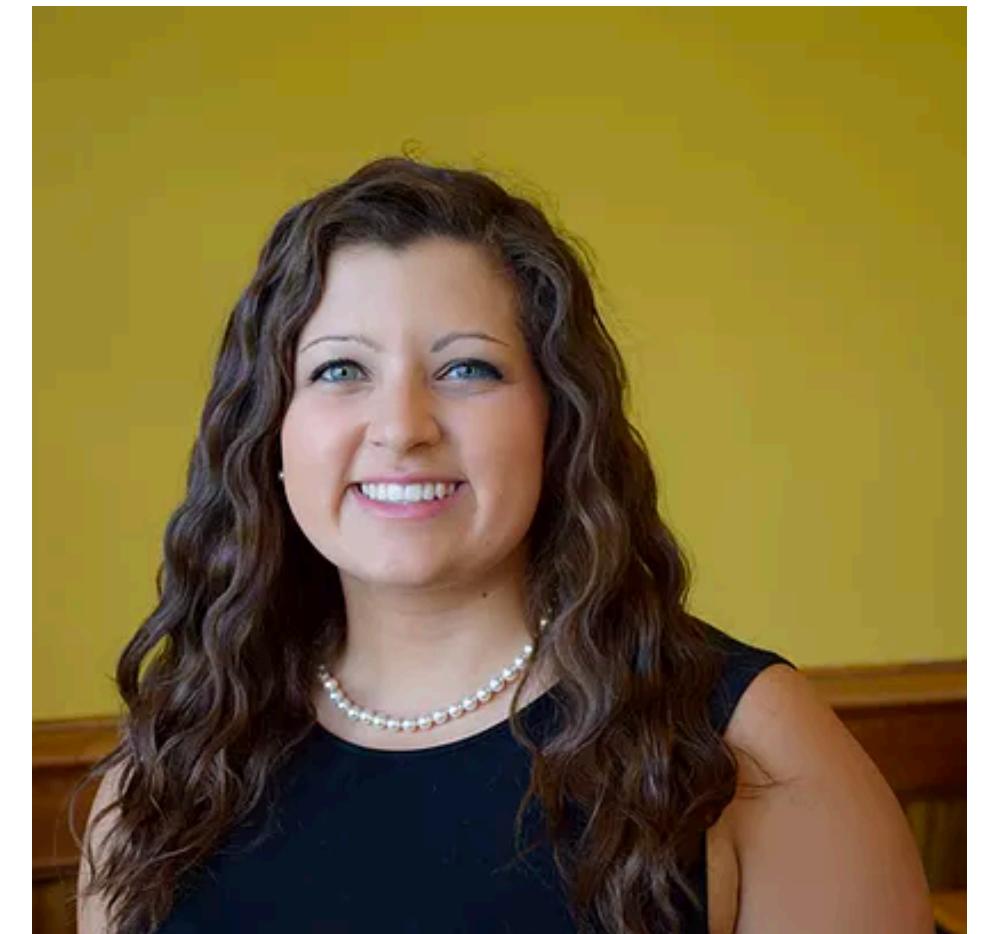
- Erin Beneteau
- PhD Student,  
University of Washington
- Speech Pathologist by training



# Assumptions Checked

## About the authors

- Yini Guan
  - UX research, nFocus
- Olivia Richards
  - PhD Student, University of Michigan
  - Conversational assistants and families
- Ray Zhang
  - PhD Student, University of Washington
  - Natural interactions



# Assumptions Checked

## About the authors

- Julie Kientz
- Professor and Chair, Human Centered Design & Engineering, University of Washington
- Understanding and reducing burdens of tech for health, education & family settings



# Assumptions Checked

## About the authors

- Jason Yip
- Assistant Professor, University of Washington
- Developing & researching informal STEM learning environments
- Creating participatory intergenerational design groups



# Assumptions Checked

## About the authors

- Alexis Hiniker
- Assistant Professor, University of Washington
- Investigating ways in which everyday technologies make life worse for their users, inventing more respectful alternatives



# Assumptions Checked

## Motivating work

- Diffusion of innovation theory
  - Social dissemination of learning and adoption
  - People rely on the experiences of others to understand what and whether to adopt a new innovation
  - People's openness also depends on framing and timing

<https://journals.sagepub.com/doi/10.1177/1049731509335569>

# Themes for Today

- It is challenging to discover the capability of conversational agents: how might we address this?
  - Jason, Arthur, Dennis, Lika, Jo

# Themes for Today

- Why might we want to converse with computers in the same way we converse with people? Why might we want to converse differently?
  - Colby, Arthur, Myles, Maruf

# Themes for Today

- With conversational detection being widely available today and ubiquitous in technology, what privacy risks does that create? As designers, how might we mitigate those risks?
  - Neeraj, Myles

# Themes for Today

## Other questions

- These papers primarily consider CAs as either/or to interfaces.  
What opportunities are there for hybrid interactions?
- What tasks are CAs well-suited for, and what tasks  
are better left to interfaces?
- How do we mitigate a lack of trust in CAs  
to correctly interpret our commands?

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