

# HCI design studio

MANEESH AGRAWALA & LYDIA CHILTON  
[CS247.STANFORD.EDU](http://CS247.STANFORD.EDU)

# Fifteen designs

In which the professors start class *en media res*

# Communicate with a quadrotor drone

Suppose the drone is autonomous, has a camera, projector, mic, & speakers

Generate and sketch out ten ideas each

You have five minutes: go!



# Share your ideas with your table

Show your favorite two ideas  
Each table nominates one to share with the class  
Your table can't repeat previous tables' ideas

# Why CS 247?

- What was challenging about fifteen designs?
  - What if it weren't fifteen ideas? What about thirty? One hundred?
  - Communicating your idea clearly and graphically
- CS 147 black-boxed important parts of the design process



# Deliberate practice

Let's talk about why we're here.

# Expertise 101

- Expert-level performance **not** determined by innate talent
- Nor determined by rote practice
- Instead, it requires **deliberate practice**

Ericsson, Krampe, and Tesch-Romer. The Role of Deliberate Practice in the Acquisition of Expert Performance. Psychological Review 1993.

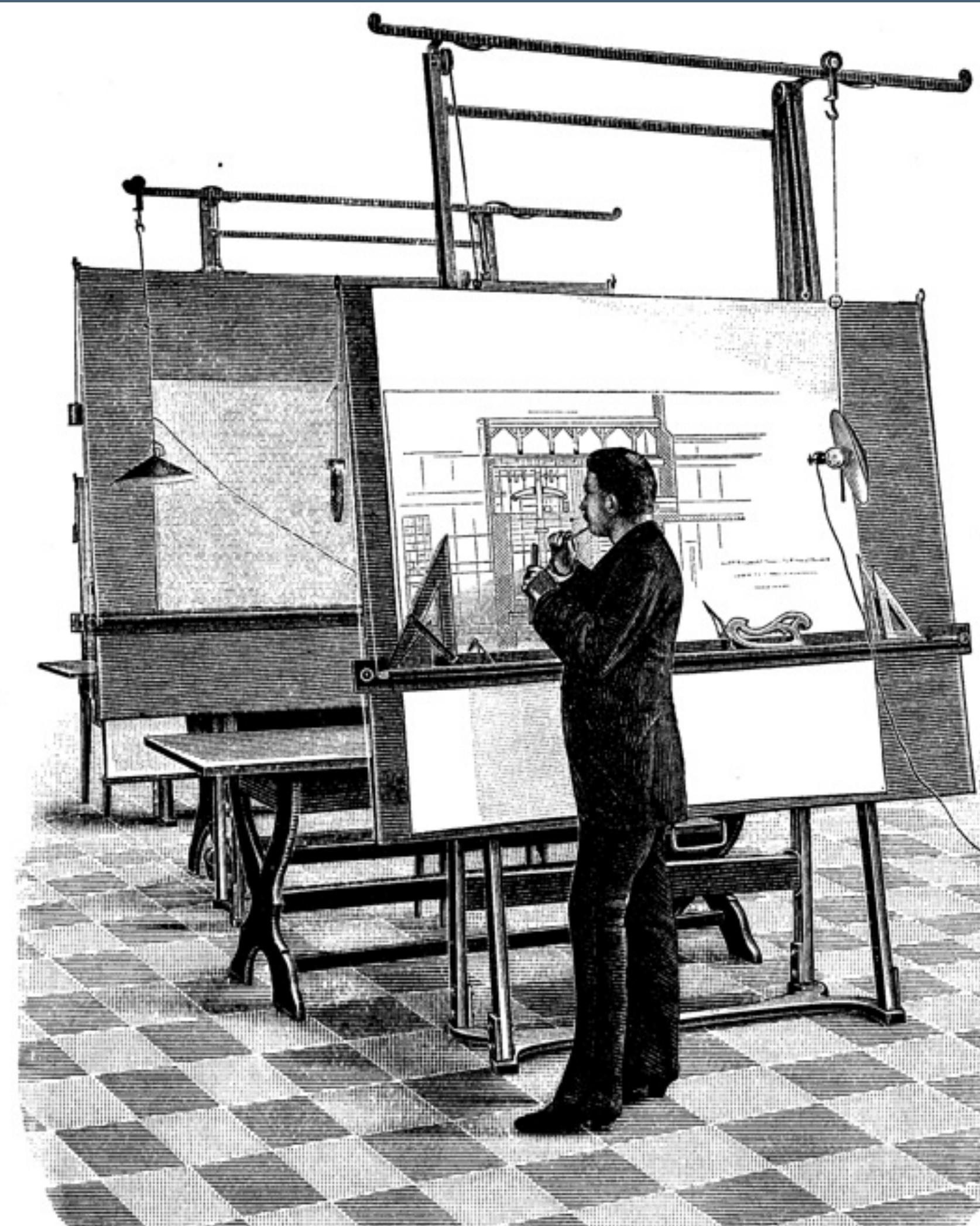
# What is deliberate practice?

- Repeated attempts followed by formative assessment and applications of corrective feedback
  - 1. Do it
  - 2. Assess the quality of the outcome
  - 3. Get feedback on how to improve
  - 4. Do it again, applying the feedback
  - 5. Do it again
  - 6. Do it again again
  - 7. Do it again again again

# In most of CS, feedback is free

compile error  
runtime error  
segmentation fault

# In design we use expert critique



- The design studio, popularized by the École des Beaux-Arts in France in the 1800's

# Design is subjective

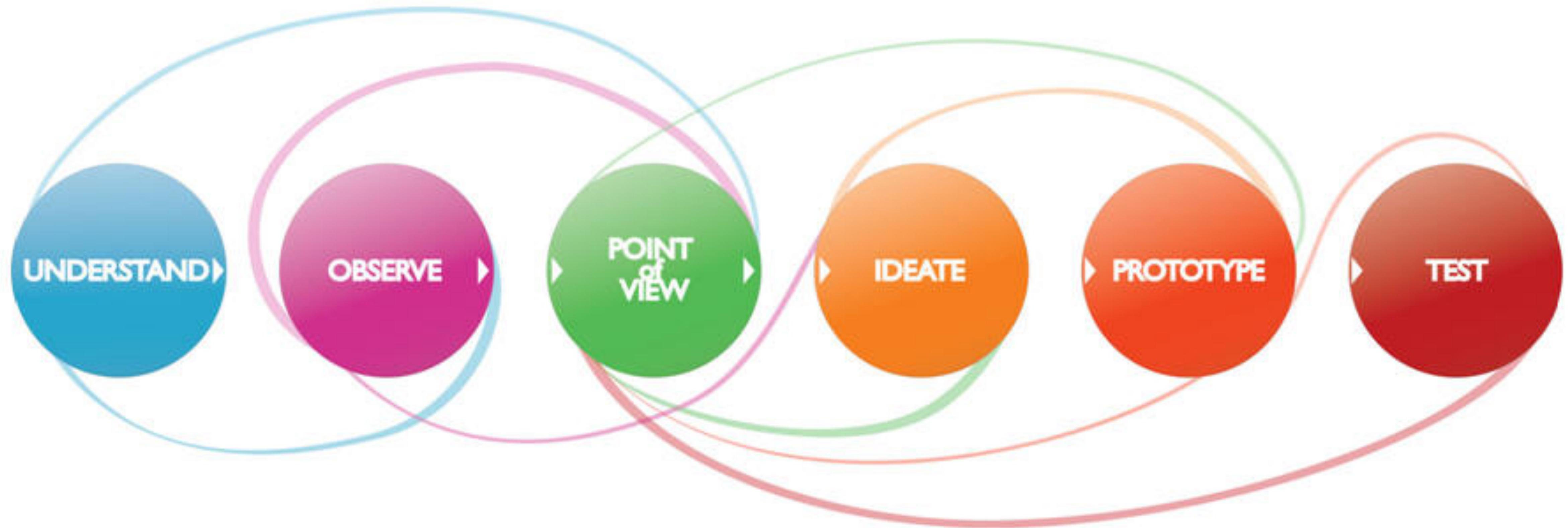
- Critiques will be subjective as well
- This is why we carefully choose our TAs
- It is OK to discuss. But acknowledge their, experience, and skill

# CS 247

- Deliberate practice in design
- Four assignments with repeated feedback and iteration from your studio staff
- An opportunity that is unique to Stanford

# CS 247

- Advanced techniques for interaction design
  - Act I. Studio/Critique
  - Act II. Needfinding
  - Act III. Prototyping
  - Act IV. Interacting



CS 147 overview

CS 247 zoom in

# In sum

- This class is about improving your design skills through deliberate practice
- You will get repeated feedback twice a week from teaching staff. We will push you
- Iterate based on our feedback and you will learn a lot

# Studios

- Class is split into studios of 15-20 people each
- Each studio is led by professor and TA
- Teaching staff will lead your critique, feedback and grading

# The structure of studio sessions

- You will share, critique, and be critiqued each week as part of your project deliverables
- Design critique: focused feedback to guide your ideation and prototyping process
  - More on this soon
  - This isn't routine feedback: it's guidance intended to push you
  - Ignore critique at your peril

# Theme: Interactive Explanations

Distill

ABOUT PRIZE SUBMIT

## Latest Articles

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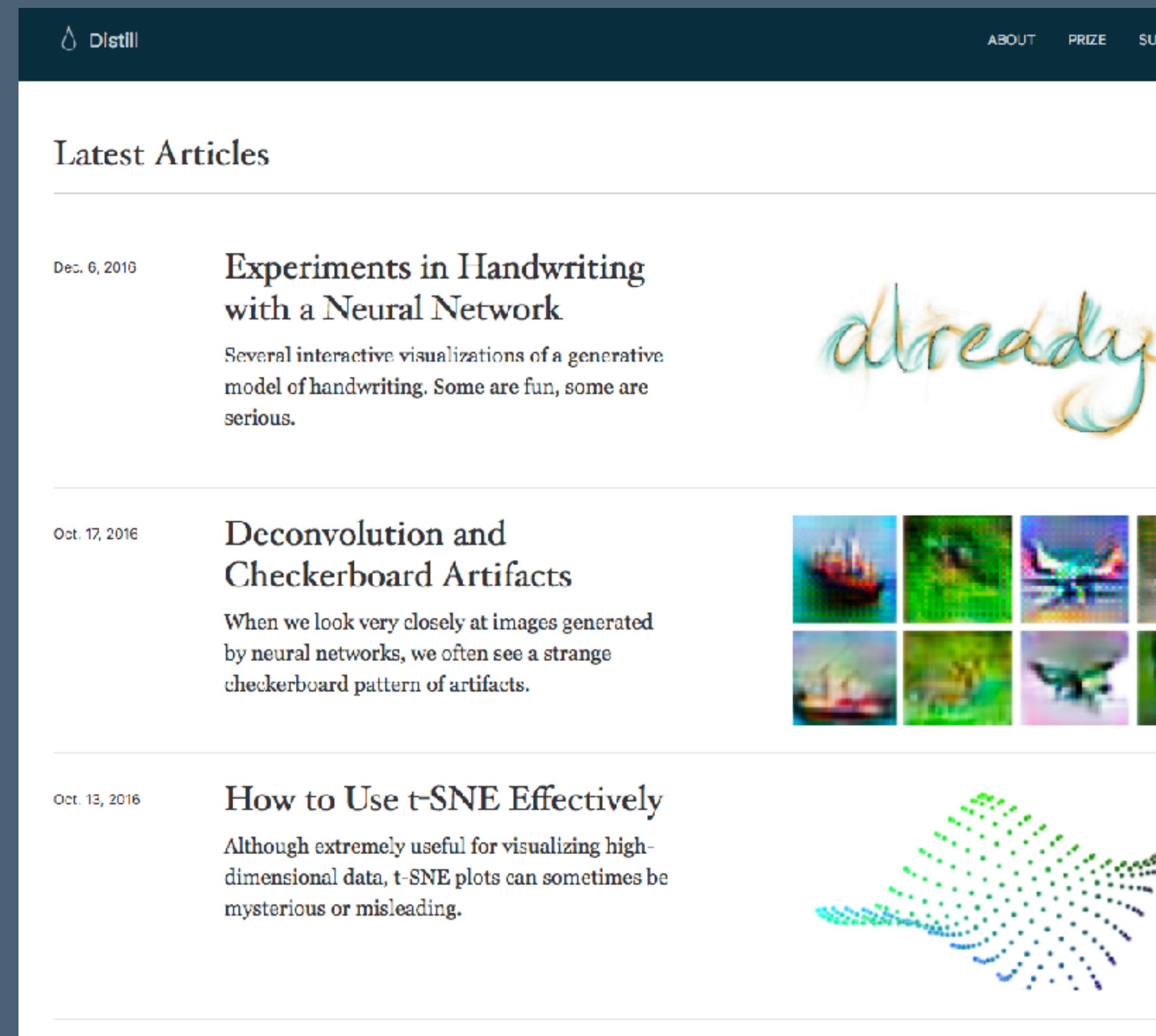
Dec. 6, 2016 **Experiments in Handwriting with a Neural Network**  
Several interactive visualizations of a generative model of handwriting. Some are fun, some are serious.

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Oct. 17, 2016 **Deconvolution and Checkerboard Artifacts**  
When we look very closely at images generated by neural networks, we often see a strange checkerboard pattern of artifacts.

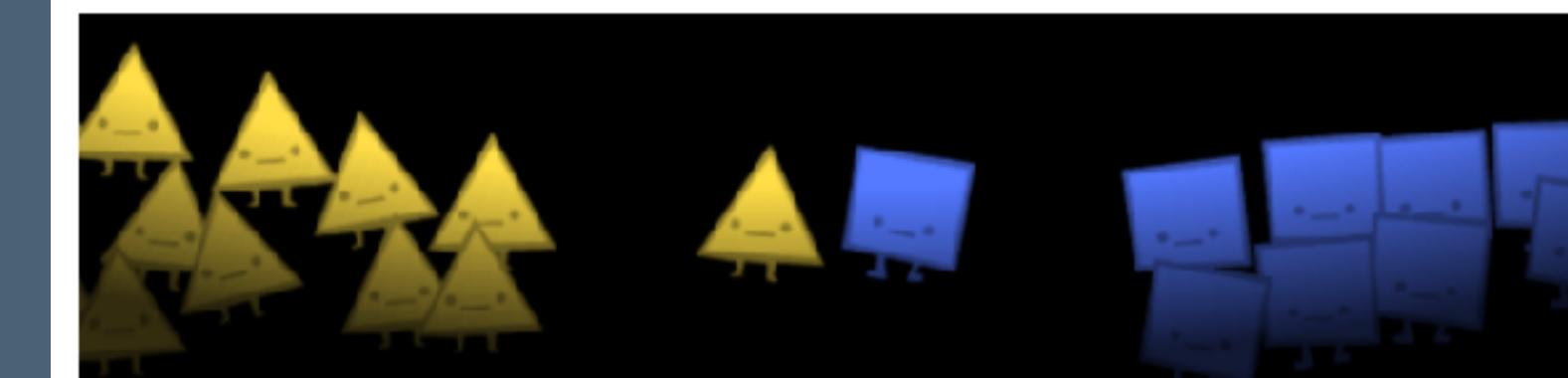
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Oct. 13, 2016 **How to Use t-SNE Effectively**  
Although extremely useful for visualizing high-dimensional data, t-SNE plots can sometimes be mysterious or misleading.



## EXAMPLES OF EXPLORABLES

Lots of people are already using interactive explanations, to teach about the natural and social sciences...



**Parable of the Polygons** by Vi Hart and Nicky Case  
a social simulation of discrimination and diversity



**Earth: A Primer** by Chaim Gingold  
"what If your Earth Science book was alive?"



**Neurotic Neurons** by Nicky Case  
an interactive animated-video-essay-thing on neurons & anxiety

<http://distill.pub/>

<http://explorableexplanations.com/>

# PARABLE OF THE POLYGONS

A PLAYABLE POST ON THE SHAPE OF SOCIETY

by vi hart + nicky case

[español](#) | [deutsch](#) | [français](#) | [português](#) | [日本語](#) | [中文](#) | [polski](#)  
[italiano](#) | [magyar](#) | [nederlands](#) | [हिन्दी](#) | [čeština](#) | [Русский](#) | [العربية](#)



<http://ncase.me/polymorph>

# Introductions

Did you know: the university officially calls them CAs?

# Maneesh Agrawala

- Professor, Computer Science
- Director, Brown Institute for Media Innovation
- HCI / Graphics / Visualization



# Lydia Chilton

- Assistant Professor, Computer Science  
Columbia University
- HCI / Design / Crowdsourcing



# Teaching Assistants

- Ludwig Schubert
- Aaron Loh

# Assignment 0: Apply for class

- Due at midnight tonight, and required to take class
- It's at <http://hci.st/247spring>

# Class logistics

Because it wouldn't be the first day of class without them.

# Our project rhythm

- Assignments will be due by the start of class (1:30pm)
- Some assignments graded formatively...
  - Points for completing the requirements of the assignment
  - Typically worth fewer points
  - ✓-, ✓, ✓+ feedback to guide your progress
  - Can be redone and resubmitted at the next studio for additional feedback.

# Our project rhythm

- Assignments will be due by the start of class (1:30pm)
  - No late assignments
- Other assignments graded summatively...
  - Traditional rubric-based, graded feedback
  - Worth many more points
- Goal: use the formative assignments to get our advice and feedback in a safe space, so that you can maximize your performance on the summative assignments.

# Our project rhythm

- Example:
  - Assignment II, Part I: **formative**, needfinding observation. Feedback in class.
  - Assignment II, Part II: **summative**, go improve and redo observation.

# Four projects

- A1: critique
- A2: needfinding
- A3: prototyping
- A4: interaction

# Grading

- Heavily project-based (90%):
  - Assignment 1: 5%
  - Assignment 2: 20%
  - Assignment 3: 25%
  - Assignment 4: 40%
- Participation (10%):
  - 5% for studio participation
  - 5% for team participation

# Attendance

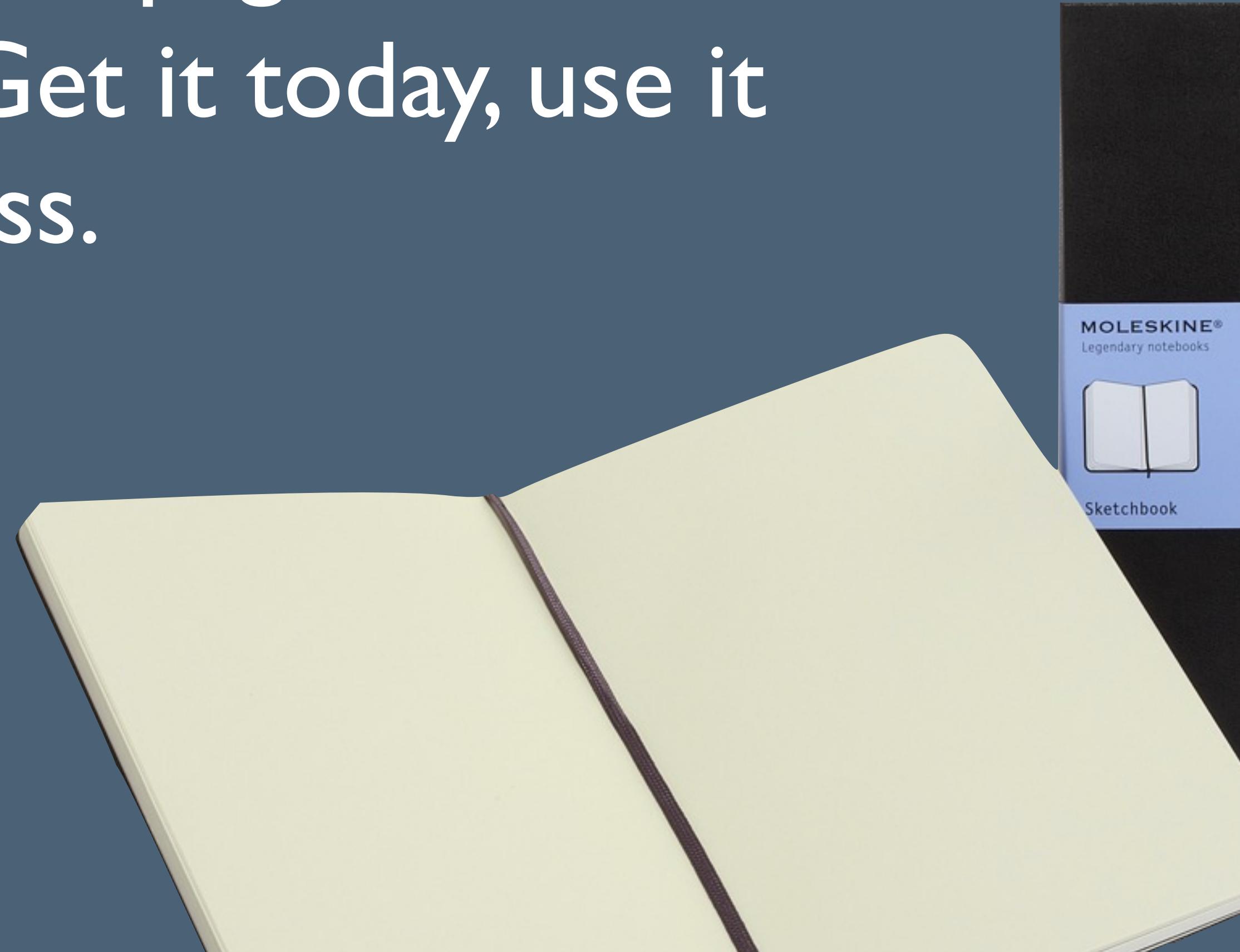
- This class is a studio, where a lot of the learning happens in class through a mixture of lecture, activity, and project work.
- For this to work, attendance is mandatory.
- There are two pre-excused absences allowed — post on Piazza in advance.

# Prerequisites

- We expect that you have background in design thinking fundamentals (e.g., CS 147) and web programming ability (e.g., CS 142)
- If you are from a department other than CS, SymSys, and MS&E, let's talk. We want a diverse classroom

# Materials

- Buy a sketchbook and thick pen.
- Make sure you can easily tear out pages.
- This is required as part of A2. Get it today, use it tomorrow. Bring it to every class.
- Stanford Bookstore
- Amazon Student Prime
- Art Store on CA Ave



# Questions?

Ans: 42

# Critique



# Why critique?

- Design is hard
- Designers get stuck
- Designs are not “good or bad,” but “better or worse”
- It can be useful to hear your ideas from somebody else
- A good critique can nudge a designer into a more productive design space.

# Criticism vs. Critique



- It's tempting to be a critic
- Hating on people is funny
- Critics feel powerful and important
- Critics are often correct
- But critics are rarely helpful
- Critics shut down creators

# Criticism vs. Critique



- Critique is an open-ended process that is intended to push the designer to be even better.
- Your goal: give the designer an “aha!” moment about their own idea.

# Getting critiqued



# Set the stage, but briefly

- Tell everyone your design goals before you describe your project.
- Don't give a feature tour, focus on a user's experience.
- Be quick. The more you say, the less feedback you get.

# A problem statement

- I am showing... *[early/mid/late work]*
- Around... *[the problem]*
- Because... *[why it's a problem]*
- And am looking for feedback around... *[specific focus for feedback]*
- I am not looking for feedback yet on... *[things you have not thought about yet]*

# Breathe

- Your goal is not to defend your idea.
- Your goal is to understand the feedback, and why people are reacting the way they are. Use this information to improve your design.
- Or do you really think that your design is the best possible idea in the world, and can't be improved?

# Write it down

- Dedicate a team member or a friend (if a solo project) to be the notetaker.
- You want to focus your energies on being a part of the conversation, not on trying to remember everything.



hmslydia.com

Lydia

# Lydia Chilton · Columbia · HCI

Sections ▾

I am an assistant professor in the Computer Science Department of Columbia University starting in Fall of 2017. My area of focus is human-computer interaction (HCI), and I am looking for students who are:

- analytical
- problem solvers
- love the power of computation
- interested in the design process
- curious about the world

I aim to work closely with my students to **build tools that make people better at solving problems**. The three main approaches are to:

- **organize** massive amounts of information and make sense of it
- **design** better solutions through brainstorming, synthesis, and iteration
- **communicate** complex ideas more easily with visual symbols and illustrative metaphors



Lydia Chilton  
Columbia University  
Computer Science Department  
(currently visiting Stanford University)  
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[Google Scholar Page](#)

## Computational Design is a grand challenge in HCI

Design is an the key process for solving problems spanning from software design to graphic design. Although trained experts can do design work, we don't fully understand how to do it, how to teach it, or why design is successful. Let's break down and rebuild the design process from the ground up.

Start with the assumption that the design process can be viewed computationally: that it has modules that can be isolated and then computationally composed. We can then see design as a search process for transforming an input into an output that meets a desired specification.

- Set the Stage:
  - My goal is to attract the right grad students to apply to Columbia CS
  - I am showing a first release version.
  - Problem: My articulation resonated with some potential students, but not others.
  - I am looking for feedback on: first impressions it creates of me: graphic design and language
  - I am not looking for feedback on: word-level detail



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# Sharing critique



# What should I say?

- Make sure you understand their design goals.
  - The best way to do that is to repeat them in your words.
- Match your feedback to the design goals. Is this assignment focusing on usability, aesthetics, needs, or idea generation?
- Good heuristics:
  - Can I see a nearby point in the design space that gets more to the core of the problem?

“I like...”

“I wish...”

“What if...?”



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A portrait photograph of Lydia Chilton, a woman with short blonde hair, wearing a black blazer over a white shirt, standing in front of a dark background.

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# Try to suggest a better path

- One of the best scripts for a critique comment is:  
“I really like [an aspect of the design].  
It can be even better.  
And here’s how: [suggestion].”
- Remember: Design is hard. Design is not “good or bad”  
but “better or worse”.
- Help nudge designers into productive spaces.

# Example: getting to the core

- Suppose the designer was exploring ways to help parents calm down crying children at the supermarket.



- “What if you focused not on how the parents deal with whining kids, but with what made the kids upset in the first place?”

# Example: question the goals

- “What if parents don’t actually want to quiet down their kids? Maybe they just want to get in and out quickly to minimize the pain to everyone else, and trying to fix it will only prolong things.”

# Example: question fixation

- “I like the interaction design for the touch interface. It is really beautiful. I wish there were results from a prototype to verify the design approach first.”

# Assignment I

# Critique

- Goal: exercise your critique skills
- Critique two interfaces,
  - one of yours
  - one Interactive Explanation (not Parable of the Polygons)
- Due Wednesday
  - Bring zoomed-in printouts to class on Wednesday
- Much more at [cs247.stanford.edu](http://cs247.stanford.edu)

# Studio time

The screenshot shows the New York Times homepage with a dark blue header. The main title 'The New York Times' is at the top left. Below it, the date 'Monday, April 3, 2017' and various navigation links like 'Sections', 'Search', 'ENGLISH 中文 (CHINESE) ESPAÑOL', and a user profile 'hmslydia'. The main article is 'China Finds the Way to Trump Is Through His Son-in-Law' by MARK LANDLER, featuring a large image of a building. Other visible articles include 'How Uber Uses Psychological Tricks to Push Its Drivers' Buttons' by NOAH SCHIFFER, 'Disclosures Show Trump's Staff Mixed Politics and Paydays' by STEVE EDELMAN, ERIC LIPSON and ANDREW W. LEHRER, and 'The Best TV Shows and Movies New to Netflix, Amazon and More in April'.

Critique The New York Times homepage.

Critique this page with respect to the goal of getting the user to engage with the page by clicking on an article of interest.

# Fill out the Application

<http://hci.st/247spring>