

CROWDSOURCING A MEETING OF MINDS

DESIGNING THE FUTURE OF WORK

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20% of US jobs [Blinder 2006]
45,000,000 workers [Horton 2013]





COORDINATION NEGLECT: HOW LAY
THEORIES OF ORGANIZING
COMPLICATE COORDINATION IN
ORGANIZATIONS

Out of Sight, Out of Sync: Understanding
Conflict in Distributed Teams

The Mutual Knowledge Problem and Its
Consequences for Dispersed Collaboration

The team scaling fallacy: Underestimating the declining efficiency of larger teams

Who's in Charge Here? How Team Authority Structure Shapes Team Leadership

**Team Familiarity, Role
Experience, and
Performance: Evidence from
Indian Software Services**

The Influence of Shared Mental Models on Team Process and Performance

Some unintended consequences of
job design

Structure and Learning in Self-Managed Teams:
Why “Bureaucratic” Teams Can Be Better Learners





How might computing connect large groups to tackle bigger, harder problems than they could complete in isolation?

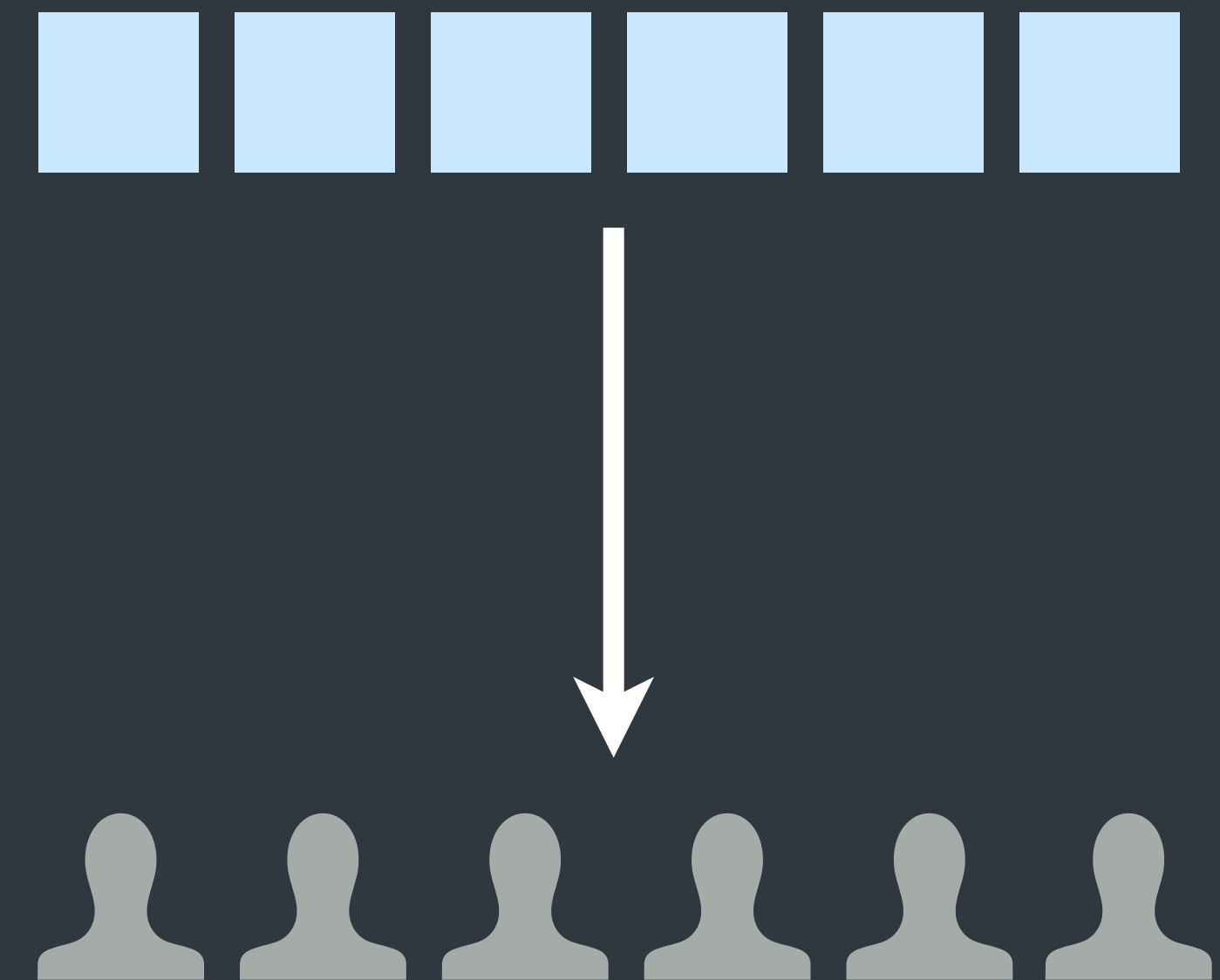
CROWDSOURCING: SMALL TASKS, MANY PEOPLE

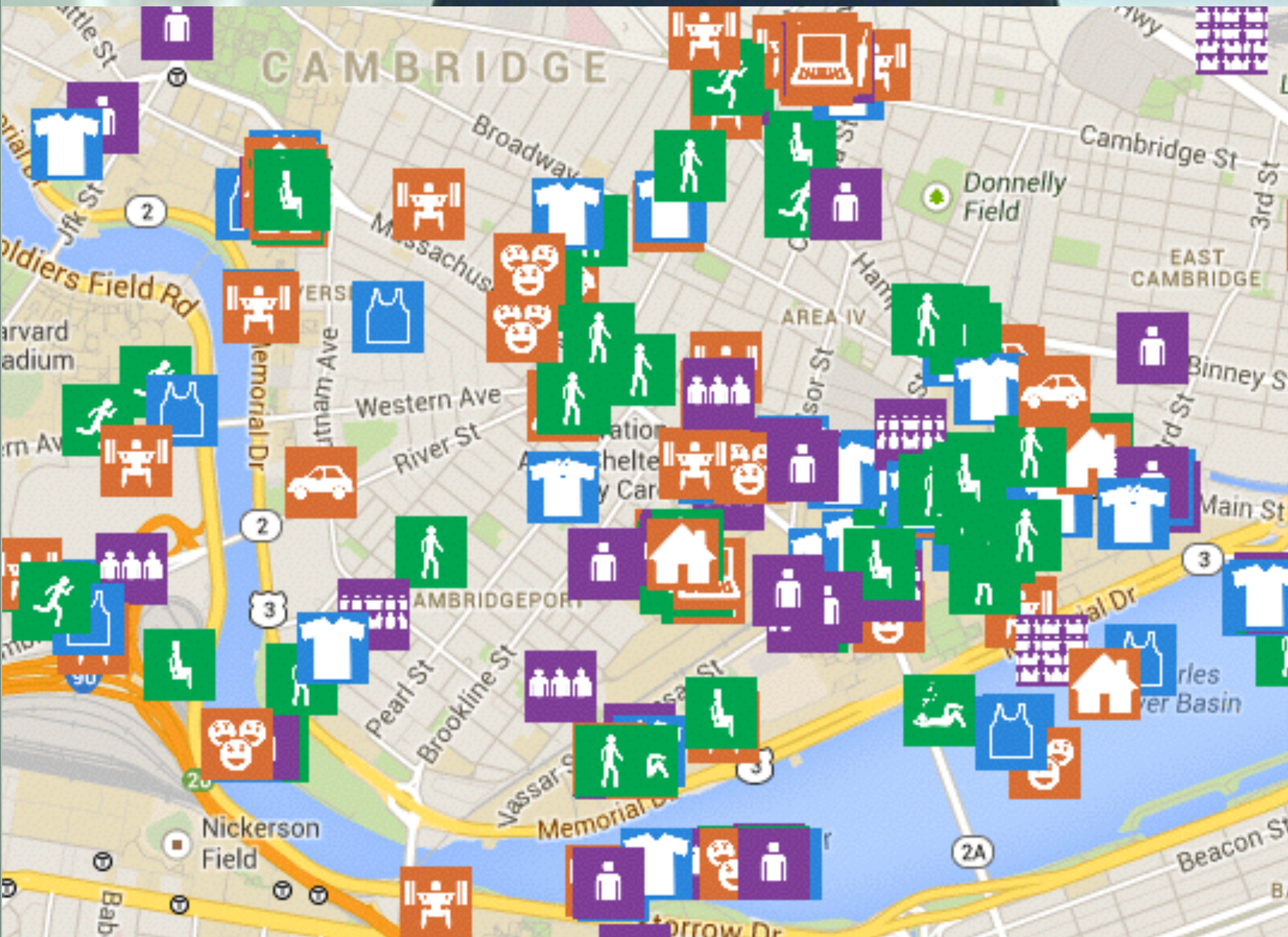
Computationally
recombine many paid
non-expert opinions

e.g., text shortening
[Bernstein et al. 2010]

e.g., image labeling
[von Ahn and Dabbish 2005]

e.g., data collection
[Deng et al. 2009]





Public deployment:
over 100,000
unlocks

no slower than
slide-to-unlock

no more cognitive
load than
slide-to-unlock

HYBRID CROWD-ML CLASSIFIERS



Paired examples generate human features
Machine learning learns to weigh the evidence

Short sentences
Few details

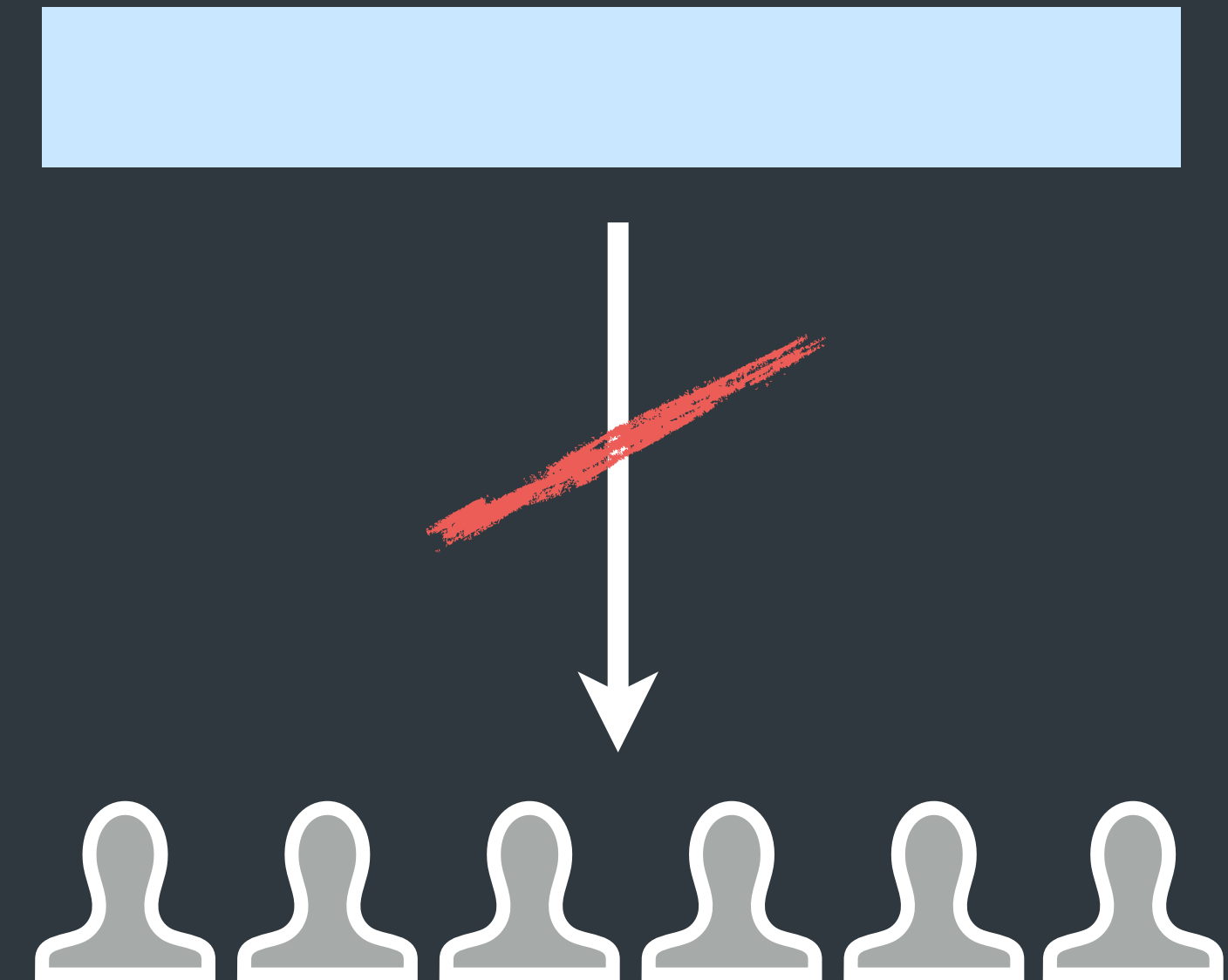
Hybrids 300% relative improvement over human reasoning

[Cheng and Bernstein CSCW 2015]

MICROTASK CROWDS STRUGGLE WITH COMPLEX TASKS

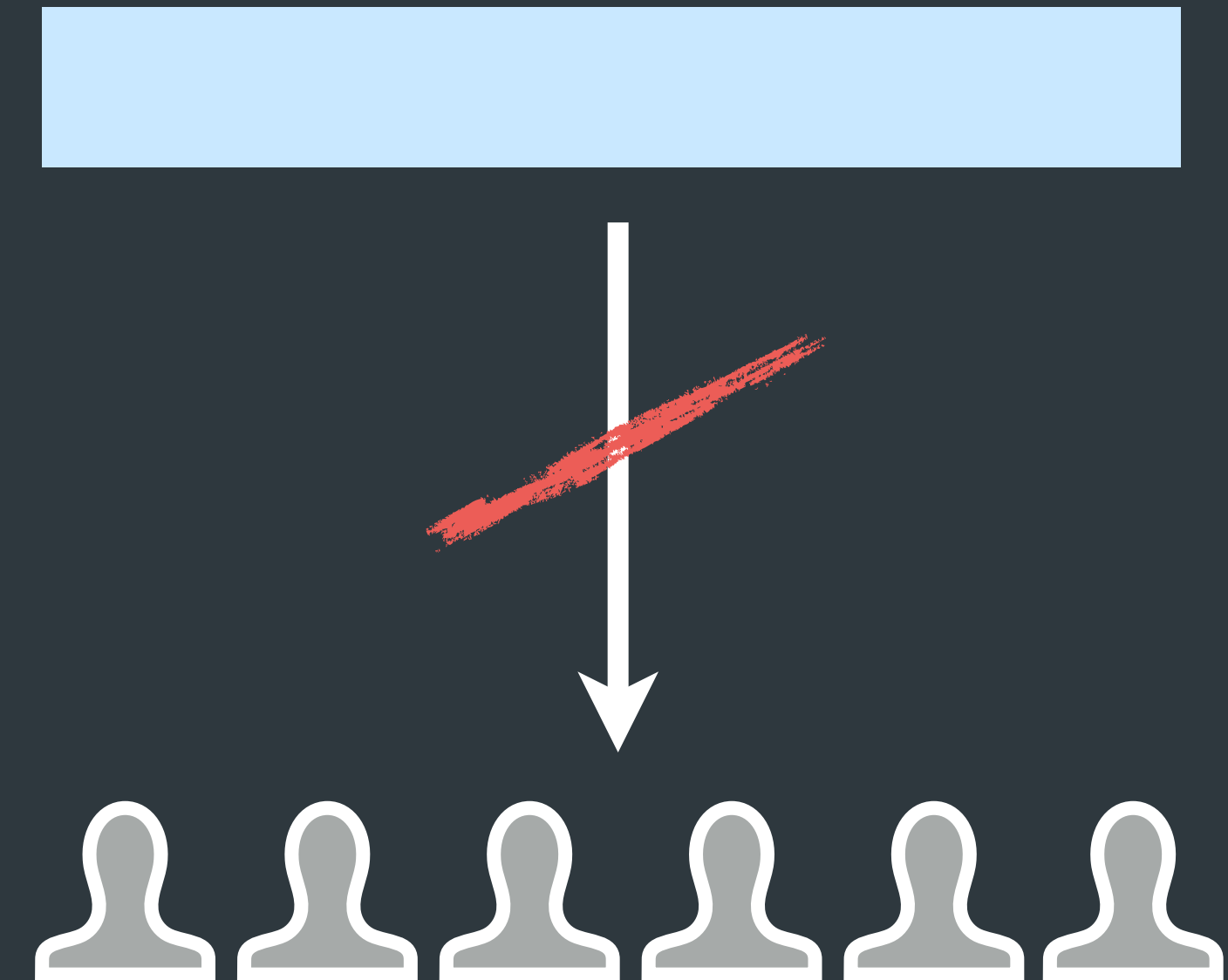
Design, engineering,
writing, video production,
music composition

[Kittur et al. 2013, Kulkarni et al. 2012]



MICROTASK CROWDS STRUGGLE WITH COMPLEX TASKS

Today: Three efforts to computationally scale up the complexity, interdependence, and sociotechnical infrastructure for crowd work.



EXPERT CROWDSOURCING WITH FLASH TEAMS

Daniela Retelny, Sébastien Robaszkiewicz, Alexandra To, Walter Lasecki, Jay Patel, Negar Rahmati, Tulsee Doshi, Melissa Valentine, Michael Bernstein. UIST 2014. **Best paper award.**

COULD WE CROWDSOURCE...

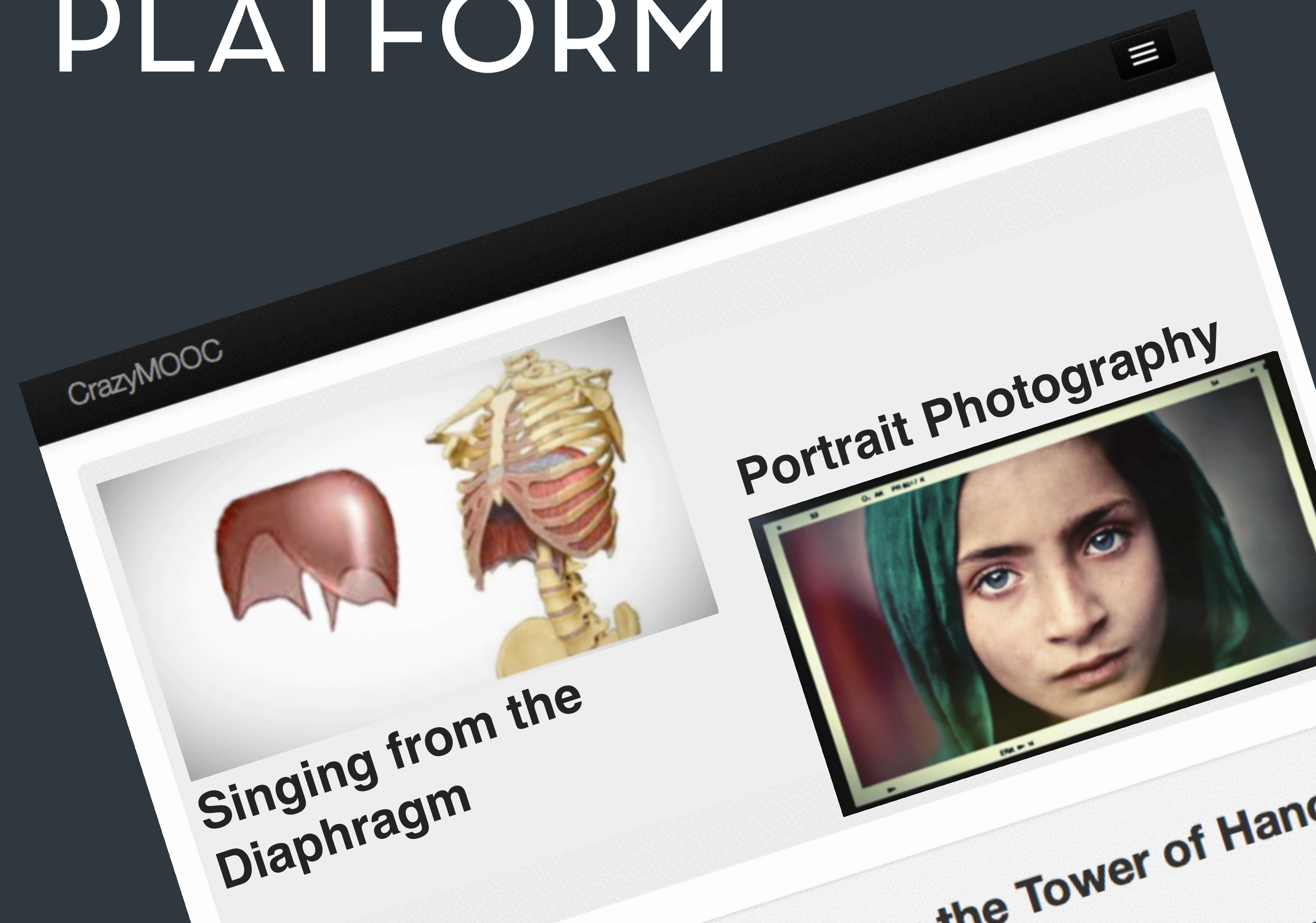
THE DESIGN PROCESS,
STARTING FROM A NAPKIN
SKETCH, IN ONE DAY?



COULD WE CROWDSOURCE...
AN ANIMATED VIDEO
IN 48 HOURS?



COULD WE CROWDSOURCE...
AN ENTIRE MOOC PLATFORM
IN 24 HOURS?



CROWDS OF EXPERTS

Mechanical Turk



microtask worker
microtask worker
microtask worker
microtask worker
microtask worker



Upwork



programmer
designer
video editor
musician
statistician

CROWDS OF EXPERTS FACE COORDINATION CHALLENGES



Microtask techniques
do not leverage **diverse**
skills and expertise.



Expert crowd work is
independent and
uncoordinated.

ORGANIZATIONAL BEHAVIOR



Self-managed teams are inefficient,
riddled with frustrated members,
and poorly coordinated.
[Bunderson and Boumgarden 2010]

ORGANIZATIONAL BEHAVOR

MSB: 10: take these team scaffolds —> transform the ideas behind team scaffolds so that they could...

Arvind: The earlier slides, you flash up graphics while you talk through them, might want to stagger more
e.g., slide 10 you into a lot, then ask the question, might want to stagger the display



Lightweight team scaffolds significantly outperform pipelined and self-managed efforts.
[Valentine and Edmonson 2012]

computational ORGANIZATIONAL BEHAVIOR

Could we combine the management
strength of team scaffolds with the scale
and interactivity of computing?

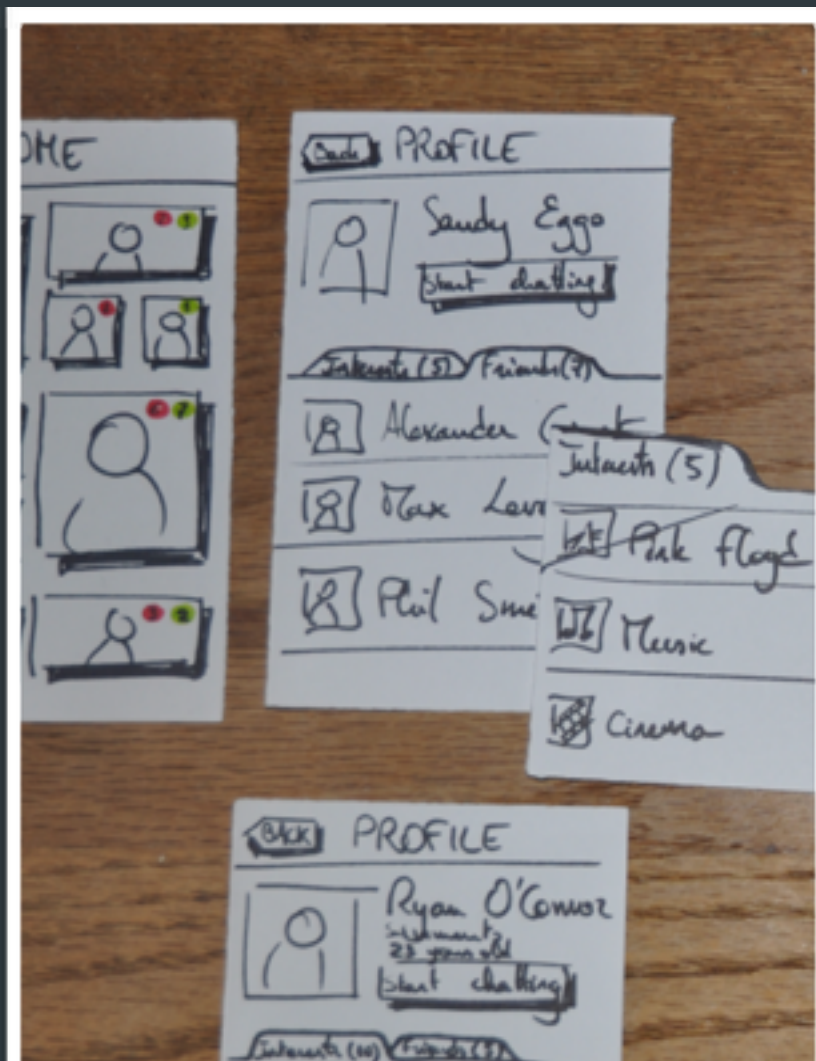
FLASH TEAMS

Crowdsourcing infrastructure for creating and guiding on-demand teams of diverse experts

FLASH TEAMS

Computationally-guided teams of crowd experts supported by lightweight, reproducible and scalable team structures.

Input

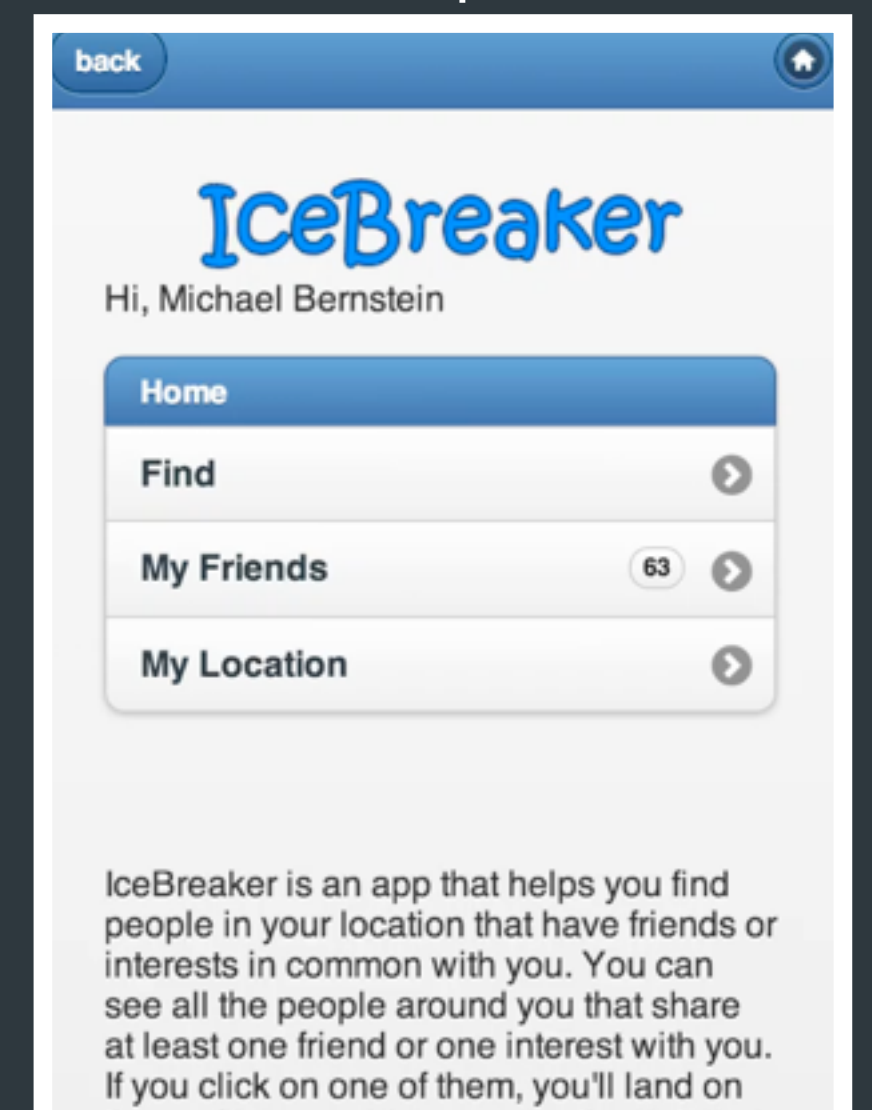


Flash Team

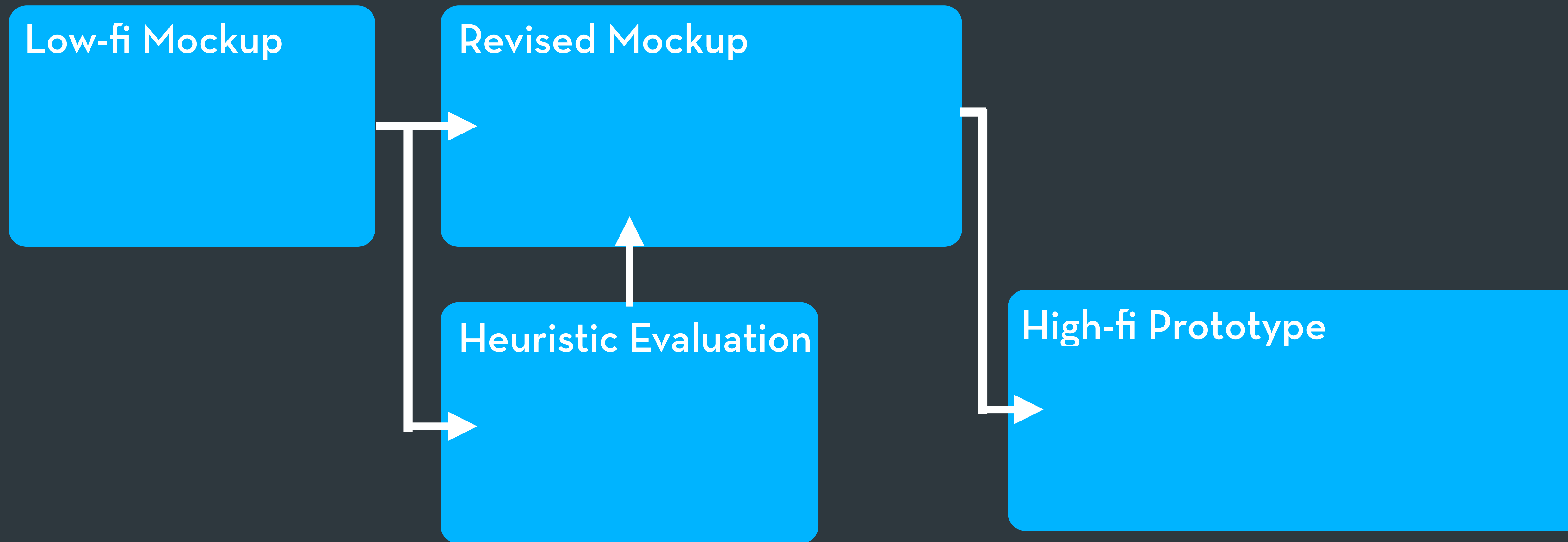


DESIGN

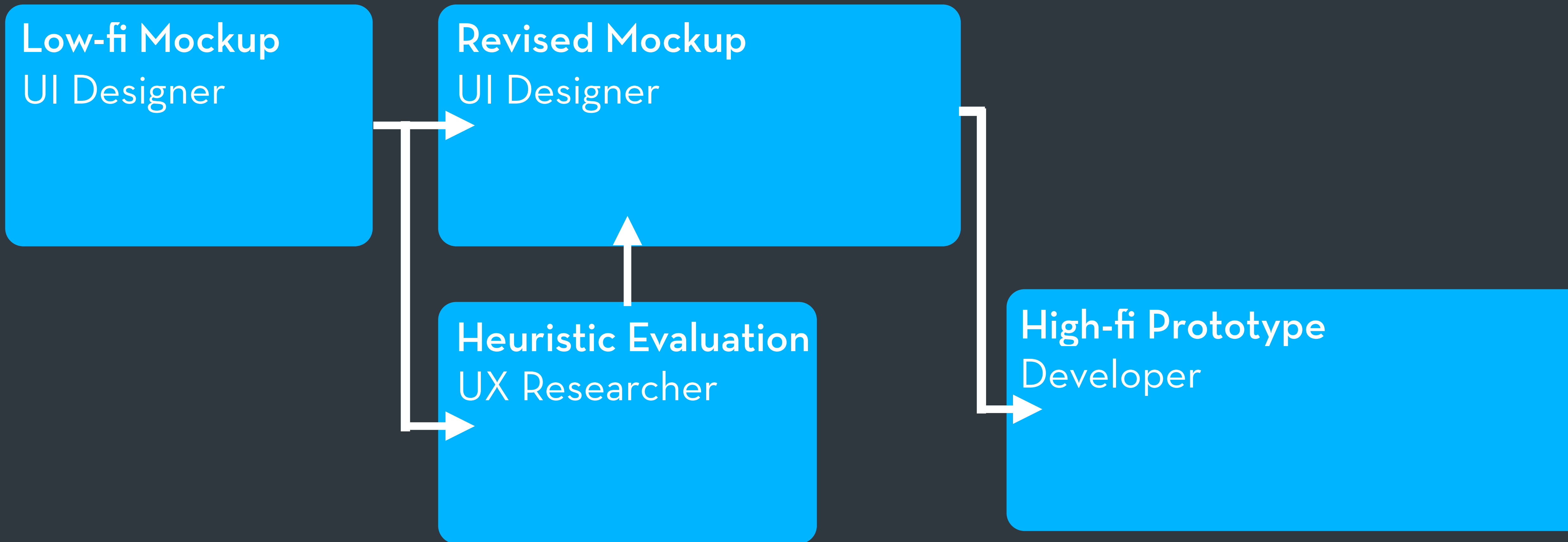
Output



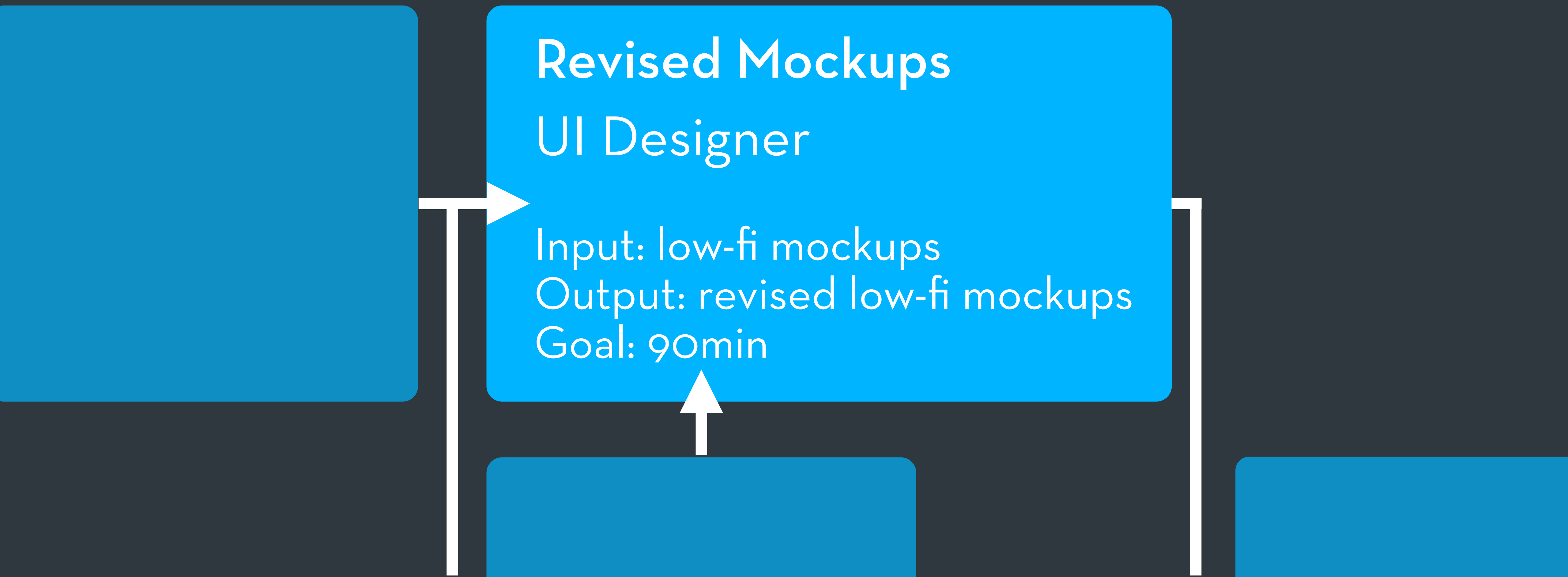
SEQUENCE OF LINKED TASKS



SEQUENCE OF LINKED TASKS



ATOMIC UNIT: BLOCK



Low-fi Mockup

UI Designer

Input: napkin sketch
Output: low-fi mockups
Goal: 1hr

Revised Mockup

UI Designer

Input: low-fi mockups
Output: revised low-fi mockups
Goal: 2hrs

Heuristic Evaluation

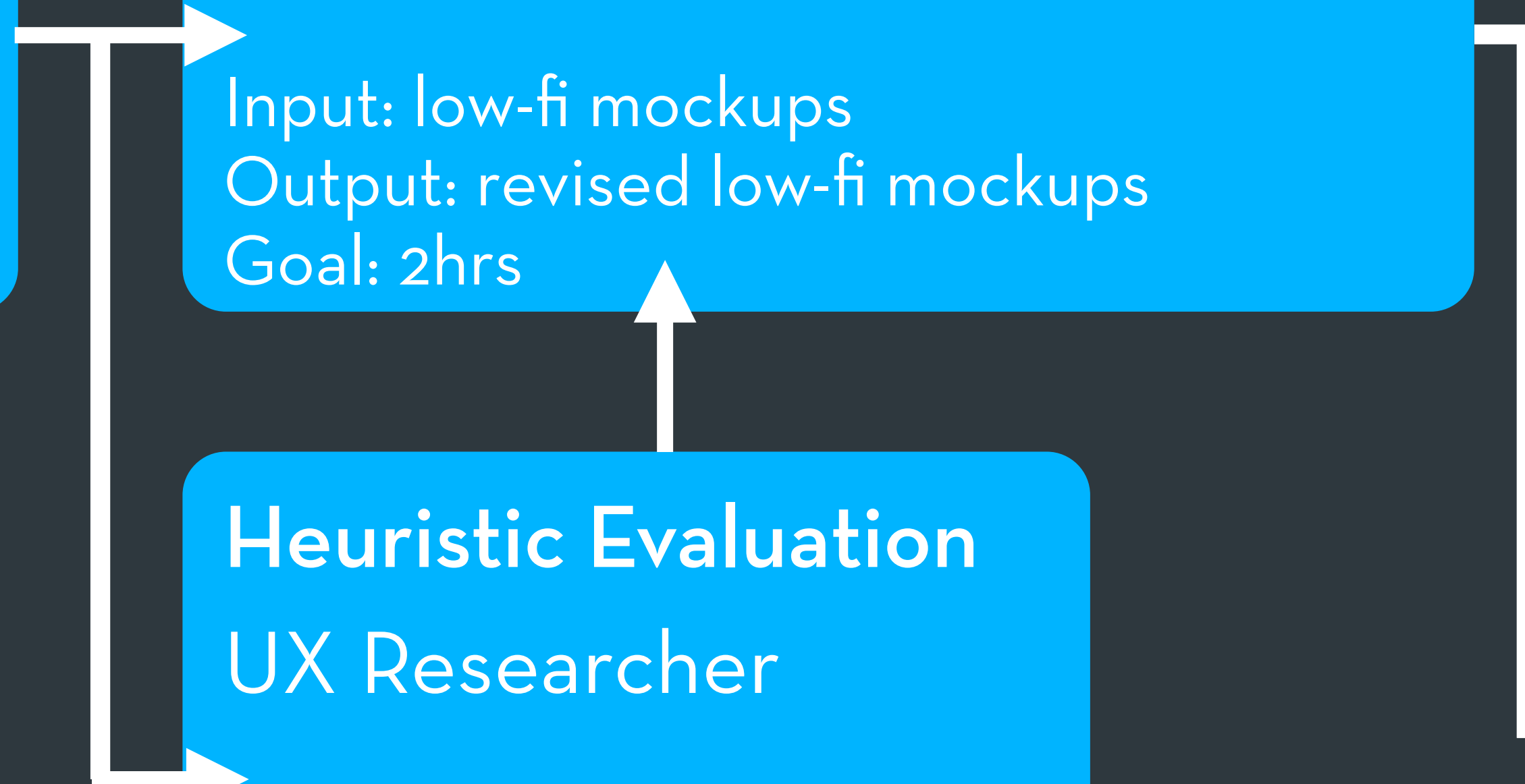
UX Researcher

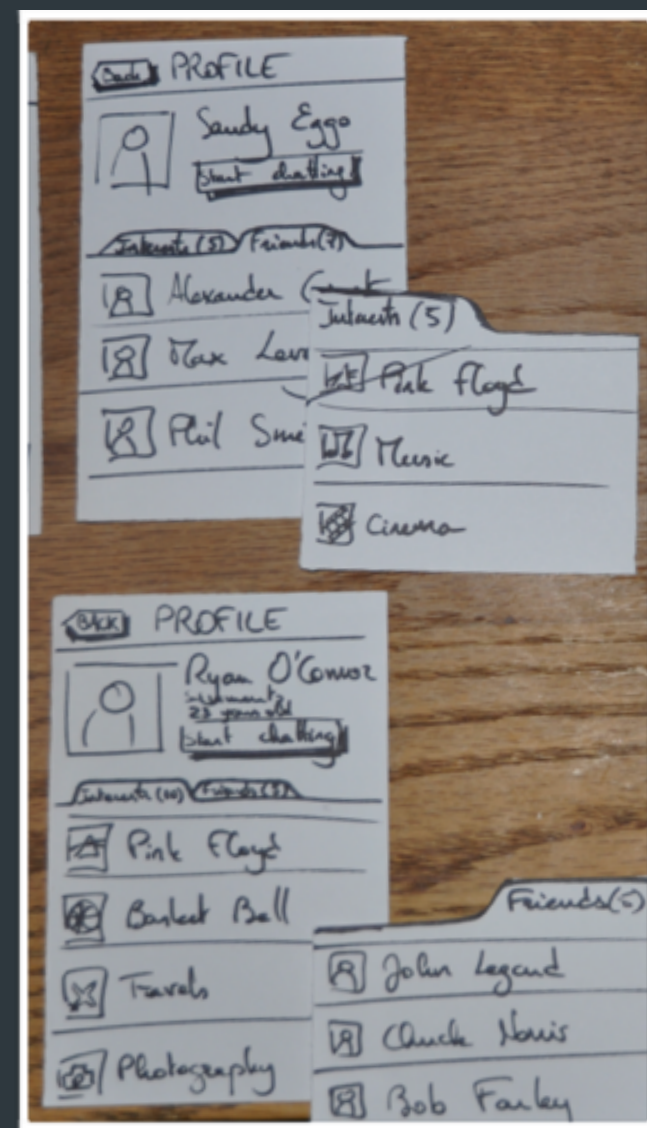
Input: low-fi mockups
Output: heuristic evaluation
Goal: 1hr

High-fi Prototype

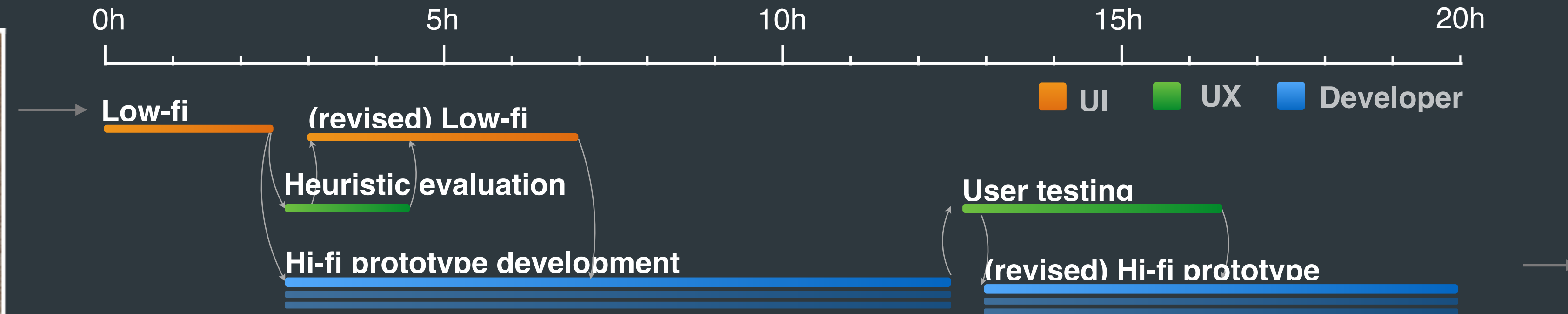
Developer

Input: low-fi mockups, HE
Output: high-fi prototype
Goal: 4hrs





napkin
sketch



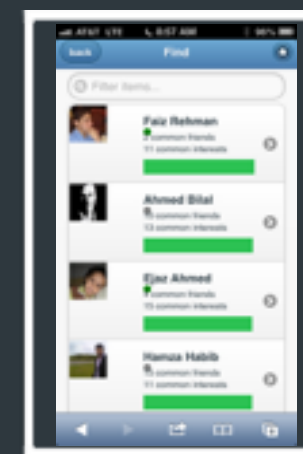
low-fi
mockup



heuristic
evaluation



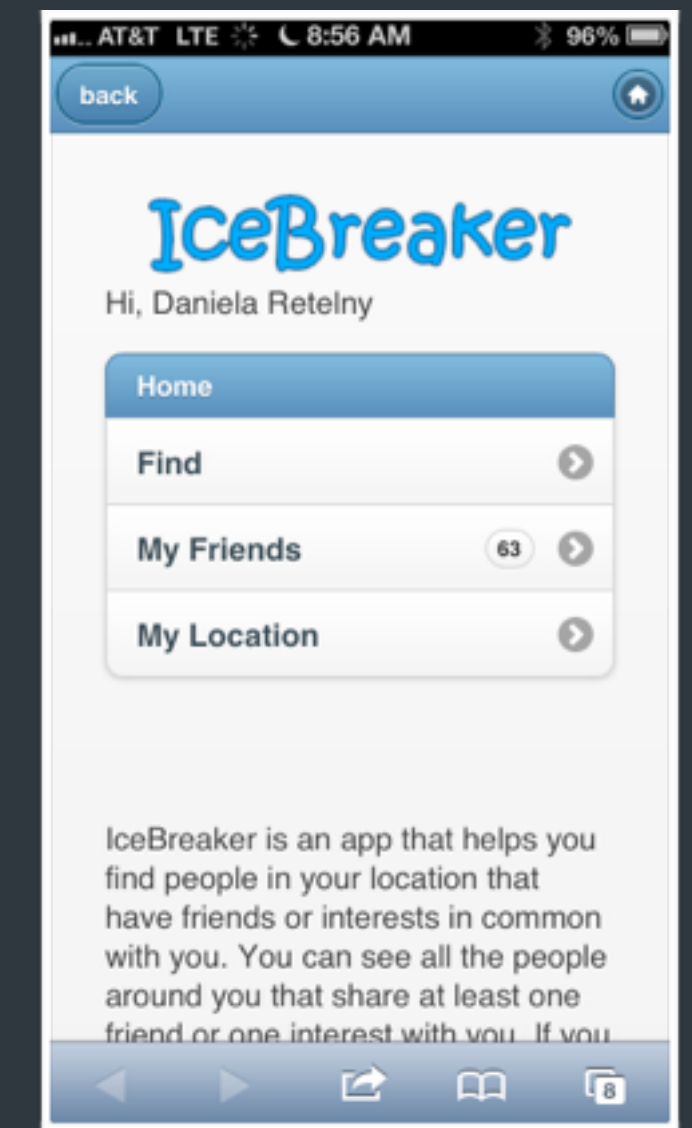
(revised)
low-fi mockup



hi-fi
prototype



user study
report



(revised) hi-fi
prototype

RUNNING A FLASH TEAM

1. Introspect on the team composition & convene experts from the crowd
2. Convey the team through the workflow, shepherding files between tasks and sharing schedule updates

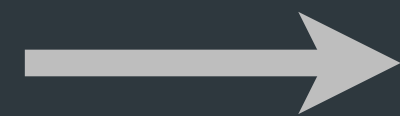
Upwork



programmer
designer
video editor
musician
statistician

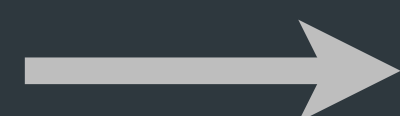
COMPUTATIONAL AFFORDANCES OF FLASH TEAMS

Modularity



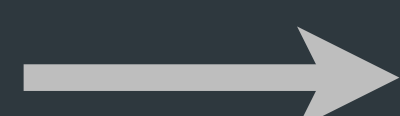
Scale

Elasticity



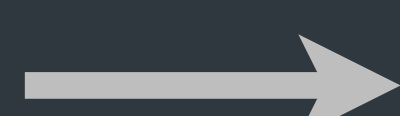
Grow + shrink

Pipelining



Optimize

Planner



Create on-demand

MODULARITY

REPLICATE TEAM STRUCTURES AT SCALE



DESIGN



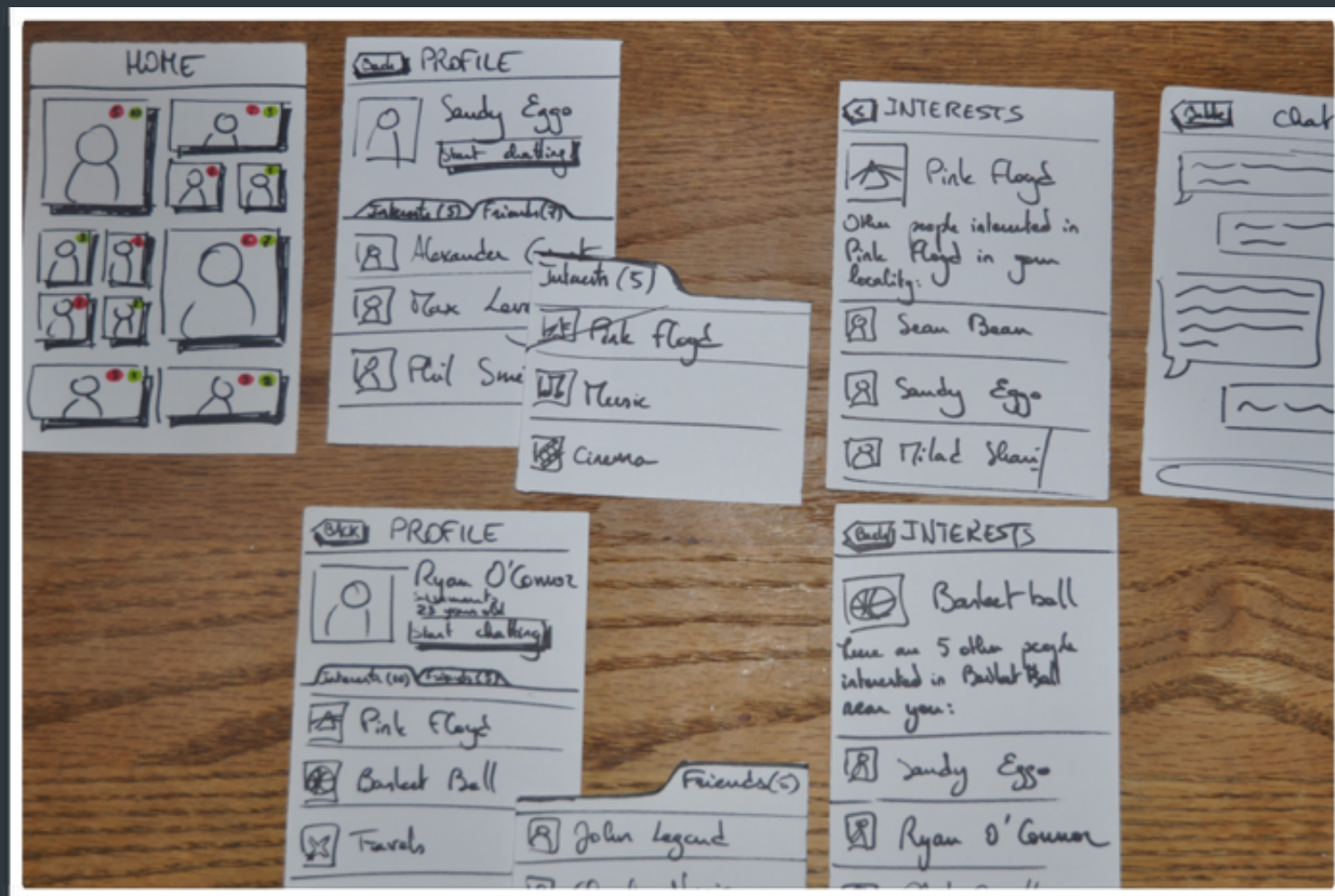
DESIGN



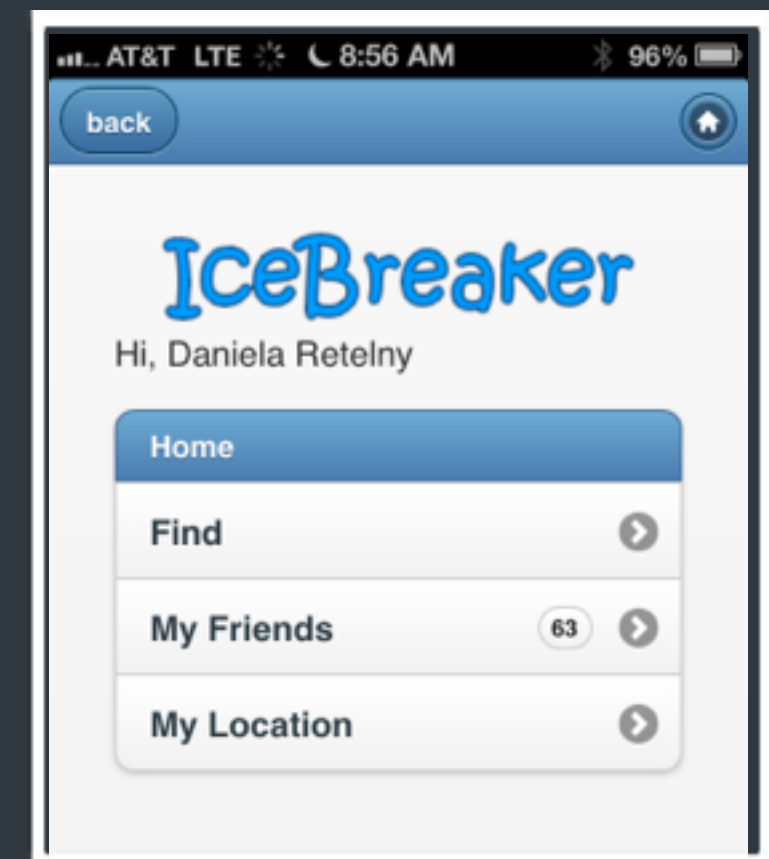
DESIGN

MODULARITY

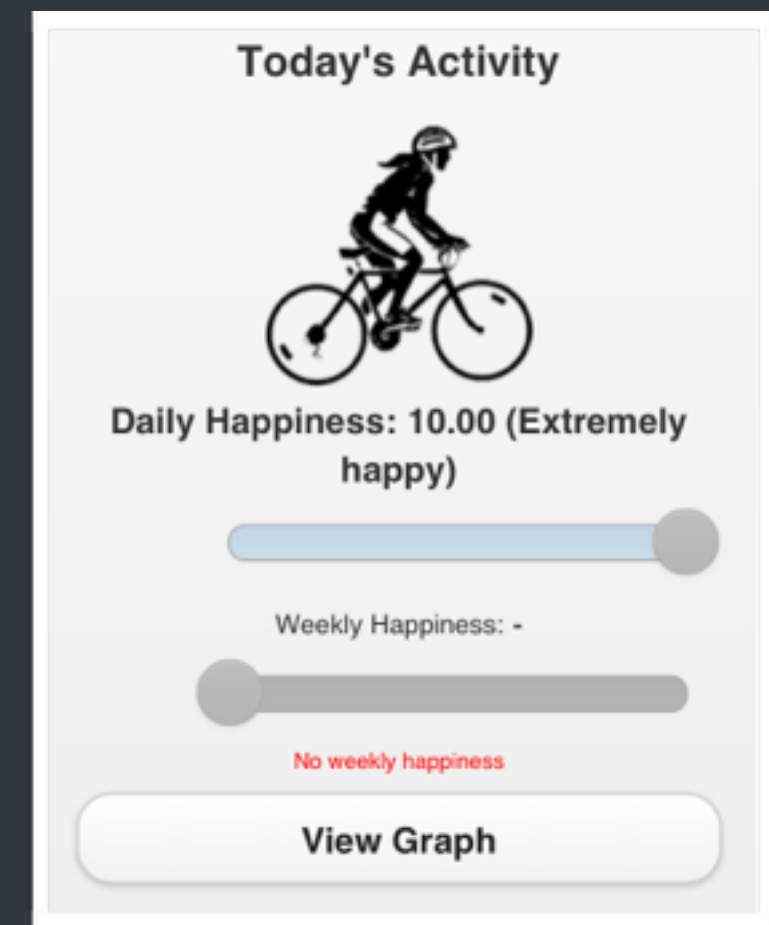
REPLICATE TEAM STRUCTURES AT SCALE



DESIGN



DESIGN



MODULARITY

COMBINE TEAMS TO FORM ORGANIZATIONS

DESIGN



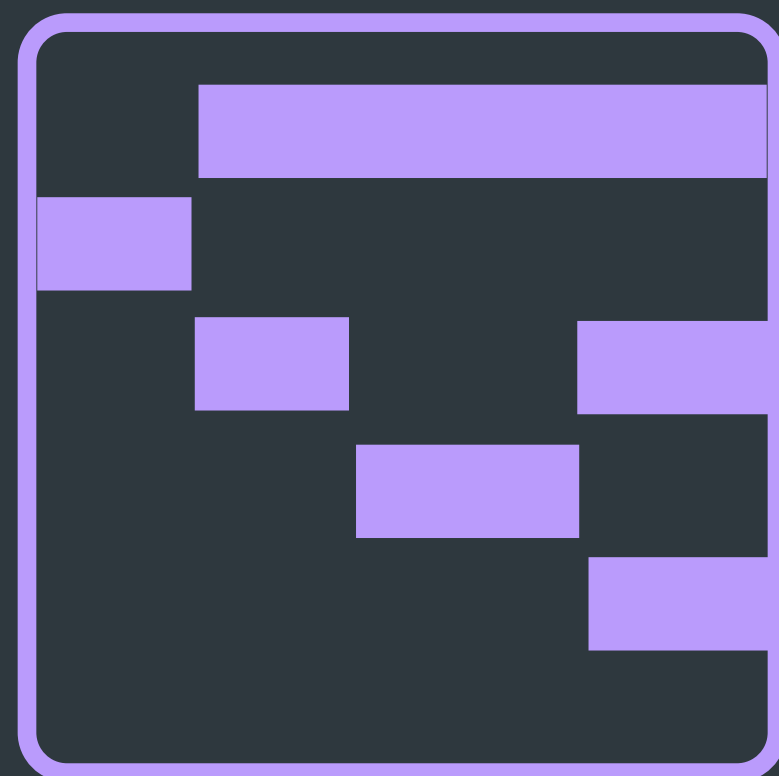
DESIGN



DESIGN



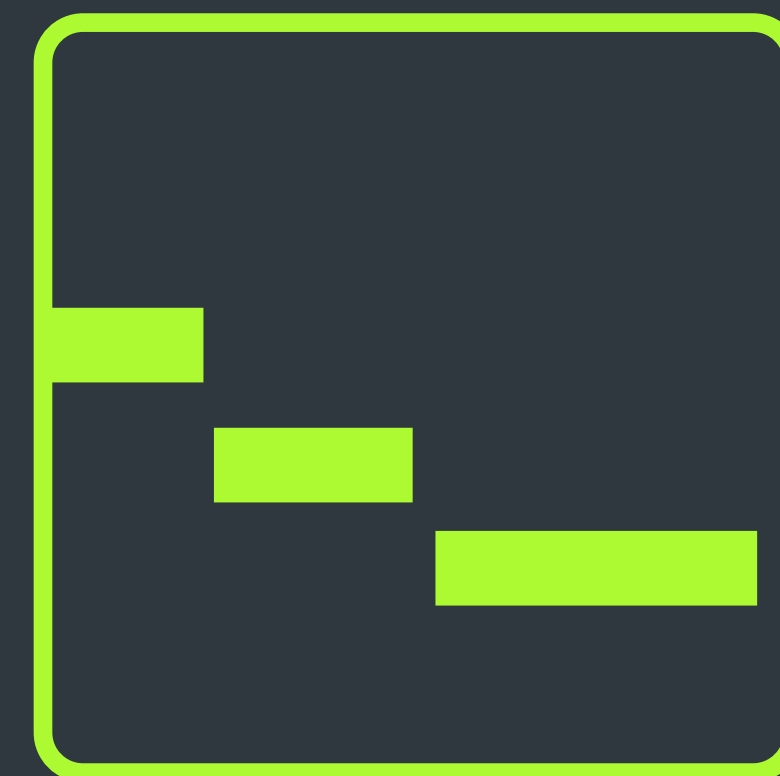
EBOOK



ANIMATION

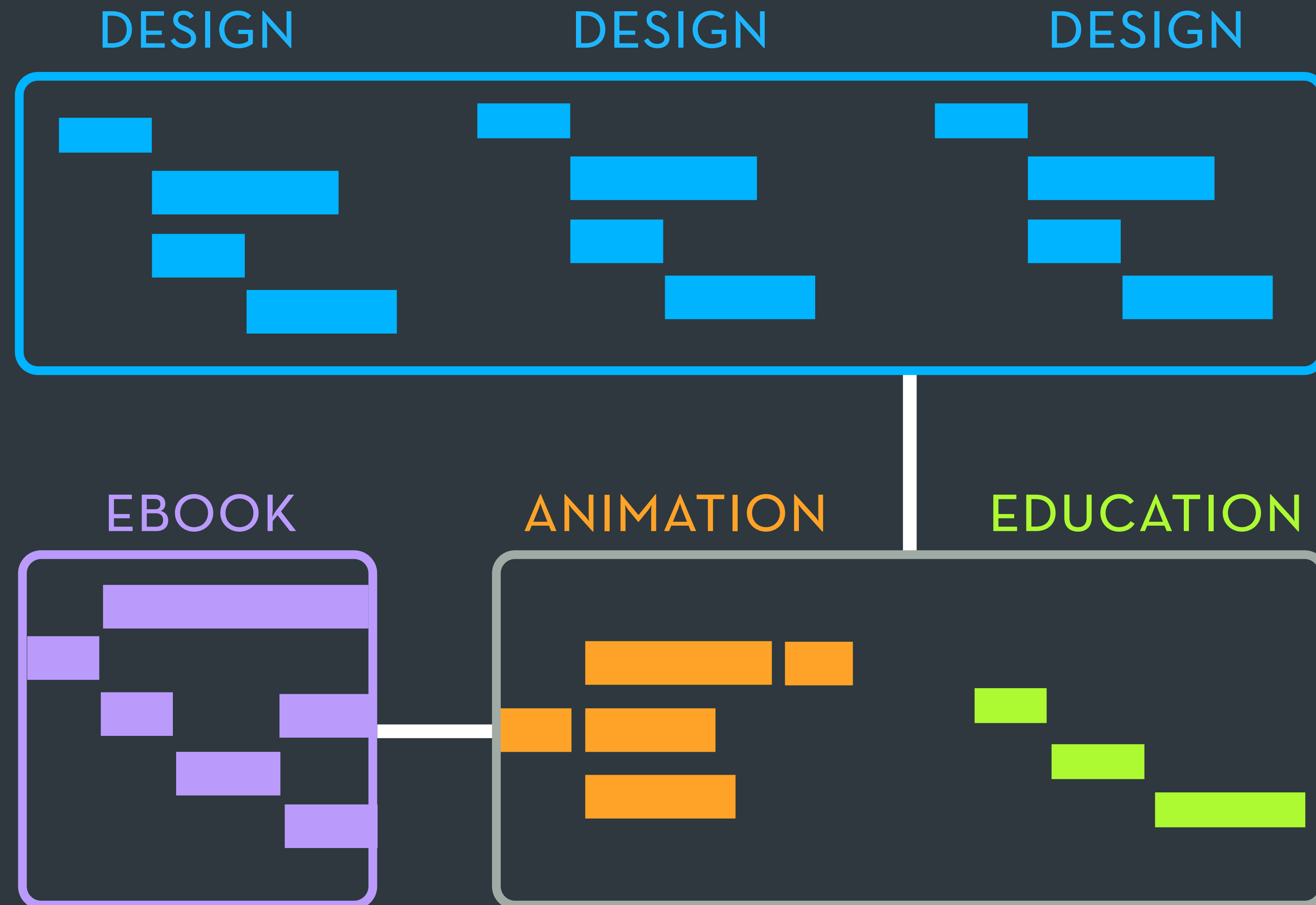


EDUCATION



MODULARITY

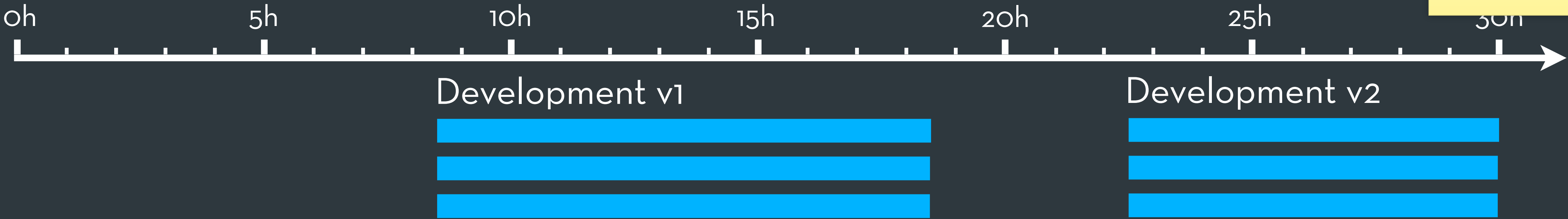
COMBINE TEAMS TO FORM ORGANIZATIONS



ELASTICITY

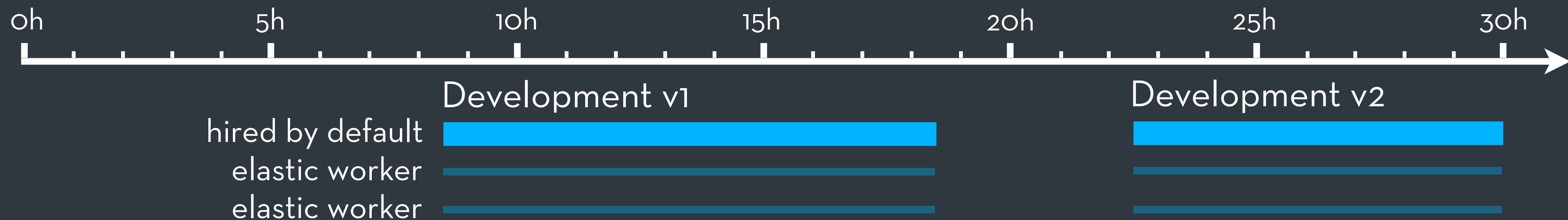
GROWTH ON-DEMAND

Is it ok to leave DRI on this slide and next slide even though I don't mention it when I speak?



ELASTICITY

GROWTH ON-DEMAND

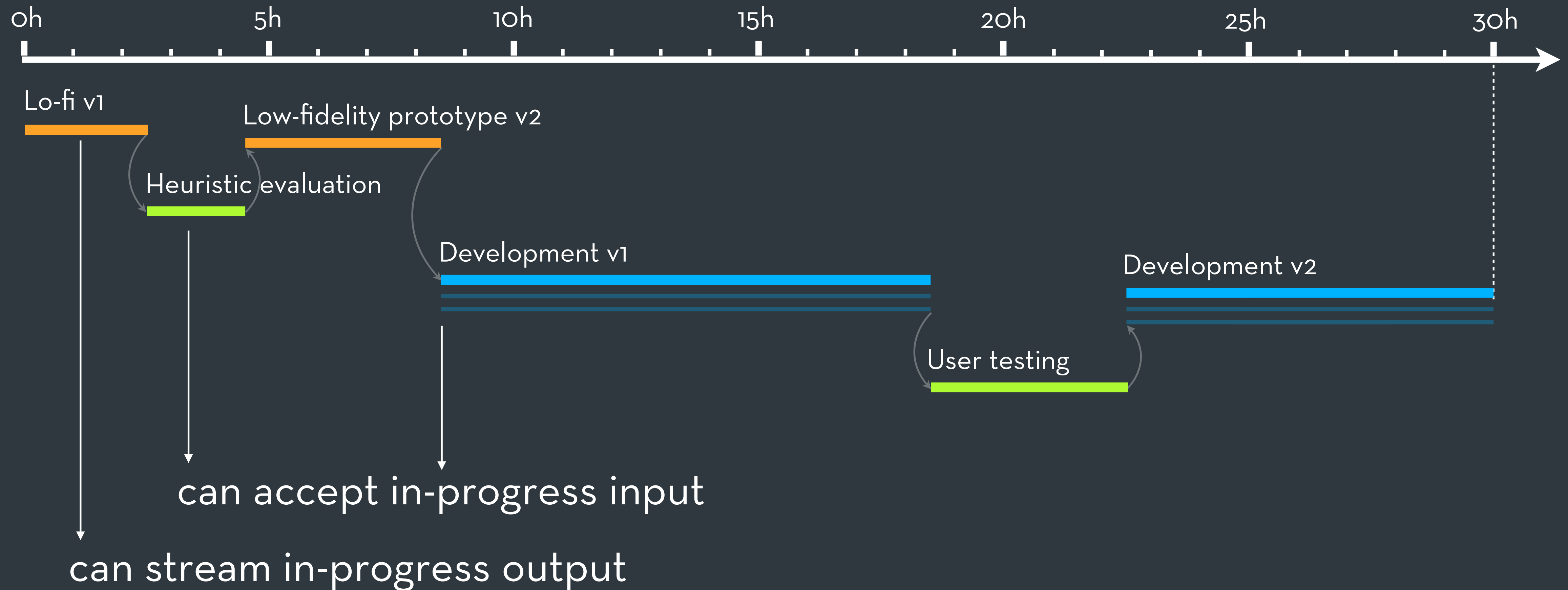


Elasticity enables growth by dynamically adding:

- Extra workers to complete job on time
- Workers with specialized skills

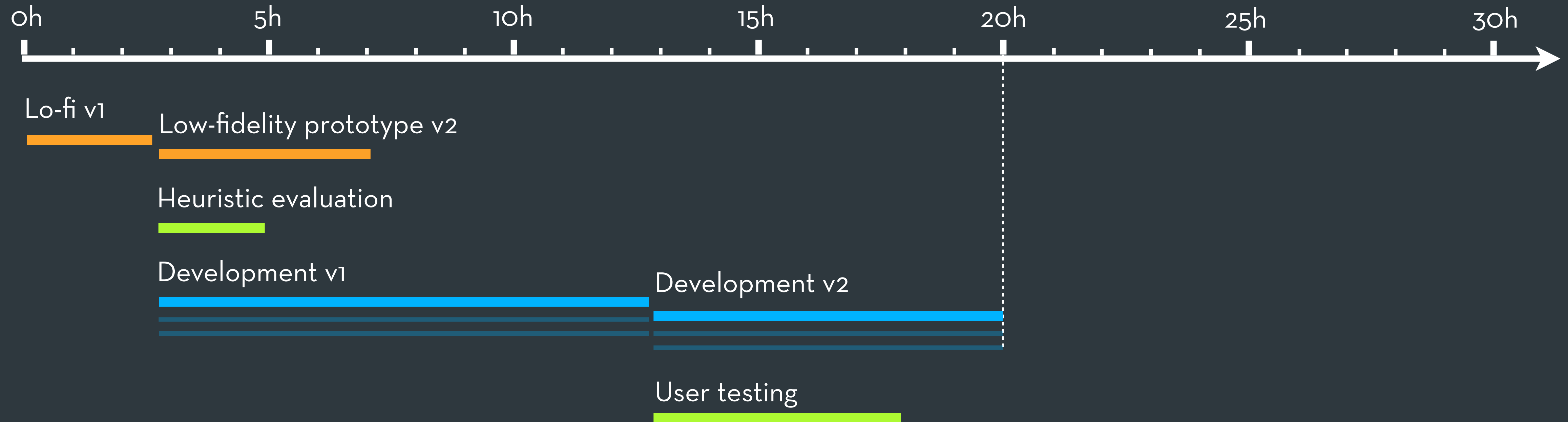
PIPELINING

PASS ALONG INCOMPLETE RESULTS



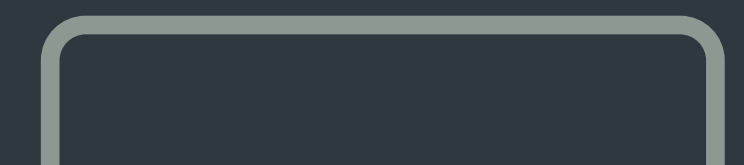
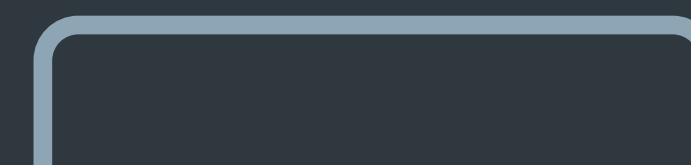
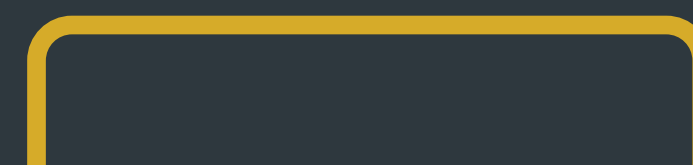
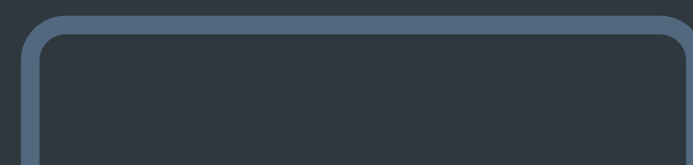
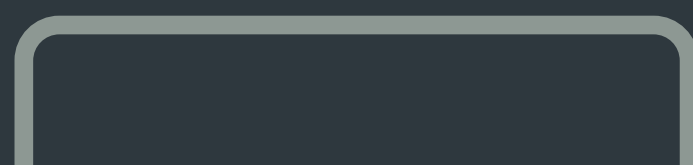
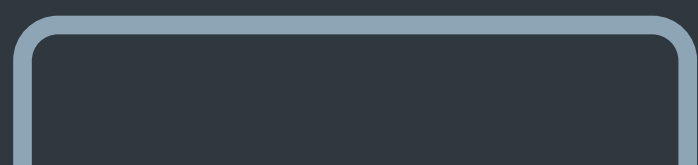
PIPELINING

PASS ALONG INCOMPLETE RESULTS



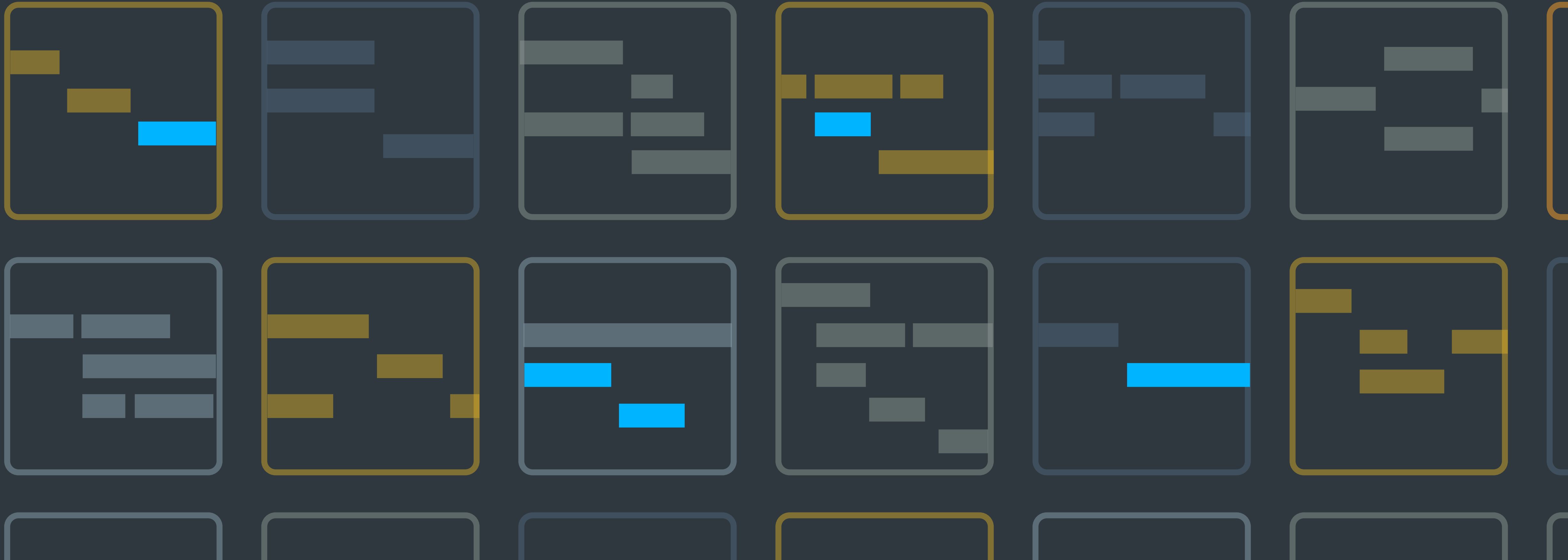
CREATION BY REQUEST

“I have a napkin sketch of a design, and I’d like an animation describing the idea.”



CREATION BY REQUEST

Synthetic team created from compatible blocks from previous teams.



CREATION BY REQUEST

Translate blocks into a STRIPS action planning problem, which utilizes efficient boolean satisfiability solvers.



CREATION BY REQUEST

Translate blocks into a STRIPS action planning problem, which utilizes efficient boolean satisfiability solvers.

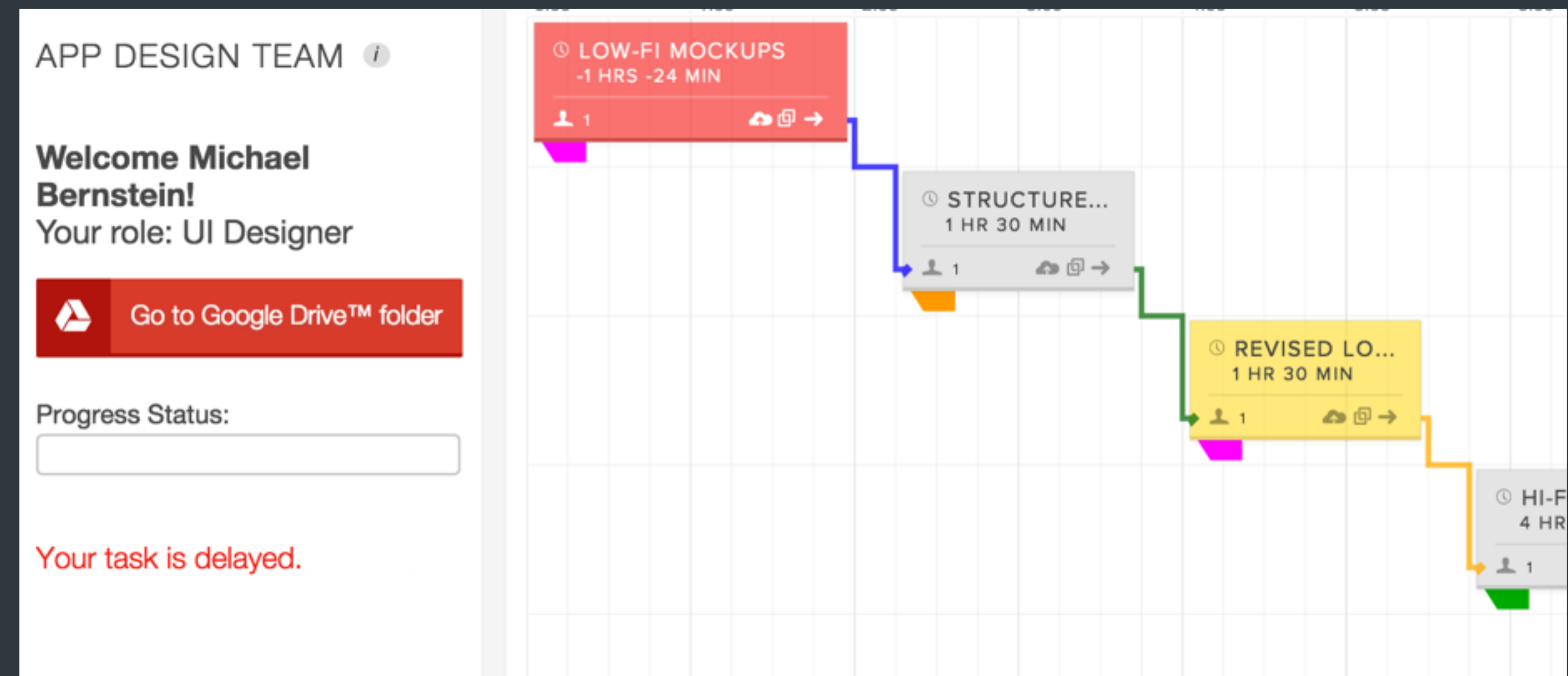
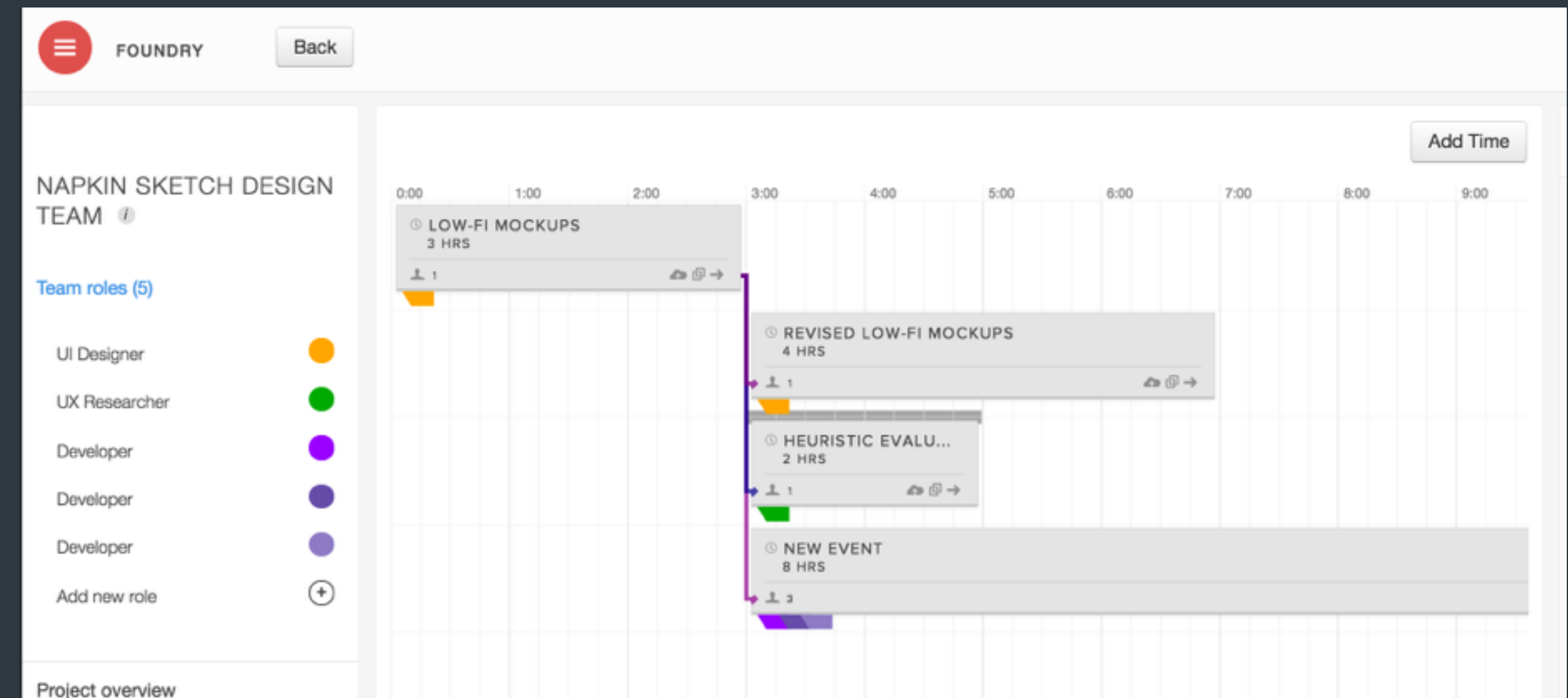


FOUNDRY

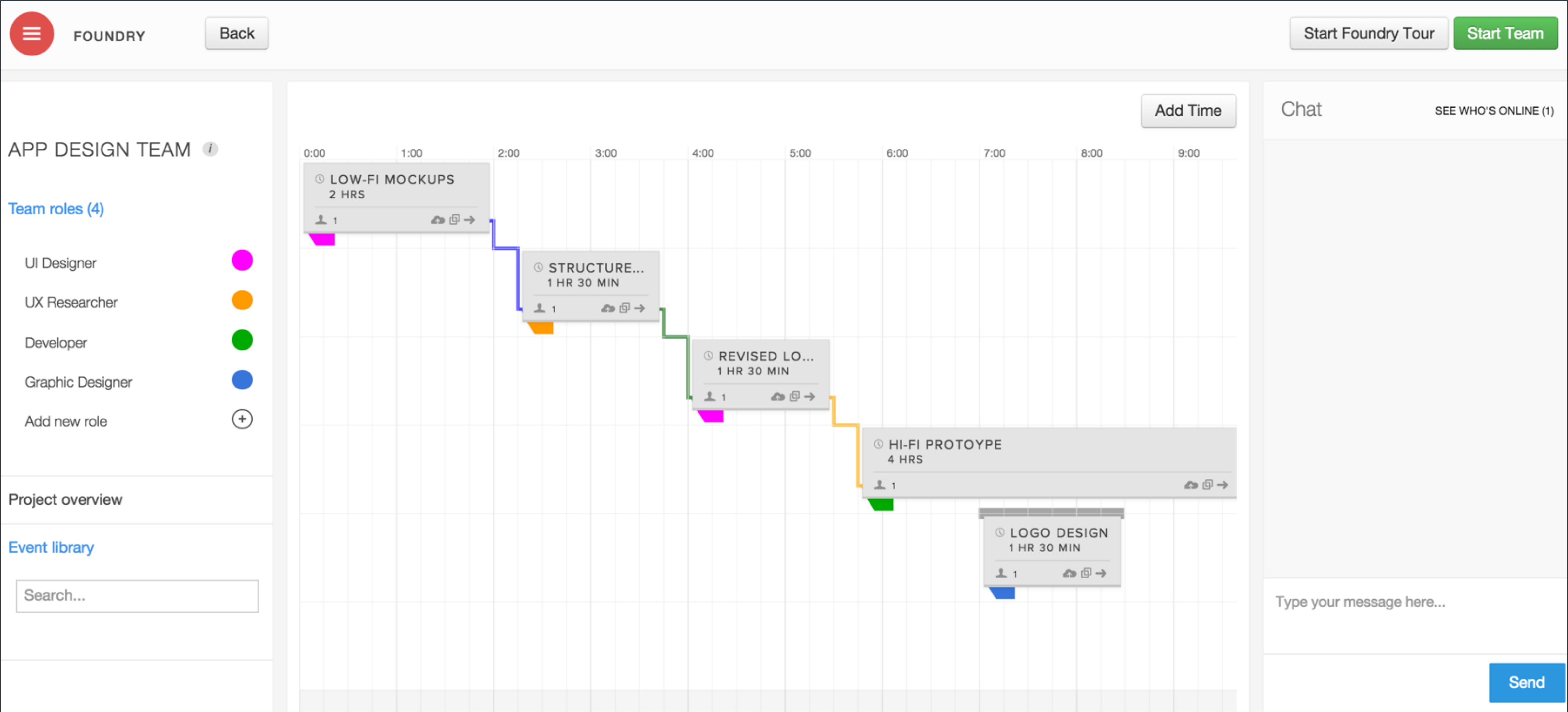
Web platform that allows:

Requesters to author
flash teams

Team members to
track the progress
of tasks



AUTHORING IN FOUNDRY



AUTHORING IN FOUNDRY

The screenshot displays the Foundry software interface for project management. At the top, there is a red circular menu icon, the word "FOUNDRY", and a "Back" button. The main workspace shows a timeline from 0:00 to 7:00. A task titled "LOW-FI MOCKUPS" is scheduled from 0:00 to 2:00. A modal window titled "Developer" is open, showing configuration options for a role. The modal includes a list of team roles on the left, a "Developer" role selected in the modal, and a "Member Color" dropdown set to green. The modal also features "Save", "Delete", and "Replace" buttons. The timeline shows a sequence of tasks: "LOW-FI MOCKUPS" (2 HRS), "STRUCTURE..." (30 MIN), "REVISED LO..." (1 HR 30 MIN), and "HI-FI PROTOYPE" (4 HRS). The "REVISED LO..." task is highlighted with a pink bar.

FOUNDRY Back

APP DESIGN TEAM ⓘ

Team roles (4)

- UI Designer
- UX Researcher
- Developer
- Graphic Designer
- Add new role

Developer

website-prototypingX html5X

Member Type:
Worker

Member Color: ■

Save Delete Replace

0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00

⌚ LOW-FI MOCKUPS
2 HRS

STRUCTURE...
30 MIN

⌚ REVISED LO...
1 HR 30 MIN

⌚ HI-FI PROTOYPE
4 HRS

AUTHORING IN FOUNDRY

FOUNDRY

Back

Start Foundry Tour

Start Team

APP DESIGN TEAM

Team roles (4)

UI Designer

UX Researcher

Developer

Graphic Designer

Add new role

Project overview

Event library

Search...

0:001:00

LOW-FI MOCKUPS
2 HRS

1

9:00

Add Time

Chat

SEE WHO'S ONLINE (1)

Type your message here...

Send

Low-fi Mockups

Event Start

Hours : 0Minutes : 0

Total Runtime

Hours : 2Minutes : 0

Project Coordinator

-- Choose PC --

Directly-Responsible Individual

UI Designer

Members

☒ UI Designer

☐ UX Researcher

☐ Developer

☐ Graphic Designer

Description

Create low-fi mockups from a sketch of an idea

Inputs

sketch x Add input

Deliverables

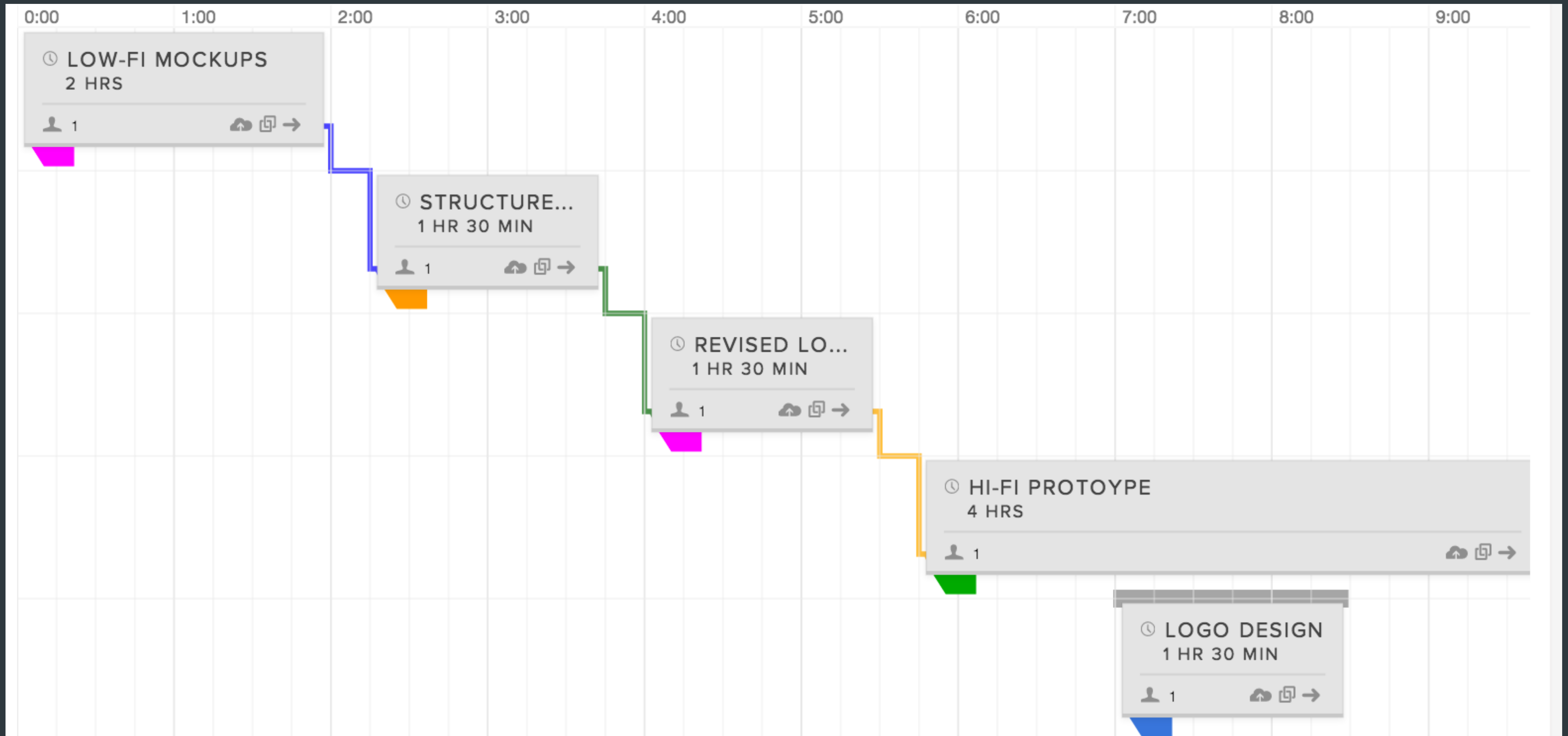
mockups x Add deliverable

Hire

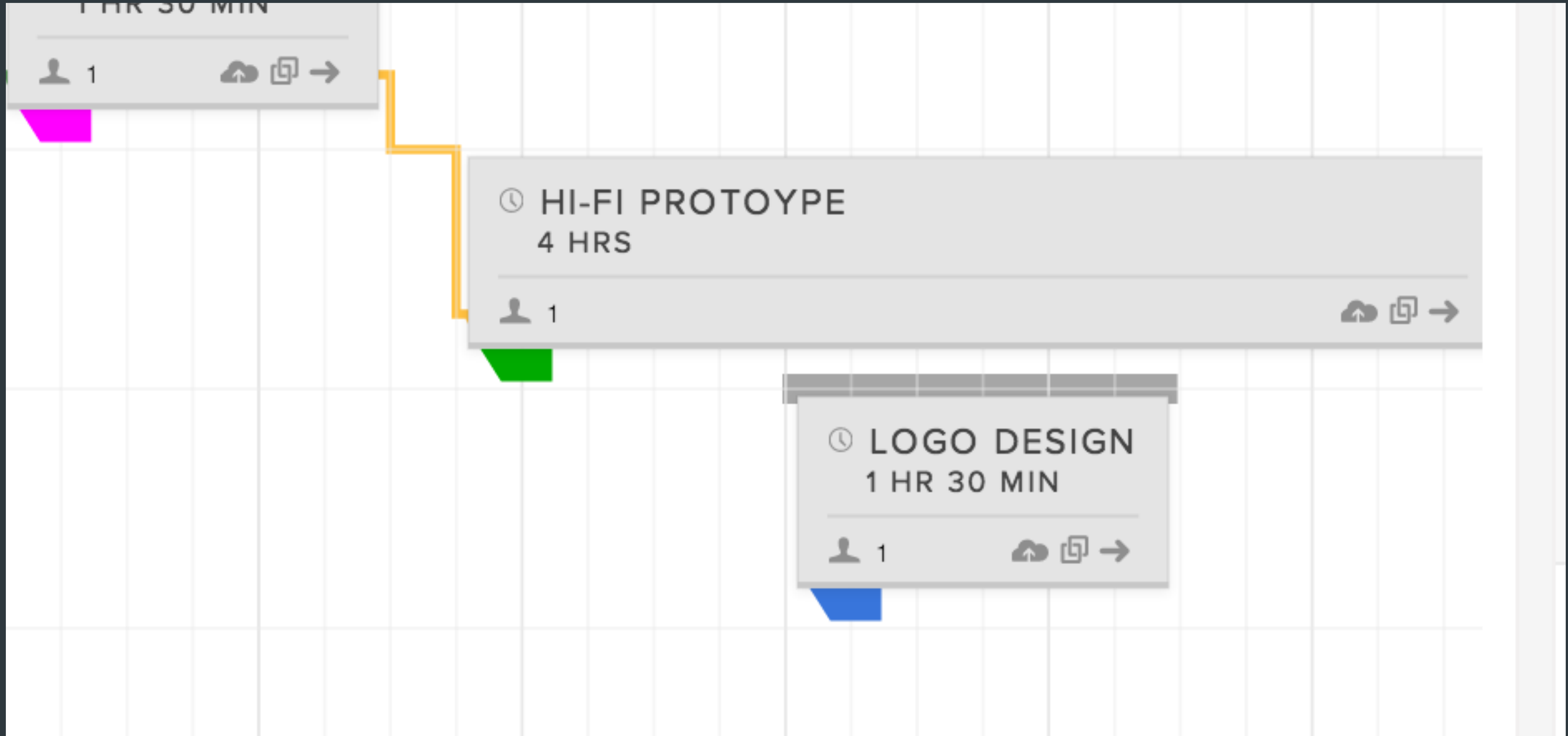
Save

Delete

AUTHORING IN FOUNDRY



AUTHORING IN FOUNDRY



FOUNDRY AS MANAGER

Start Team?



Are you sure you want to begin running App Design Team?

Cancel

Start the team

⌚ STRUCTURE...
1 HR 30 MIN



1



⌚ REVISED LO...
1 HR 30 MIN



1



⌚ HI-FI PROTOYPE
4 HRS

FOUNDRY AS MANAGER

FOUNDRY

Start Foundry Tour

APP DESIGN TEAM

Welcome Michael Bernstein!

Your role: UI Designer

Go to Google Drive™ folder

Progress Status:

You can now start Low-fi Mockups task.

Project overview

0:00

1:00

2:00

3:00

4:00

5:00

6:00

7:00

8:00

9:00

LOW-FI MOCKUPS

2 HRS

1

STRUCTURE...

1 HR 30 MIN

1

REVISED LO...

1 HR 30 MIN

1

HI-FI PROTOYPE

4 HRS

1

LOGO DESIGN

1 HR 30 MIN

1

Chat

SEE WHO'S ONLINE (2)

Hi Team! Let's get started!

Stanford HCI (Author)

1/16/2015, 9:57:57 PM

I'm ready!

Michael Bernstein (UI Designer)

1/16/2015, 11:36:48 PM

Type your message here...

Send

FOUNDRY AS MANAGER



FOUNDRY

APP DESIGN TEAM *i*

Welcome Michael Bernstein!
Your role: UI Designer

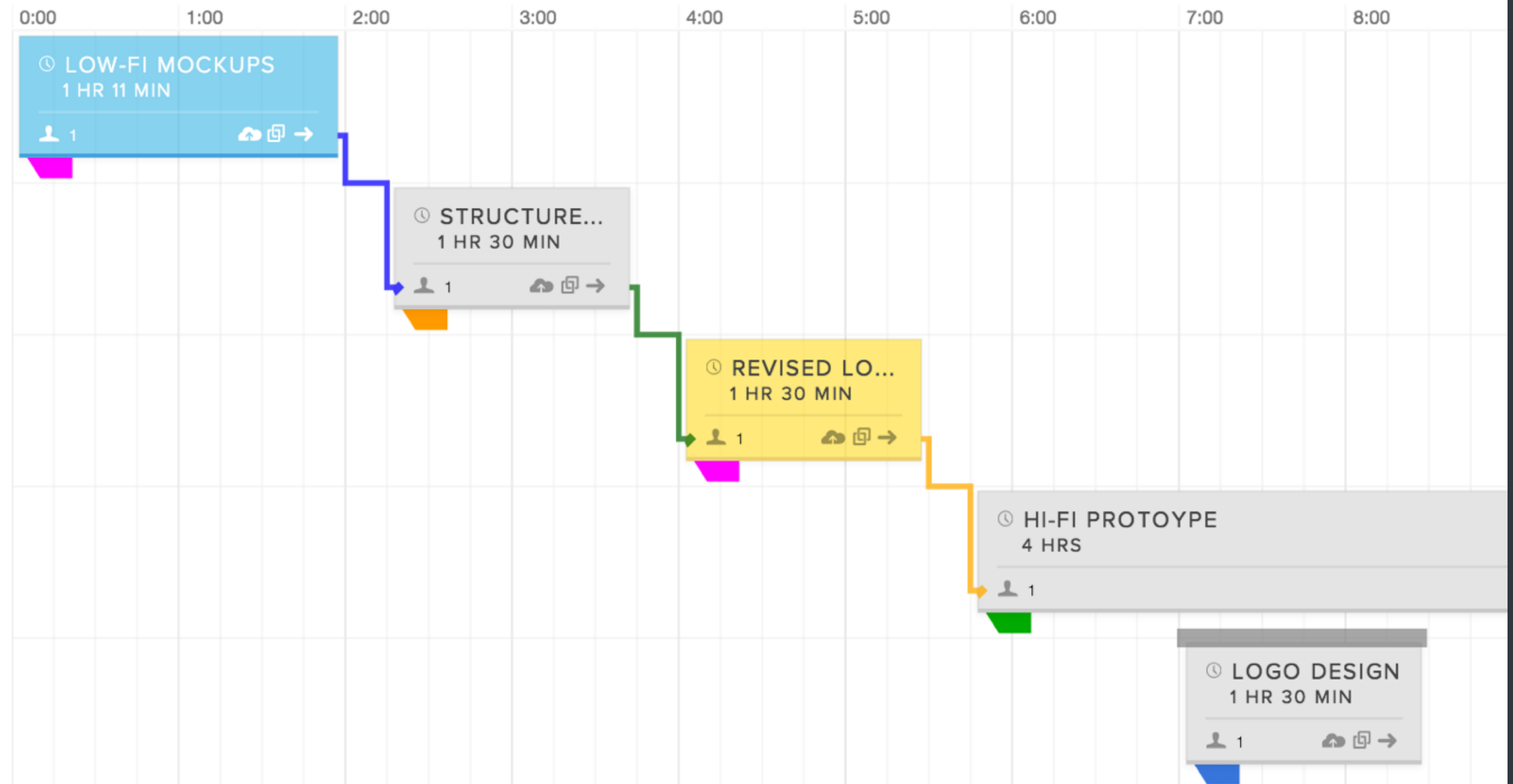


Go to Google Drive™ folder

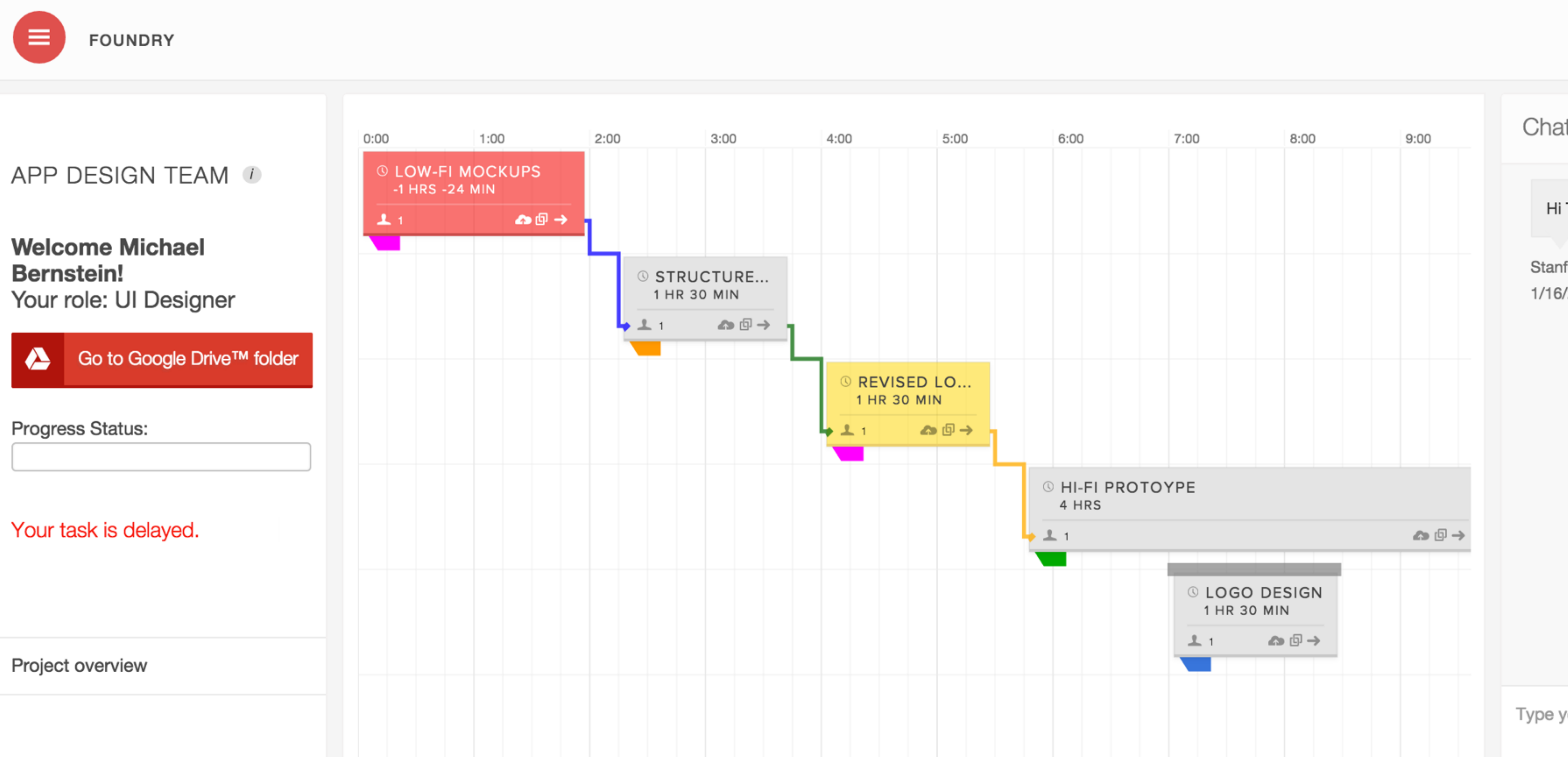
Progress Status:

Your task is in progress.

Project overview



FOUNDRY AS MANAGER



FOUNDRY AS MANAGER

FOUNDRY

Start Foundry Tour

APP DESIGN TEAM

Welcome Michael Bernstein!

Your role: UI Designer

Go to Google Drive™ folder

Progress Status:

You can now start Revised low-fi mockups task.

Project overview

0:00

1:00

2:00

3:00

4:00

5:00

6:00

7:00

8:00

9:00

LOW-FI MOCKUPS

-3 HRS -44 MIN

1

STRUCTURE...

44 MIN

1

REVISED LO...

1 HR 30 MIN

1

HI-FI PROTOYPE

4 HRS

1

LOGO DESIGN

1 HR 30 MIN

1

Chat

SEE WHO'S ONLINE (2)

Hi Team! Let's get started!

Stanford HCI (Author)

1/16/2015, 9:57:57 PM

I'm ready!

Michael Bernstein (UI Designer)

1/16/2015, 11:36:48 PM

Type your message here...

Send

FOUNDRY IN SUM

Author structured, modular representations of flash teams

Grow, shrink, pipeline and recombine the flash teams

Recruit from Upwork

Maintain situational awareness as the team works

FLASH TEAM EXAMPLES

Recruited from paid crowd marketplace Upwork

Three team types:

- Napkin sketch (design & web programming)

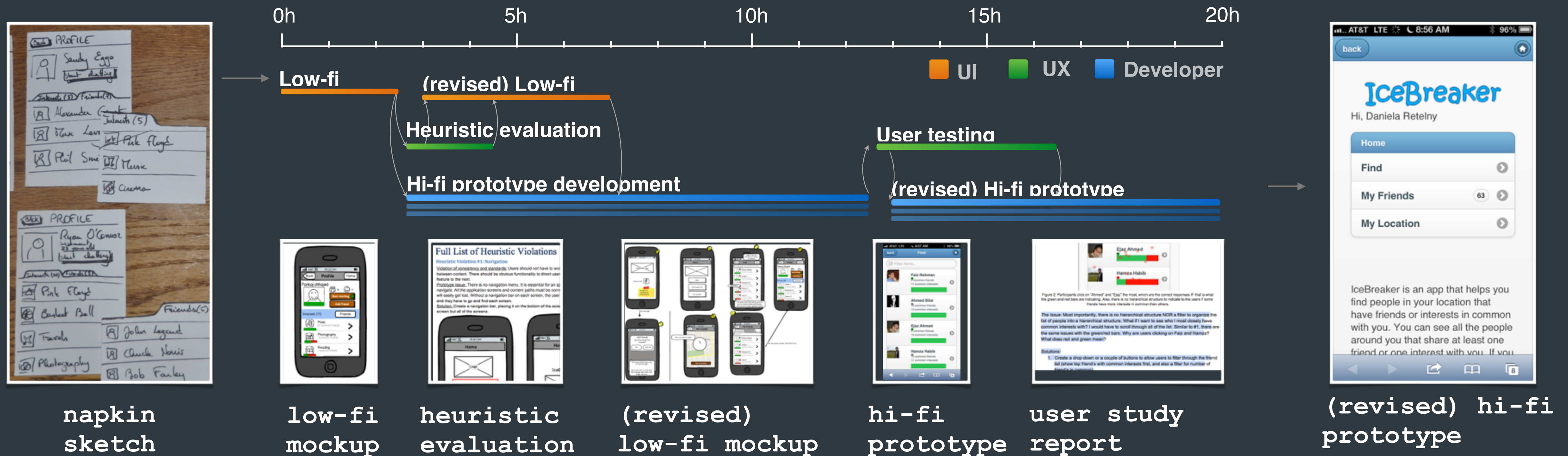
- Animation (video making)

- MOOC (online education)

NAPKIN SKETCH DESIGN TEAM

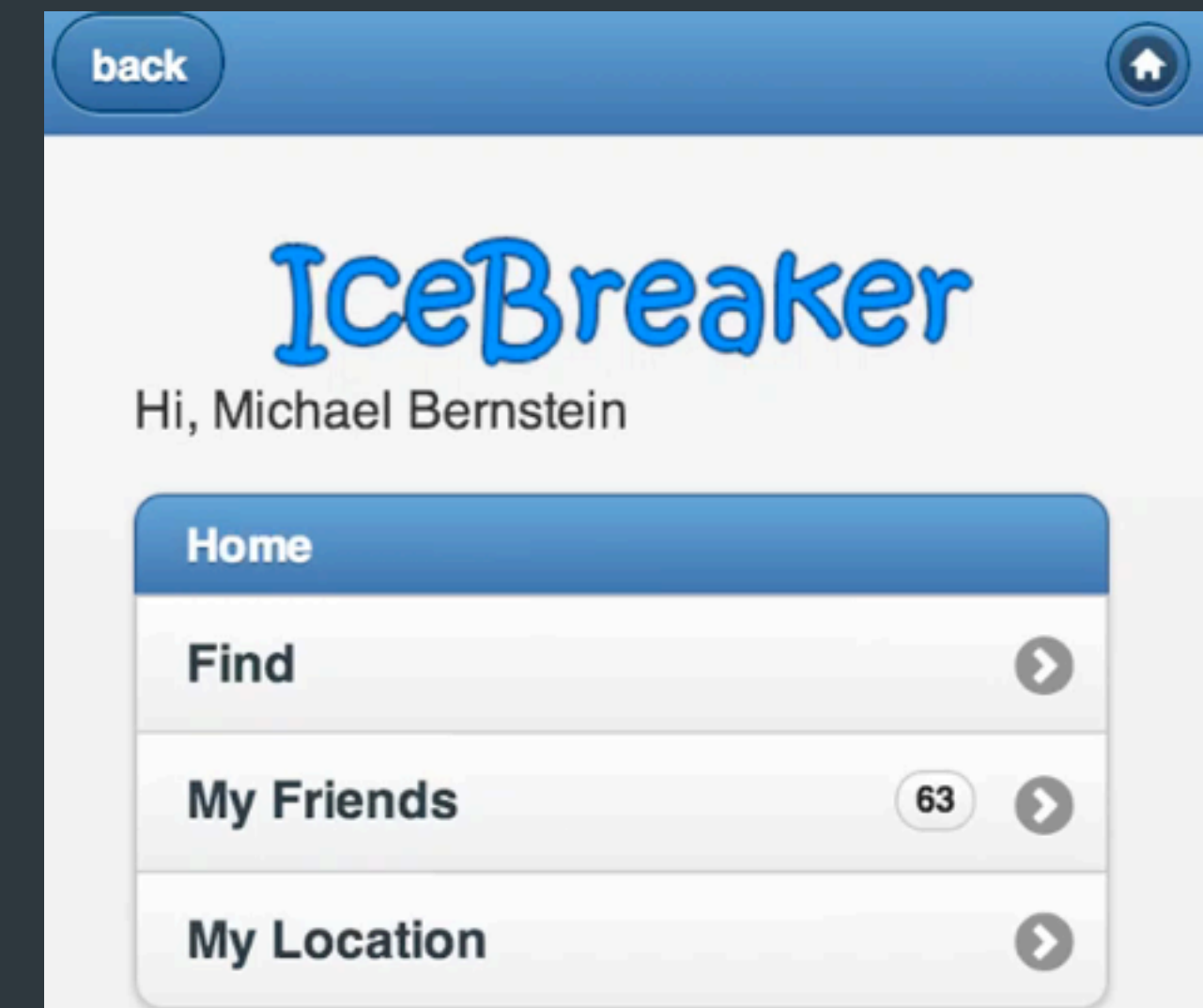
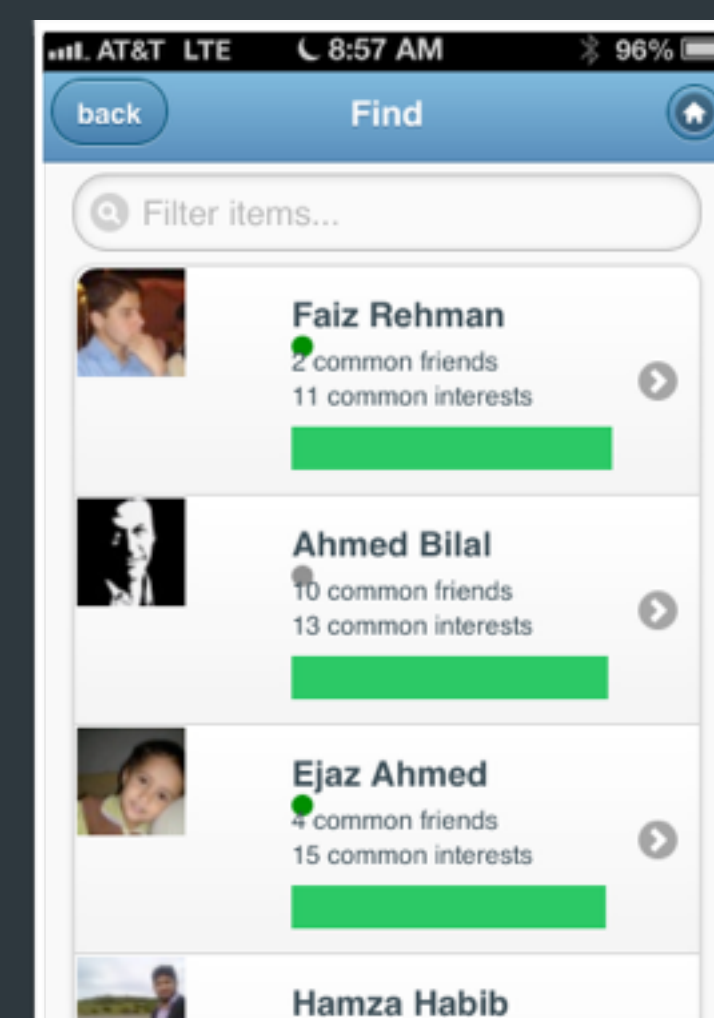
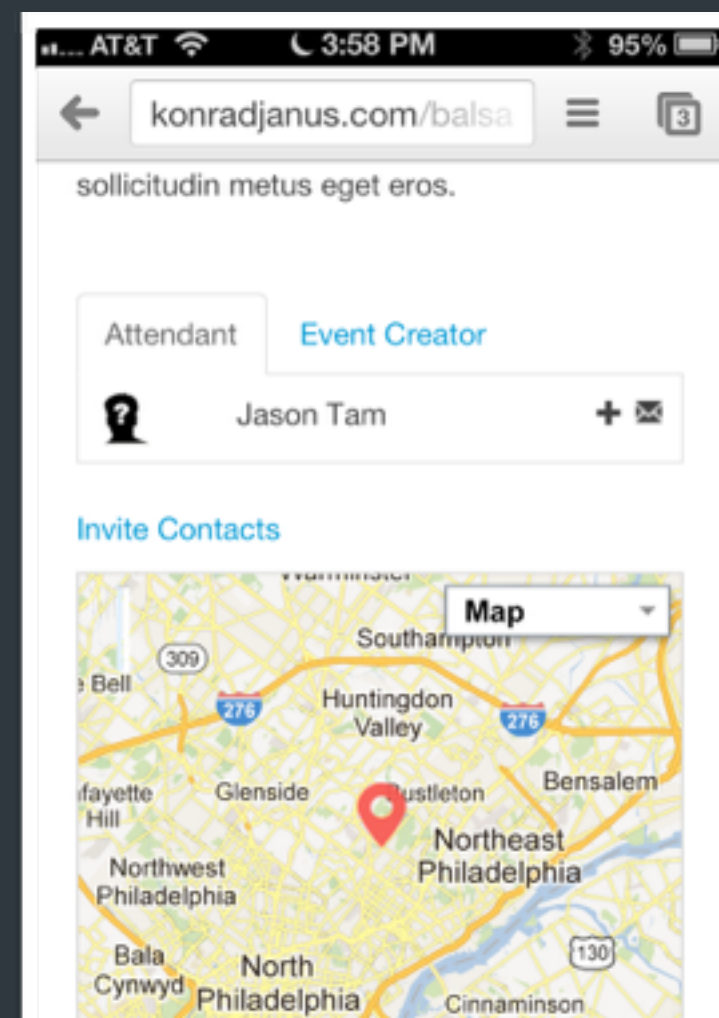
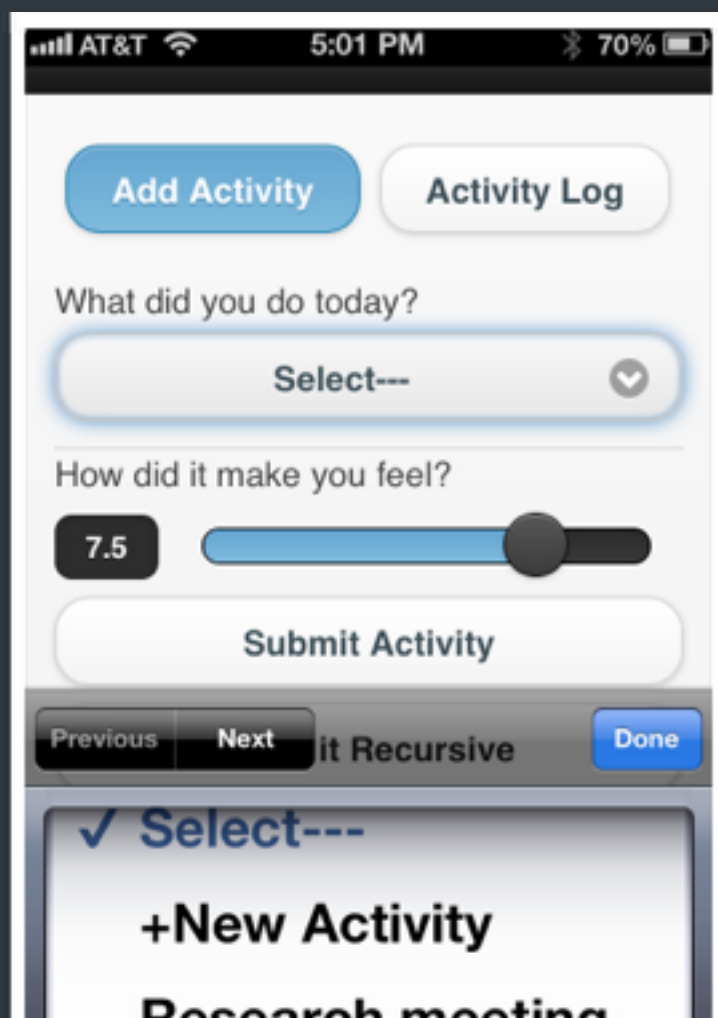
OVERVIEW

Objective: replication of flash teams across different inputs



USER-TESTED HI-FI PROTOTYPES IN ONE DAY

Design Goal	Completion time	Team size	Total cost
Emotion tracking	31:30	3	\$744.48
Event bullet board	18:00	5	\$1270.28
Social meetups	23:10	5	\$1200.97

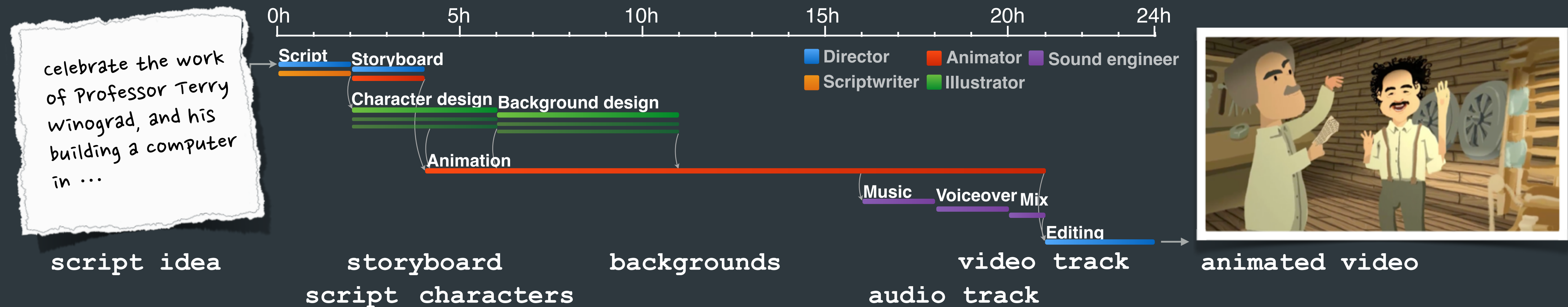


IceBreaker is an app that helps you find people in your location that have friends or interests in common with you. You can see all the people around you that share at least one friend or one interest with you. If you click on one of them, you'll land on the profile page. You can see the detailed list of interests or friends in common, and you can start a chat conversation. If you click on an interest or a friend in common, you'll see a list of all the people in your location that share that particular interest.

ANIMATION TEAM

OVERVIEW

Objective: explore how flash teams can support creative outputs and non-engineering domains



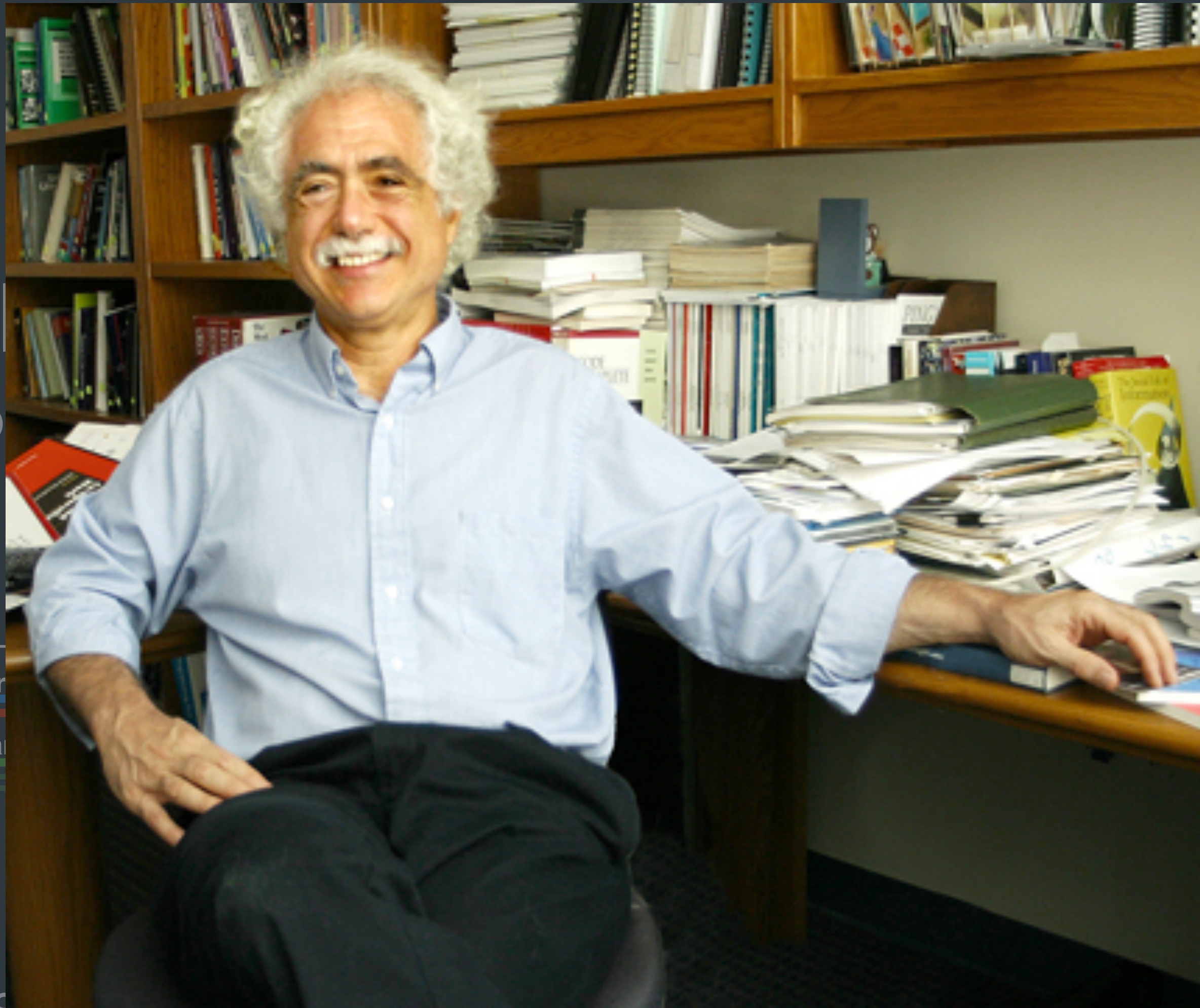
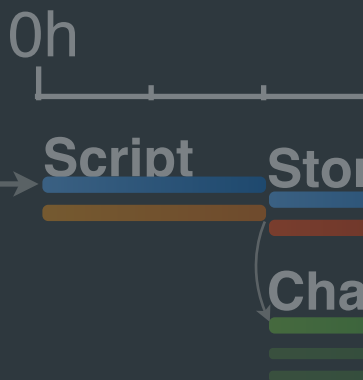
ANIMATION TEAM

OVERVIEW

Objective: explore creative
outputs and no

port creative

celebrate the work
of Professor Terry
Winograd, and his
building a computer
in ...



script idea

story
script characters

backgrounds
audio track

animated video

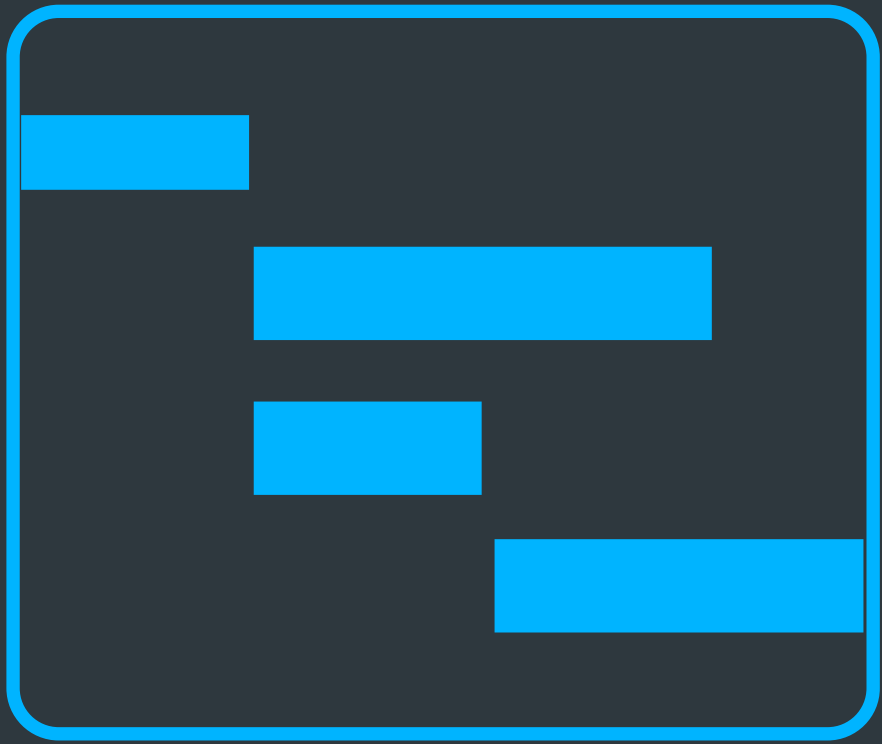


ON-DEMAND MOOC

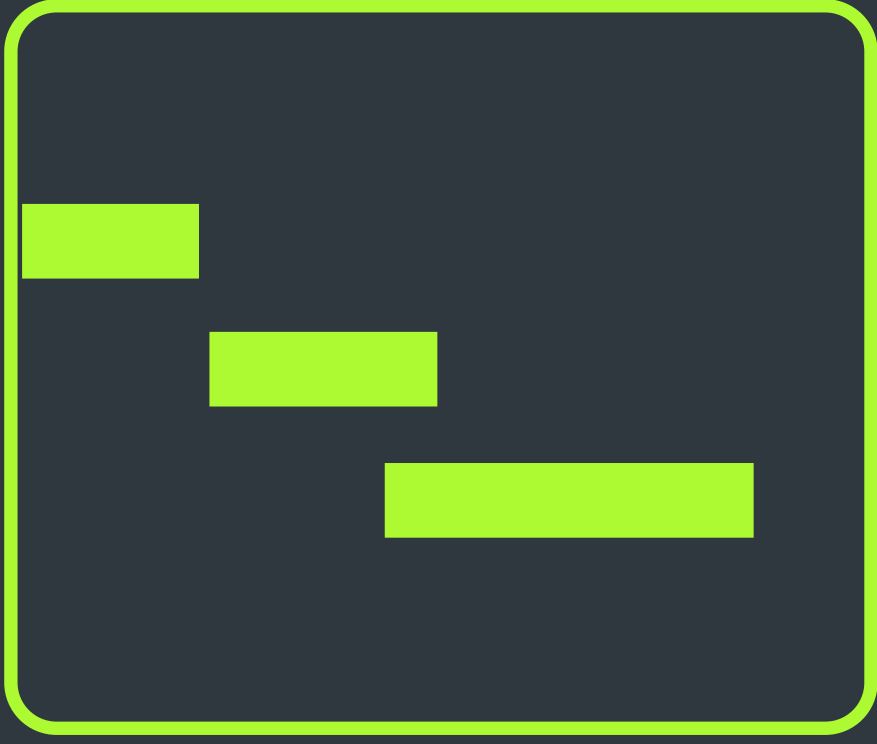
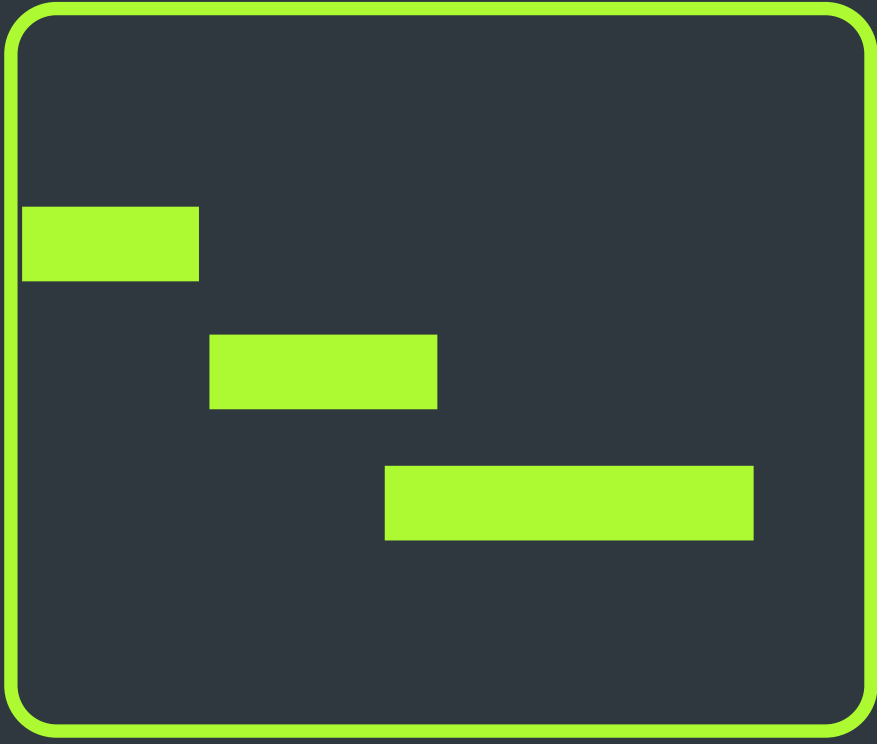
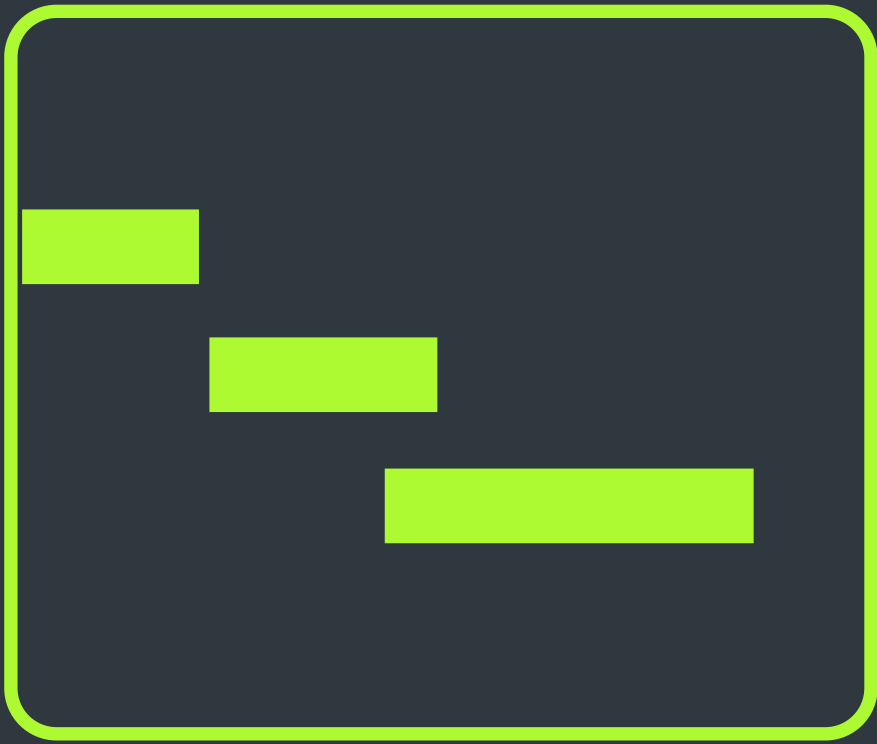
OVERVIEW

Objective: compose multiple modular team structures to complete a large scale project in 1 day

DESIGN (x3)



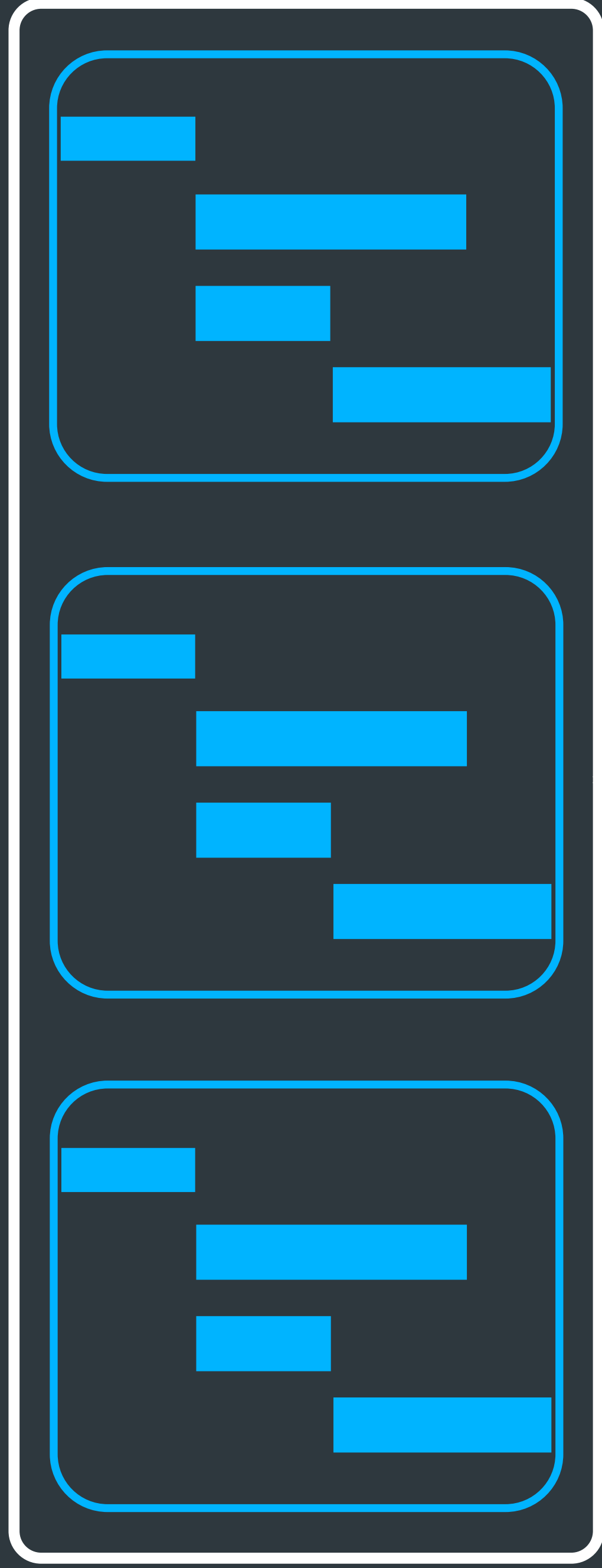
EDUCATION (x3)



ANIMATION (x3)



WEB PLATFORM



COURSE 3

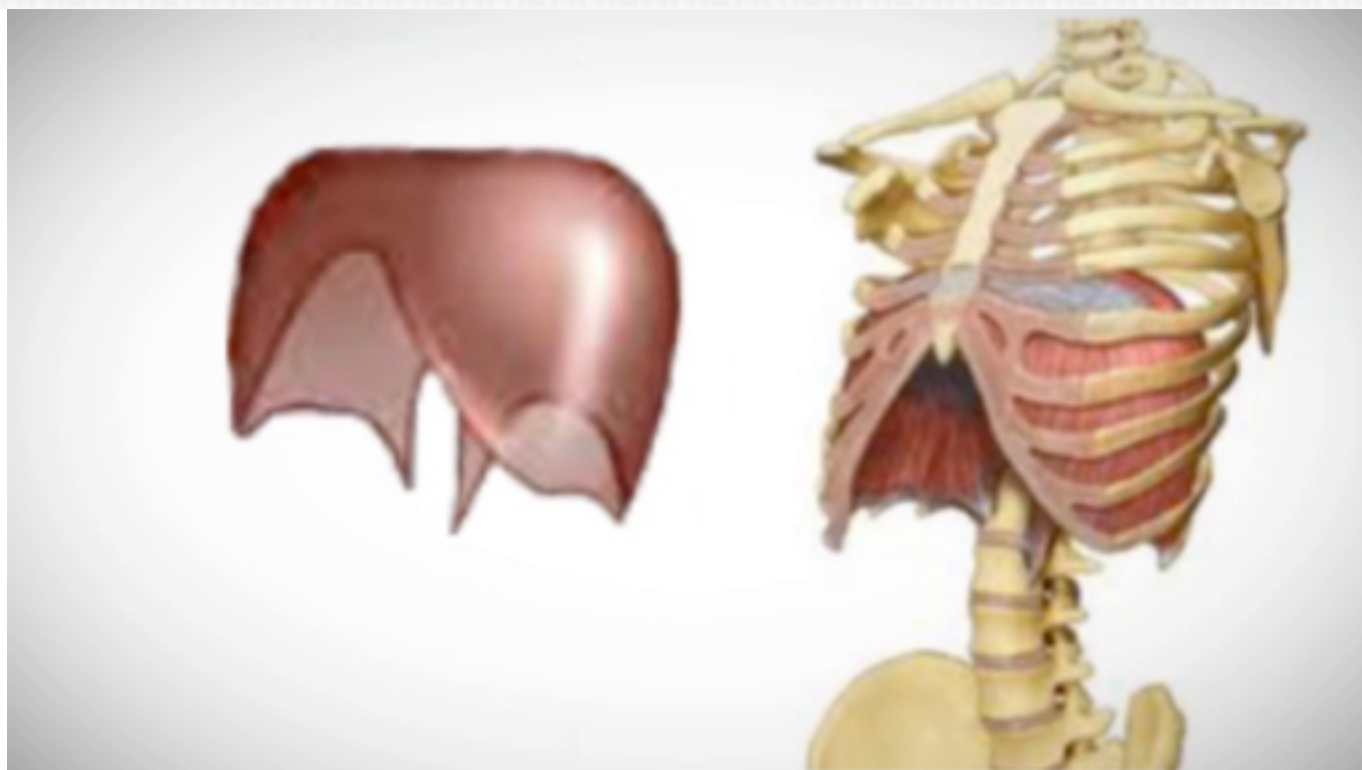
COURSE 2

COURSE 1

MOOC COMPLETED IN 1 DAY

MOOC component	Completion time	Video length	Total cost
Diaphragm singing	19:20	1 min 49	\$1,597.32
Portrait photography	19:00	1 min 30	\$741.58
Towers of Hanoi	11:30	1 min 24	\$446.49
Web platform	13:00	N/A	\$1015.80

CrazyMOOC

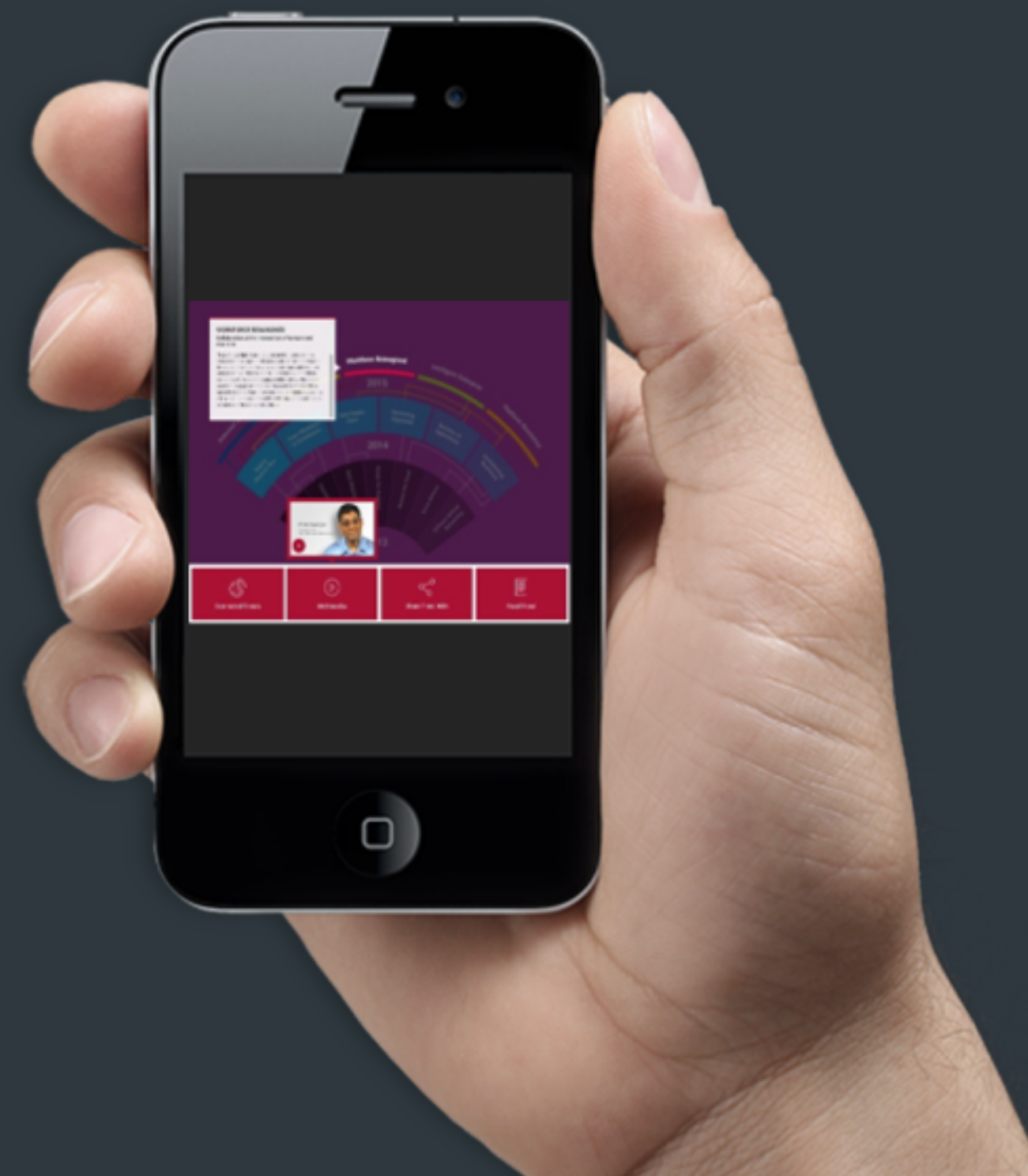


ACCENTURE'S FLASH TEAMS

Project #1:
Marketing video
177 work hours

Project #2:
Mobile application
54 work hours

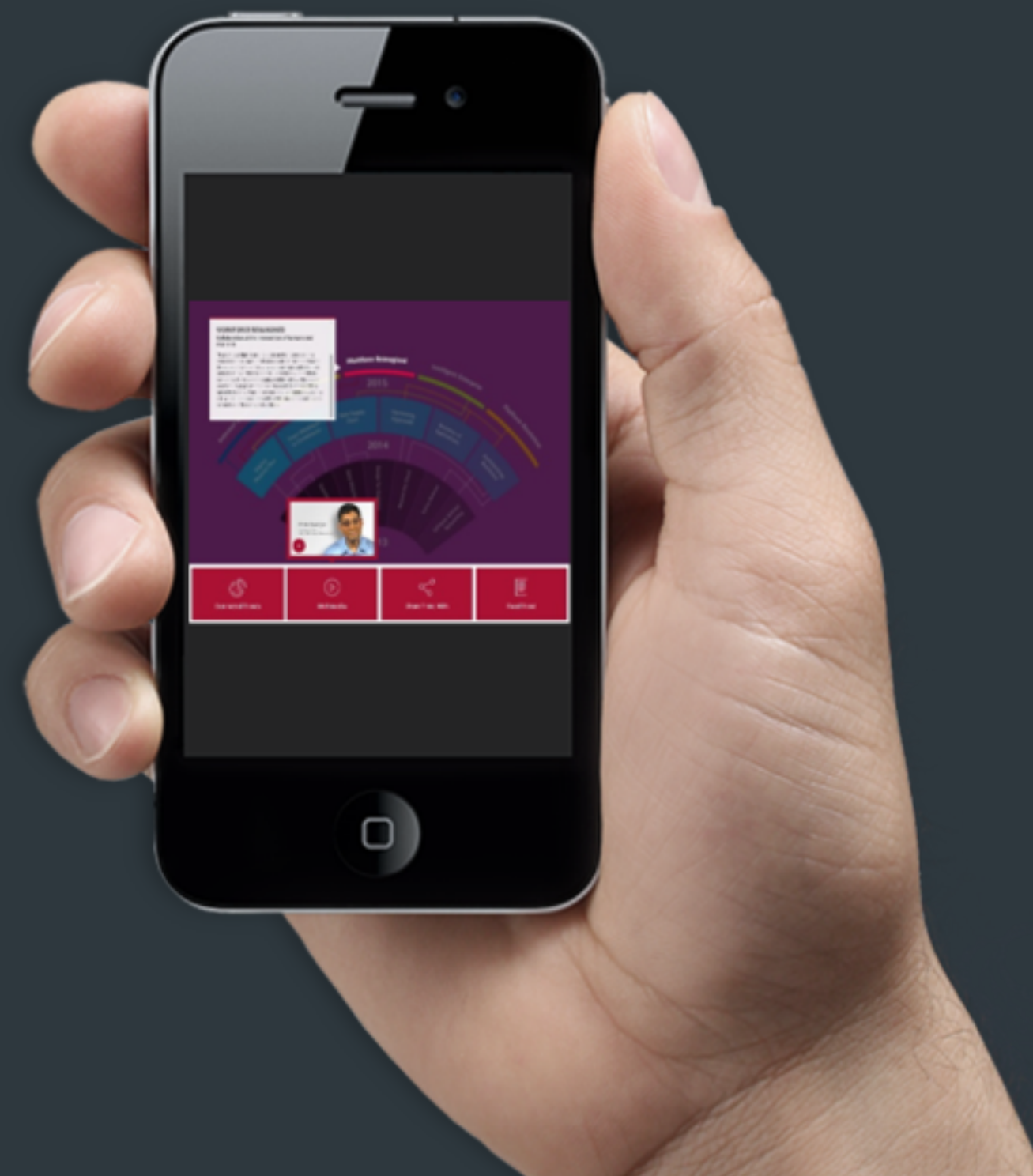
Project #3:
Business dev. video
132 work hours



ACCENTURE'S FLASH TEAMS

Result:

1/8th – 1/6th cost of agency estimate for equivalent quality



ARE FLASH TEAMS EFFECTIVE?

FIELD EXPERIMENT

Do flash teams complete tasks equally effectively but in less time?

Controlled experiment: 22 experts across six napkin sketch teams (UI design, UX research, web dev)

Flash teams vs. self-managed teams

FIELD EXPERIMENT

NAPKIN SKETCH DESIGN TEAM

Task: party planning mobile web application

Input: Napkin sketch

Requested time limit: 13 hours

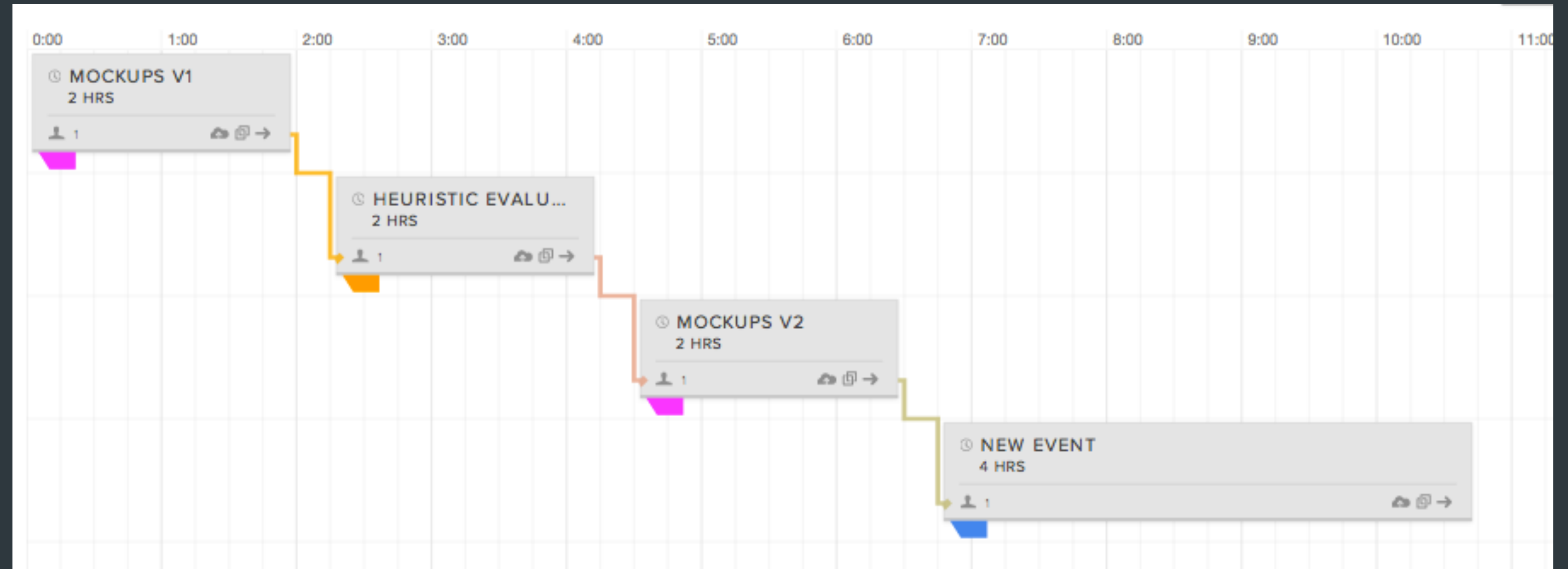
Measured: total number of work hours across team

CONDITIONS

FLASH TEAMS VS. SELF-MANAGED TEAMS

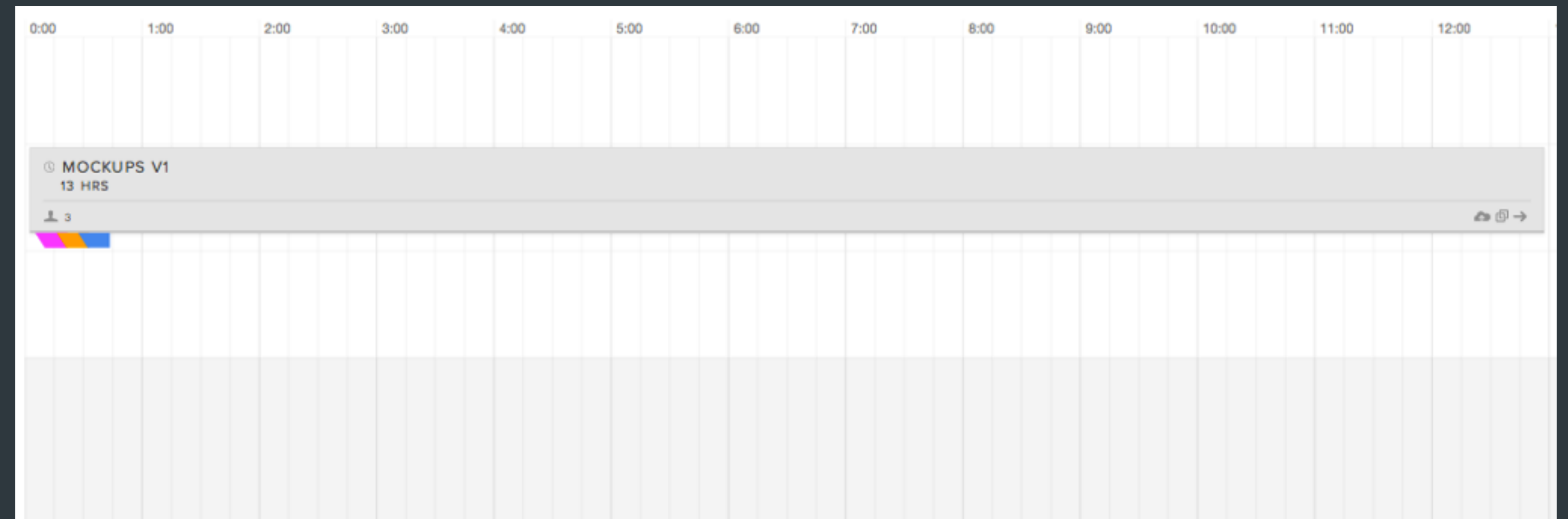
Flash teams:

full Foundry with
flash team workflow



Control teams
(self-managed):

full Foundry with just
one 13hr block



FLASH TEAMS: 50% FEWER WORK HOURS

Flash teams (mean 13hr2min) are **significantly faster** than self-managed teams (mean 23hr47min), $p=0.05$

The **slowest** flash team finished in fewer hours than the **fastest** team in the control condition

Flash teams introduce computational infrastructure for crowdsourcing diverse, on-demand teams of experts.



WE ARE DYNAMO: COLLECTIVE ACTION WITH CROWD WORKERS

Niloufar Salehi, Lilly Irani, Michael Bernstein, Ali Alkhatib, Eva Ogbe,
Kristy Milliland, Clickhappier. CHI '15. **Best paper honorable mention.**

CROWD WORK: PROMISE OR PERIL?

Crowdsourcing generated excitement by framing itself as a populist form of information work.

Yet platforms such as Amazon Mechanical Turk place workers inside a reliable, steadily humming infrastructure, making it difficult for workers to make their voice heard.

[Irani and Silberman '13]

“WHAT ABOUT A UNION?”

The metaphor of unionization is largely built around offline organizations, and needs to be redesigned for digital labor.


- new workers join the market daily and stay for only days or weeks
- work contracts last only minutes
- no way for workers to enforce behaviors on other workers

“If by ‘union’ you mean a ‘labor union’, I would not feel comfortable taking part. It runs against my grain because I am an individualist. I do not want to feel forced to go along with the ‘majority thinking’ of the leaders within a labor union. I have never been a member of a union and hope to continue along my merry way. I consider myself self-employed...not working for anyone in particular.”

<http://turkernation.com/archive/index.php/t-18874.html>

CROWD COLLECTIVE ACTION

One year of ethnography with crowd workers, understanding and building relationships. This work led to the creation of:



[Home](#)[Vote on new ideas!](#)[How it works](#)[Forum](#)[light_dragonfly](#)

Powering change on MTurk

We are a community of 485 Turkers and growing...!

Trending Campaign Ideas

23 more upvotes to launch this campaign

2

Live Campaigns

Dear Jeff Bezos

Posted 4 months ago.

We are writing to let you and the rest of the world know all about who we are. The intent is for you to see that Turkers are not only actual human beings, but people who deserve

This is the page that will host the letters you send to us and publicize the

1) Idea

2) Vote

3) Discuss

4) Mobilize



[Start an email campaign to Jeff Bezos letting him know who we are off/on mTurk, and what we are looking for on mTurk.](#)

Posted 2 months ago by dark_bird_of_paradise.

Dear Jeff Bezos
Posted 4 months ago.

We are writing to let you and the rest of the world know all about who we are. The intent is for you to see that Turkers are not only actual human beings, but people who deserve respect, fair treatment and open communication.

[Join the discussion and letter writing!](#)

[Wiki page for authoring the description and goals](#)

This is the page that will host the letters you send to us and publicize the movement:

Letters »

THE SAME FORCES THAT
MAKE IT EASY TO GATHER
ON THE WEB...

ALSO MAKE IT EASY TO
DISPERSE.

FLIRTING WITH FAILURE: STALLING

“So, it seems no one is interested [...] [a Turker] just says we're doing it wrong, but won't say how to do it right, and no one else has input.”

FLIRTING WITH FAILURE: FRICTION

“I’m sorry to see the core document get excessively mired in technical detail in what purports to be a high-level document on ethics. I certainly hope this document sees fewer revisions than it will if it ties any of its own legs directly to the five-year-old ‘beta test’ which Amazon calls ‘policy’.”



STALLING
FRICTION

A diagram consisting of two words, 'STALLING' and 'FRICTION', stacked vertically. Two white curved arrows connect them: one on the left pointing from 'FRICTION' up to 'STALLING', and one on the right pointing from 'STALLING' down to 'FRICTION', forming a circular loop.

scylla and charibdis...

STRUCTURED HUMAN SCRIPTS

These kinds of publics require special action to preserve their kinetic energy. For example:

debates with deadlines

act and undo

This labor could not have been written into software: it consists of human scripts undertaken by a trusted party.

SUCCESSES SO FAR

532 verified workers signed up (pseudonymously)

7,000 unique visitors

32,000 views

22 ideas for action

2 live campaigns

ETHICAL RESEARCH GUIDELINES

First campaign: curb poor academic research practices

Spawned when an IRB-approved economics researcher ran an experiment to inject false information into Turkopticon

Wiki-written guidelines covering fair pay, rejection, and IRB arbitration for poor requesters

23 PAGES OF EFFORT

Guidelines for Academic Requesters

About the project [\[edit\]](#)

Version 1.0

"Treat your workers with respect and dignity. Workers are not numbers and statistics. Workers are not lab rats. Workers are people and should be treated with respect." - turker 'T', a Turkopticon moderator

This document consists of this main **Guidelines for Academic Requesters** page, and several subpages with important additional details, which are referenced with "Read more" links at relevant points throughout this main page:

- [Basics of how to be a good requester](#)
- [Fair payment](#)
- [Resources for communicating with requesters](#)
- [Links to other resources on AMT and online research ethics](#)
- [Meta: Maintaining the guidelines](#)

Contents [\[hide\]](#)

- 1 [About the project](#)
 - 1.1 [Goal: Guidelines that IRB will use to approve responsible AMT research](#)
- 2 [For Turkers: what can you do when these guidelines are violated?](#)
- 3 [Guidelines](#)
 - 3.1 [Clearly identify yourself to give workers a sense that you are accountable and responsible](#)
 - 3.2 [Provide reasonable time estimates](#)
 - 3.3 [Approve work as soon as possible](#)
 - 3.4 [Maintain worker privacy](#)
 - 3.5 [Abide by AMT Terms of Service](#)

<http://guidelines.wearedynamo.org> – 216 signatures so far

HUMANIZATION IN THE MEDIA


Dear Jeff Bezos


We are writing to let you and the rest of the world know all about who we are. The intent is for you to see that Turkers are not only actual human beings, but people who deserve respect, fair treatment and open communication.

[Donate](#)

Donations will go towards reaching out to more Turkers via a HIT on MTurk (a 3 minute paid vacation). Raised: \$60



 Tweet 23

 Like Share 40

21 letters

Amazon.com

Amazon's Mechanical Turk workers protest: 'I am a human being, not an algorithm'

A Christmas email campaign is asking Amazon's CEO Jeff Bezos to improve terms for workers providing cheap digital labour



engadget

Amazon's Mechanical Turk workers be treated like humans



by Jon Fingas

@jonfingas

December 3rd 2014 at 1:39 pm

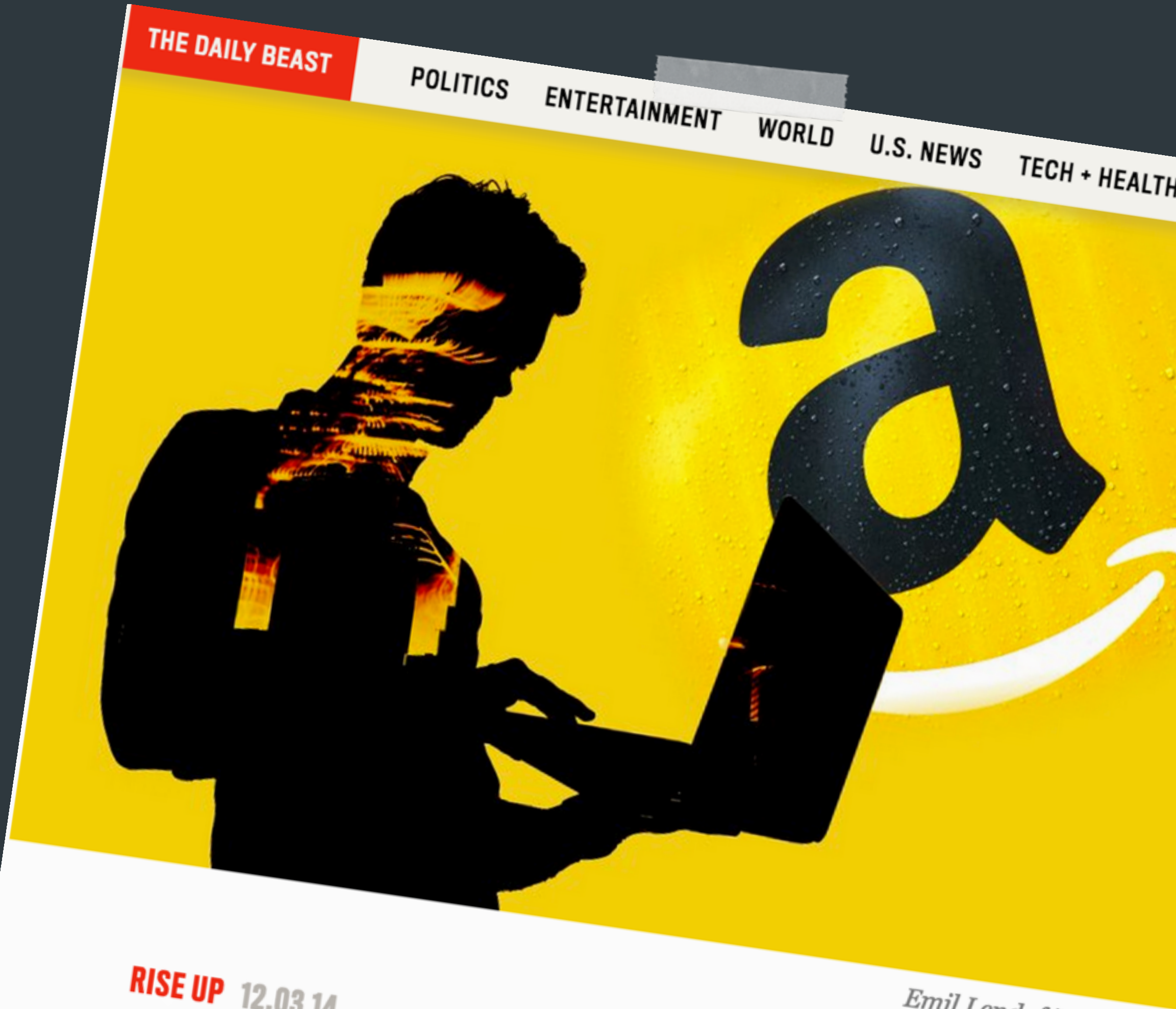


Kevin Zawacki

Amazon's Turkers Kick Off the First Crowdsourced Labor Guild

RISE UP 12.03.14

Emil Lendof/The Daily



IN SUM...

If flash teams are a new form of work collective,
Dynamo is a new form of counterbalance.

Our goal: design systems for collective action in crowd work

CROWD RESEARCH: UNLOCKING THE GATES TO THE IVORY TOWER

ongoing work with Rajan Vaish, Geza Kovacs, Ranjay Krishna, Sharad Goel,
and James Davis

SETTING OUR SIGHTS HIGHER

Must we restrict ourselves to research problems that are solvable alone or in small groups?

Must we deny access to motivated aspiring researchers?

Could people around the world work together to...

Build a new crowdsourcing platform?

Design and run hundreds of parallel experiments?

Develop computer vision algorithms?

WELL-STATED PROBLEMS

Gowers's Weblog

Mathematics related discussions

« A Tricky issue

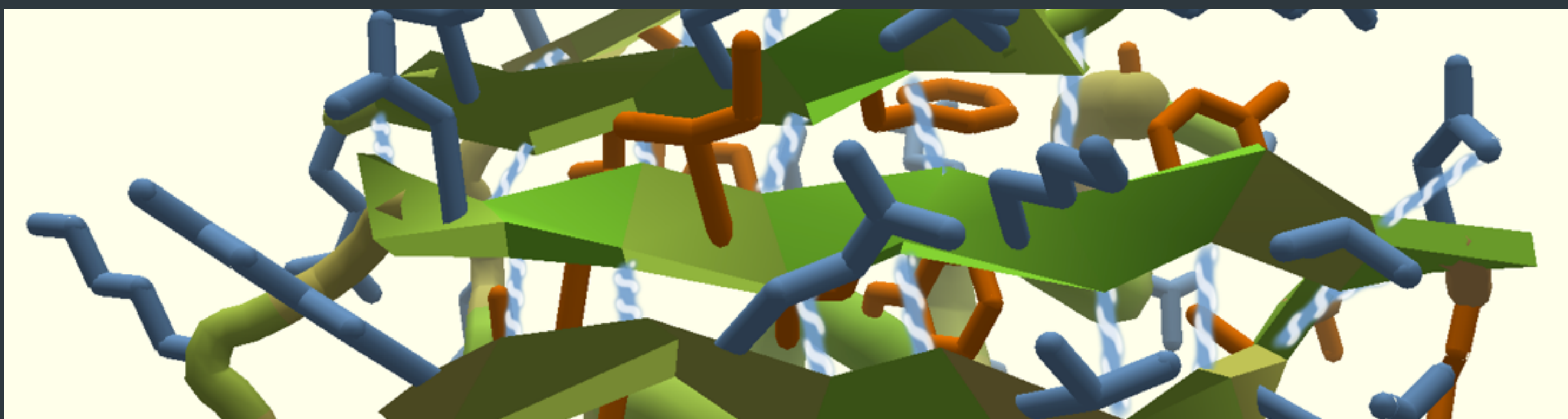
Background to a Polymath project »

Is massively collaborative mathematics possible?

Polymath project

[Gowers and Tao]

[Cranshaw and Kittur 2011]



FoldIt

[Cooper et al. 2010]

OPEN-ENDED, MESSY RESEARCH

Could we invite anyone from around the world to participate, and crowdsource large-scale, **open-ended** research problems?

These are problems for which a felicitous approach to finding the solution cannot be known in advance.

EDUCATIONAL MISSION

Provide scaffolding so anyone can learn to do top-tier research

Participant motivations: research experience, stronger resume, solving interesting problems

Tightly-constrained
RAship



Open-ended
grad school

crowd research

CHALLENGE: COORDINATION

My Stanford group is eight students. And that keeps me pretty busy.
Google managers are asked to have no more than seven reports.
So how could we possibly run a research team of hundreds?

CHALLENGE: CREDIT

Eventually, we need to decide on an author order, and participants will need recommendation letters. How do we measure impact?

Assumption: advisor goes last in the author order, but other authors should be ranked by contribution to the project

Calling aspiring researchers!

Do you love challenges? Do you aspire to be a researcher? - but do not know how to conduct research or whom to contact to? - Well, here's your chance to work on a research project and co-author academic papers with professors from Stanford University and the University of California.

[Learn More »](#)

1097 signups, predominantly from India and United States

27% female, median age 21, average team 3 people

73% undergraduate, 22% masters, 4% PhD, 1% high school

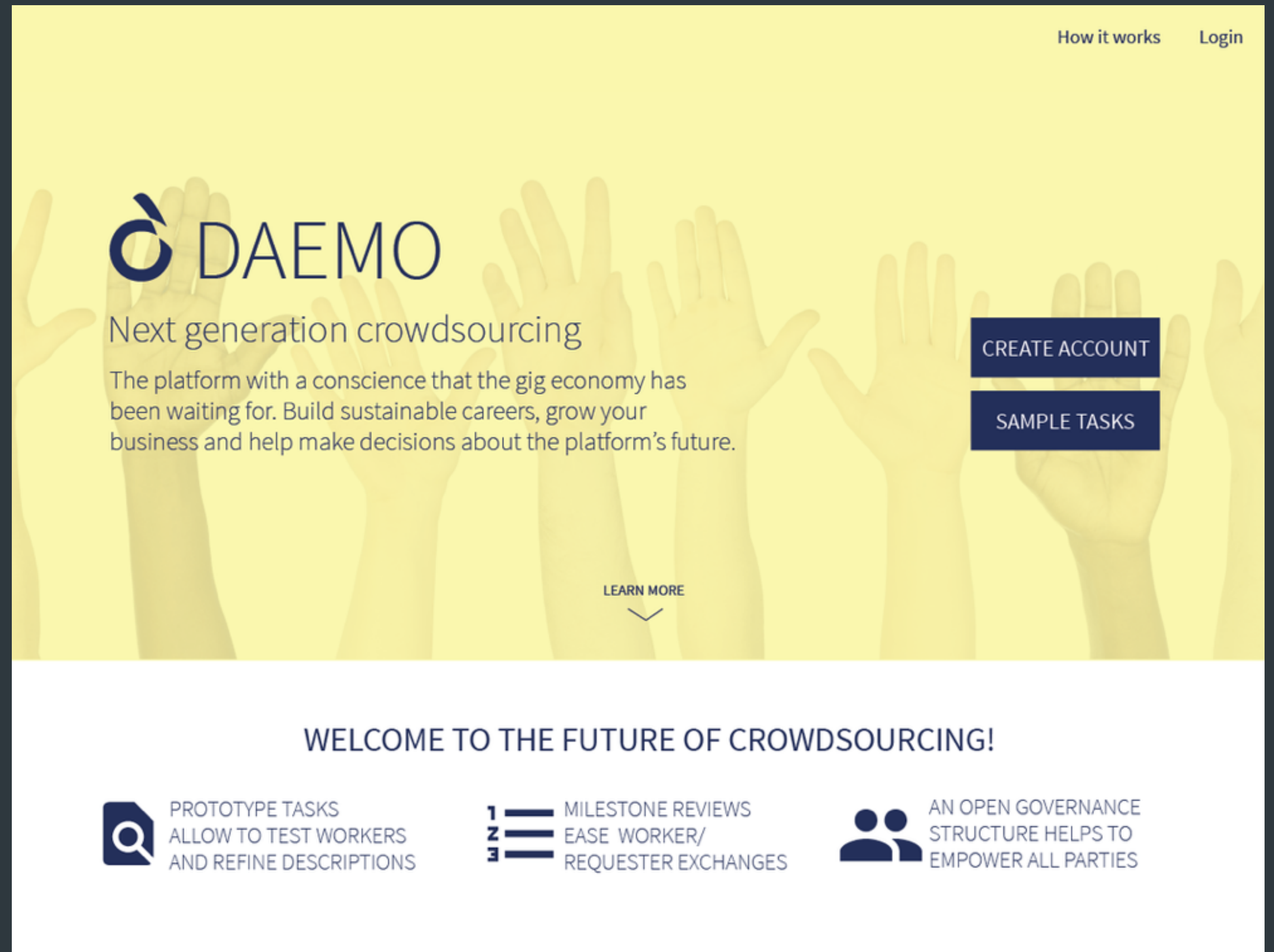
71% engineering-oriented areas of study

THREE PARALLEL PROJECTS

HCI

Michael Bernstein, Stanford

Building a new crowd
marketplace



How it works Login

DAEMO

Next generation crowdsourcing

The platform with a conscience that the gig economy has been waiting for. Build sustainable careers, grow your business and help make decisions about the platform's future.

CREATE ACCOUNT

SAMPLE TASKS

LEARN MORE

WELCOME TO THE FUTURE OF CROWDSOURCING!

- 1 PROTOTYPE TASKS
ALLOW TO TEST WORKERS
AND REFINE DESCRIPTIONS
- 2 MILESTONE REVIEWS
EASE WORKER/
REQUESTER EXCHANGES
- 3 AN OPEN GOVERNANCE
STRUCTURE HELPS TO
EMPOWER ALL PARTIES

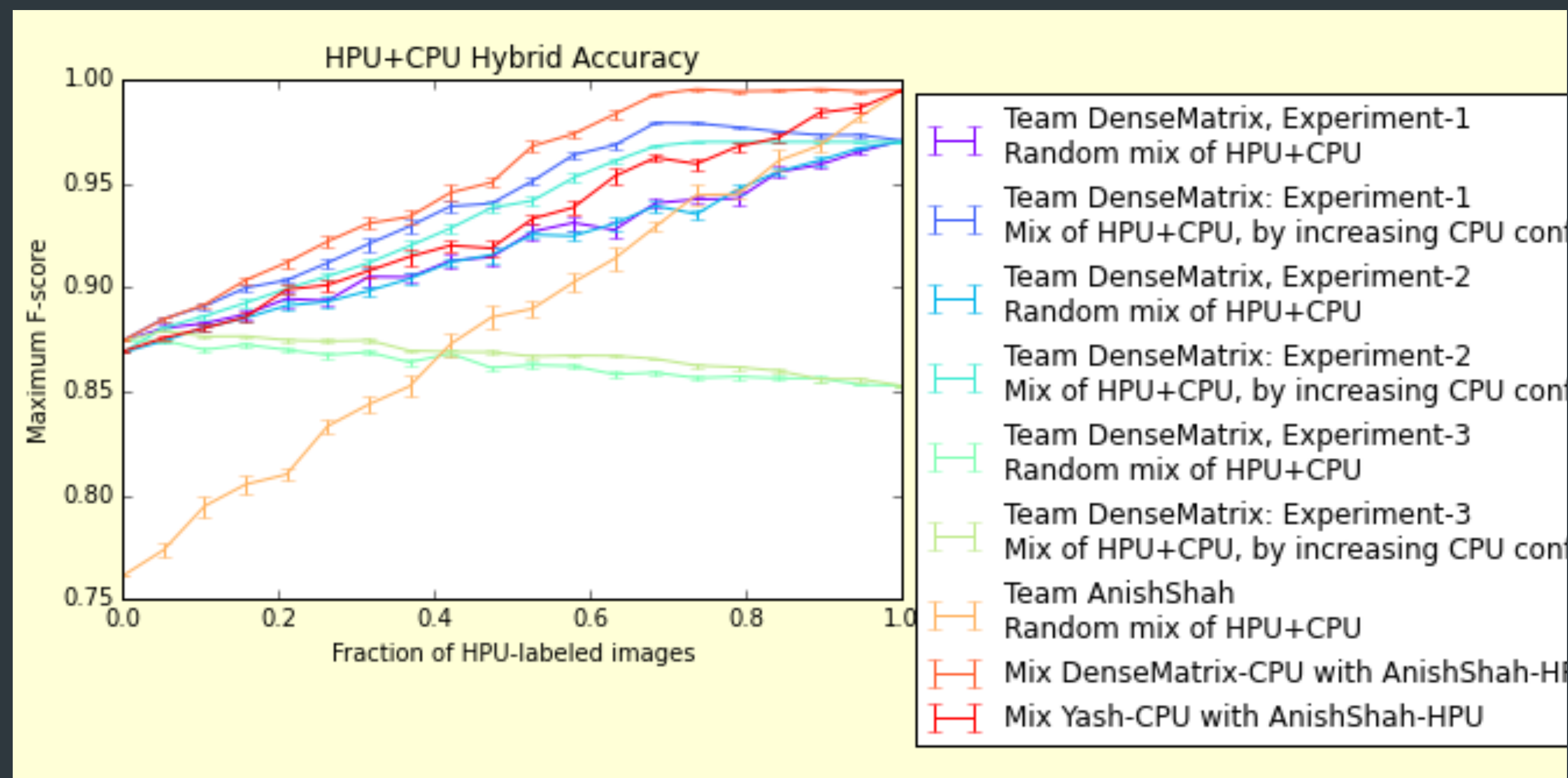
THREE PARALLEL PROJECTS

Computer vision

James Davis, UCSC

Serge Belongie, Cornell

Hybrid crowd-computer
vision algorithms



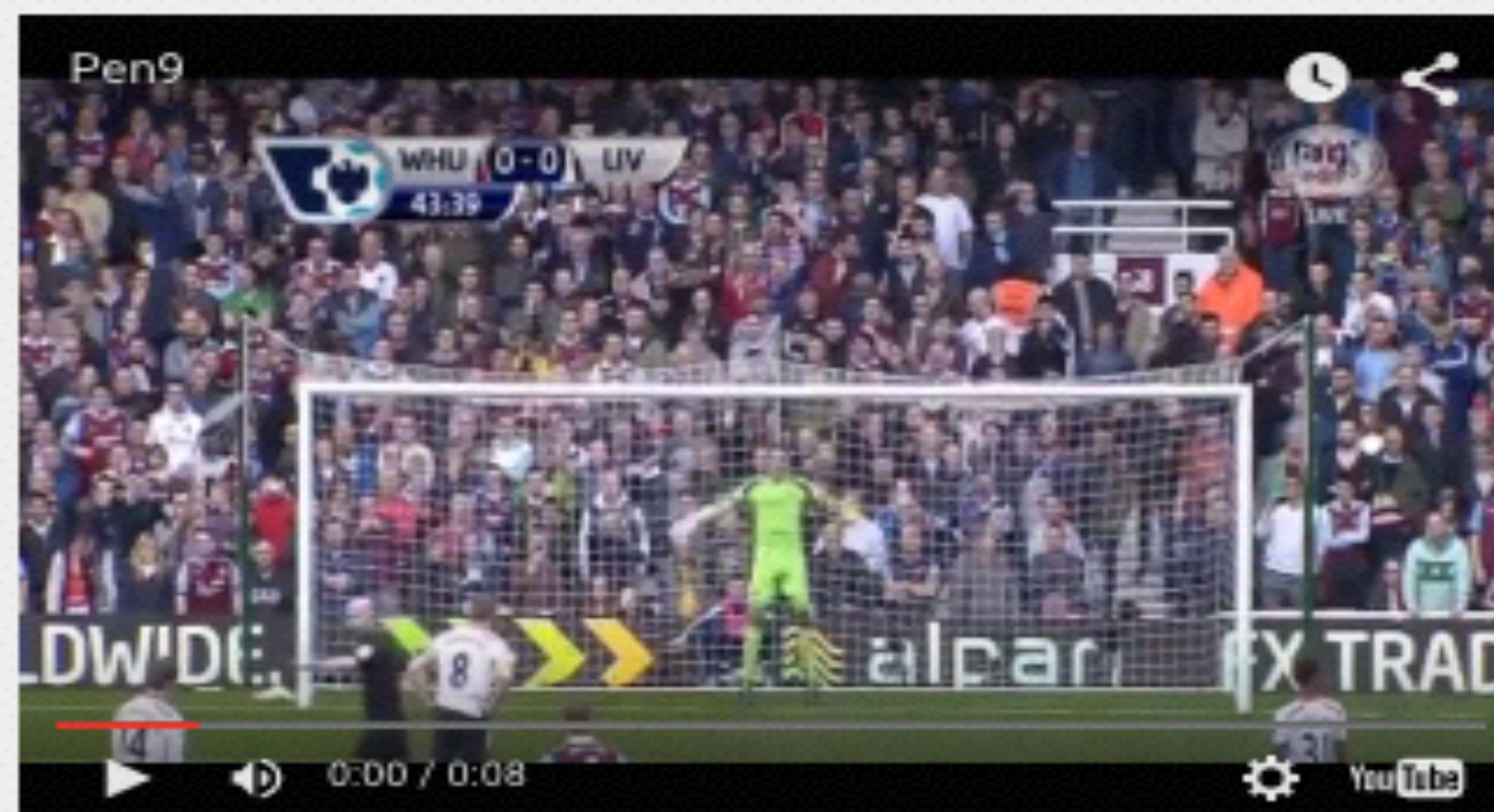
THREE PARALLEL PROJECTS

Data science

Sharad Goel, Stanford

Hundreds of experiments testing the wisdom of the crowd

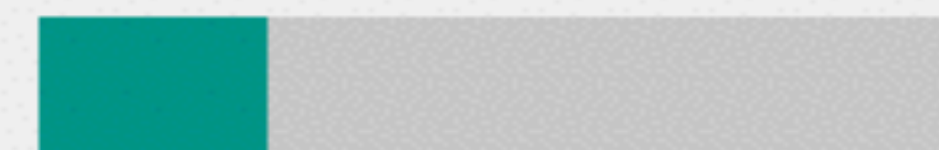
Predict the direction of penalty shot



Time Remaining

30

Tasks Remaining in the domain: 15 / 20



Options:

- ☐ left
- ☐ right

RESEARCH IN PROGRESS

Three work-in-progress papers: two at UIST, one at HCOMP

Papers in preparation or under review...

COORDINATION STRATEGY

Exploration during the week, reset to argmax each weekend

Saturdays: team meeting + milestone opens

Thursdays: milestone closes

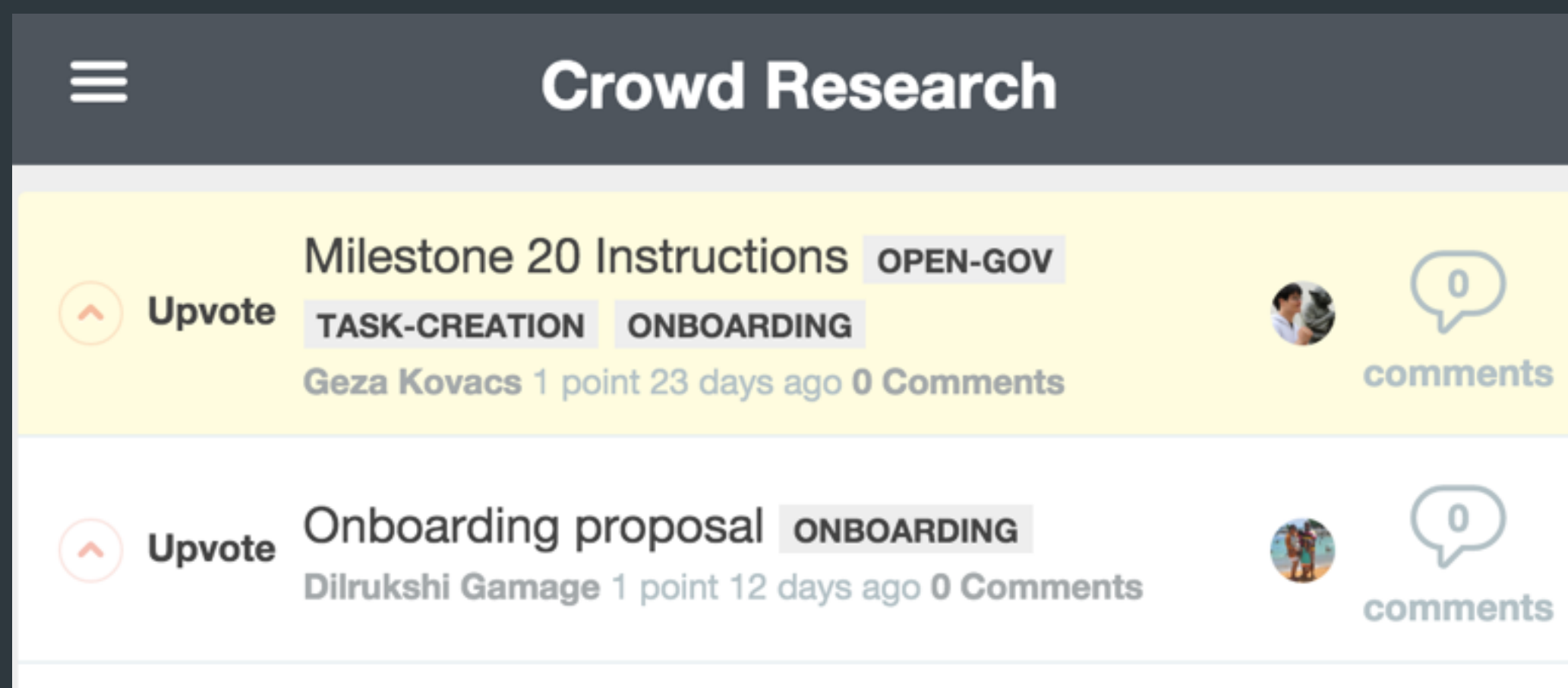
Fridays: peer feedback and ranking + staff collation

COORDINATION STRATEGY

Divergence

Every interested contributor submits a milestone, then peers upvote high-quality submissions

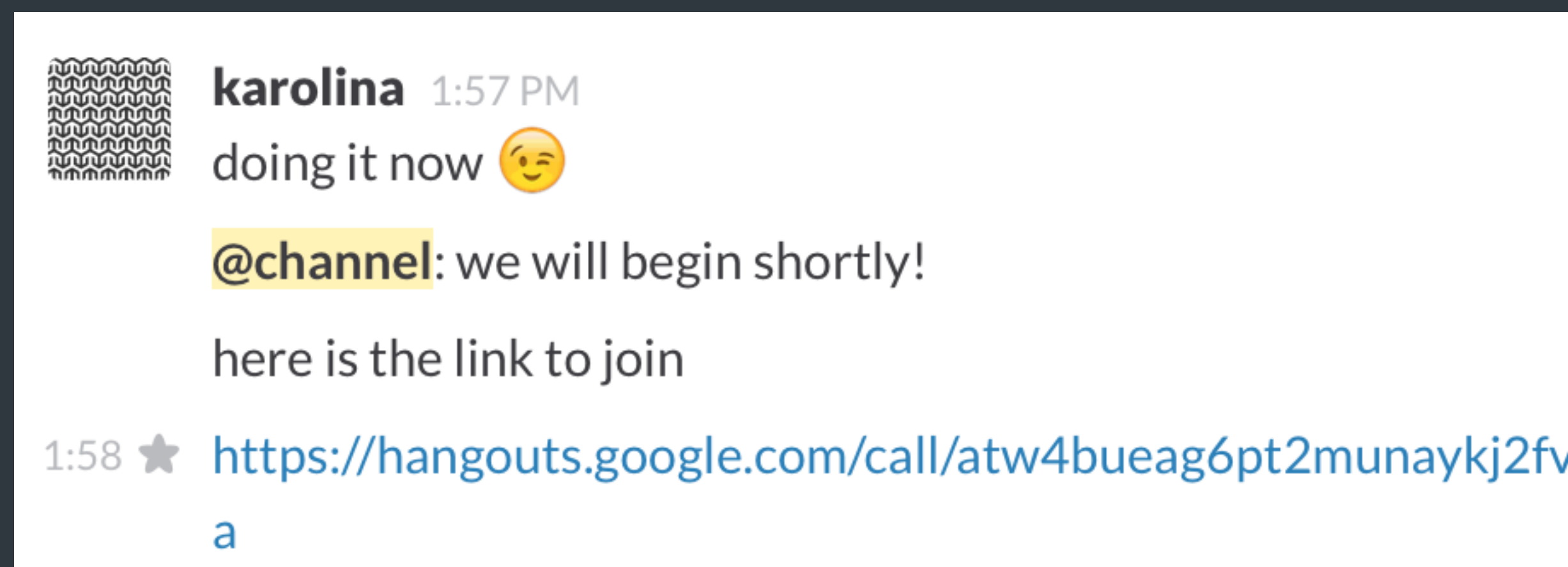
Tools: Telescope (Reddit clone), Wiki



Convergence

Empower active community members to create temporary ad-hoc teams

Tools: Google Hangout, Slack, Google Presentations



INTUITION: TRANSFORM CREDIT INTO A NETWORK PROBLEM

Each participant allocates 100 points across other contributors.

This produces a credit network, but some groups of participants rally a few friends to vote for them and artificially increase their influence.

PAGERANK-BASED CREDIT

Approach: run a modified PageRank algorithm over the network

Informally, PageRank identifies the universally-respected contributors, then weighs their votes more heavily. This process iterates until convergence.

gle+

9:01 AM

hello everyone!

9:02 AM

Hi!

Greetings from Seattle!

9:02 AM

Hi!

9:02 AM

hey!

9:02 AM

Hi!

9:02 AM

hi ^_^

9:02 AM

Hi

9:02 AM

hello

Michael

Nicole

Akshara

Rashmi

gle+

9:01 AM

hello everyone!

9:02 AM

Hi!

Greetings from Seattle!

9:02 AM

Hi!

9:02 AM

hey!

9:02 AM

Hi!

9:02 AM

hi ^_^

9:02 AM

Hi

9:02 AM

hello

Michael

Nicole

Akshara

Rashmi

gle+

9:01 AM

hello everyone!

9:02 AM

Hi!

Greetings from Seattle!

9:02 AM

Hi!

9:02 AM

hey!

9:02 AM

Hi!

9:02 AM

hi ^_^

9:02 AM

Hi

9:02 AM

hello

Michael

Nicole

Akshara

Rashmi

gle+

9:01 AM

hello everyone!

9:02 AM

Hi!

Greetings from Seattle!

9:02 AM

Hi!

9:02 AM

hey!

9:02 AM

Hi!

9:02 AM

hi ^_^

9:02 AM

Hi

9:02 AM

hello

Michael

Nicole

Akshara

Rashmi

MILESTONE SELF-ASSIGNMENT

STANFORD
RED GROUP
Crowd
Research

Getting Started

Crowd Research

☆

🔔

Org Visible



Click first: how does this work?




Each week, you (and/or your team) sign up for at least one milestone here on Trello. See more...



👁️ ⋮ 💬 3 🔒 May 28




VS VN YG YG AL MB




RC SG SI SC TK VT


 PA RA  RN

MT  ME  MM  NA

 LX MD MM  MV

 JO  JS KG 

 CJ  GR 


 ARD AT AD AR A AS

AS



Understanding lives of workers

Try being a worker on oDesk (now Upwork.com) or other large project platforms.

👁️ ⋮ 💬 13 🔒 May 28

 VN VV AL

I KG KG MT

AR B  

Dashboard - Militerin Munakani (If you're not Militerin Munakani, click here) Your Worker ID: 4241568@oDesk

Earnings To Date	Value	Earnings Available	Value
Approved HITs	\$3.93	Earnings Available for Transfer	\$3.23
Bonuses	\$0.00		
Total Earnings	\$3.93		

Your HIT Status

Date	Submitted	Approved	Rejected	Pending	Earnings
May 23, 2014	5	5	0	0	\$1.91

HIT Totals

HITs You Have Submitted	Value	Rate
HITs Submitted	5	—
... Approved	5	100.0%
... Rejected	0	0.0%
... Pending	0	—



Sign up as a worker for Mechanical Turk at and earn \$1.




👁️ ⋮ 💬 37 📌 5 🔒 May 28

Hello, world! Getting started with our code

Work on one of our open feature requests on GitHub

👁️ ⋮ 💬 1 🔒 May 28


 RC  SC UC VV


  



Get your hands dirty and set up our Hello, World example




👁️ ⋮ 💬 37 🔒 May 28

YG YG A A NJ

 UC VT VS VN VV

 SG SB SS TS




 RN RC SP 



MM  PS  



Related work/papers: read and comment


Read the MobileWorks paper

👁️ ⋮ 💬 17 🔒 May 28

 VS  YG  YO


 MM  RC RC


 JL  MB ME

AK A  AN B

Read Flash Teams paper

⋮ 💬 5 🔒 May 28

JL KZ ME RC  SC



Read paper on the future of crowdwork

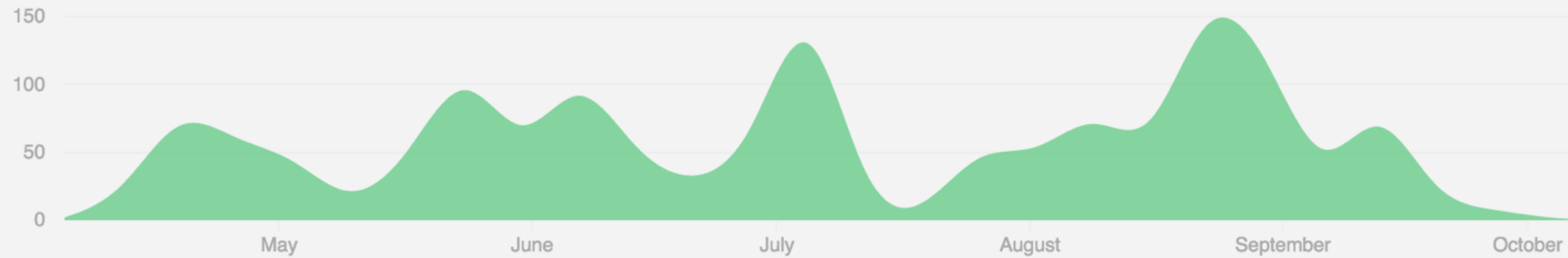
⋮ 💬 7 🔒 May 28

ENGINEERING

Apr 5, 2015 – Oct 26, 2015

Contributions to develop2, excluding merge commits

Contributions: **Commits** ▼



dmorina

502 commits / 141,296 ++ / 365,266 --

#1

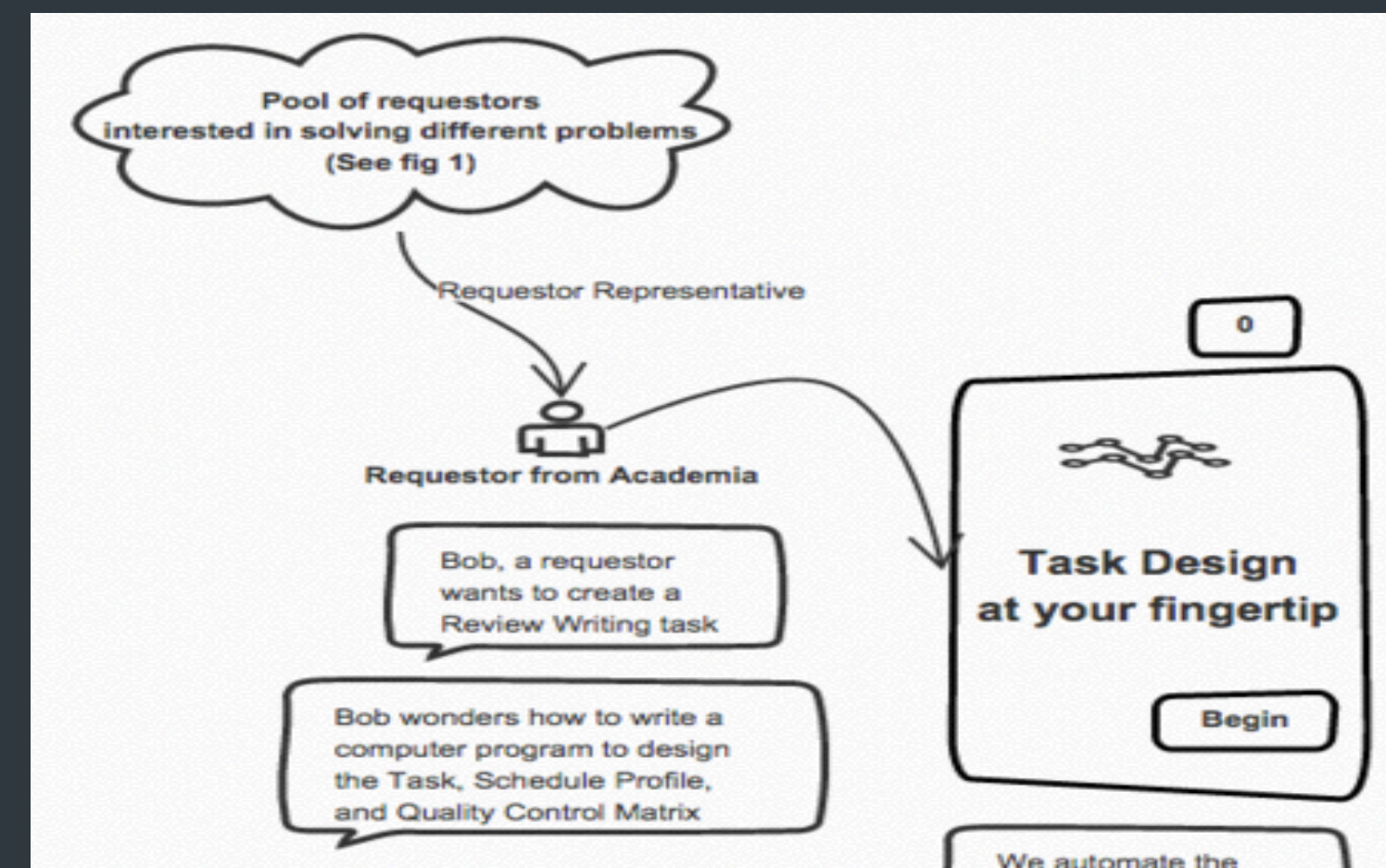
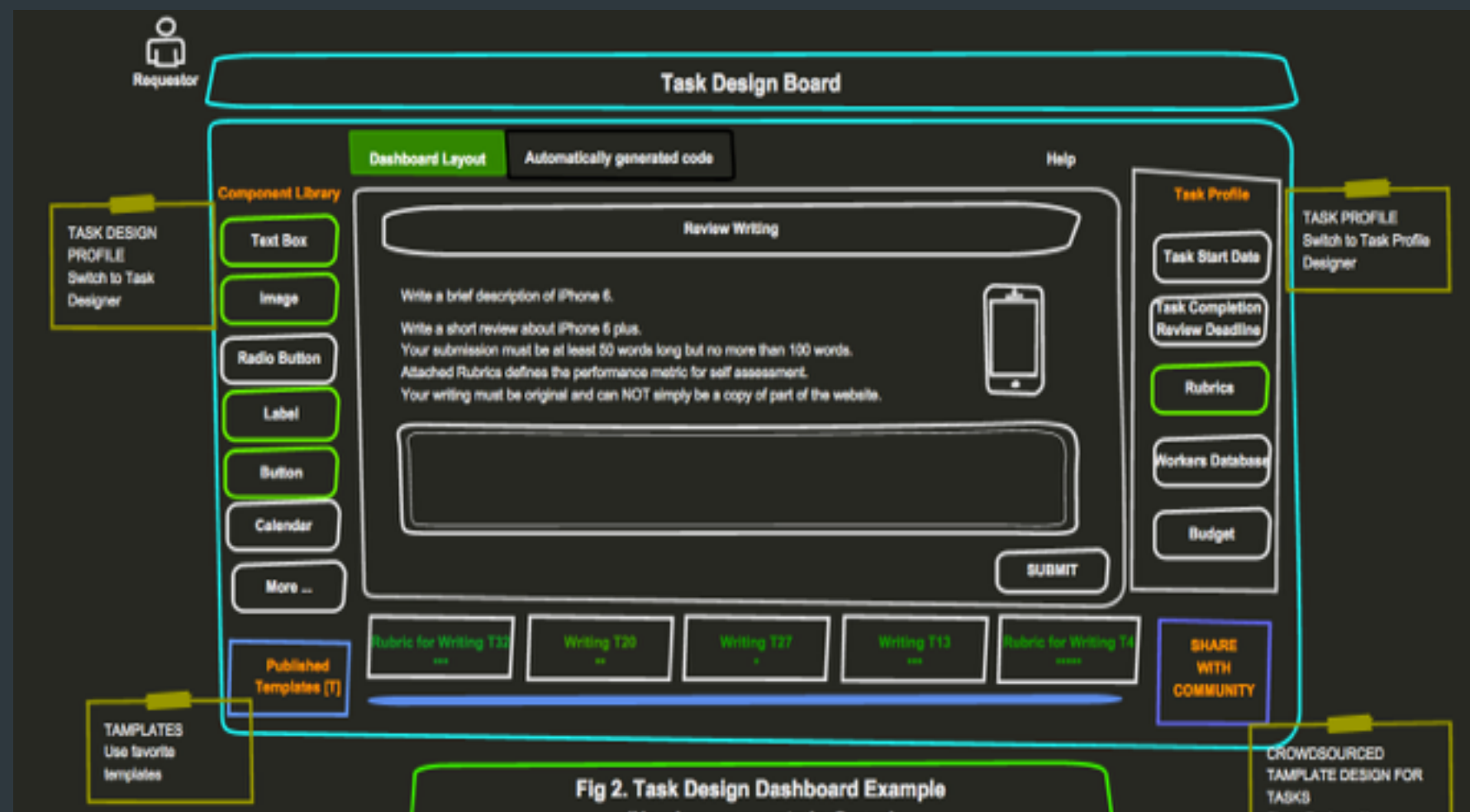
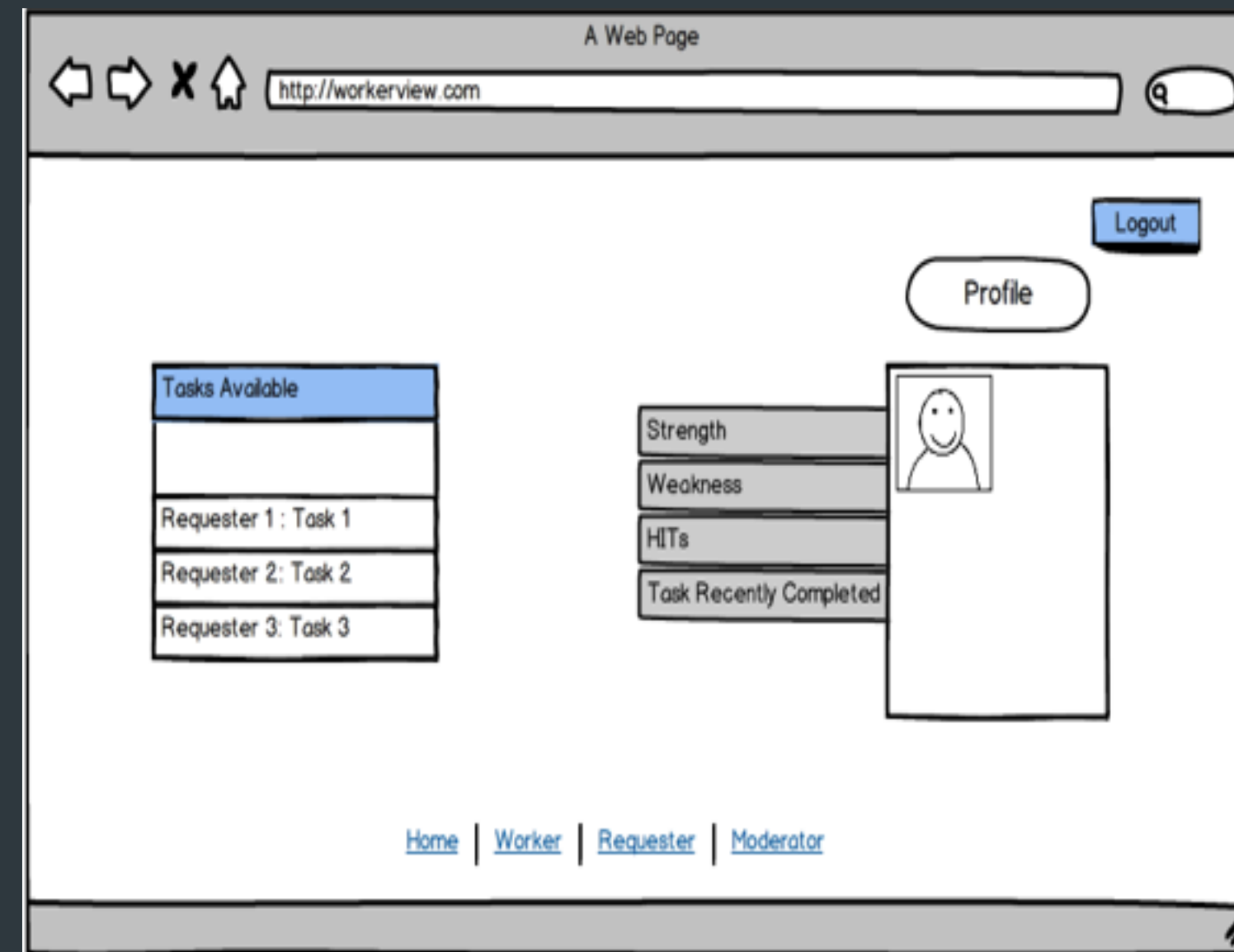


nistala

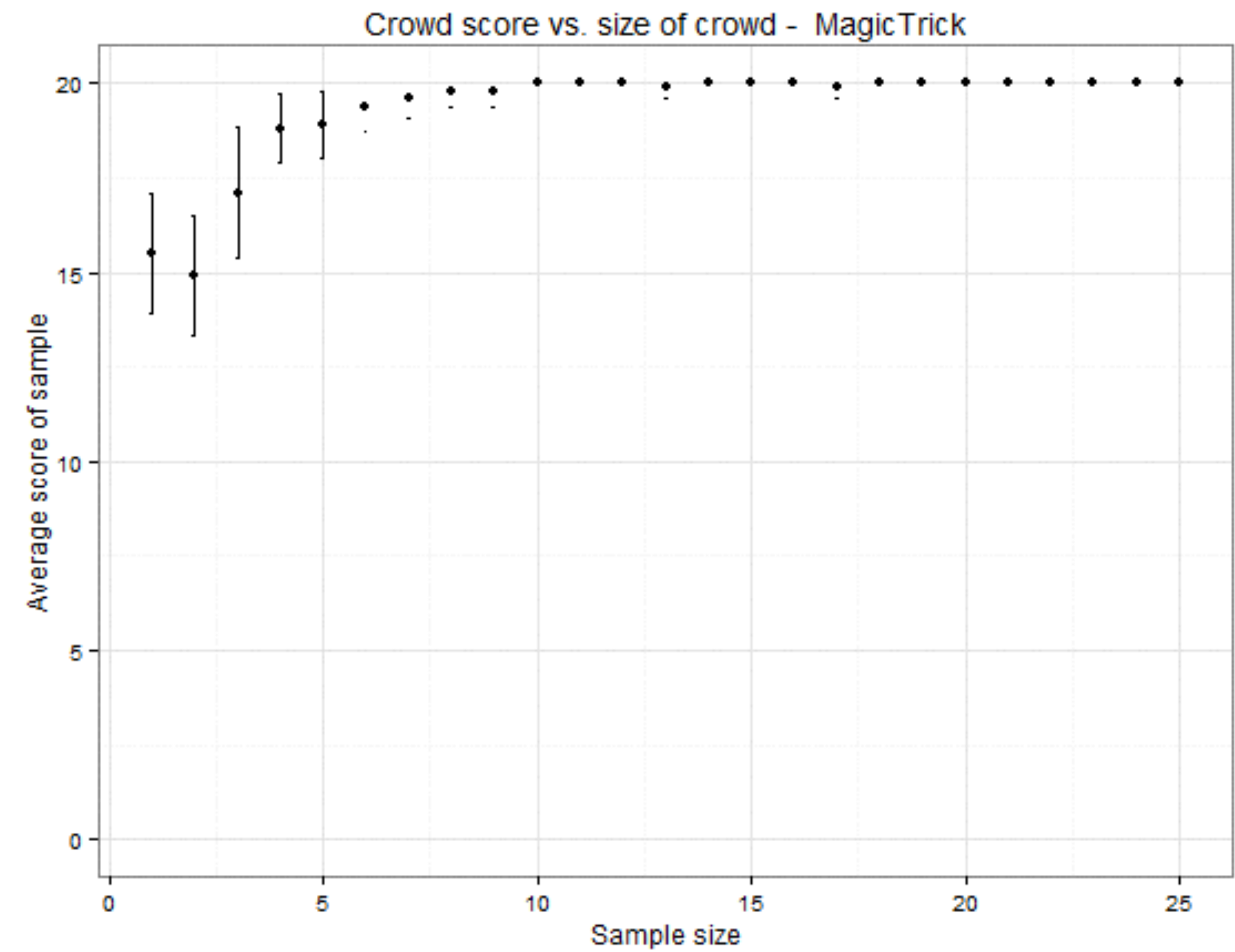
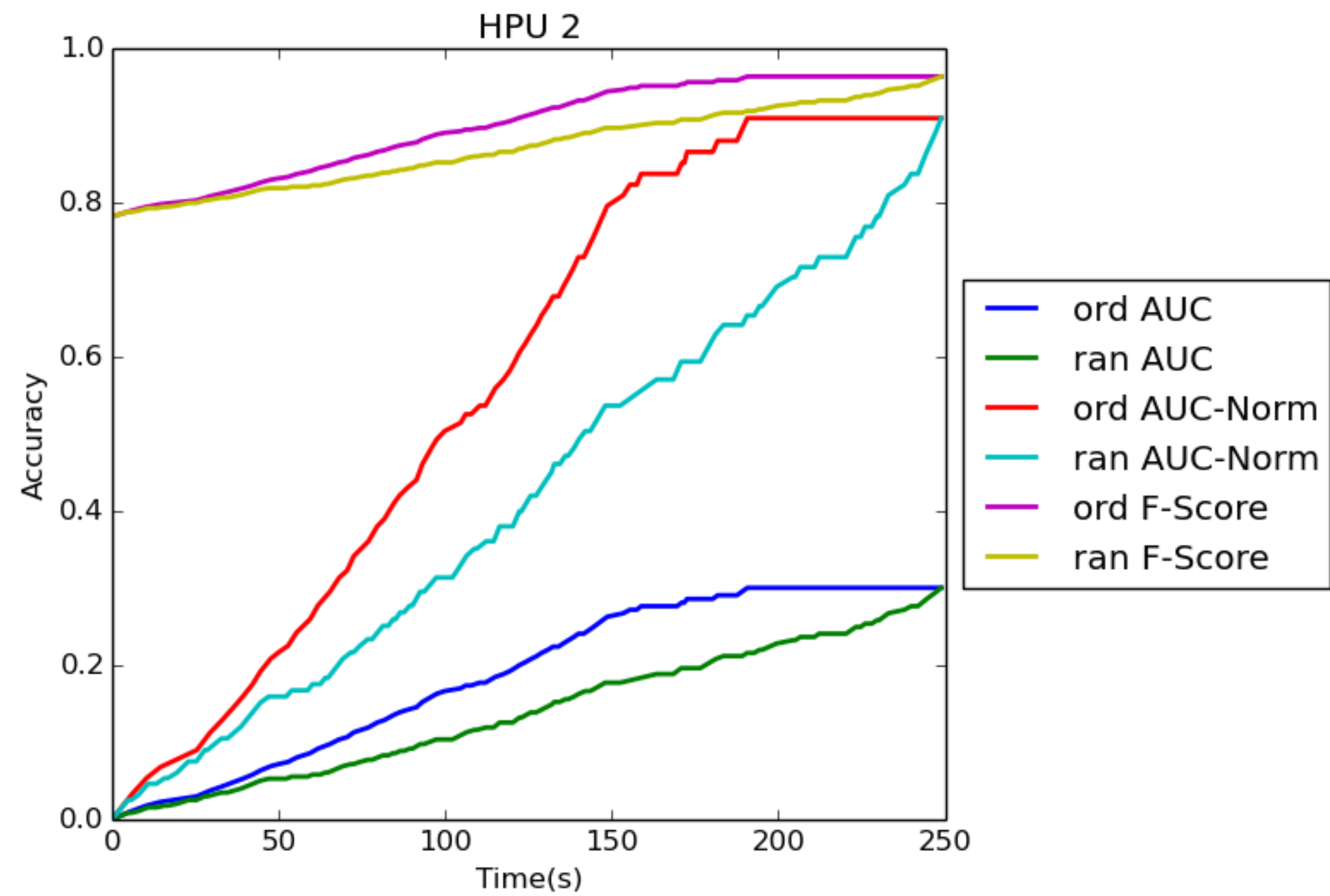
249 commits / 1,671,624 ++ / 1,442,878 --

#2

PROTOTYPES AND STORYBOARDS



DATA ANALYSIS



BRAINSTORMING AND WRITING

1. Anyone can pitch an idea. If it gets enough support, it goes to the next election and needs majority support from both workers+requesters.
 - **(original) Direct democracy:** anyone can pitch a policy idea, and once it gets past a threshold of support (e.g., 1000 votes), it goes up on a ballot. Twice a year, ideas go out to a direct vote for everyone on the platform. If it gets majority support from both workers and requesters, it passes.
2. Members get elected as worker or requester representatives (3 each) to a panel. Tiebreaking from a 7th member (jointly elected president).
 - **(original) Representative democracy:** once a year, members of the platform can be elected as either worker or requester representatives for a small panel (e.g, six people). Anybody can pitch a policy idea, and once it gets past a threshold of support (e.g., 1000 votes), the elected representatives must discuss it and vote on it.
3. Wikimocracy: the site's rules and policies are a wiki. Anyone can discuss, and if they edit, policies change directly.
4. Any idea that gets enough support enters a public one-month voting period. It's completely voluntary to vote. (Like a Kickstarter campaign.)
 - **Original: Fast-paced referendums:** similar concept as direct democracy, but instead of per year, you do it as vote thresholds within a month (within time of posting), and it's completely voluntary to vote. Kinda like a campaign on kickstarter. Fast pace and flexible deadlines will help the ideas continually flowing in.
5. For low-level changes, highlight the interface and suggest changes directly. Upvote/downvote directly on the interface.

majority of workers and requesters and not only one side. this could help balancing the platform.



Adam Marcus
5:05 AM May 9

Resolve

equal representation of workers and requesters? pro: seems fair, con: might run into the same sorts of paralysis issues the FEC is in now (<http://mobile.nytimes.com/2015/05/03/us/politics/fec-cant-curb-2016-election-abuse-commission-chief-says.html>)



Saloni Kogta
11:52 AM May 13

Resolve

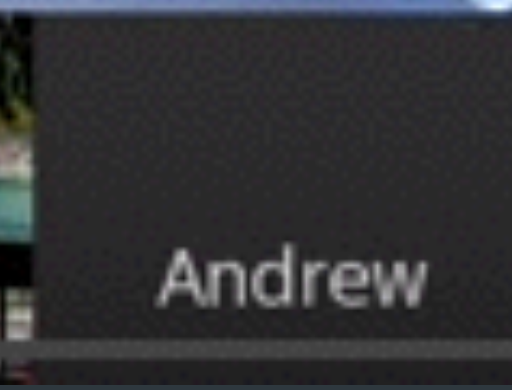
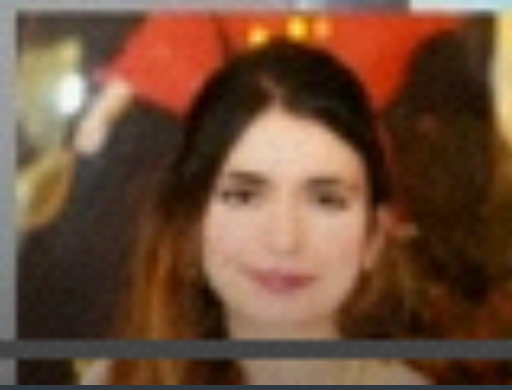
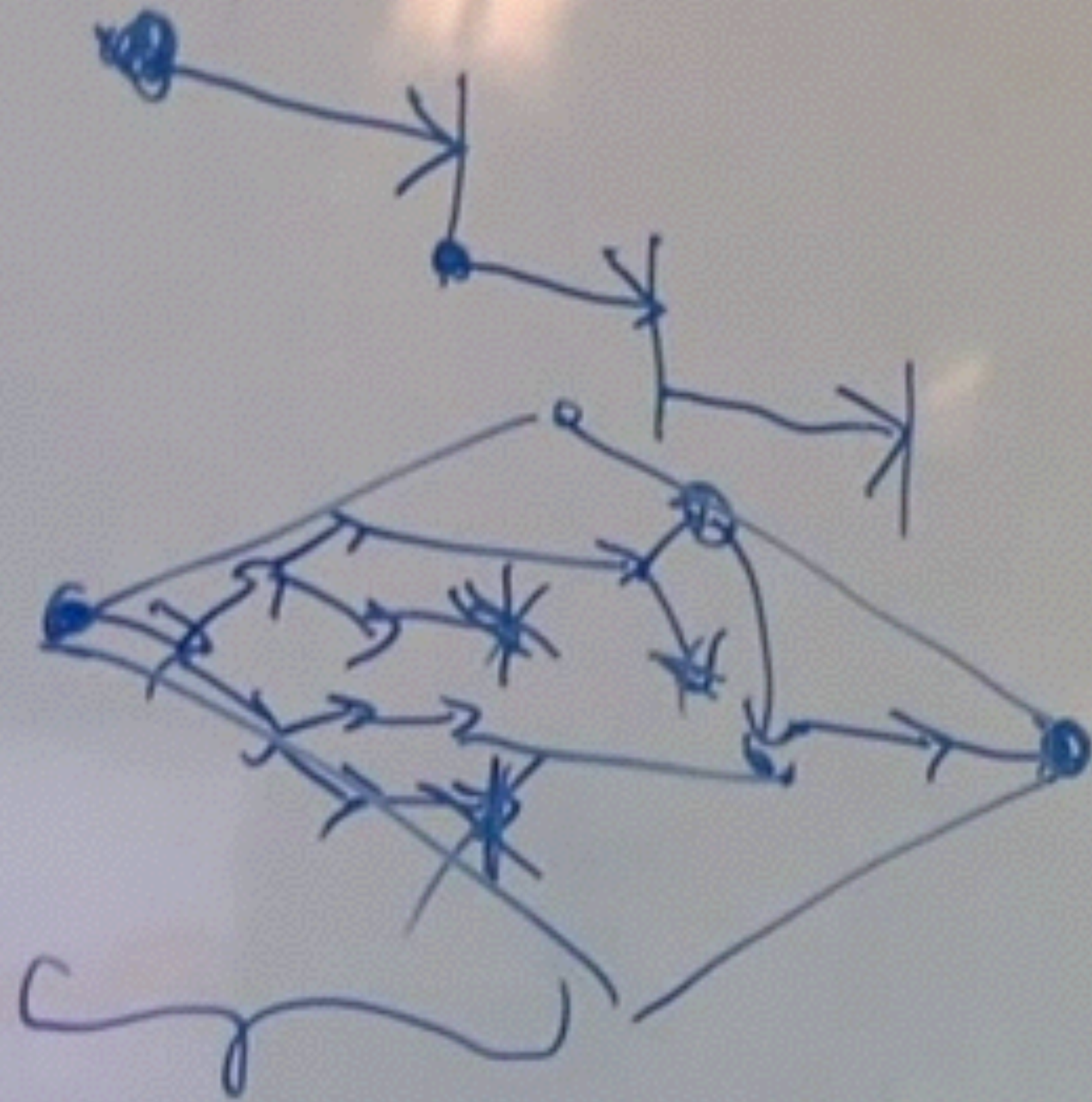
I am not sure how "fair" these elections would be. Money and power could play a major role here. I may be referring to a case that has extremely small possibility of occurring, but, what if the intentions of the elected members are changed or are influenced by some other party?

Reply...



Anonymous

Andrew Ng, Coursera

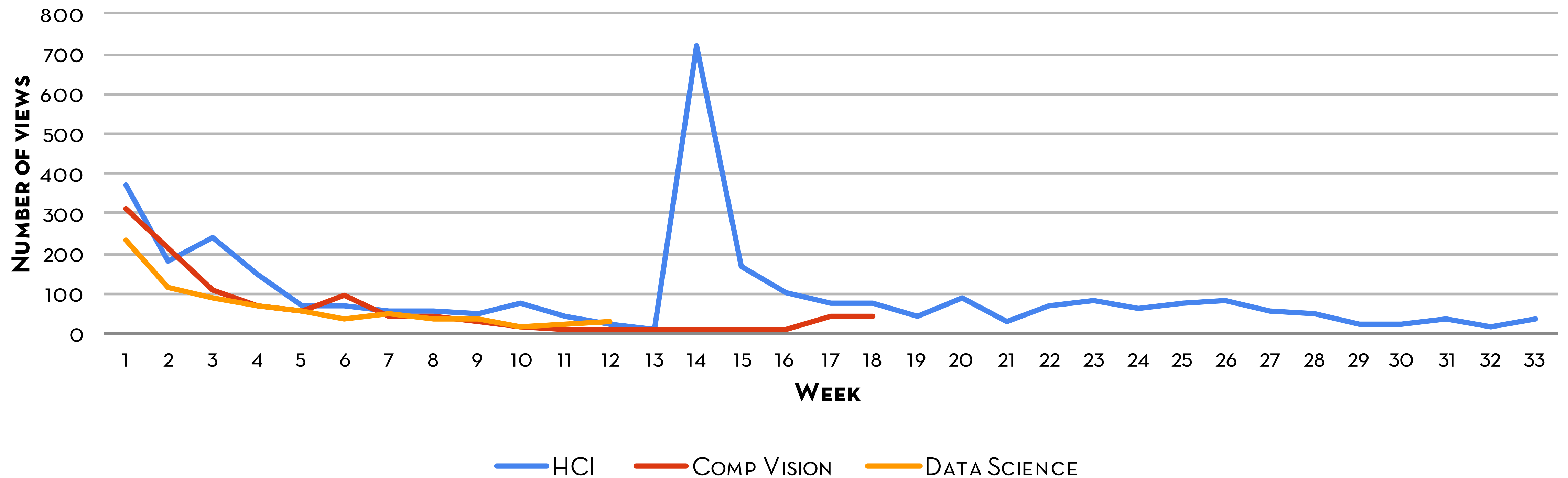


Anant Agarwal, MIT and EdX



LONGEVITY

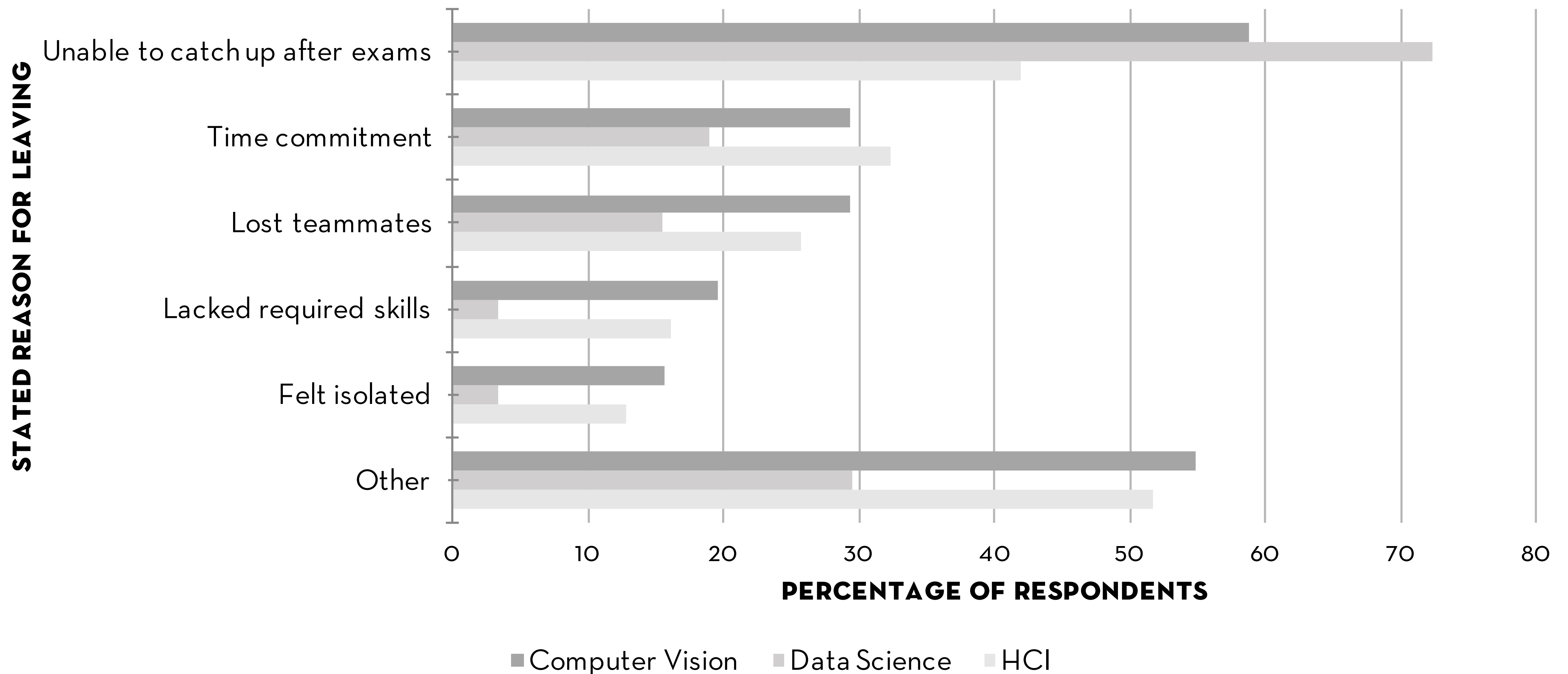
YouTube views of weekly meetings



LONGEVITY

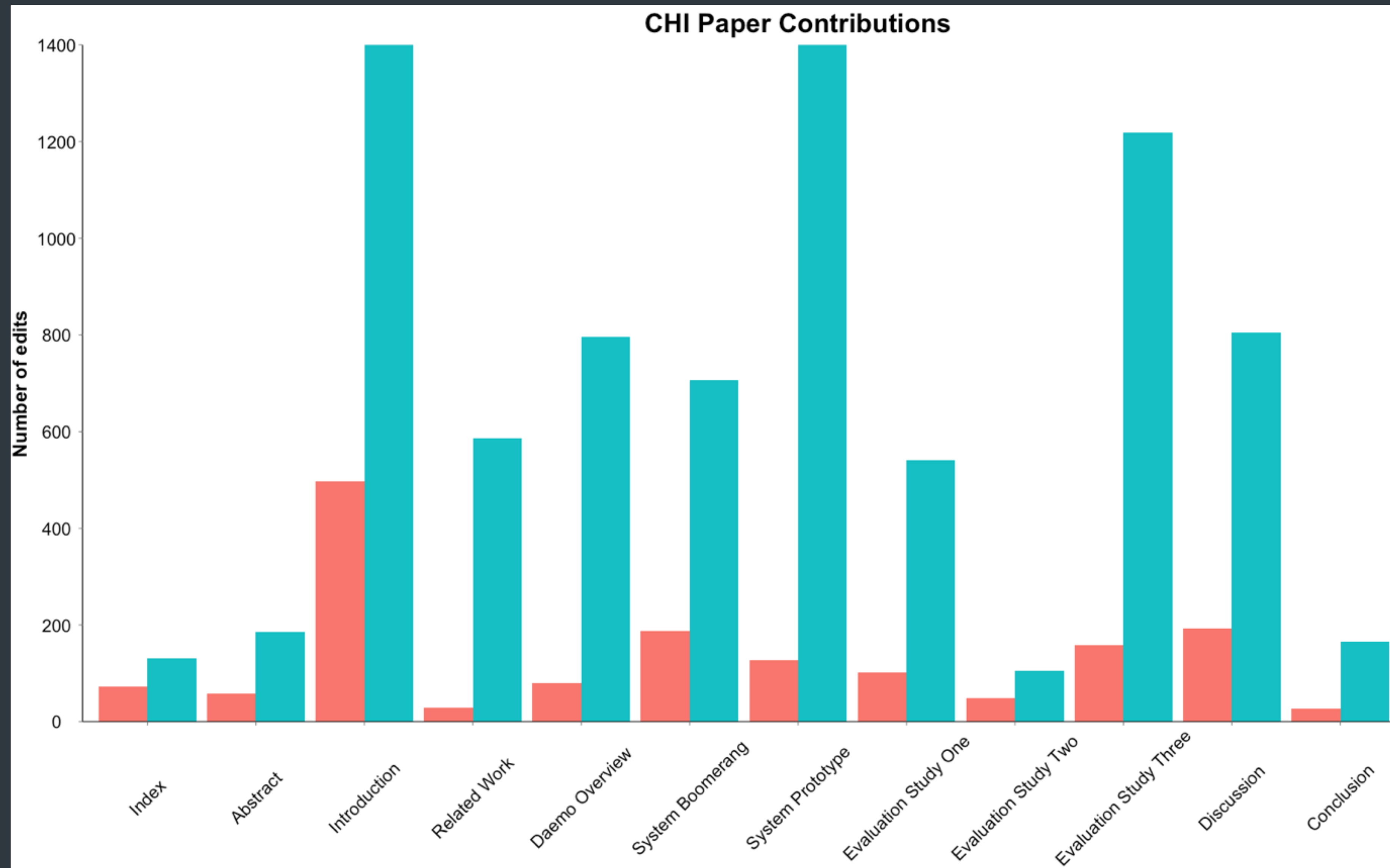


REASONS FOR DROP-OFF



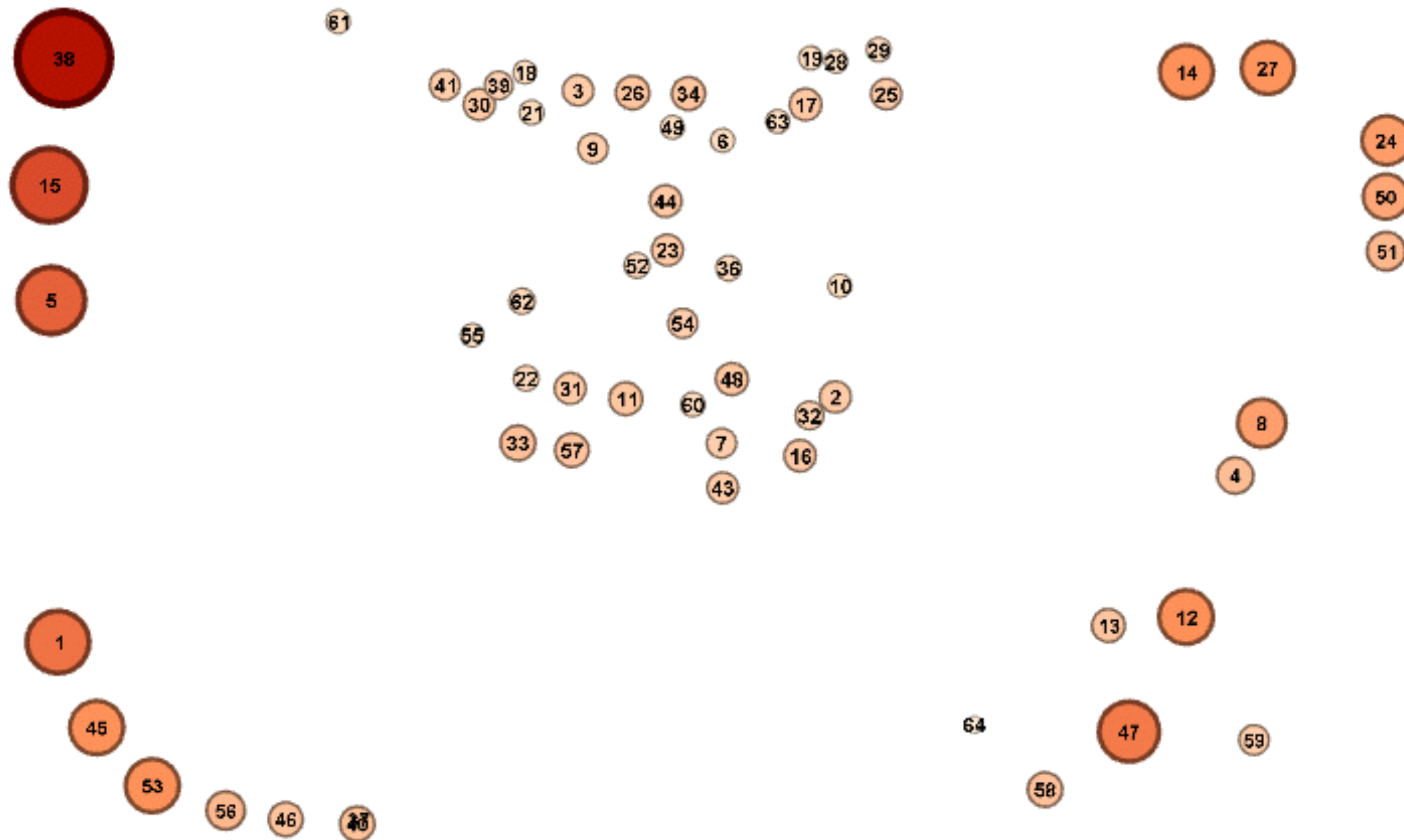
PAPER WRITING

a.k.a. “Michael loves editing intros.”



Crowd
Advisor

PAGERANK



CROWD RESEARCH

We aim to...

Tackle open-ended and messy research problems where a static interface won't be enough

Tackle big problems while mentoring new researchers

Recognize contributions (more) fairly and share credit

THE FUTURE OF WORK IS...

Complex and interdependent

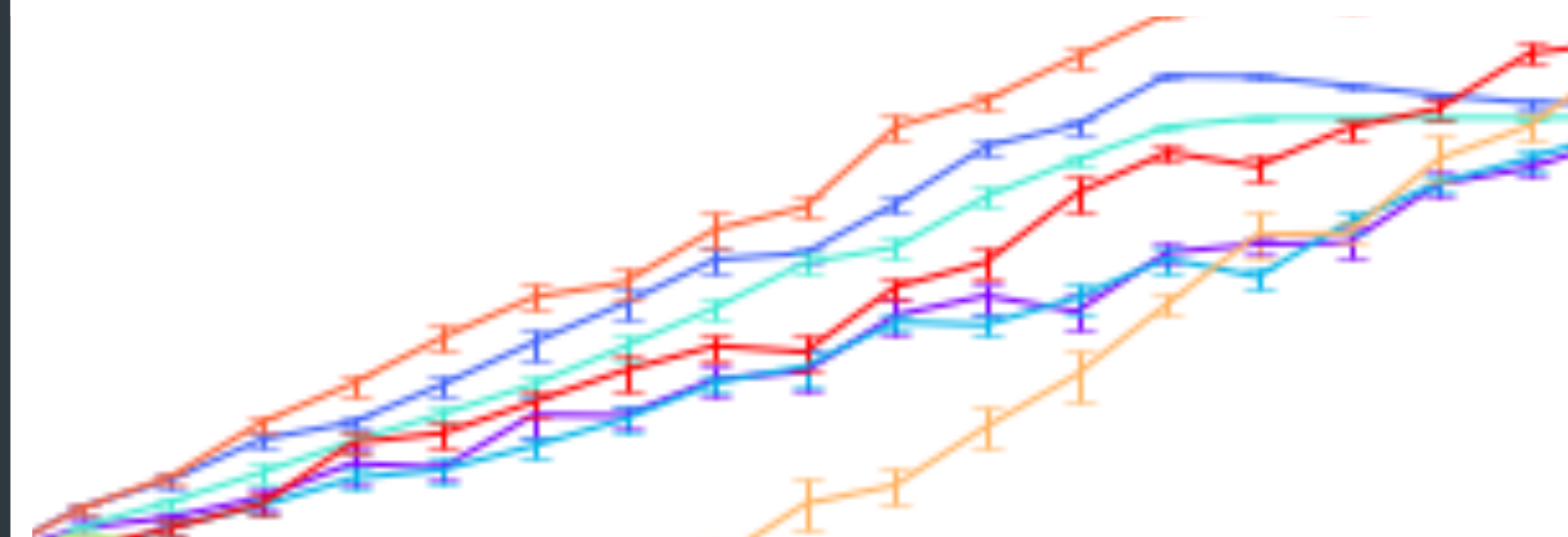
Advocating for pro-social outcomes

Solving open-ended challenges



Powering change

We are a community of 485 Turke



THE FUTURE OF WORK IS...

Complex and interdependent

Advocating for pro-social outcomes

Solving open-ended challenges

