Engineering for Ethics, Privacy, and Fairness in Computer Systems

CMSC 25910 ("CS 259")

Spring 2022

The University of Chicago

THE UNIVERSITY OF CHICAGO

Course Overview

Course Description

This course takes a **technical approach to understanding ethical issues** in the design and implementation of **computer systems**. Tensions often arise between a computer system's utility and its privacy-invasiveness, between its robustness and its flexibility, and between its ability to leverage existing data and existing data's tendency to encode biases. The course will demonstrate how computer systems can violate individuals' privacy and agency, impact sub-populations in disparate ways, and harm both society and the environment. It will also introduce algorithmic approaches to fairness, privacy, transparency, and explainability in machine learning systems. Through hands-on programming assignments and projects, students will design and implement computer systems that reflect both ethics and privacy by design. They will also wrestle with fundamental questions about who bears responsibility for a system's shortcomings, how to balance different stakeholders' goals, and what societal values computer systems should embed.

Course Staff

Blase Ur
Instructor
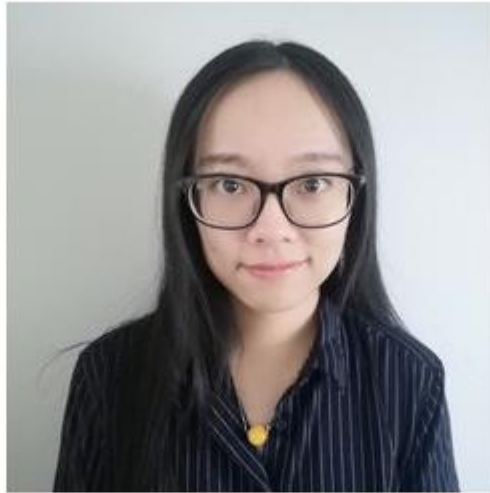
Weijia He
TA

Kevin Bryson
TA

CMSC 25910/25900 vs. DATA 25900

CMSC 25910 (Blase): https://classes.cs.uchicago.edu/archive/2022/spring/25910-1/

Focus on computer systems / algorithms / engineering / implementation

8 programming assignments; 8 reading responses; 1 course project

Multiple languages, including Python, JavaScript, HTML, MySQL

(Highly similar to CMSC 25900 from Spring 2021)

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DATA 25900 (Raul): http://raulcastrofernandez.com/DATA-25900-Spring22/

    Focus on data science / data analysis

    4 programming assignments; 6 reading responses; project; report; quizzes

    Python using Jupyter Notebooks

Responsible and Respectful User Interfaces
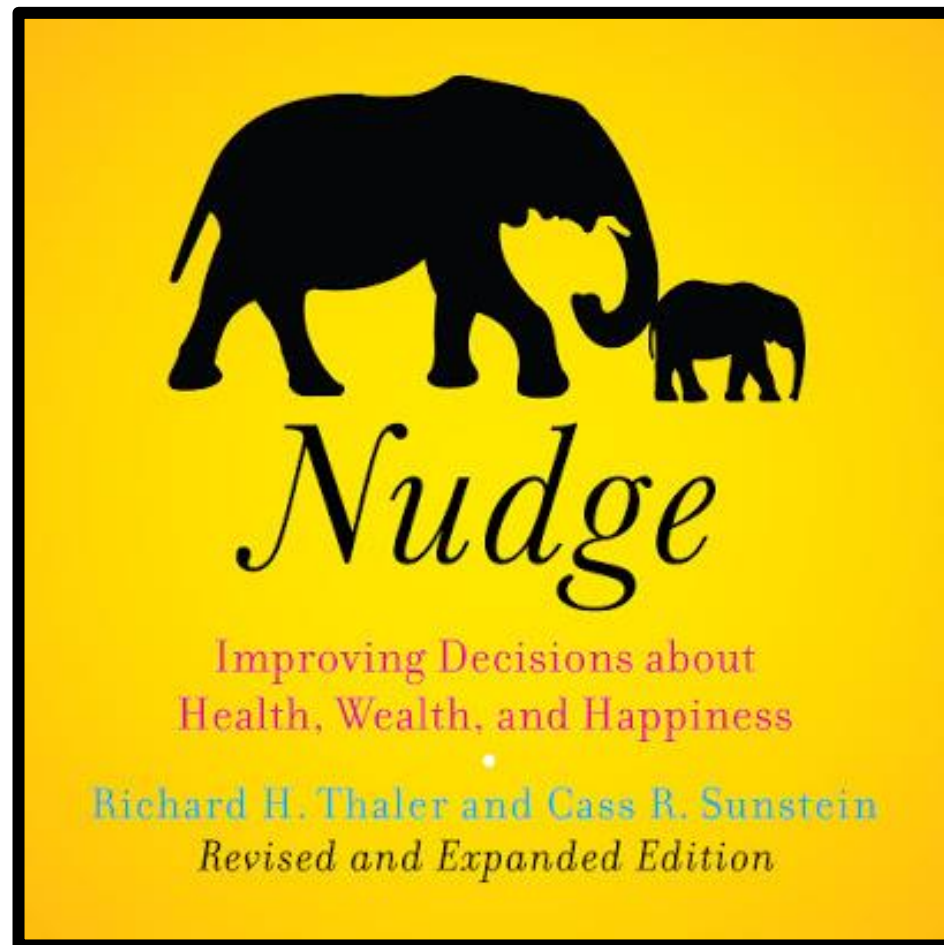
Should a product have an opinion?

The power of defaults

The power of the default (organ donation)

Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).
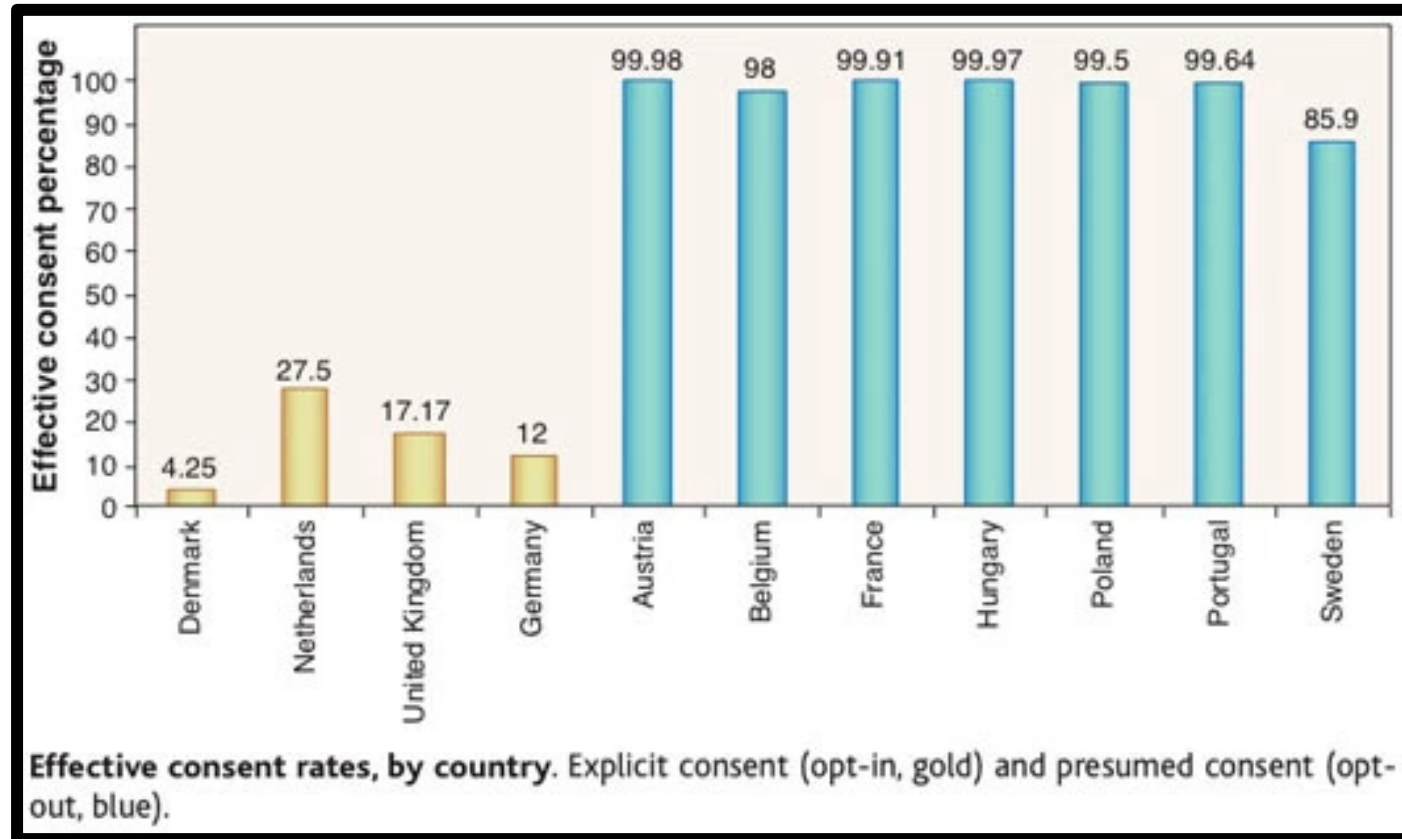
Interfaces that influence

Behavioral nudging

Dark patterns

Taxonomy from www.darkpatterns.org

- Trick questions
- Sneak into basket
- Roach motel
- Privacy Zuckering
- Price comparison prevention
- Misdirection
- Hidden costs
- Bait and switch
- Confirmshaming
- Disguised ads
- Forced continuity
- Friend spam

https://twitter.com/darkpatterns has many examples

Examples from www.darkpatterns.org

Steve Bromley
@Steve_Bromley

"No, I don't like savings"

50% OFF 3 Months

Pro Monthly

~~£11.99/mo~~

£143.88 billed annually

Pro Monthly Plan + Discount

£6.0/mo

£101.92 billed annually / per license

Save £ 17.99 per license

No, I don't like savings | Yes, Take Offer

Mar 14, 2021

Examples from www.darkpatterns.org

Benedict Evans ✔
@benedictevans

You could write a book about all the dark patterns Amazon uses to promote Prime.

amazon.co.uk
WELCOME ADDRESS ITEMS WRAP DISPATCH **PAY** CONFIRM

Benedict Evans, we're giving you immediate access to all Prime benefits with a 30-day FREE trial

Try 30 days of Prime for free. You can cancel anytime.

	prime	**Without Prime**
Prime Video	Included	Unavailable
Amazon Music	Included	Unavailable
Fast delivery on Prime eligible items	FREE	From £4.99

Order without Prime. Decline free trial

Order Now with Prime
Pay later

Examples from www.darkpatterns.org

Katie Dill
@lil_dill

When engagement metrics drive the decision..
On the left, Twitter's email with the direct message text included.
On the right, LinkedIn's email forcing me to open the app to see the message. Drives me 🍌s every time!
Twitter, I appreciate you for putting the user first on this.
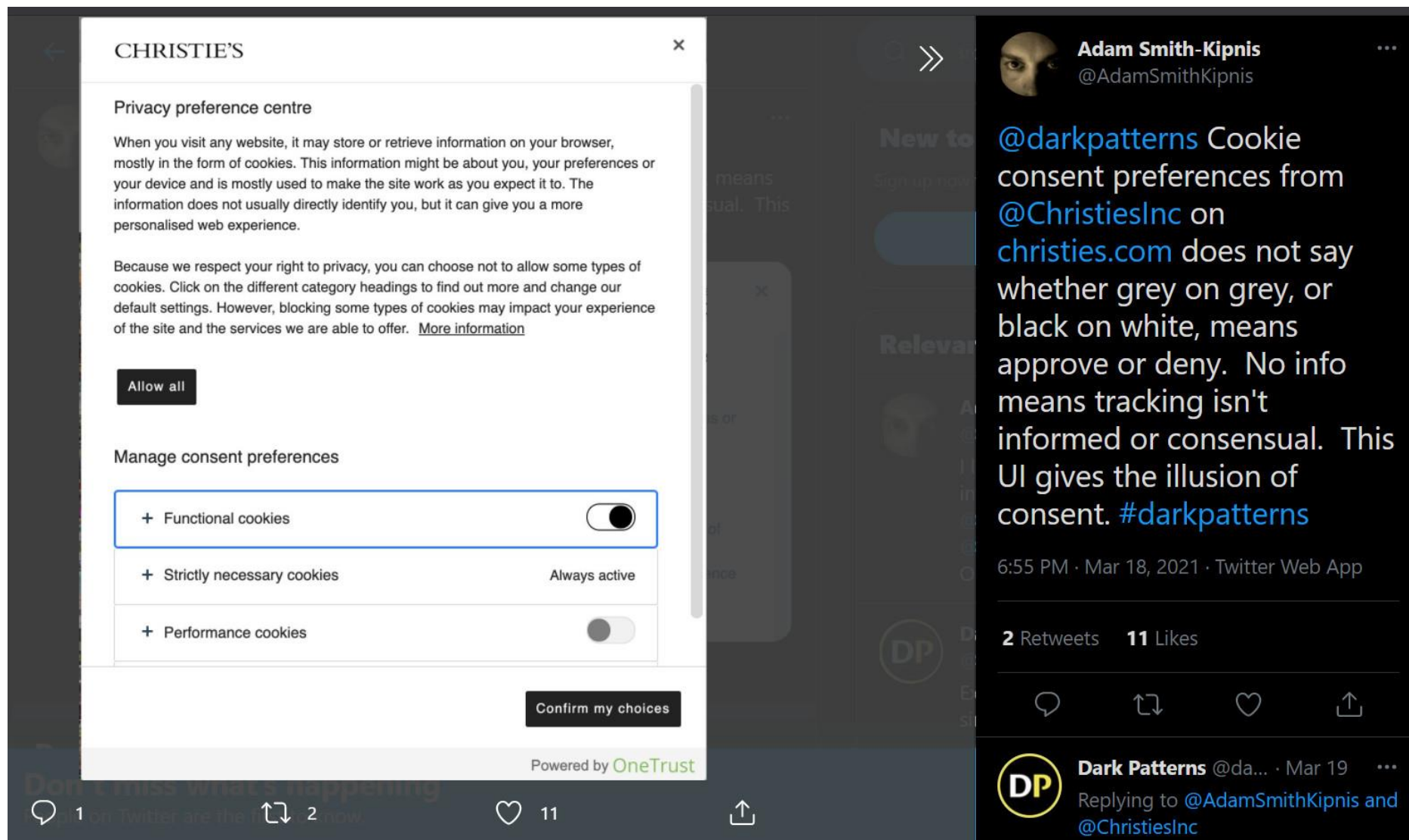
patrick weiss sent you a Direct Message.

Hi there 👋

Reply

1 new message awaits your response

Patrick Weiss
Co-Founder at LDM

View message

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Examples from www.darkpatterns.org

Meta-example from xkcd

Are dark patterns bad?

Security "Dark Pattern"

This Connection is Untrusted

You have asked Firefox to connect securely to **grey-dev.ece.cmu.edu**, but we can't confirm that your connection is secure.

Normally, when you try to connect securely, sites will present trusted identification to prove that you are going to the right place. However, this site's identity can't be verified.

What Should I Do?

If you usually connect to this site without problems, this error could mean that someone is trying to impersonate the site, and you shouldn't continue.

Get me out of here!

► **Technical Details**

► **I Understand the Risks**

Security "Dark Pattern"

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Get me out of here!

▾ **Technical Details**

grey-dev.ece.cmu.edu uses an invalid security certificate.

The certificate is not trusted because it is self-signed.

(Error code: sec_error_untrusted_issuer)

▾ **I Understand the Risks**

If you understand what's going on, you can tell Firefox to start trusting this site's identification. **Even if you trust the site, this error could mean that someone is tampering with your connection.**

Don't add an exception unless you know there's a good reason why this site doesn't use trusted identification.

Add Exception...
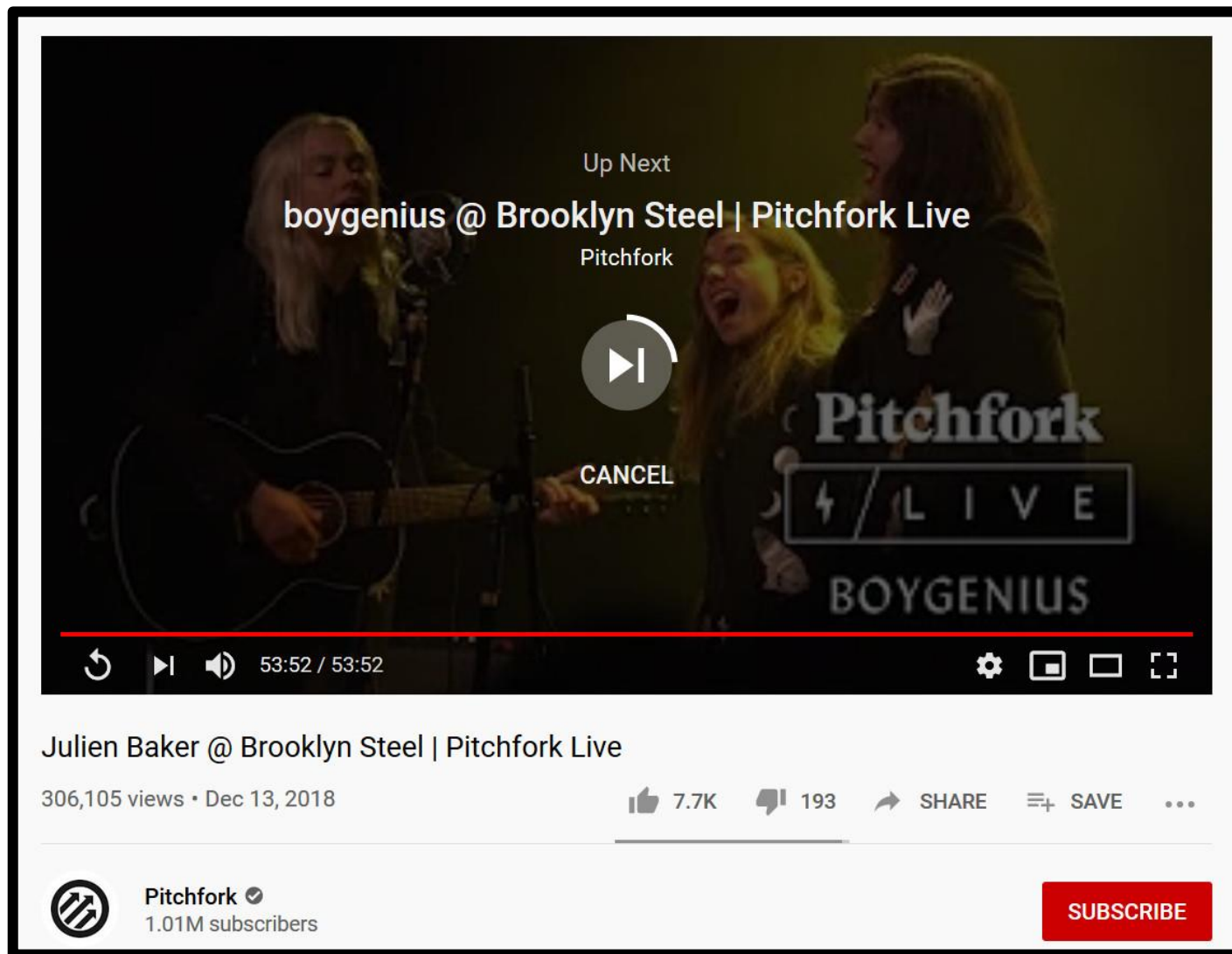
Interfaces that incentivize behaviors

Ways interfaces incentivize

- Social approval (like counts / view counts / follower counts)
- Karma / leaderboards / Reddit gilding
- Creating a Fear Of Missing Out (FOMO)
- "Only 1 left in stock"
- Forced obsolescence or devices that seem to slow down
- Intentionally showing inaccurate measurements

Does auto-play capture intent? Addiction?

Data coercion by user interfaces

- Argument for not requiring: agency; privacy; legitimately missing
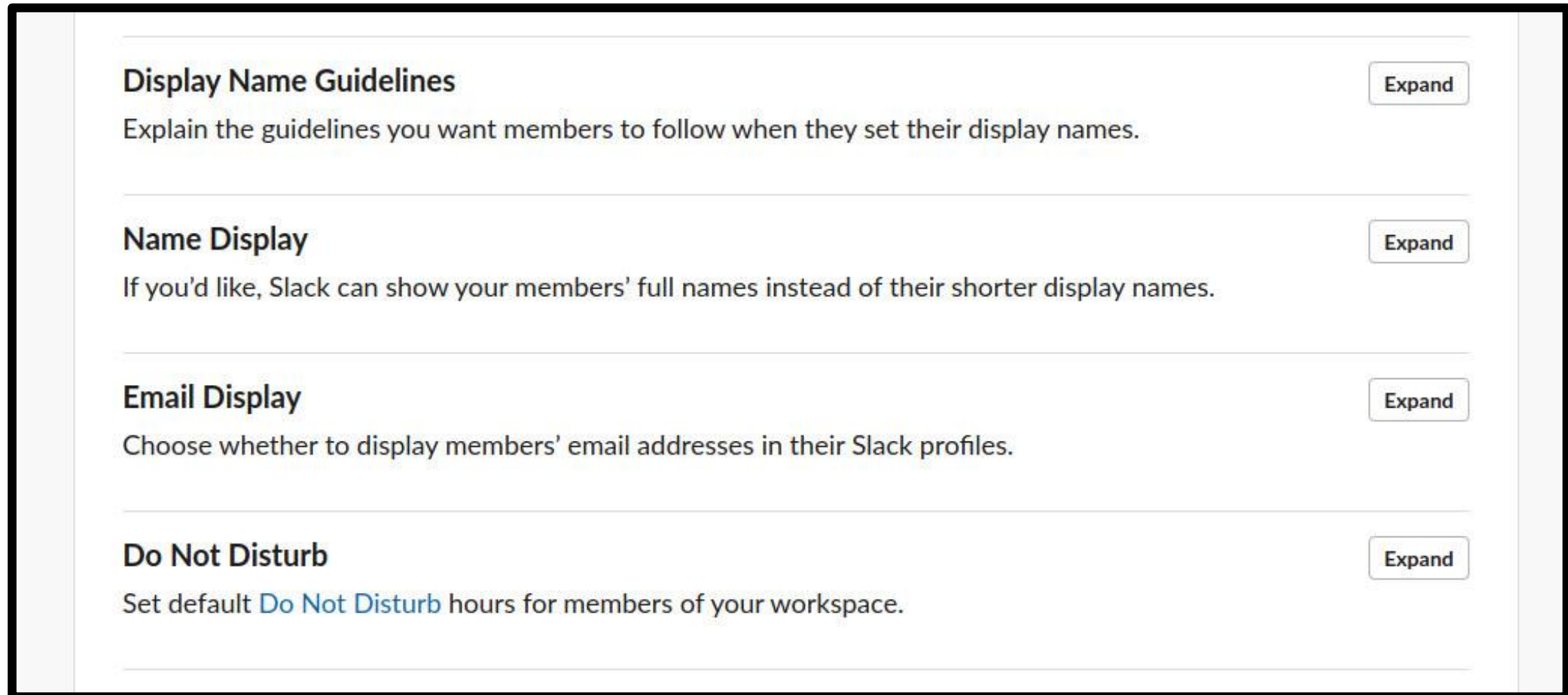- Argument for requiring: preventing missing data, stopping laziness

Can we think about data-relevant user interfaces in terms of power?

Power in interfaces

- Who chooses what questions are there?

- Who chooses default options / settings / option ordering?

- Who gets to add data?
  - Facebook shadow profiles (for advertising)
  - Tag others or upload photos of others in social media
  - Grubhub, Postmates, and DoorDash add restaurants without permission (see https://www.eater.com/2020/1/29/21113416/grubhub-seamless-kin-khao-online-delivery-mistake-doordash)

- Who chooses which data is right?
  - Wikipedia editing wars and controversial articles

Who sets policies?

- Slack organizational policies about names

Display Name Guidelines [Expand]

Explain the guidelines you want members to follow when they set their display names.

Name Display [Expand]

If you'd like, Slack can show your members' full names instead of their shorter display names.

Email Display [Expand]

Choose whether to display members' email addresses in their Slack profiles.

Do Not Disturb [Expand]

Set default Do Not Disturb hours for members of your workspace.

Respecting time and away-from-screen time

Expectations about types of notifications

- Email vs. text vs. in-app notification
- Are notifications *push* or *pull*?
- Does your device make a sound? Does it buzz?
- Is there an unread number on your screen?

Slack pausing notifications

Pause notifications with Do Not Disturb

If you need focus time or time away from work, you can pause your notifications in Slack with Do Not Disturb (DND). Use DND as needed to help you concentrate, and even set a DND schedule for routine times you'd prefer not to be notified.

How does DND work?

- All notifications and @mentions will be paused. Once you resume notifications, you can review everything you received while in DND.

- Members will see a 🔕 **Do Not Disturb icon** next to your name. When sending a direct message, they can override DND to notify you of urgent messages.

Pause notifications

Desktop   iOS   Android

Turn on DND

1️⃣ From your desktop, click your workspace name in the top left.

Acme Corp. ⌄
● Sharon Robinson

2️⃣ Hover over **Pause notifications**.

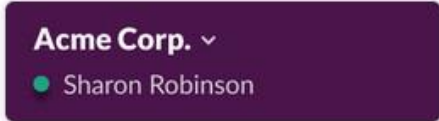3️⃣ Choose a time frame from the menu or select **Custom** to set your own.

Slack scheduling notification pauses

Online status indicators (OSIs)

• Note that users and Slack organizations can disable OSIs

Visibility of online status / audit logs

- Organizations might want to know who is clocking in/out
- Zoom lets meeting hosts know when it is backgrounded