

The Good, The Bad, and The Ugly

Lessons from an MPC for Social Good Deployment

Gabriel Kaptchuk (BU and UMD)

Jen Benoit-Bryan (SMU)

Kinan Dak Albab (Brown)

Mia Locks (MMF)

Mayank Varia (BU)



START OF
COLLABORATION

MUSEUMS MOVING FORWARD



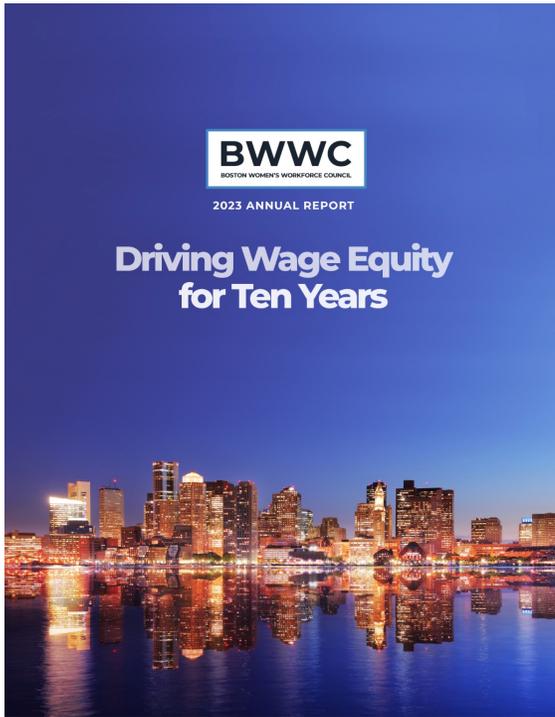
- MMF: independent organization of art museum professionals devoted to envisioning and creating a more just museum sector
- Wanted to conduct a data study asking sensitive questions
 - Staff survey
 - Director Survey
 - HR Survey
- Required different outputs for different parties



START OF
COLLABORATION



SYSTEM CONSTRUCTION



MUSEUMS MOVING FORWARD

2022 Data Study - Staff Survey

Welcome!

Hello and welcome! We appreciate your participation in this survey. This survey is a part of Museums Moving Forward's (MMF) efforts to support greater equity and accountability in museum workplaces through research, advocacy, and coalition-building. Your museum is participating in this initiative and encouraging all staff to share their thoughts and experiences to provide a picture of the overall organizational culture. Your responses to this survey will be encrypted and kept completely anonymous, and all reporting to the leadership team of your museum will be done in aggregate. Every staff member who completes the survey will also be provided with a passcode to access the aggregate data for your institution. Your responses will also contribute to a fieldwide picture of workplace equity and organizational culture that will be publicly available in the Spring of 2023. Please check out this FAQ page to read more about the confidentiality of your responses and how this encrypted data will be used. Your participation and honest answers will help us get a complete picture of your experiences and insights. The survey takes an average of 7-10 minutes to fill out. Please complete this survey only once. Thank you for your time and willingness to share your experiences.



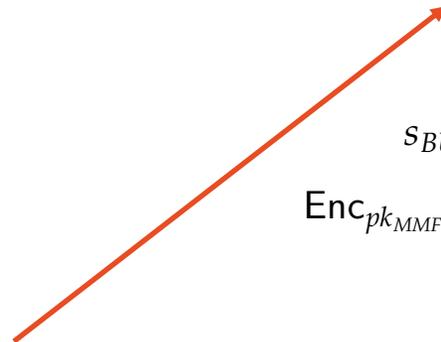
START OF
COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



$$s_{BU}, s_{MMF} \leftarrow \text{SecretShare}(data)$$

$$\text{Enc}_{pk_{MMF}}(s_{MMF}), \text{Enc}_{pk_{MMF}}(\text{KDF}(password)), s_{BU}$$

25. With which of the following racial and ethnic groups do you identify as? Please select all that apply. *

- Black or African American
- East Asian (including Chinese, Japanese, Korean, Mongolian, Tibetan, and Taiwanese)
- Hispanic, Latina, Latino, or Latinx
- Middle Eastern or North African
- Native American/Alaska Native/First Nations
- Native Hawaiian or other Pacific Islander
- South Asian (including Bangladeshi, Bhutanese, Indian, Nepali, Pakistani, and Sri Lankan)
- Southeast Asian (including Burmese, Cambodian, Filipino, Hmong, Indonesian, Laotian, Malaysian, Mien, Singaporean, Thai, and Vietnamese)
- White
- Another race of ethnicity
- Prefer not to answer

26. What is the highest level of education that you've completed? *

- Some high school
- High school graduate (high school diploma or the equivalent GED)
- Some college/Associates degree
- Bachelor's degree
- Master's degree
- Professional or doctorate degree
- Prefer not to answer

27. Do you identify as a person with a disability and/or as neuroatypical/neurodivergent? *

- Yes
- No
- Prefer not to answer

Previous

Next

28. Final step: You must create a password to log back in to view results. DO NOT LOSE YOUR PASSWORD as there is no recovery mechanism! This is critical for the preservation of privacy. *

password123

Previous

Submit Answers



START OF
COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



MPC COMPUTATION

MUSEUMS MOVING FORWARD

$Enc_{pk_{MMF}}(s_{MMF}), Enc_{pk_{MMF}}(KDF(password))$





START OF
COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



MPC COMPUTATION

MUSEUMS MOVING FORWARD

$Enc_{pk_{MMF}}(s_{MMF}), Enc_{pk_{MMF}}(KDF(password))$

Semi-honest, gate-by-gate 2PC





START OF
COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



MPC COMPUTATION

MUSEUMS MOVING FORWARD

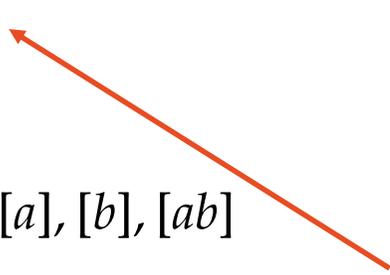
$Enc_{pk_{MMF}}(s_{MMF}), Enc_{pk_{MMF}}(KDF(password))$



Semi-honest, gate-by-gate 2PC

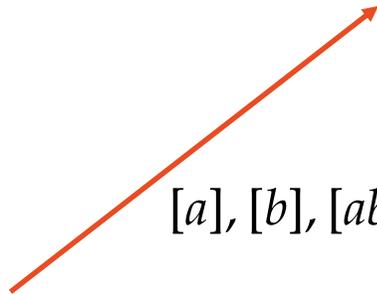


$[a], [b], [ab]$



BROWN

$[a], [b], [ab]$





START OF
COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



MPC COMPUTATION



DATA ANALYSIS

Art museum are more dissatisfied than US workers overall

60% of art museum workers are thinking about leaving their jobs
68% are considering leaving the field altogether.

More than a quarter of art museum workers have experienced discrimination at their current workplaces.

Only half of workers report discrimination because they feel nothing will be done about them



START OF COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



MPC COMPUTATION

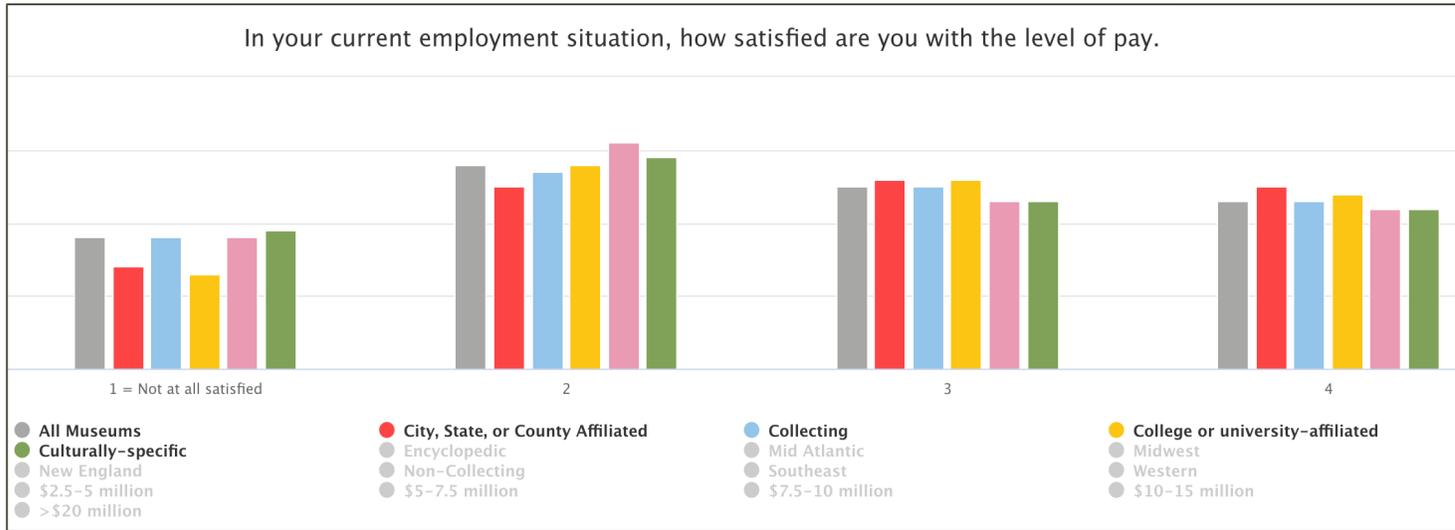


DATA ANALYSIS



DATA RELEASE

In your current employment situation, how satisfied are you with the level of pay.

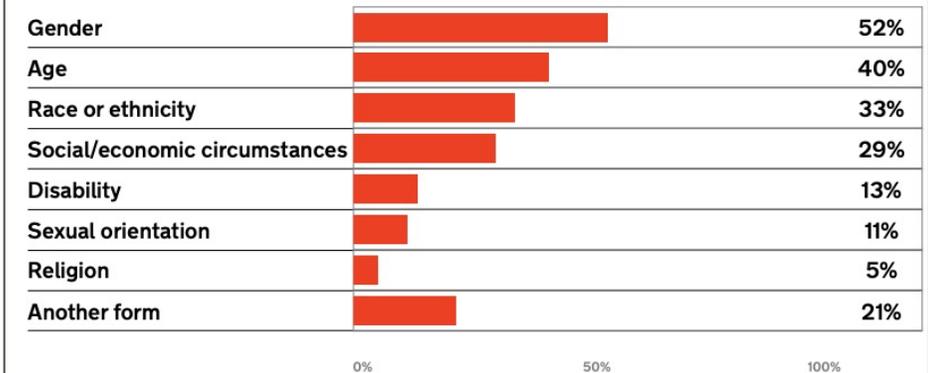


Types of Discrimination

Discrimination in art museums is most commonly based on gender, age, and race or ethnicity (see fig. 46). Workers facing discrimination experience an average of two types in their workplaces. The more senior a worker is in the organization, the fewer distinct types of discrimination they experience, with a low of 1.8 among executives up to a high of 2.7 types among entry-level workers.

Types of Discrimination

Which of the following forms of discrimination and/or harassment have you experienced in your current museum workplace? Select all that apply.





START OF COLLABORATION



SYSTEM CONSTRUCTION



DATA COLLECTION



MPC COMPUTATION



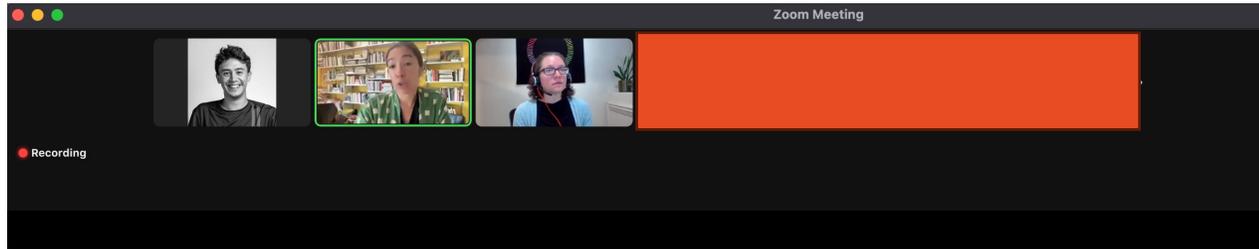
DATA ANALYSIS



DATA RELEASE



FEEDBACK



MUSEUMS MOVING FORWARD



- Be honest about what is and, importantly, what isn't possible for career trajectories within a particular institution.
- Communicate transparently about the rates of promotion at each level.
- Normalize alternative models for career growth beyond the traditional ladder climb, such as moving to other museums or taking on new functions within existing workplaces.

Meeting Chat

Art, Ann Arbor

12:36 PM

[Redacted] to Everyone

Yes, and data is incredible to finally have. Thank you!

12:36 PM

[Redacted] to Everyone

Yes, omg yes!

The numbers don't lie. But at least this finally "proves" we haven't been either.

12:44 PM

[Redacted]

Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too

To: Type



The “Instagram” Version of the Story

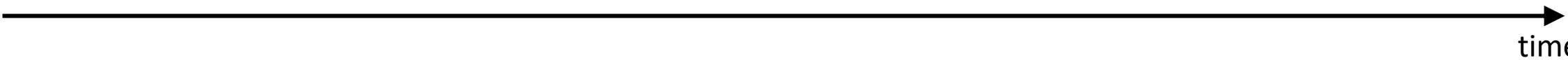


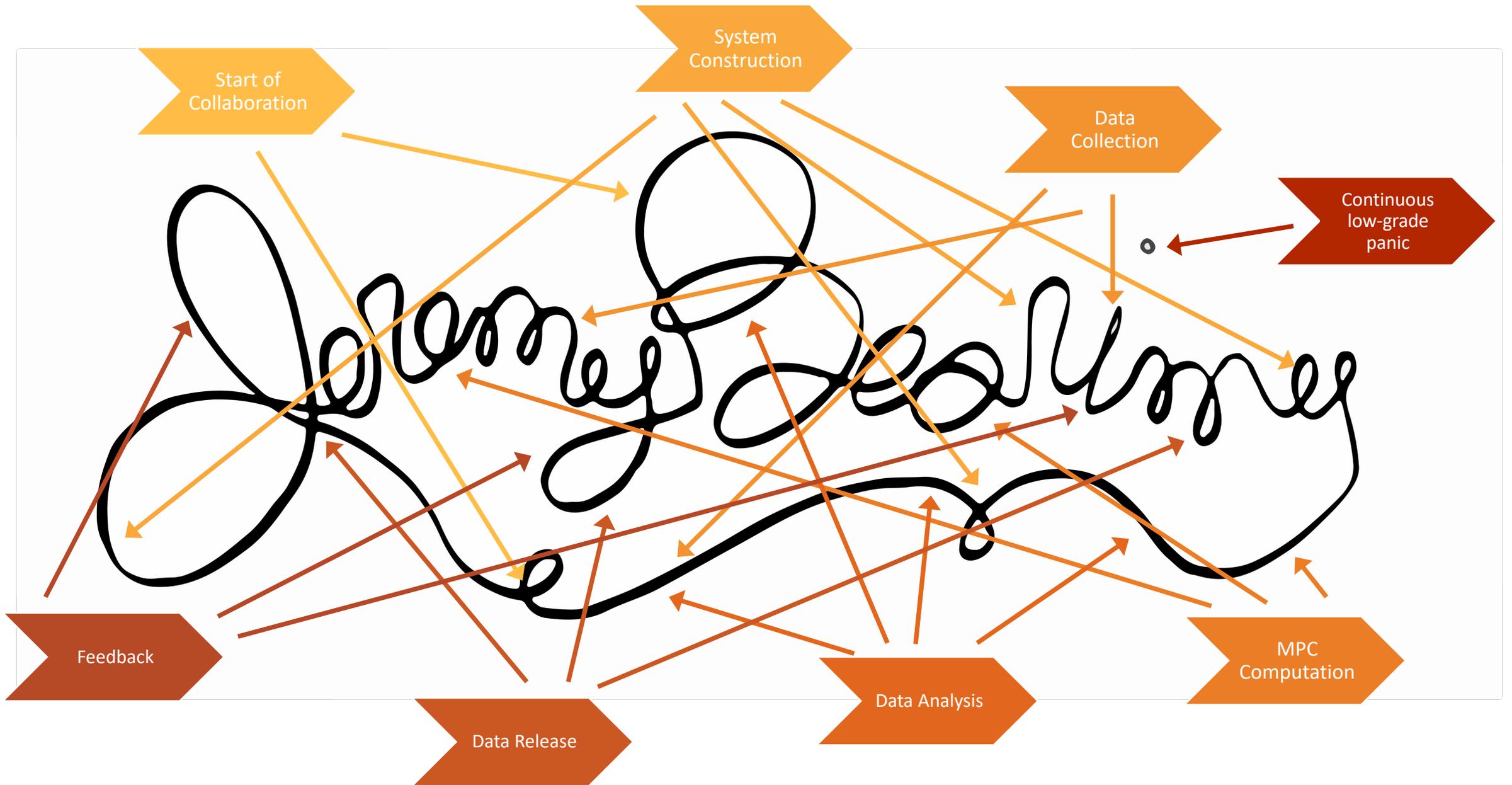


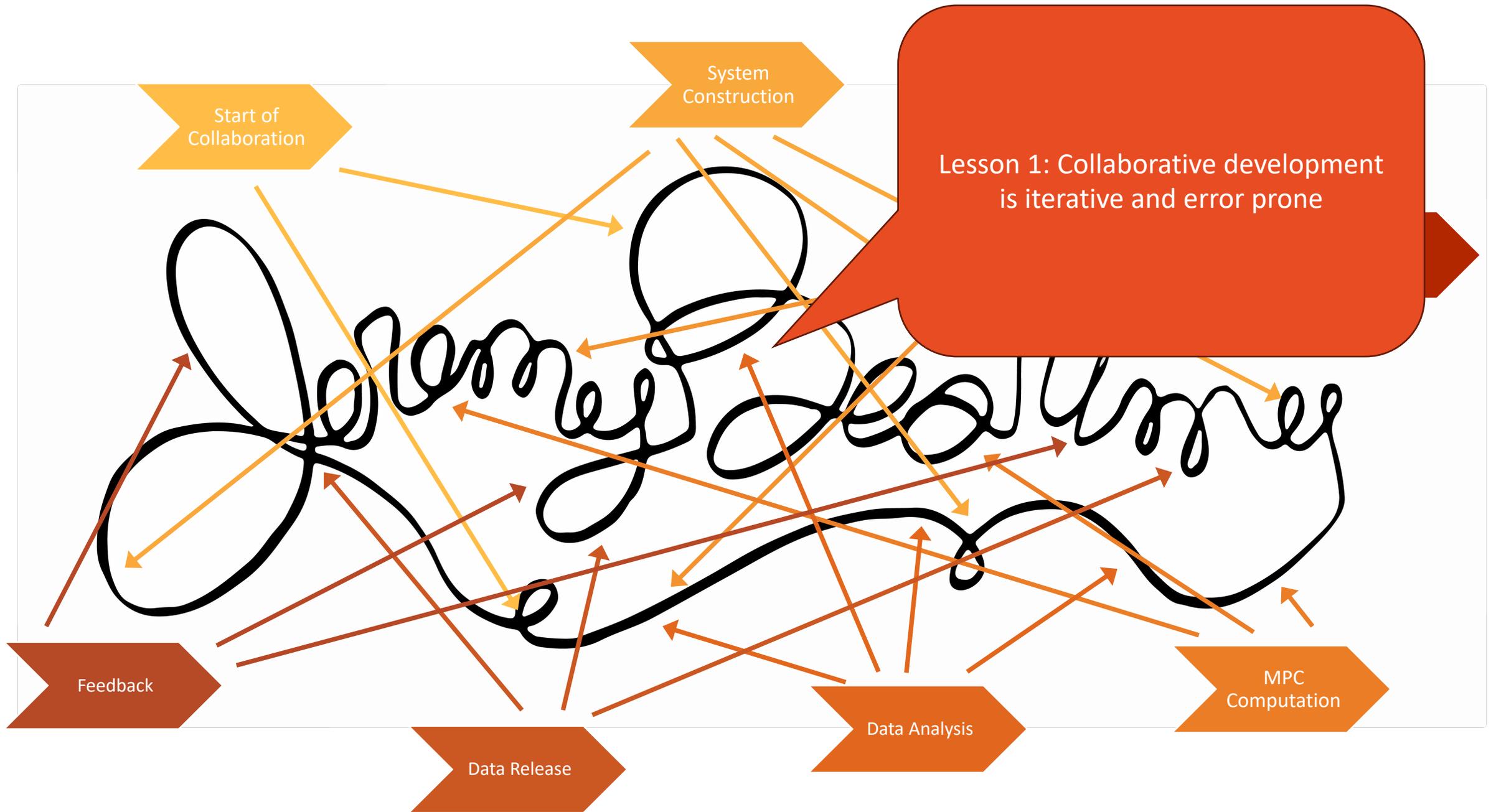
The “Instagram” Version of the Story



Credit: reddit



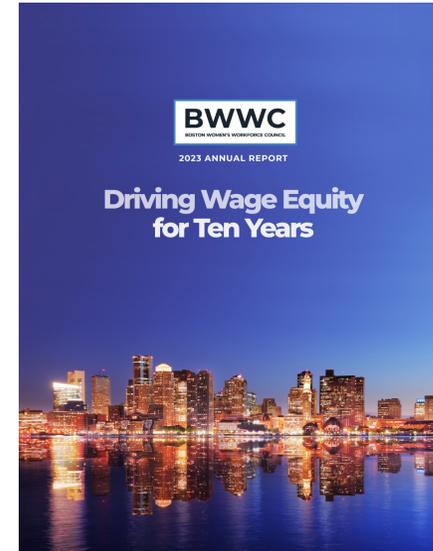




Start of Collaboration



ENGAGE EXTERNALLY



PRIOR VISIBLE WORK ON
MPC

Start of Collaboration



ENGAGE EXTERNALLY

Lesson 2: Spend time in non-CS spaces

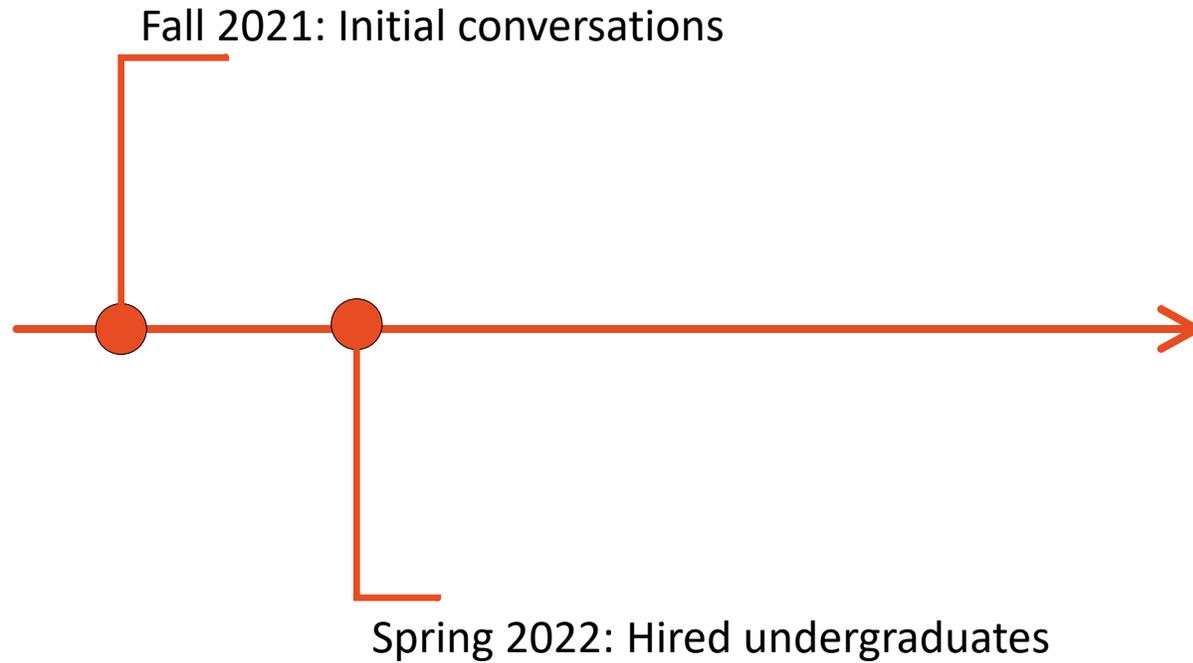


PRIOR VISIBLE WORK ON
MPC

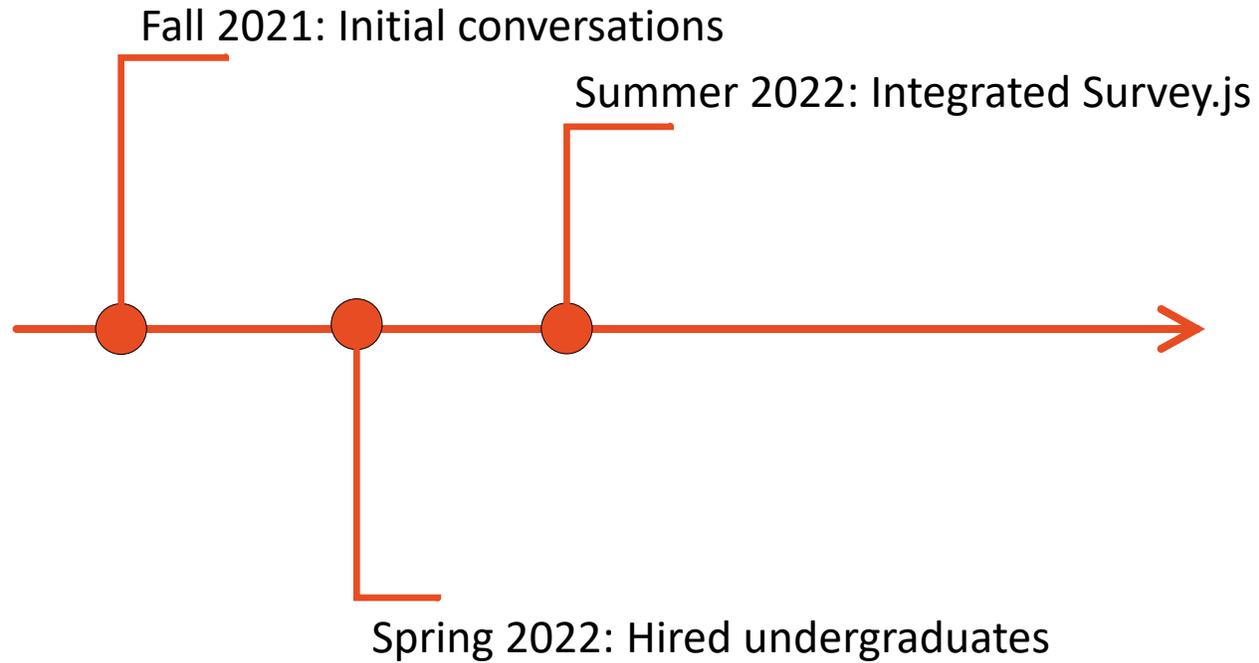
System Construction



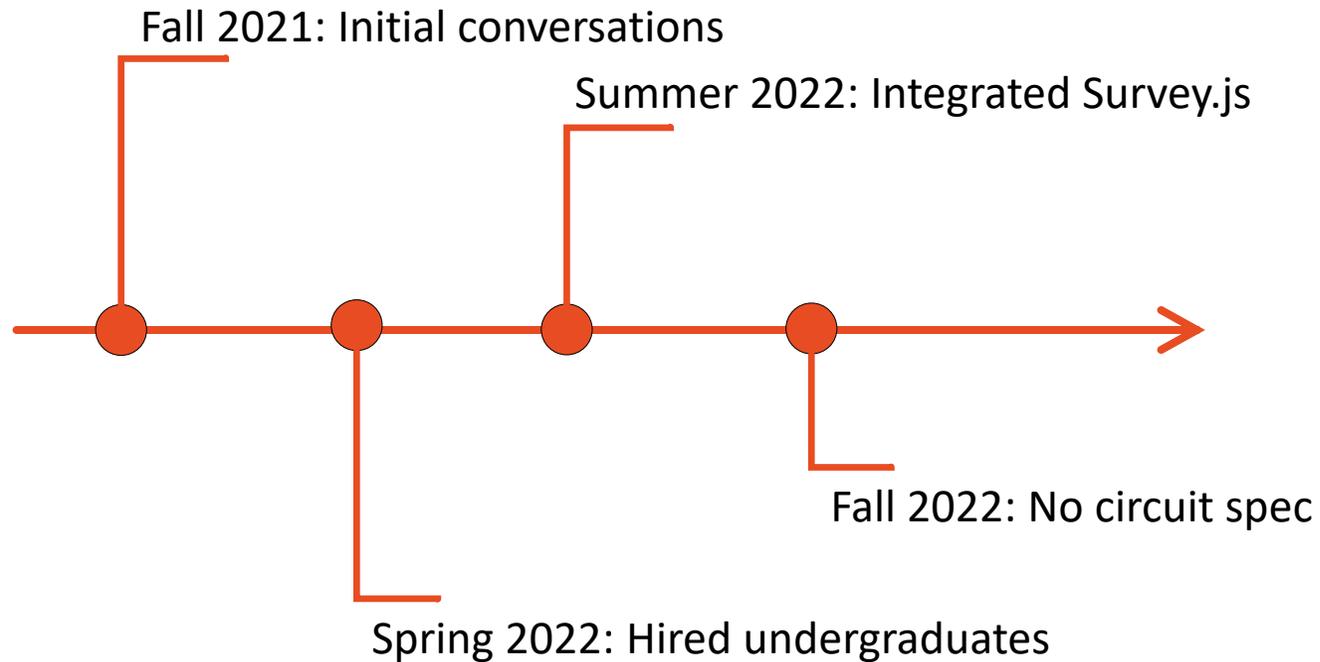
System Construction



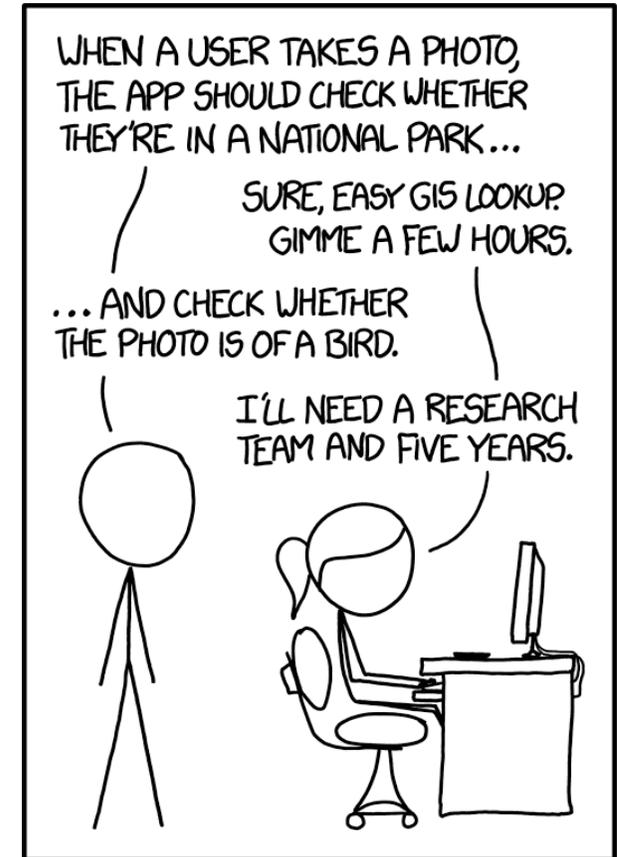
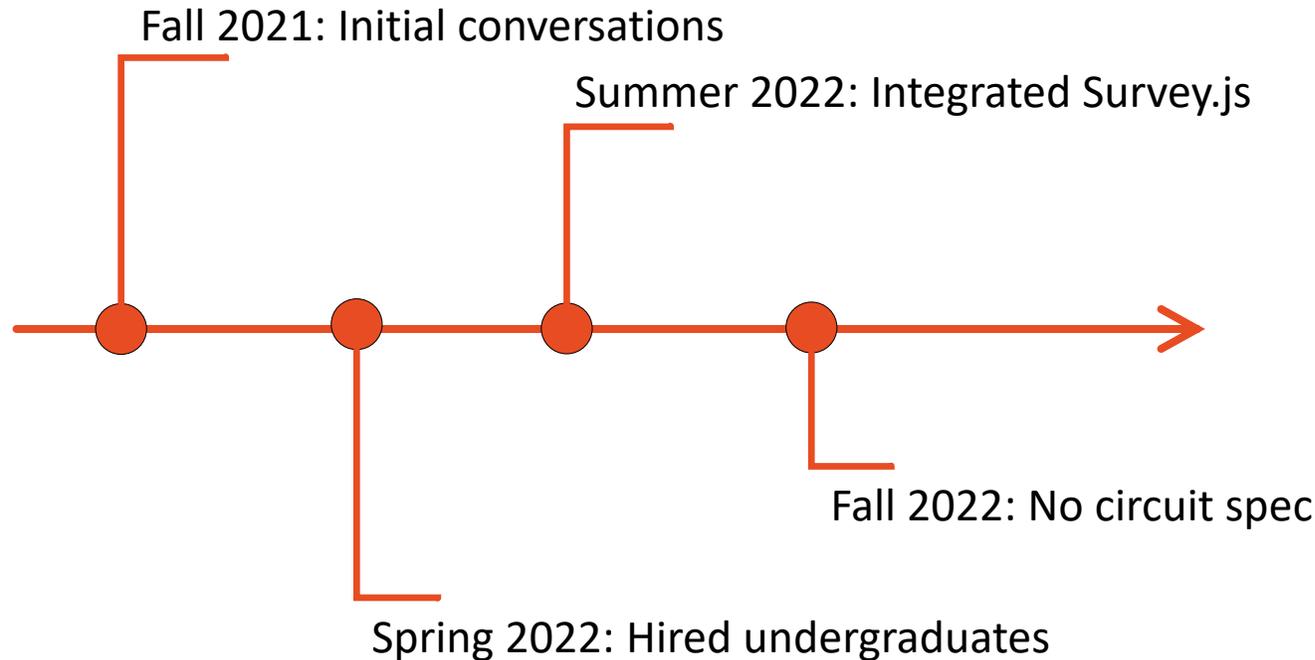
System Construction



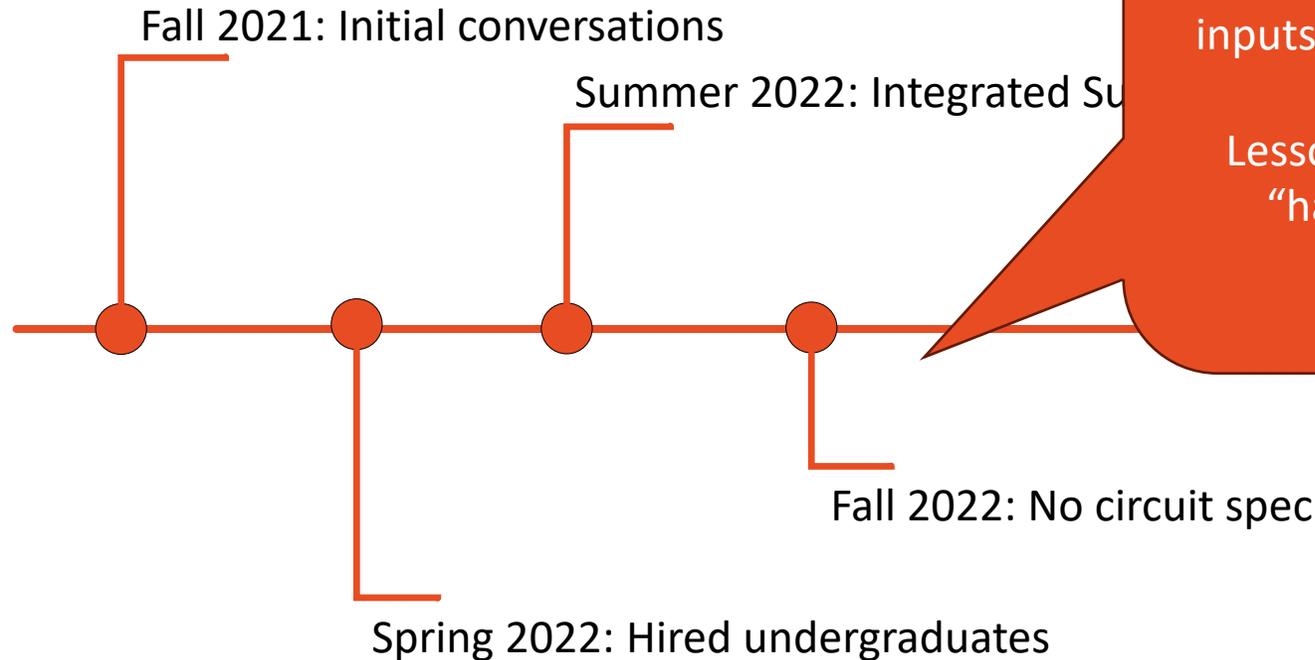
System Construction



System Construction

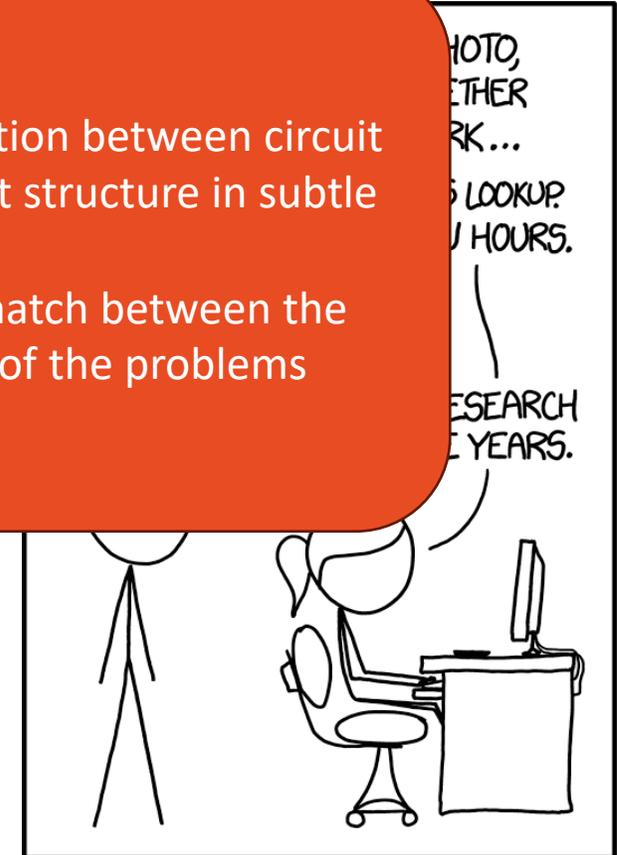


System Construction



Lesson 3: Distinction between circuit inputs and circuit structure in subtle

Lesson 4: Mismatch between the "hard" parts of the problems



IN CS, IT CAN BE HARD TO EXPLAIN THE DIFFERENCE BETWEEN THE EASY AND THE VIRTUALLY IMPOSSIBLE.

Data Collection

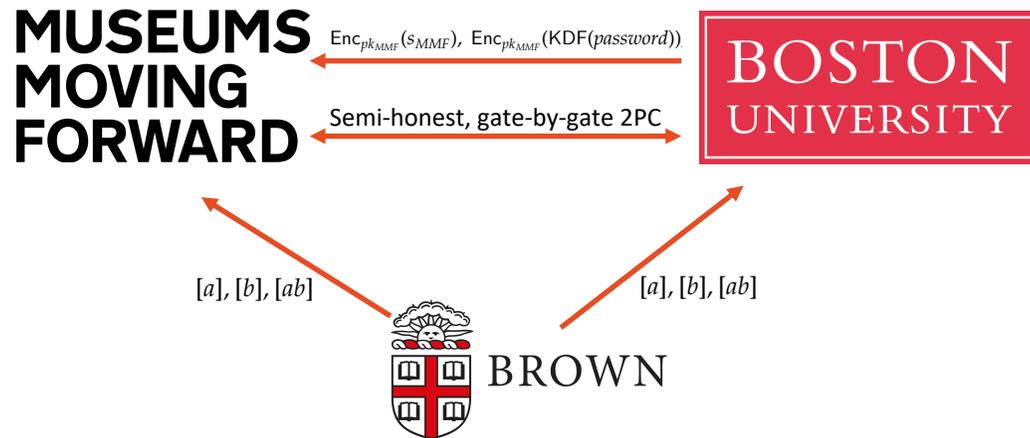
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  title:
    "What is your approximate gross annual income (before taxes
    and deductions) from your current position in the museum?
    (If this changes from month to month, please provide an
    average). Report only your income from your museum job
    and round to the nearest multiple of 1000.",
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  min: 0,
  step: 1000,
  max: 5000000,
  validators: [
    {
      type: "regex",
      regex: "[0-9]+$",
      text: "Please enter a valid number. The response cannot
        include commas, currency symbols, or spaces (e.g. 50000)
        ",
    },
  ],
},
```

Data Collection

```
{
  type: "text",
  name: "question10",
  title:
    "What is your approximate gross annual income (including bonuses and deductions) from your current employer (If this changes from month to month, report the average). Report only your annual income and round to the nearest multiple of 1000.",
  isRequired: true,
  min: 0,
  step: 1000,
  max: 5000000,
  validators: [
    {
      type: "regex",
      regex: "^[0-9]+$",
      text: "Please enter a valid number. The response cannot include commas, currency symbols, or spaces (e.g. 50000)",
    },
  ],
},
```

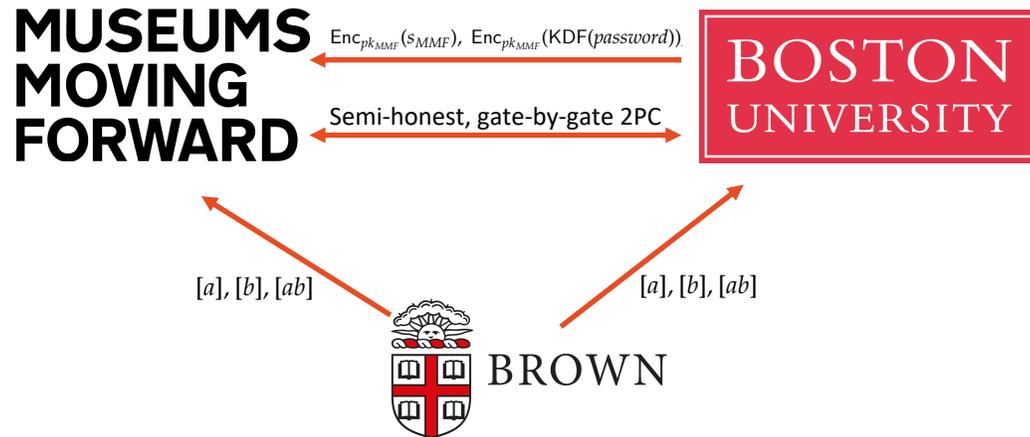
Lesson 5: Testing MPC without circuits is hard. Tight design cycles lead to errors

MPC Computation



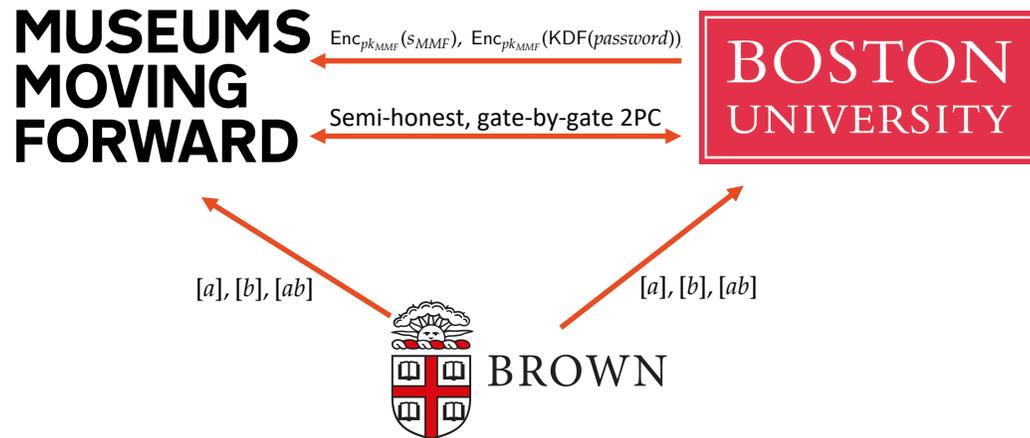
MPC Computation

- Very much the WAN setting with consumer-grade internet connection

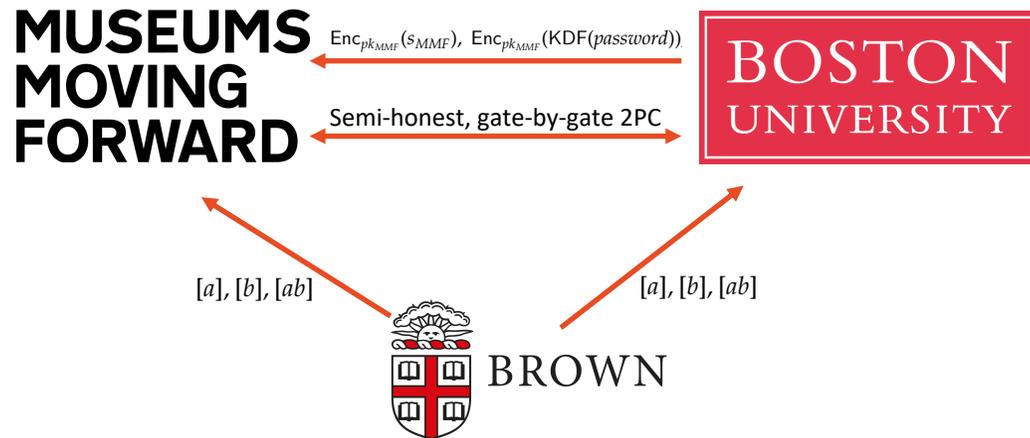


MPC Computation

- Very much the WAN setting with consumer-grade internet connection
- Highly non-linear circuits (data filtering, comparisons, etc...) with no “smart” preparations

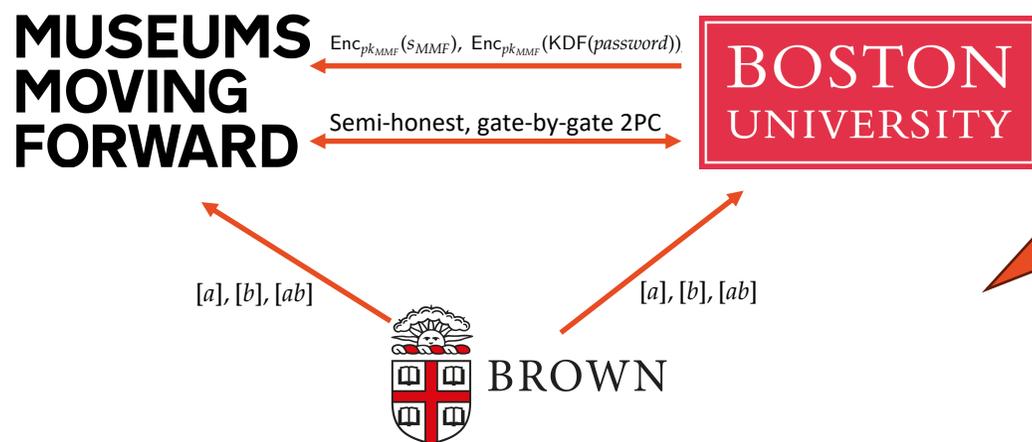


MPC Computation



- Very much the WAN setting with consumer-grade internet connection
- Highly non-linear circuits (data filtering, comparisons, etc...) with no “smart” preparations
- Runtimes 15-30 hours long with frequent crashes. Computations lasted up to a week

MPC Computation



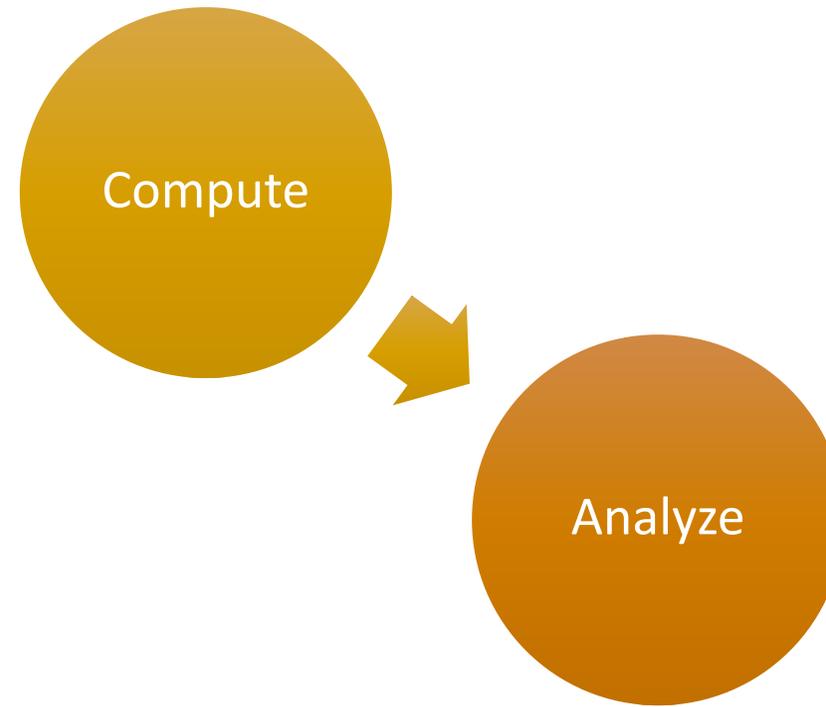
Lesson 6: Don't defer choosing circuits.

Lesson 7: Academic WAN is still an idealized model

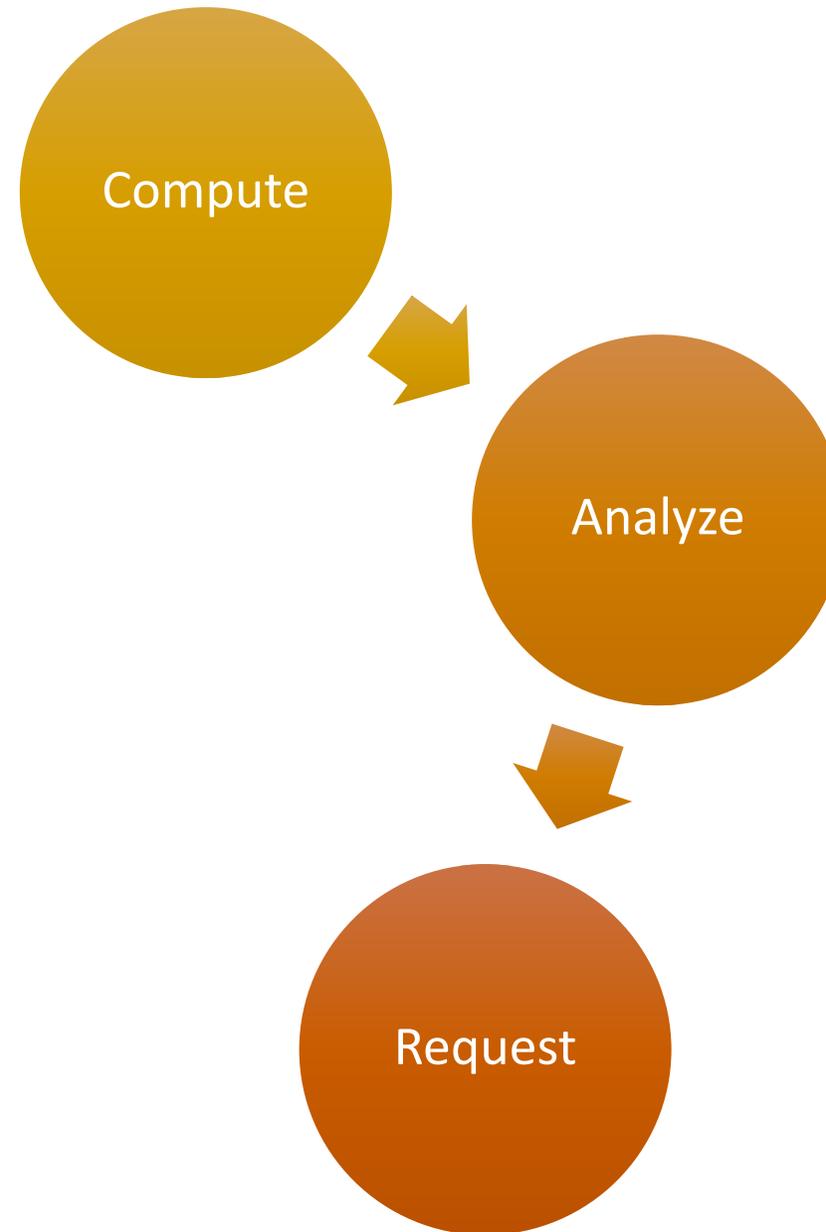
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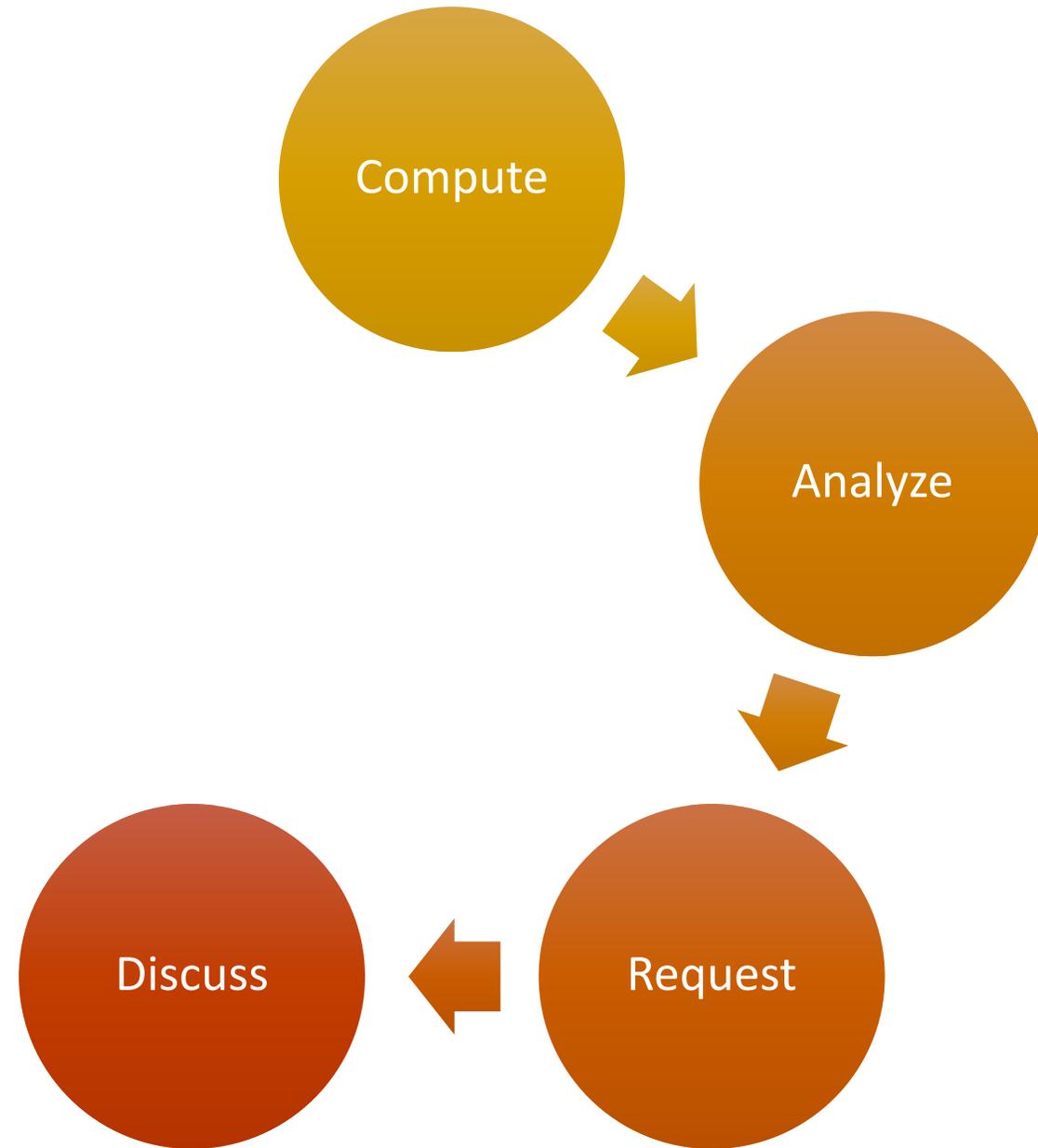
Data Analysis



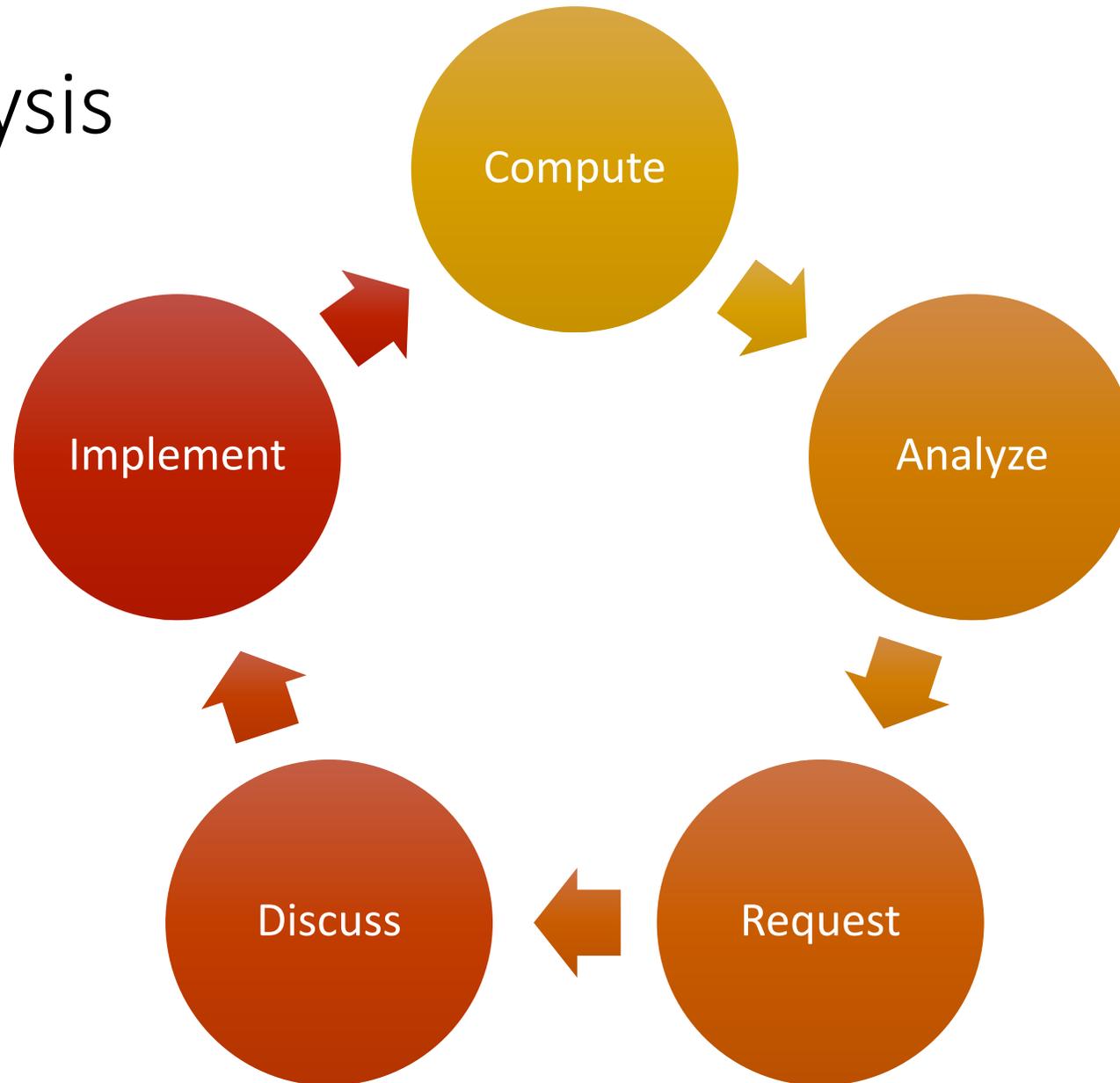
Data Analysis



Data Analysis



Data Analysis



Start of Collaboration

System Construction

Data Collection

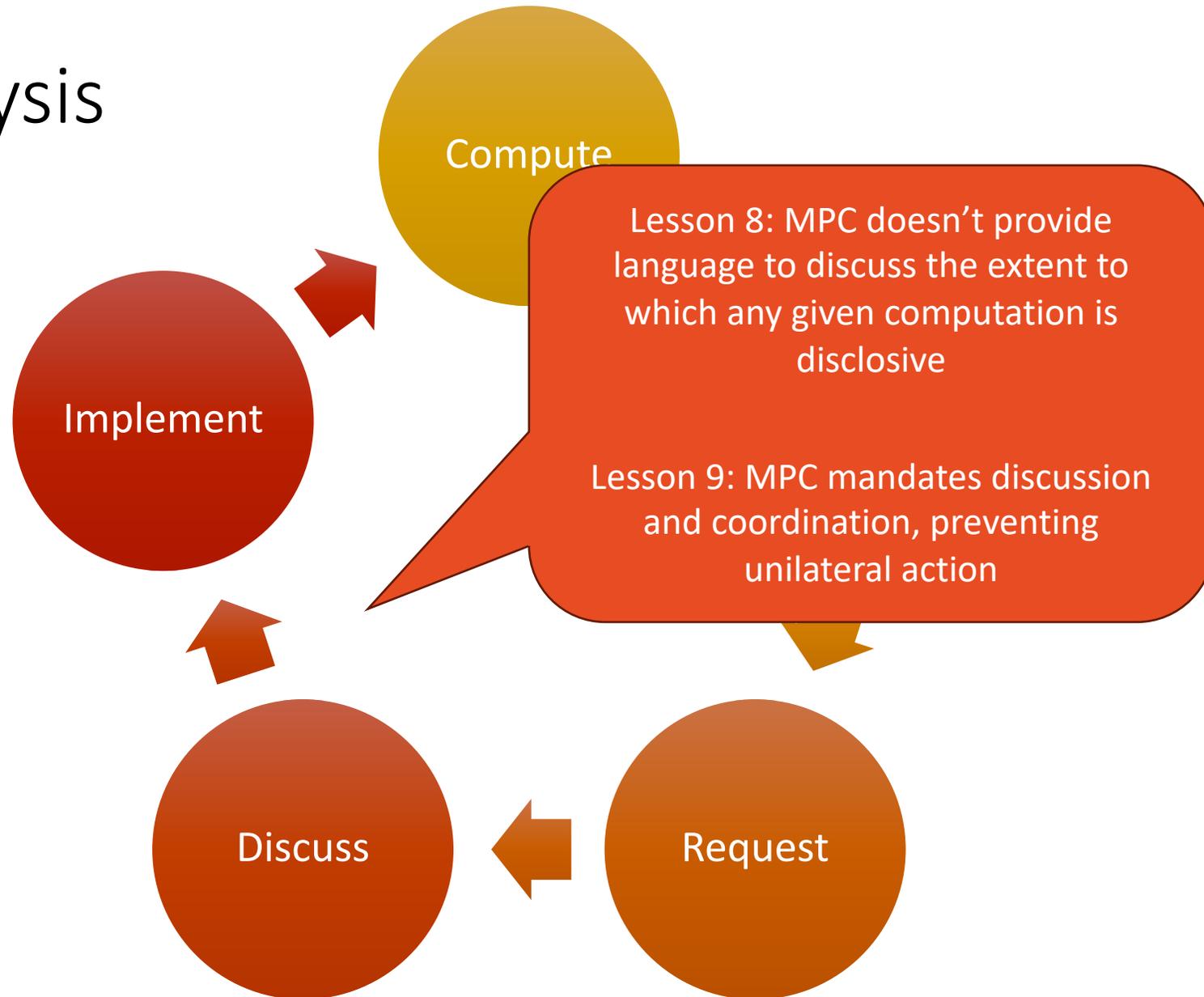
MPC Computation

Data Analysis

Data Release

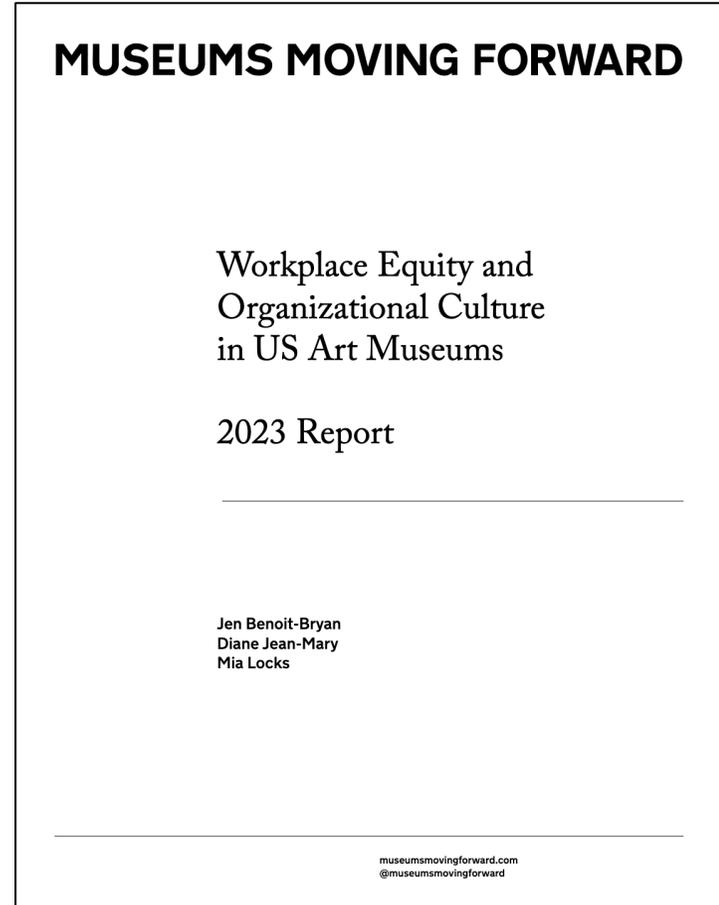
Feedback

Data Analysis



Data Release

- Following norms in the social sciences, MMF wanted to release raw data as an appendix



Data Release

- Following norms in the social sciences, MMF wanted to release raw data as an appendix

Lesson 10: Norms around privacy and trust are field specific

Lesson 11: Norms are often implicit and only surface in moments of tension

Jen Benoit-Bryan
Diane Jean-Mary
Mia Locks

museumsmovingforward.com
[@museumsmovingforward](https://twitter.com/museumsmovingforward)

WARD

Feedback

The screenshot shows a Zoom meeting interface. At the top, there are three video thumbnails and a red bar. Below this is a slide with the title "MUSEUMS MOVING FORWARD". The slide features a central diagram with five colored circles (yellow, blue, red, green, pink) surrounding a central white pentagon. The circles are labeled: "Opportunities for Growth" (yellow), "Emotionally Intelligent Leaders" (blue), "Psychological Safety" (red), "Pay Equity and Transparency" (green), and "Diversity Retention Plans" (pink). The central pentagon is labeled "Five Ways to Move Museum Workplaces Forward". To the right of the diagram is a list of three bullet points in orange text. Below the slide is a chat window with three messages from a user with an orange profile picture. The messages are: "Yes, and data is incredible to finally have. Thank you!", "Yes, omg yes!", and "Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too".

MUSEUMS MOVING FORWARD

- Be honest about what is and, importantly, what isn't possible for career trajectories within a particular institution.
- Communicate transparently about the rates of promotion at each level.
- Normalize alternative models for career growth beyond the traditional ladder climb, such as moving to other museums or taking on new functions within existing workplaces.

Chat messages:

- [Redacted] to Everyone 12:36 PM
Yes, and data is incredible to finally have. Thank you!
- [Redacted] to Everyone 12:36 PM
Yes, omg yes!
- [Redacted] 12:44 PM
Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too

Feedback

The screenshot shows a Zoom meeting interface. At the top, there are three video thumbnails and a red bar indicating recording. The main content is a slide titled "MUSEUMS MOVING FORWARD" with a central diagram and a list of bullet points. The diagram features a central white pentagon labeled "Five Ways to Move Museum Workplaces Forward" surrounded by five colored circles: "Opportunities for Growth" (yellow), "Emotionally Intelligent Leaders" (blue), "Psychological Safety" (red), "Pay Equity and Transparency" (green), and "Diversity Retention Plans" (pink). To the right of the diagram are three bullet points in yellow text. An orange speech bubble is overlaid on the slide, containing the text: "Lesson 12: With trust and honesty, there's an opportunity to recover from mistakes and tension". Below the slide is a chat window with two messages: "The numbers don't lie. But at least this finally 'proves' we haven't been either." and "Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too". The chat window also shows a timestamp of 12:44 PM and icons for chat, emojis, and a menu.

Zoom Meeting

Recording

MUSEUMS MOVING FORWARD

- Be honest about what's important, what's not, and for career training, particularly in particular
- Communicate transparently about the rates of promotion at each level.
- Normalize alternative models for career growth beyond the traditional ladder climb, such as moving to other museums or taking on new functions within existing workplaces.

Opportunities for Growth

Emotionally Intelligent Leaders

Psychological Safety

Pay Equity and Transparency

Diversity Retention Plans

Five Ways to Move Museum Workplaces Forward

Lesson 12: With trust and honesty, there's an opportunity to recover from mistakes and tension

The numbers don't lie. But at least this finally "proves" we haven't been either.

12:44 PM

Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too

Most Important Lessons

Lesson 4: Mismatch between the “hard” parts of the problems

Lesson 8: MPC doesn't provide language to discuss the extent to which any given computation is disclosive

Lesson 10: Norms around privacy and trust are field specific

Thank you!



[Link to MMF's Report](#)

Megan Chen (Helping With Demos)

Conor Walsh

Phil Ledoit

Zhenghui Wang

Abigail Gualda

Gabriel Kaptchuk (BU and UMD)

Jen Benoit-Bryan (SMU)

Kinan Dak Albab (Brown)

Mia Locks (MMF)

Mayank Varia (BU)

Shobhakumar Selvarhaj

Ingi Hong

Ananya Chakraborty

Aykerim Dussikenova

Thachathum Amornkasemwong

Emily Shen (Sharing Educational Resources)