HPC in the City: Pandemics

SC23
Denver, CO | i am hpc.

Kick-Off

November 3, 2023

HackHPC
Hackathons and Codeathons

HTTPS://HACKHPC.GITHUB.IO/HPCINTHECITY23

The University of Texas at Austin
Center for Pandemic Decision Science

STAR PARTNERSHIP PROGRAM

TACC TEXAS ADVANCED COMPUTING CENTER

Omnibond Engineering • Trust • Identity

VOLTRON DATA

SGX3 Extend. Expand. Exemplify.

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AGENDA

1. **Hackathon Objectives**
2. **Code of Conduct**
3. **Project Timeline**
4. **Deliverables and Resources**
5. **Mentors**
6. **Project Eureka**
7. **Mentor Pitches**
8. **Team Formation**

Join our Discord Server
https://discord.gg/G2a7JWnQkP

Code of Conduct

Hackathon Objectives and Student Outcomes

The hackathon aims to harness the resources, skills, and knowledge found in the HPC community in an effort to provide applied exposure towards students from 2-4 year post-secondary educational institutions. In short, the hackathon will provide HPC skills and training while targeting problems that directly affect the participants.

Develop knowledge and create solutions to identified pandemic decision science projects through application of data analysis/presentation or management utilizing HPC/CI resources.

Student Outcomes

- Increased familiarity with data science in the cloud
- Experience collaborative software engineering
- Develop professional communication skills

Awards


Awards
• Judges Choice Award
• Viewer's Choice Award
• Impact Award

Major and Minor Awards

- Team Introduction
- Project Management
- Team Trailer
- Progress
- Judges Award
  - Criteria
- Viewer's Choice
  - Votes
- Impact Award
  - Community

Criteria :

- Project Impact
- Viability / Usefulness
- The creativity of execution /Wow-effect
- UX / Polish
- Technical complexity
- Collaboration
- Presentation
- Completeness

Project Timeline

Event Simplified Schedule

- **Friday, 11/3/23**
  - **Kick-Off**
    - *Mentor Pitches* & Team Formation
- **Saturday, 11/4/23**
  - Morning Checkin - Team Introductions
  - Afternoon Checkin - Team Goals and Project Plan
- **Sunday, 11/5/23**
  - Afternoon Checkin - One-Day Progress
- **Monday, 11/6/23**
  - Afternoon Checkin - Team Status
- **Tuesday, 11/7/23**
  - Morning Checkin - *Mentor Trailers*
  - **Final Presentations**

~ 96 hrs Total Time
- ~7 hrs Planning / Checkins
- ~30 hrs Sleep/Rest
~59 hrs Work Time

Project Deliverables and Resources

Deliverables:

- Github Repository
  - README.md with project description
  - Source code Including Comments
  - Presentation
    - Team members with pictures
    - Use of technology in the project
    - Project impact to the community
  - *Poster (+5pts Judging Score)

Resources:

- Project Eureka
- TACC Frontera / LS6
- Mobility Dataset (TACC)
- Commonly Used:
  - Python
  - R / RStudio
  - Jupyter Notebooks
  - Node.Js (JavaScript)
  - Colab
  - HTML\CSS
- Discord - https://discord.gg/G2a7JWnQkP

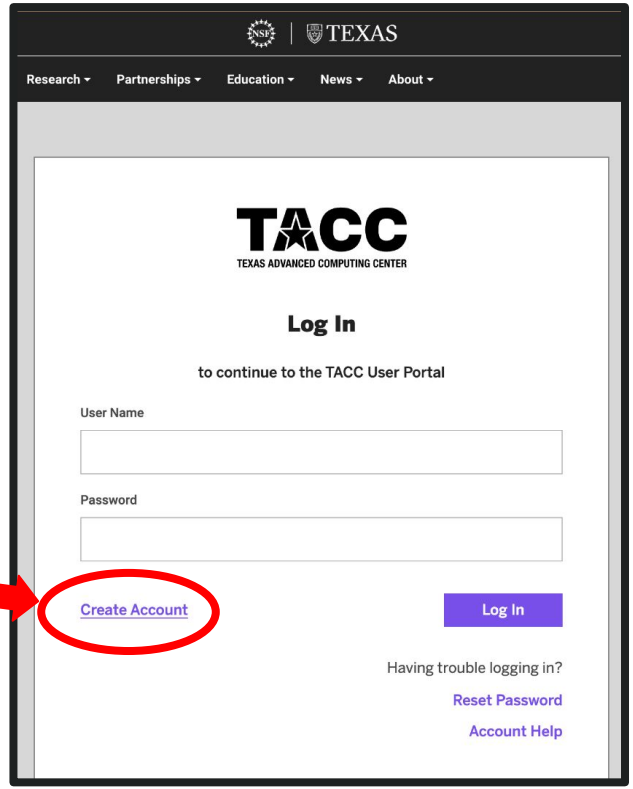
TACC Computational Resources

TACC New User Account Creation

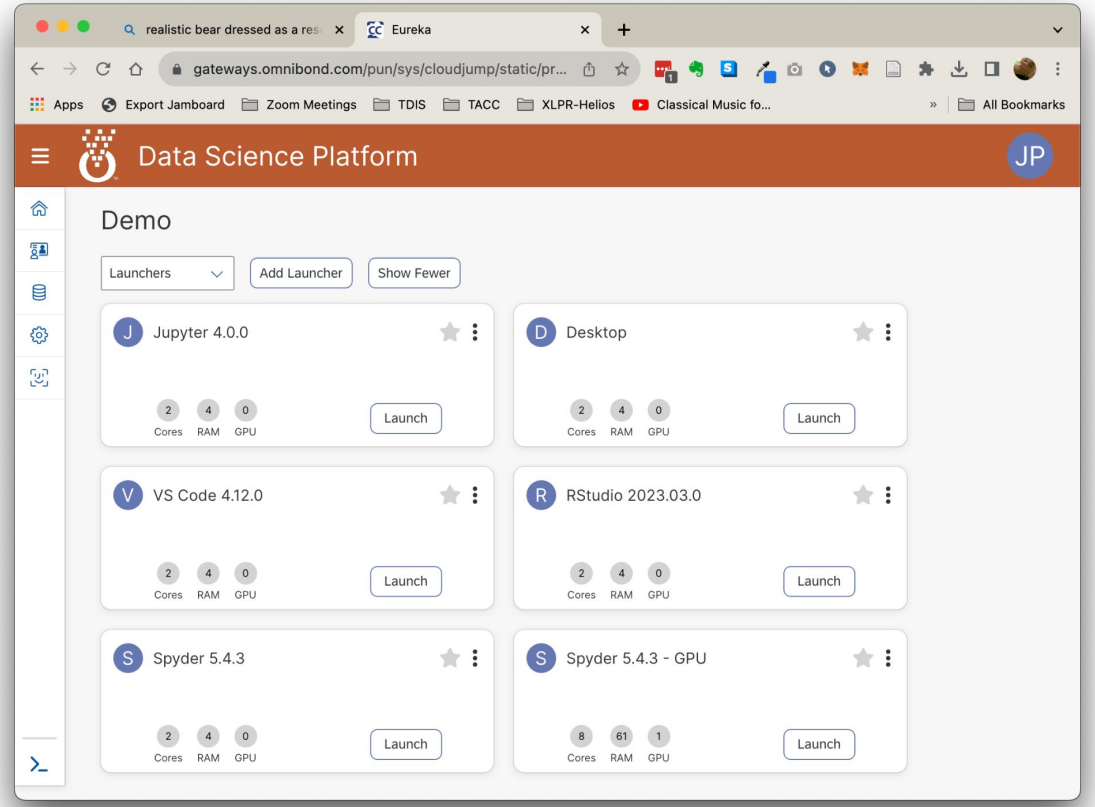
1. https://tacc.utexas.edu
2. Click “Login” in the upper right corner
3. Select “Create Account”
4. Create a MFA token
5. Provide your TACC user account via this form: https://forms.gle/pCu9K9X5cC6seJpc8

* Use your school or organization email address. DO NOT USE A GMAIL, YAHOO, or HOTMAIL email address

** If you do not have US citizenship please inform me via email: jpowell@tacc.utexas.edu



Omnibond's Project Eureka



- On-Demand Virtual Machines
- Pre-configured Data Science images
- Provided for each team
  - Access created based on your registration information
- Brief tutorial during the Kick-Off

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Omnibond's Project Eureka Overview

Boyd Wilson

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Thank You to Our Mentors and Staff!

Mentor Pitches

Kelly Gaither

Oluwasegun Ibrahim

Jose-Luis

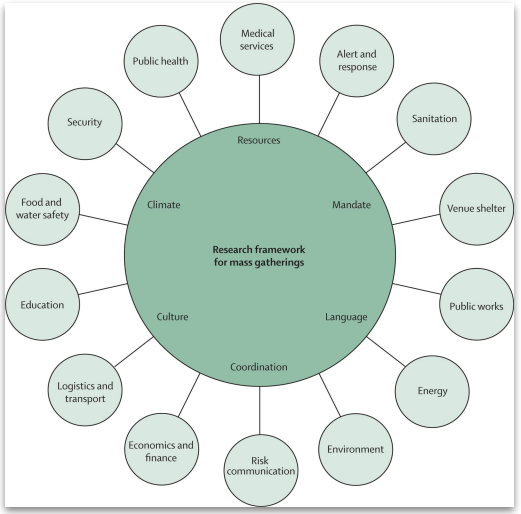
Emily Javan

Images Generated by Microsoft Bing Image Creator powered by DALL·E 3
Prompt: Create a picture to represent this idea "*Project description 1st sentence*"

A Massy Situation

Mentor: Kelly Gaither

- Mass gatherings are defined as large numbers of people >1000 congregating at a specific location for a specific purpose (*CDC Yellow Book 2024*)
- Attendees at mass gatherings face unique risks due to environmental hazards, challenging security situations, increased risk for infectious disease transmission
- This team will try and identify mass gatherings that occurred from 2018 through February 2022 using anonymized Safegraph Mobility data, looking at travel patterns and demographics estimated from Census Data and compare this to past events



John S Tam, Maurizio Barbeschi, Natasha Shapovalova, Sylvie Briand, Ziad A Memish, Marie-Paule Kieny, "Research agenda for mass gatherings: a call to action", The Lancet Infectious Diseases, Volume 12, Issue 3, 2012, Pgs 231-239.

Suggested Skills:

- Critical thinking
- Programming or analysis tool proficiency
- Research skills to determine types and locations of past mass gatherings in the US

Possible Deliverables?

- Dashboard or animation showing mass gatherings over time
- Maps and analysis of past mass gatherings versus what was found in the mobility data
- Poster and presentation on the results

Mobility and Social Vulnerability Index (SVI)

Mentor: Jose Herrera

COVID-19 has disproportionately impacted individuals depending on where they live and work, and based on their race, ethnicity, and socioeconomic status (Fox, et.al. 2022).

Travis County, TX (ranked as the second fastest growing city in the USA), shows a segregated structure: vulnerable sectors in of the population (according to the SVI) are located at the east of the city, while less vulnerable populations are located to the west (**C**).

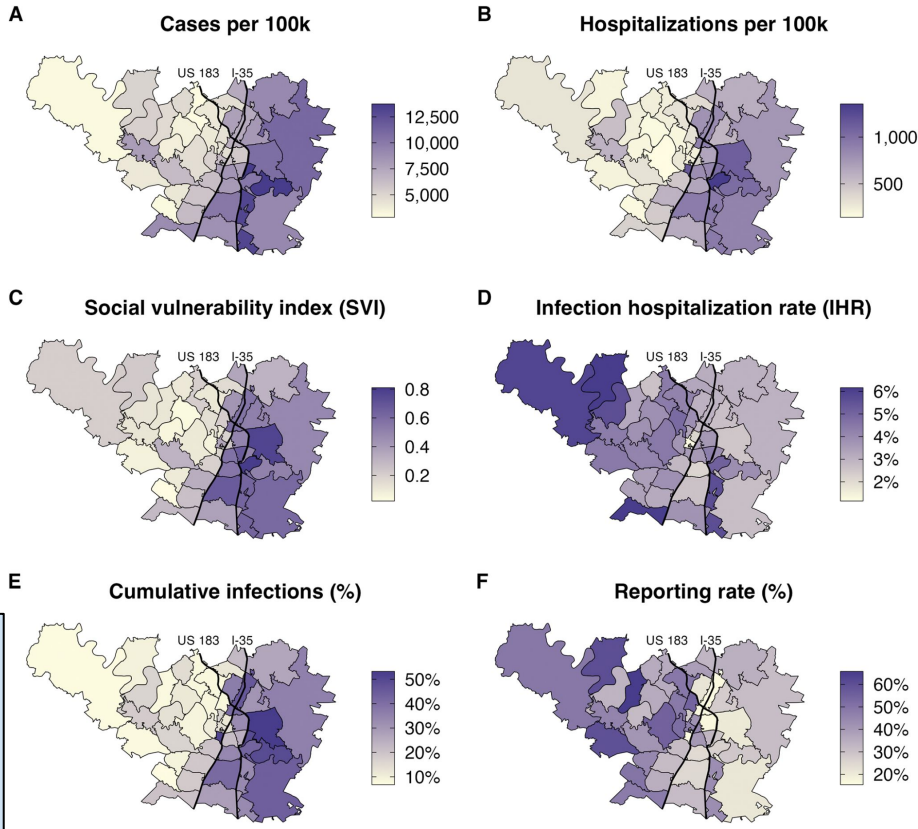
This segregation is shown in the burden of COVID19:

- Larger numbers of reported cases (**A**), hospitalizations (**B**) and cumulative infections (**E**) occurred in the east of the city.
- Higher percentages of infection hospitalization rate (**D**) and reporting rates (**F**) were observed in the west side of the city.

Q1: Is there a relationship between changes in mobility and the SVI?
Q2: Is this relationship dependent on mobility restrictions?

Data at the zip code level:

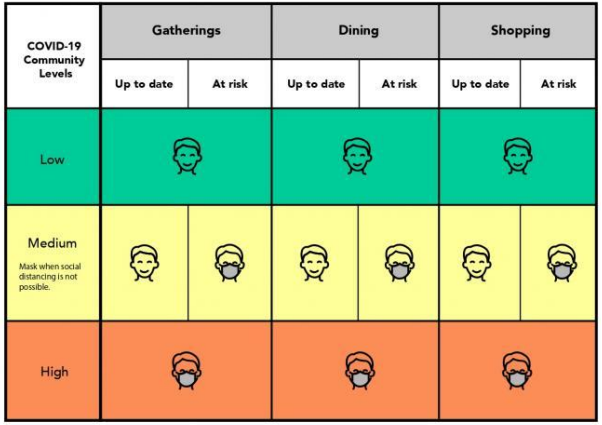
- Social vulnerability Index (calculated with data from the American Community Survey).
- Mobility data (visits to points of interest) - Safegraph.



Reddit Data for Pandemic Preparedness

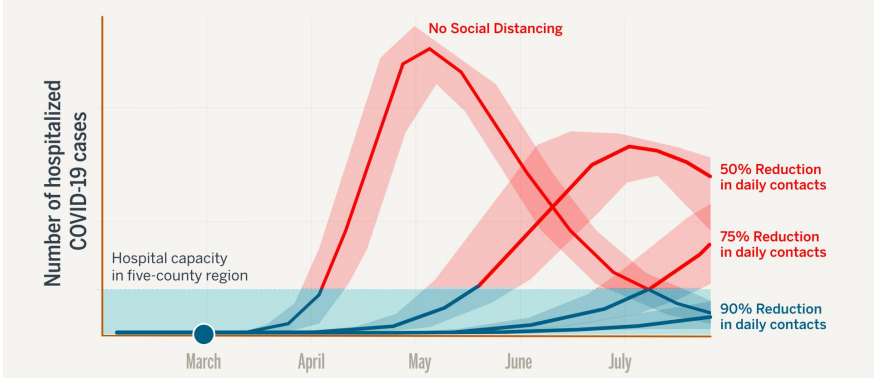
Can we use Austin sub-Reddit conversations to

1. **track community opinions to pandemic-related policies**?
   a. Mentor: Oluwasegun Ibrahim - Mathematician, post-doc
   b. Austin had a real-time stage alert system
2. **estimate community pandemic preventative behaviors**?
   a. Mentor: Emily Javan - Data scientist, PhD Candidate
   b. Masking, vaccination, social distancing



Data

- Austin policy timeline
- Reddit Text Analysis
- Public Health Resources
  - less and organized
  - more sources less organized



QUESTIONS ??

Next Session:

- **DAY 2 MORNING CHECK-IN: Team Introductions**
  [Saturday, *11/4/23 @ 10:30am CDT*]

Schedule:

https://hackhpc.github.io/hpcinthecity23/schedule.html

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