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HPC in the City: St. Louis



HACKATHON

Kick-Off Session



Join the HPC in the
City Discord using
this QR Code!

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HACKATHON

Kick-Off Session

Agenda

- Introductions
- Hackathon Objective
- Ethics
- Deliverables and Resources
- General Information
- Schedule
- Mentor Project Overviews
- Team Formation



Presenter: Je'aime Powell

Organizers



Linda Hayden - *ECSU*
haydenl@mindspring.com



Boyd Wilson - *Omnibond*
boyd@omnibond.com



Amy Cannon - *Omnibond*
amycannon@omnibond.com



Je'aime Powell - *TACC*
jpowell@tacc.utexas.edu



Alex Nolte - *University of Tartu*
alexander.nolte@ut.ee



Josh Kissel - *Omnibond*
josh@trafficvision.com

The Objective of HPC in the City: St. Louis

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 about solutions to identified issues affecting St. Louis through application of data analysis/presentation or management.

Student Outcomes

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

Ethics

Everybody is welcome!



Student Deliverables and Resources

Deliverables:

- **Source code Including Comments**
- **PDF of presentation**
 - Team members with pictures
 - Use of HPC technology in the project
 - Regional (St. Louis) implications of the project
- **Github Repository Link**
 - README.md with project description

Resources:

- **Google Cloud (Provided Credits)**
- **Cloudy Cluster**
- **Most Commonly Used**
 - Python
 - Jupyter Notebooks
 - Node.Js (JavaScript)
 - Repl.it (Collaborative Environment)
 - HTML
- **Discord**
<https://discord.com/invite/rSXasYKDwE>



Join the HPCHack
Discord using this
QR Code!

Awards and Judging Criteria



General Information (the 3 T's)

- **Teams**

- 4-5 Students
- 1 Primary Mentor
- 1 Specialist/Staff

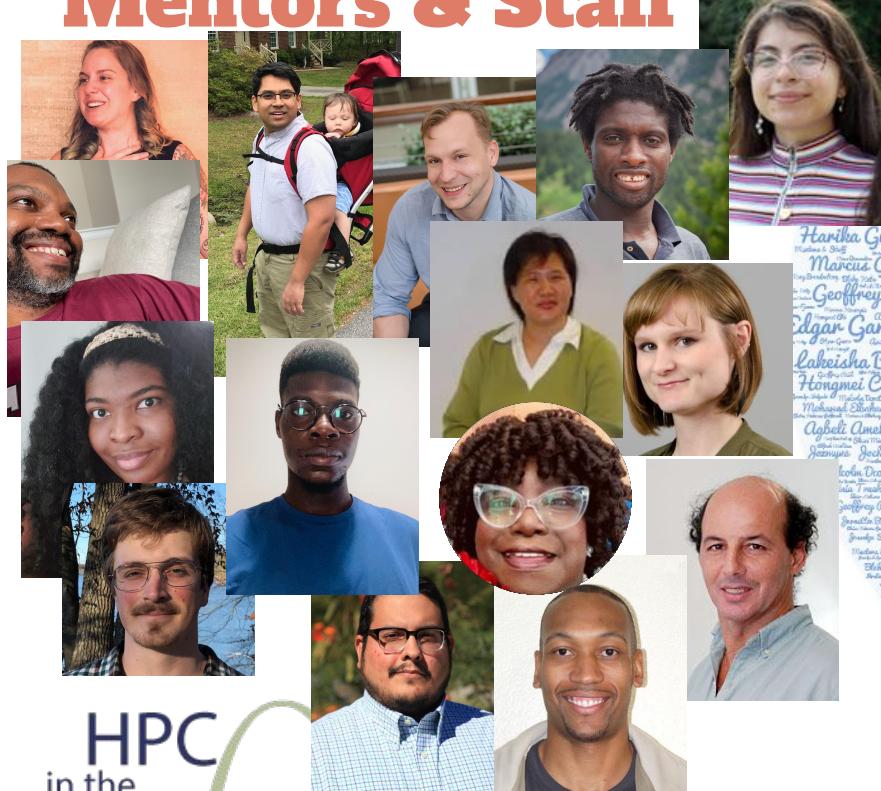
- **Time**

- November 4th - 8th
 - 11/4@~6pm ET Event Start
 - Team formation
 - 11/[5-8] @ 11 ET & 6pm ET- Checkins
 - 11/8@6pm ET-Final Presentations

- **Topic Examples**

- Data Analysis of COVID 19
- Economic disparities and their effects on college participation
- Genomics, Molecular Dynamics, or Weather Modeling in the Cloud.
- Social Justice
- AI-based Crowd Status
- Public Data Management
- Graduation Rates
- Broadband Access
- Insurance vs. Public Health Resilience

Mentors & Staff



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<http://hackhpc.org/hpcinthecity>



 SC21
St. Louis, science
MO & beyond.



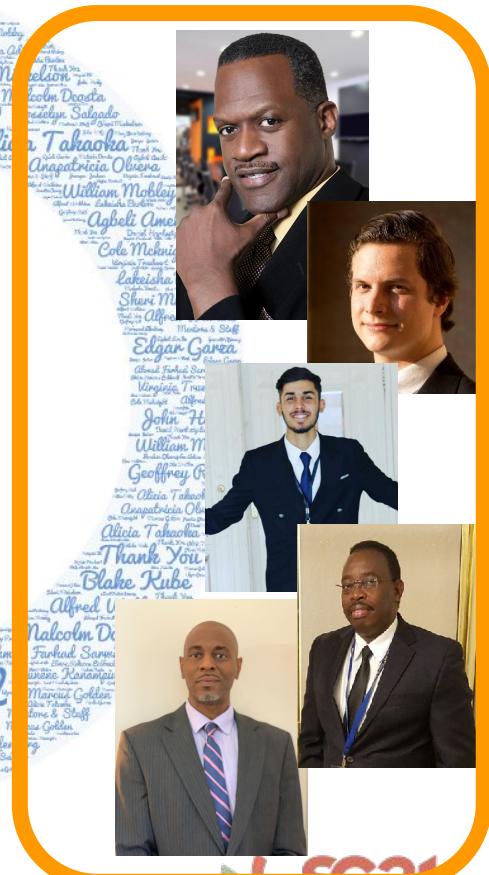
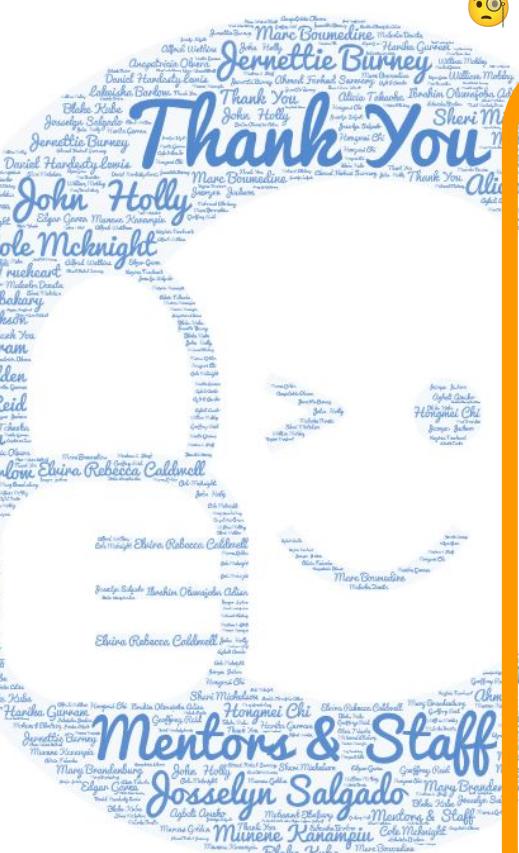
Distinguished Suit Section

Mentors & Staff



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SC21
St. Louis, science
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Project Overviews

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Clean Air Quality

Clean Air Quality

- Alicia Takaoka (University of Hawaii at Hilo)
 - ajwilson@hawaii.edu
- Cleaning the air quality can take several forms including improving public transportation.
- In 2020, St. Louis received an F from the American Lung Association for ozone levels and a B overall. How can HPC address this issue?
- Possible HPC Resources
 - [Open Source Computer Vision Library](#),
 - [Array of Things](#),
 - [EPA air quality datasets](#)
- Possible Languages
 - English,
 - Spanish,
 - Bosnian



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Investigating Systemic Racial Bias in Public
funded Services in the Great City of St. Louis,
MO



Investigating Systemic Racial Bias in Public funded Services in the City of St. Louis



- Munene Kanampiu (WSSU Computer Science Faculty/Hackathon Mentor)
 - Winston-Salem State University
Email: kanampiumw@wssu.edu
 - Rebecca Caldwell (WSSU Computer Science Faculty/Hackathon co-mentor)
Email: caldwellr@wssu.edu
- Project Idea: Does there exist racial bias in allocation of public-funded services in the great city of St. Louis? (Sample data examples: Public safety, Public health, Public education)
- Impact: Racial Injustice Awareness for the residents of St. Louis & greater Missouri state
- Possible HPC Resources: Assorted from Google Computing/Cloudy cluster platforms
 - Python, Jupyter notebooks, HTML, Google sheets?
- Data science: Data Set Links portal <https://rdx.stldata.org/search/type/dataset>

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The logo features the text "HPC in the City: St. Louis" in a serif font. The word "HPC" is in dark blue, "in the" is in black, "City:" is in dark blue, and "St. Louis" is in a larger, italicized dark blue. A large green arch graphic starts from behind the "HPC" and "in the" text and sweeps up and over the "City:" and "St. Louis" text. To the right of the arch, the letters "SC21" are written in large red and green block letters. Below "SC21" is the text "St. Louis, science MO & beyond." in smaller red and green letters.

Studying
sunny-day flooding
at coastal
community

Studying sunny-day flooding at coastal community

- **Hongmei Chi (Florida A&M University)**
 - Email: Hongmei.chi@famu.edu
- **Idea: Building model**
- **St. Louis Impact: Team members learning how to collect data and building model**
- **Possible HPC Resources: clusters**
- **Possible Languages: R or Python**





How can we **quickly** identify flooded streets and pass across **information** to residents?



Will Mobley
Institute for Disaster Resilient Texas
Texas A&M Galveston

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IoT Blockchain Smart City

Project Name

- **Agbeli Ameko & Dr. Keith Maull**
 - UCAR/NCAR
- **Idea:** Blockchain enabled IoT weather and Smart City network
- **St. Louis Impact:**
 - Encourage local community to add their IoT devices to a local Smart City network via the blockchain that is free from Big Tech
- **Possible HPC Resources:**
- **Possible Languages:** python, sql



St. Louis Blockchain Enabled IoT Smart City

Infrastructure

Part of team will implement blockchain for IoT weather measurement in St. Louis

+

Now create system for citizen scientist/users to add to network



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<http://hackhpc.org/hpcinthecity>

Data Producers

Existing data: realtime IoT weather data on the blockchain to enable smart weather applications

Data Consumers

Why: building smart weather applications for smart city DAPPS

Need and Motivation

To incentivize or create market for Citizen scientist, commercial, and industrial users in St. Louis to contribute its data and sensors to a decentralized smart city network

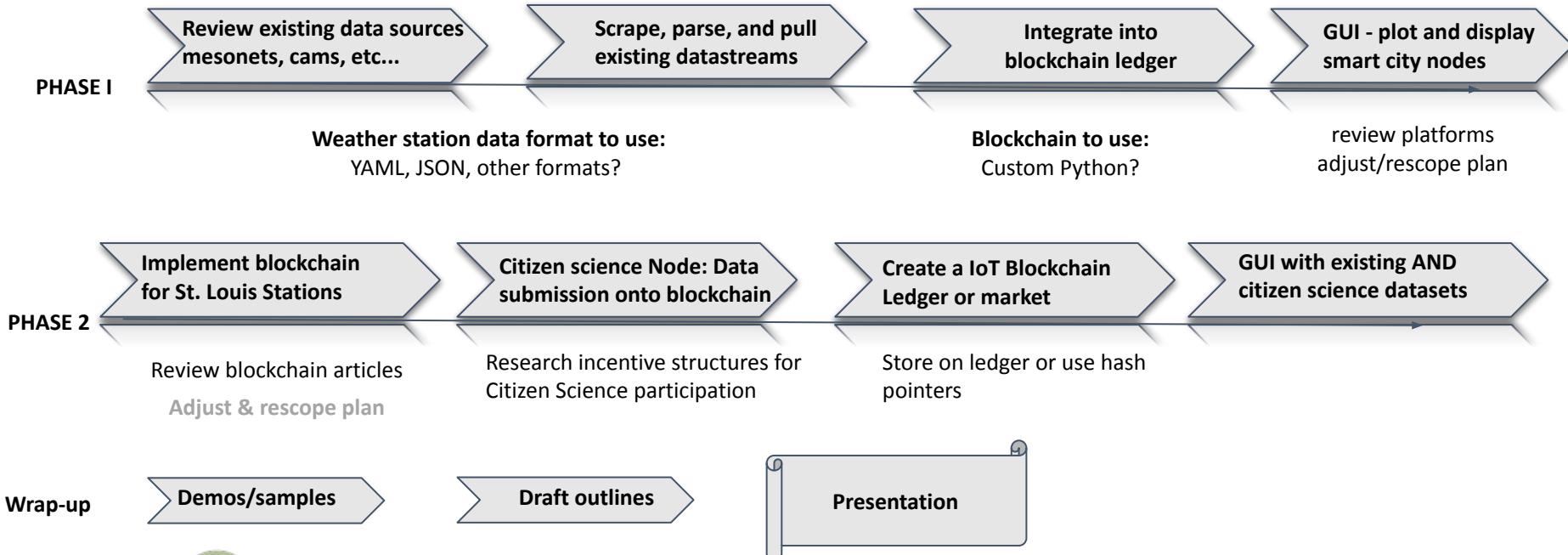
Data sovereignty: community is in control to verify, duplicate, and validate data setting system free from the BIG 5 Tech cartel

Smart Contract/Incentives

...Some kind of Coin, ranking, or “credit” based on contribution to IoT smart city network



Development Cycle and timeline



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**Identifying K-12 Access
to Healthy Food via
Community-Led Grocery
Store in Schools**

Project Name

- Edgar Garza(TACC)
 - Email: egarza@tacc.utexas.edu
 - Discord: obscure cynic#0079
- How can St. Louis-area school districts and community-based organizations identify food deserts, by leveraging census/poverty data and equity indicators (food insecurity, health food access) to create community-led grocery stores in schools.
- As of 2017 in St. Louis, black families are nearly six times as likely as white families to receive food stamps and twice as likely (than white residents) to live in census tracts with low access to healthy food.
- Google Cloud and Jupyter Notebooks
- Python, R, Web Dashboards



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Can we do better?
Exploring MO State
Electric Power Sector

Project Name (Can we do better? Exploring MO State Electric Power Sector)

- Marc Boumedine (University of the Virgin Islands)
mboumed@uvi.edu, 340 693 1255
- Describe how the State of Missouri in relation to the Electric power sector
- Balancing load, Cost saving?
Increasing the usage of Green energy?
- Visualization, ML
- Python, R

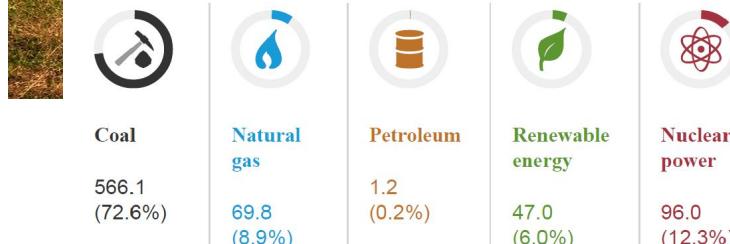


located compared to similar states

consumption by source

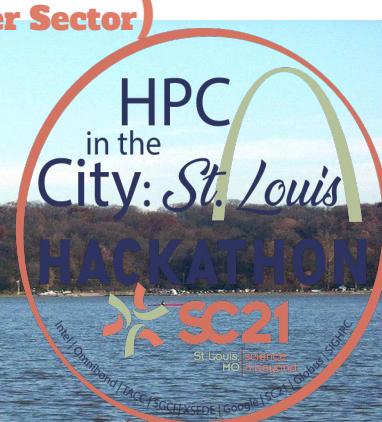
Electric power sector consumption by source

780.1 trillion British thermal units
(percent of total for all sources)



Source: US Energy Information Administration
<https://www.eia.gov/opendata/widgets.php>

<http://hackhpc.org/hpcinthecity>



Creve Coeur

Electricity flows
trillion British thermal units



Net interstate inflow
electricity

51.4

Net international im
electricity

0.0



Team Formation

Ask your mentor about your challenge for tomorrow!

