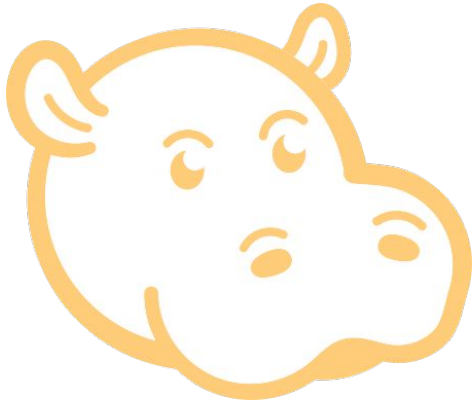


Hour of Cyberinfrastructure



AAG 2019
Washington, D.C.
Eric Shook
Coleman Shepard

Overview

- NSF funded project
- Data Science Gateway
- 17 Interactive Lessons
 - Parallel Computation
 - Big Data
 - Cyberinfrastructure
 - Computational Thinking
 - Spatial Thinking
 - Geospatial Data
 - Spatial Modeling & Analytics
 - Interdisciplinary Communication



Hour of CI - NSF Project

Hour of Cyberinfrastructure: Developing Cyber Literacy for Geographic Information Science

PI: Eric Shook

Co-PIs: Forrest Bowlick, Karen Kemp, and
Anand Padmanabhan

Collaborative CyberTraining Awards:

UMN, UMass, UIUC, and USC

OAC 1829708-UMN (total award ~\$480,000)

Duration: Aug 1, 2018 - July 31, 2020



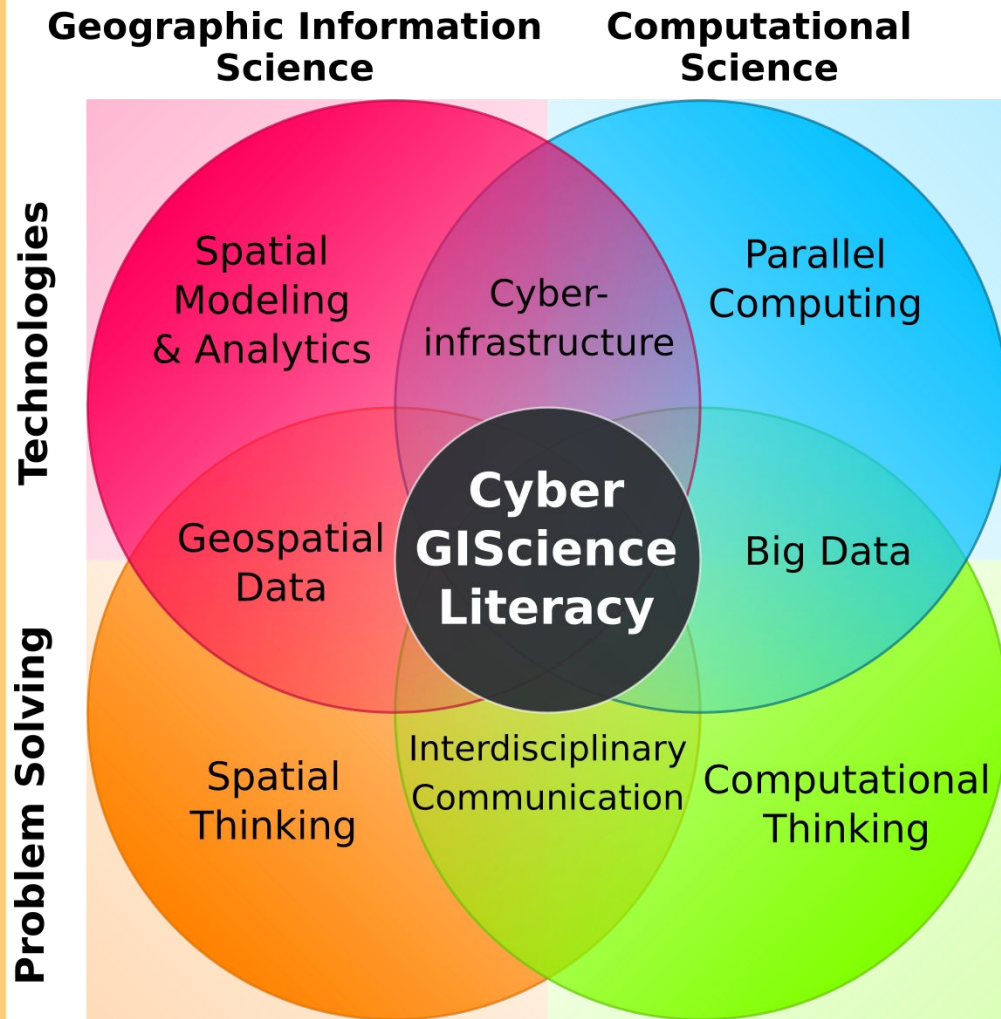
Motivation

- Accessibility to Cyberinfrastructure
 - Platform
 - Lesson Material
- Enable the Learning of Foundational Skills for Complex Topics Aimed at Social Science
- Start to Bridge Communication Disconnects



Cyber Literacy for GIScience

- Cyberinfrastructure
- Parallel Computing
- Big Data
- Computational Thinking
- Interdisc. Communication
- Spatial Thinking
- Geospatial Data
- Spatial Modeling & Analytics



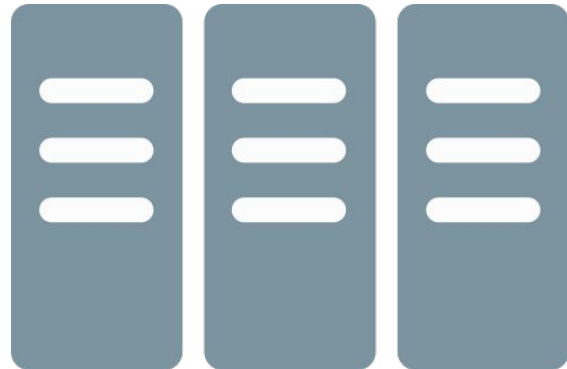
Jupyter

- Flexible Platform
 - Python
 - HTML | CSS
 - Javascript
 - Julia
 - R
 - Linux Commands
- Heavily Used in Industry
- Narrative Construction for Lessons



Jupyter

- Environment Control
 - Geospatial & Data Science Packages
- Flexible Resource Allocation
 - Scalability
- Reproducible Environments
- Easy for Open Source



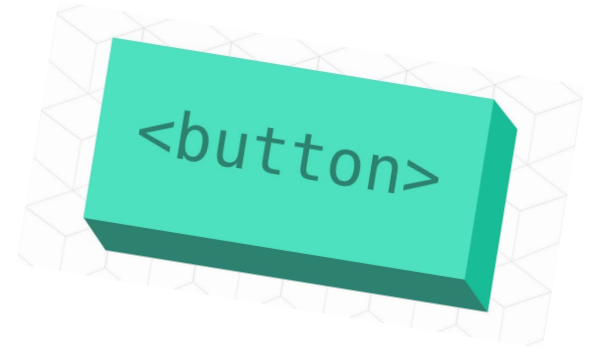
Platform

- Jupyterhub | JupyterLab
- Hosted using Jet-Stream Cloud Platform
- Authentication through XSEDE
- Ansible Configuration and Deployment



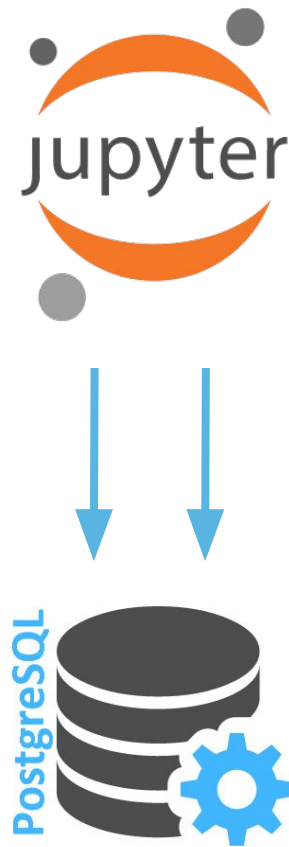
Interactivity

- User Design (UI | UX)
- User Engagement
- Tool for Knowledge Retention
- Build Narrative Construction
- Example of Types
 - Maps
 - Buttons
 - Dynamic Graphing
 - Exploratory Visualizations..



Data Collection

- Jupyter Widgets
 - Radio Buttons, Text Boxes, Check Boxes, etc
- Gain Insight into User Behavior
- Metrics Collected
 - User
 - Lesson | Question | Answers*
 - Correct or Not
 - Attempts
 - Date Accessed
 - Start Time
 - End Time
 - Time Taken



Customized Widgets

- HTML | CSS | Javascript
 - Flipcards
 - Matching
 - Forms
 - Other Modular Components
- D3.js
 - More Complex
- Collection Mechanisms



Pre AAG Workshop

April 1st - April 2nd, National Zoo

- First Meeting Face to Face
 - Lesson Developers
 - Project Personnel
- Discussion Around Lesson Construction
- Conceptualize Interactive Pieces for Each Narrative



Next Steps

- Collaboration with Lesson Developers
 - Interactive Components
- Migration to Docker from Ansible
- Job Submission to XSEDE Super Computers
- Data Collection for Customized Widgets



Project Team

- Eric Shook - Lead PI
- Karen Kemp - Co-PI
- Anand Padmanabhan - Co-PI
- Forrest Bowlick - Co-PI
- Fritz Vandover - Assessment Team
- Coleman Shepard - RA

Lesson Developers

Forrest Bowlick, Coline Dony, Aaron Weeden,
Jennifer Swift, Eric Shook, Nafiseh Haghtalab,
Michael Page, Craig Stewart



Questions?

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