Geospatial Fellows combat COVID-19 with CyberGISX

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Overarching

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GSI

What is the GSI?
The Geospatial Software Institute (GSI) is an envisioned center to support geospatial collaboration in a high performance computing setting. Initial planning is funded by the NSF. After a series of workshops and developmental meetings, the following mission, vision, and goals have been proposed for the institute:

Mission: Transform geospatial software, cyberinfrastructure (CI), and data science across many fields to revolutionize diverse discovery and innovation by enhancing computational transparency and reproducibility.

Vision: A sustainable social and technical ecosystem to enable geospatial-inspired innovation and discovery

Goals:

1. **Reproducible, transparent, and scalable geospatial software:** Enable researchers to harness the geospatial data revolution for discovery and innovation by combining geospatial software and data at scale, in reproducible and transparent ways.

2. **Geospatial digital workforce:** Increase the nation's workforce capability and capacity to utilize geospatial big data and software for knowledge discovery supported by critical spatial thinking, and to further innovate geospatial software and advance related sciences.

3. **Ethical and open geospatial software:** Promote a culture of ethical and open geospatial software driven by diverse communities.

4. **Structured guidance for computational reproducibility:** Establish structured guidance for computational reproducibility in scientific research and education that are dependent on geospatial software.

5. **High-performance and data-intensive geospatial software:** Further the convergence of high-performance geospatial software with advancements in data-intensive and high-performance computing.

Why do we need a Fellows Program?

2020 has been undeniably shaped by COVID-19, a destructive global pandemic. This disease has had a disproportionately large and enduring impact on peoples' lives. Disease transmission is an inherently spatial and human process, and efforts to track and reduce COVID-19 impacts need to take into account vast amounts of complex geospatial data. Similarly, interdisciplinary approaches are needed to fully account for complexities in human behavior and decision support.

The Geospatial Fellows program is intended to support a diverse group of researchers to tackle these challenges and harness complex geospatial data for addressing COVID-19 in a reproducible manner. This collaborative endeavor is supported by CyberGISX, an innovative geospatial development hub.

Who are the Fellows?

A call for proposals was distributed and 16 Fellows were chosen after review of submitted proposals. The Fellows represent a diverse group of scholars from various institutional backgrounds across the United States.
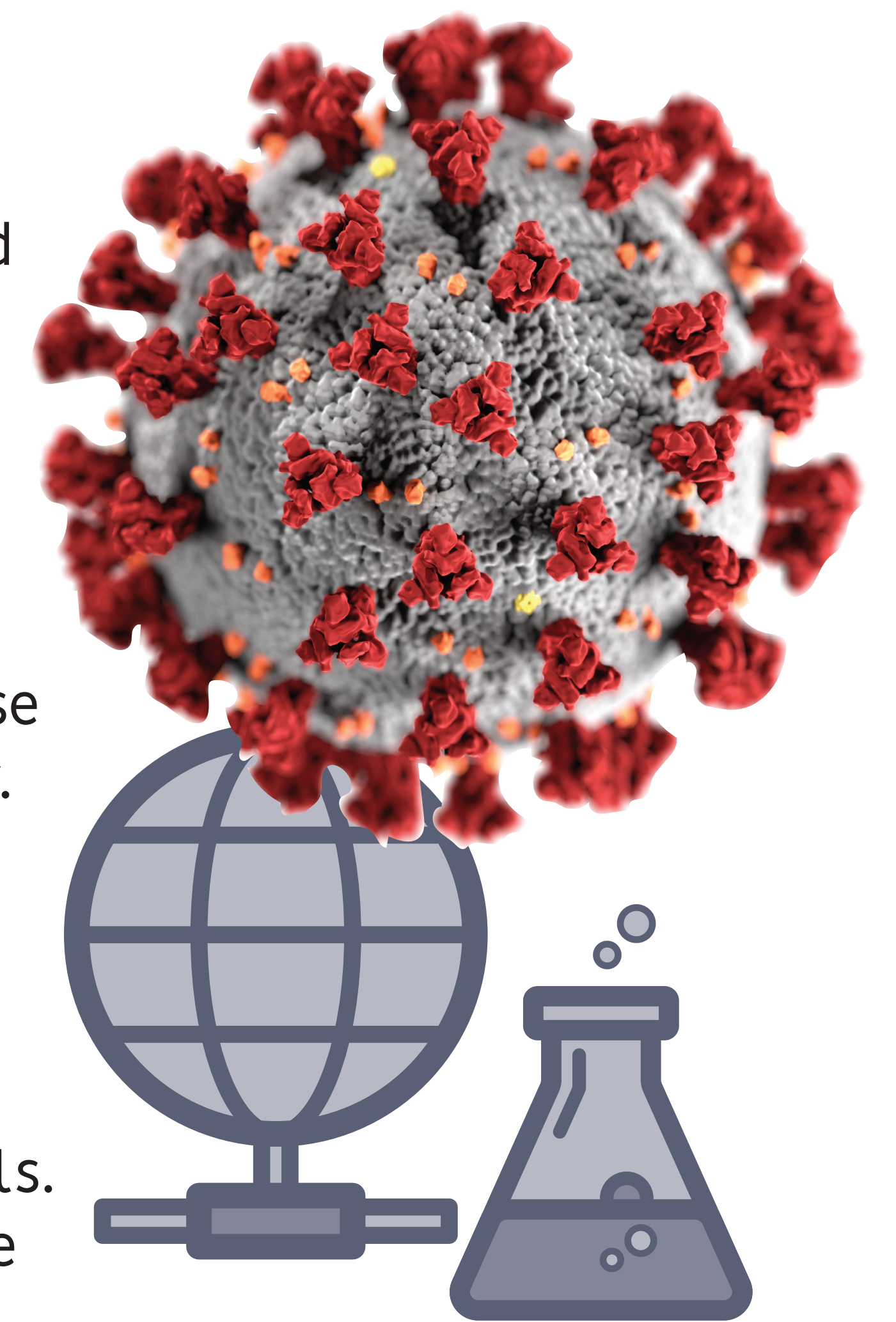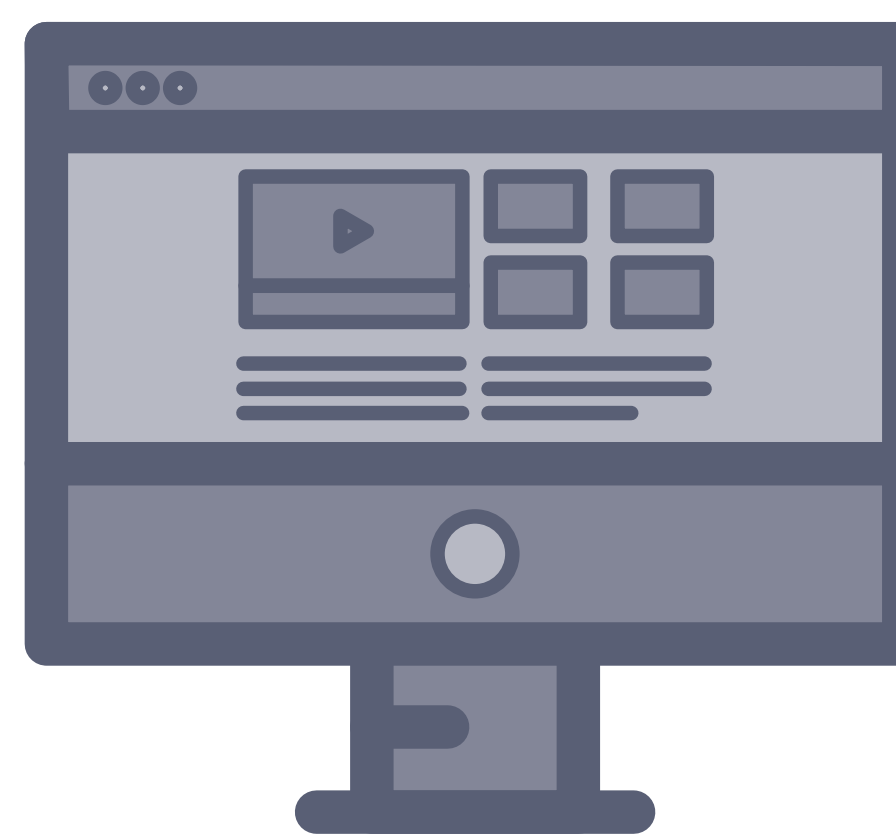
What will Fellows do?

Throughout the fellowship year, the Fellows will create a set of interactive CyberGIS-Jupyter Notebooks using CyberGISX. These will further reproducible aspects of analyses that take advantage of cutting edge geospatial software. Altogether, this will lead to the creation of a centralized hub that will contain resources for addressing COVID-19 and further educational efforts in this area. Finally, at the end of the Fellowship program, a white paper will document the process and provide suggestions for better integration of interdisciplinary work grounded in the geosciences.

How will the Program support the Fellows?

On the administrative side, the admin team is working to encourage collaboration, sharing of ideas and approaches, and fostering a reproducible analysis mindset among Fellows. To this end, the Fellows Program has organized a series of meetings, workshops, check-in procedures, blog opportunities, and project milestones. Importantly, the team will support the CyberGISX Hub, lead a series of educational trainings and office hours for Fellows to gain familiarity with and use the platform, and work to make needed functionality and libraries available in the back end.

What are the Fellow Projects focusing on?

Projects proposed by accepted teams can be broadly classified into four areas of focus: 1. **Overarching**, 2. **Methods: Analysis, Modeling, and Simulation**, 3. **Impacts**, and 4. **Social Dimensions**. The project in the **Overarching** theme looks at ways to make collaborative and multidisciplinary geospatial research more reproducible. Projects in the **Methods** theme explore avenues to model and analyze COVID spread. Projects in the **Impacts** theme focus on how COVID is impacting human systems. FInally, projects in the **Social Dimensions** theme specifically consider social aspects of the pandemic and impacts.

How does the Fellows Program advance the GSI's goals?

The Geospatial Fellows Program addresses the goals of the GSI by 1. catalyzing the continual development of the CyberGISX Hub through supporting a diverse set of use cases, 2. striving to both directly increase the capacity of Fellows to harness geospatial data and additionally both creating an enduring set of educational objects through the use of CyberGISX Notebooks and by using the Fellows program to prepare strategies to better teach geospatial approaches, 3. containing workshop presentations on ethical data use, 4. including a strong emphasis on reproducible research, and 5. providing avenues for multidisciplinary researchers to take advantage of high performance geospatial computing resources through CyberGISX.