Webinar: Geospatial Fellows for Advancing COVID-19 Research & Education

https://bit.ly/GeospatialFellowsQA

July 24th, 2020 (Friday): 3 – 4pm Central Time

NSF SI2-S2I2 Conceptualization: Geospatial Software Institute (GSI)

- Conceptualize a Geospatial Software Institute (GSI) as a long-term hub of excellence to serve diverse research and education communities
- http://bit.ly/GSIStrategicPlanDraft
- Twitter hashtag
  - #GSIfuture

Steering Committee

Donna Cox

National Center for Supercomputing Applications/University of Illinois

Co-PI

Michael F. Goodchild

University of California - Santa Barbara

Chair of the advisory committee

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University of Illinois at Urbana-Champaign, Co-PI

Paul Morin

University of Minnesota

Co-PI

Margaret Palmer

University of Maryland

Co-PI

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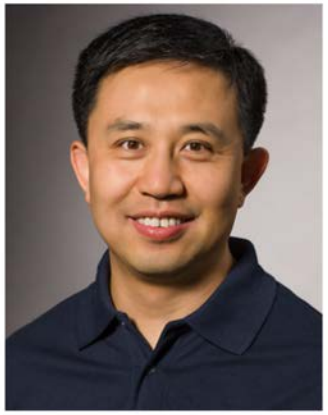
Project Manager



Shaowen Wang

University of Illinois at Urbana-Champaign

Chair, PI

Partnerships

- Academic & International
  - AAG
  - AGILE
  - AGU
  - CyberGIS
  - ESIP
  - GIScience
  - UCGIS
  - Etc.
- Government
  - CDC
  - DOE
  - EPA
  - NASA
  - NGA
  - NIH
  - USGS
  - Etc.
- Industry
  - DigitalGlobe
  - Esri
  - Google
  - HDF
  - Kitware
  - LimnoTech
  - OGC
  - Etc.

Representatives of Partners

Nadine Alameh
Open Geospatial Consortium (OGC)

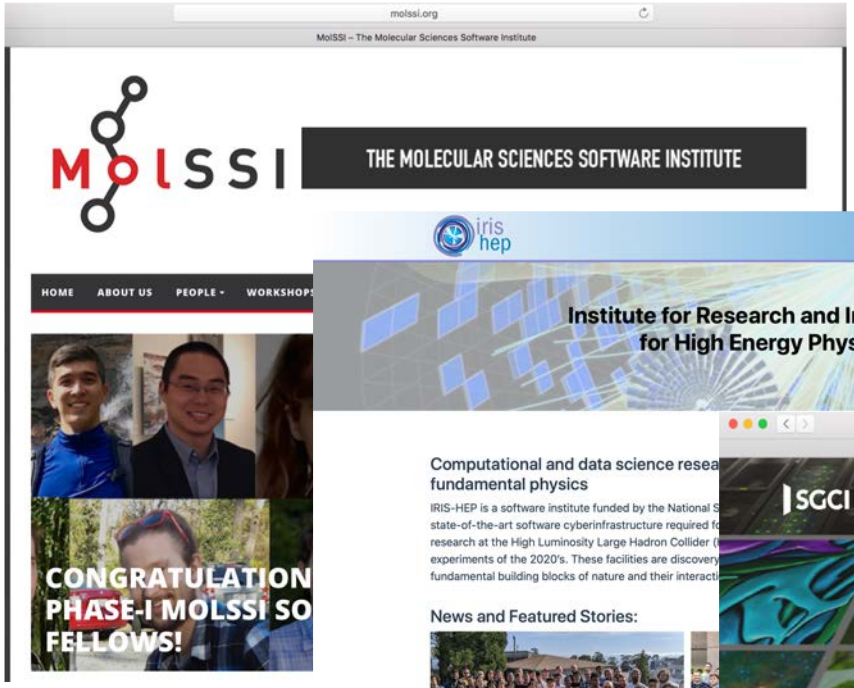
Jerad Bales
Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI)

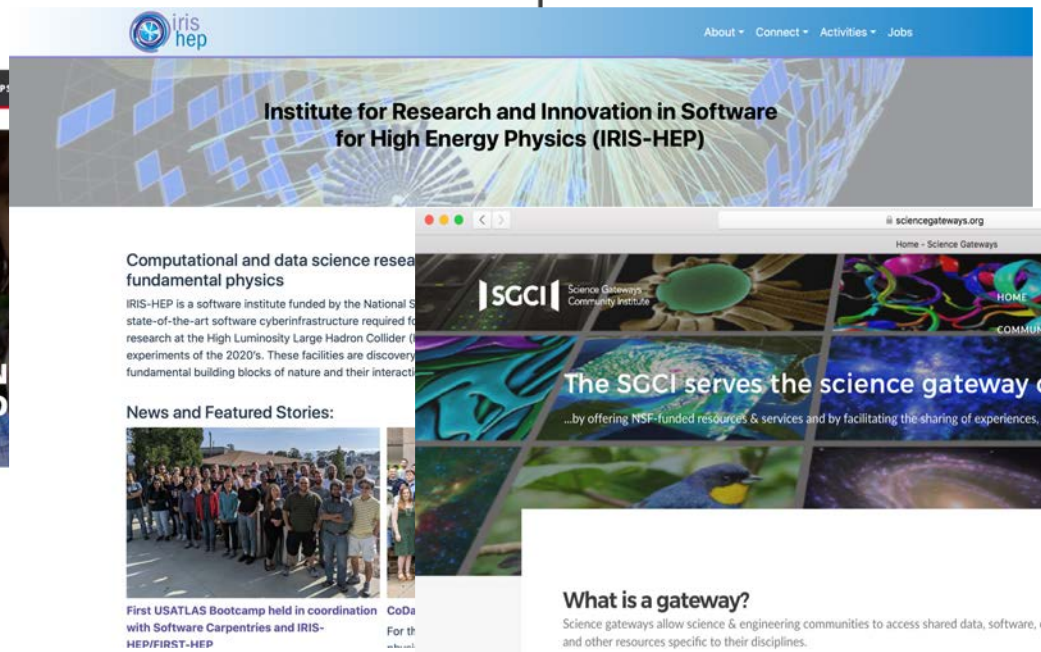
Coline C. Dony
American Association of Geographers (AAG)

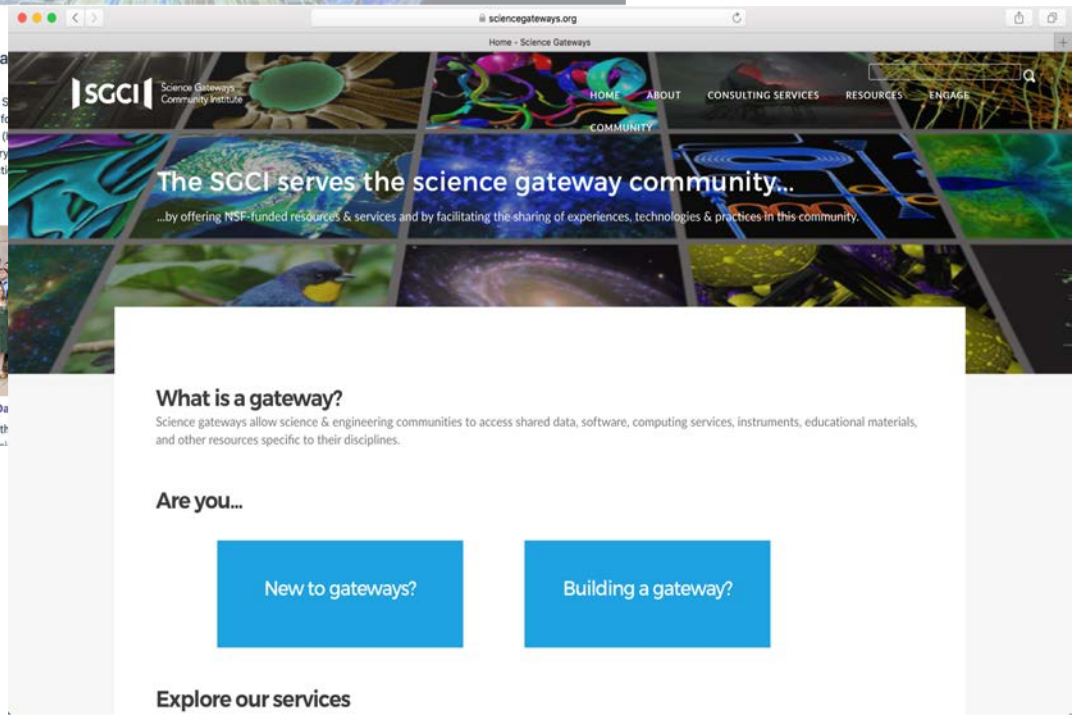
Ned English
NORC, University of Chicago

Diana S. Sinton
University Consortium for Geographic Information Science (UCGIS)

Existing NSF Software Institutes







Geospatial Data Complexity

- Dynamic
- Distributed sharing
- Ethics
- Heterogeneous
- Massive
- Multi-scale
- Privacy
- Quality
- Uncertainty

Computational & Scientific Challenges!

Geospatial Software

- Software for transforming geospatial (geo & spatial) data into information, knowledge, and intelligence
- Fusion of rapidly changing multidisciplinary sciences and technologies

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

- 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
- 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
- Ethical and open geospatial software: Promote a culture of ethical and open geospatial software driven by diverse communities
- Structured guidance for computational reproducibility: Establish structured guidance for computational reproducibility in scientific research and education that are dependent on geospatial software
- High-performance and data-intensive geospatial software: Further the convergence of high-performance geospatial software with advancements in data-intensive and high-performance computing

The context of GSI's mission, vision, and goals

Geospatial Fellows – Research & Education Topics

- AI and deep learning approaches to supporting spatial decision making
- Characterization of human mobility patterns and trends
- Detection of COVID-19 hotspots
- Educational innovation responding to COVID-19 impacts
- Ethical considerations of locational data and geospatial analysis
- Geospatial frontiers of contact tracing
- Geospatial simulation and modeling for predicting the spread and impacts of COVID-19
- Geospatial analytics for understanding the social, economic, and environmental impacts of COVID-19
- Identification of vulnerable populations and high-risk settings
- Spatial accessibility to healthcare resources
- Etc.

ILLINOIS CyberGIS Center
FOR ADVANCED DIGITAL AND SPATIAL STUDIES

AAG American Association of Geographers

University Consortium for Geographic Information Science

AAG-UCGIS Summer School 2019

Reproducible Problem Solving with CyberGIS and Geospatial Data Science

University of Illinois at Urbana-Champaign

Monday July 8 - Saturday July 13, 2019

In July 2019, a week-long summer school on *Reproducible Problem Solving with CyberGIS and Geospatial Data Science* will be co-led by the CyberGIS Center for Advanced Digital and Spatial Studies (CyberGIS Center) at the University of Illinois at Urbana-Champaign (UIUC), American Association of Geographers (AAG), and University Consortium for Geographic Information Science (UCGIS). Approximately 30 graduate students and early career scholars will learn to collaborate in developing novel solutions to complex problems and to take advantage of geospatial data science and cutting-edge scientific advances and technical capabilities of cyberGIS (e.g., CyberGIS-Jupyter and Virtual ROGER: cybergis.illinois.edu/infrastructures). Participants will experience the types of collaborative and professional interactions that are key to addressing reproducible geospatial problem solving in the context of computation- and/or data-intensive research involving confidential geospatial data. The program is built on the success of the inaugural UCGIS Summer School in 2017, and ideal for those working on interdisciplinary and transdisciplinary topics, including but not limited to: data-driven social and environmental sciences, digital humanities, geospatial artificial intelligence, and remote sensing big data.

This Summer School will be hosted on the UIUC campus at Urbana, Illinois, USA from Monday July 8 to Saturday July 13, 2019. If you are a graduate student or early-career scholar new to cyberGIS and geospatial data science and want to learn more about integrating them into your research, or are already working on cyberGIS and/or geospatial data science approaches, this Summer School will offer new and exciting opportunities for your professional development, and will help you build connections with others in related fields. UIUC will offer travel awards through generous support of the National Science Foundation (NSF) for participating in the Summer School.

Member Login

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Announcements

Guido Cervone, from Penn State University, the winner of the 2019 Carolyn Merry Mentoring Award!

Apply Today for a Spot in our Summer School 2019! Funded!

Meet the 2019 TRELIS Cohort!

Iowa's Marc Armstrong Selected as a 2019 UCGIS Fellow

Current GIS&T Job Listings

Upcoming Events

Fri Apr 26, 2019
April 2019 Board Meeting
Category: Board Meetings

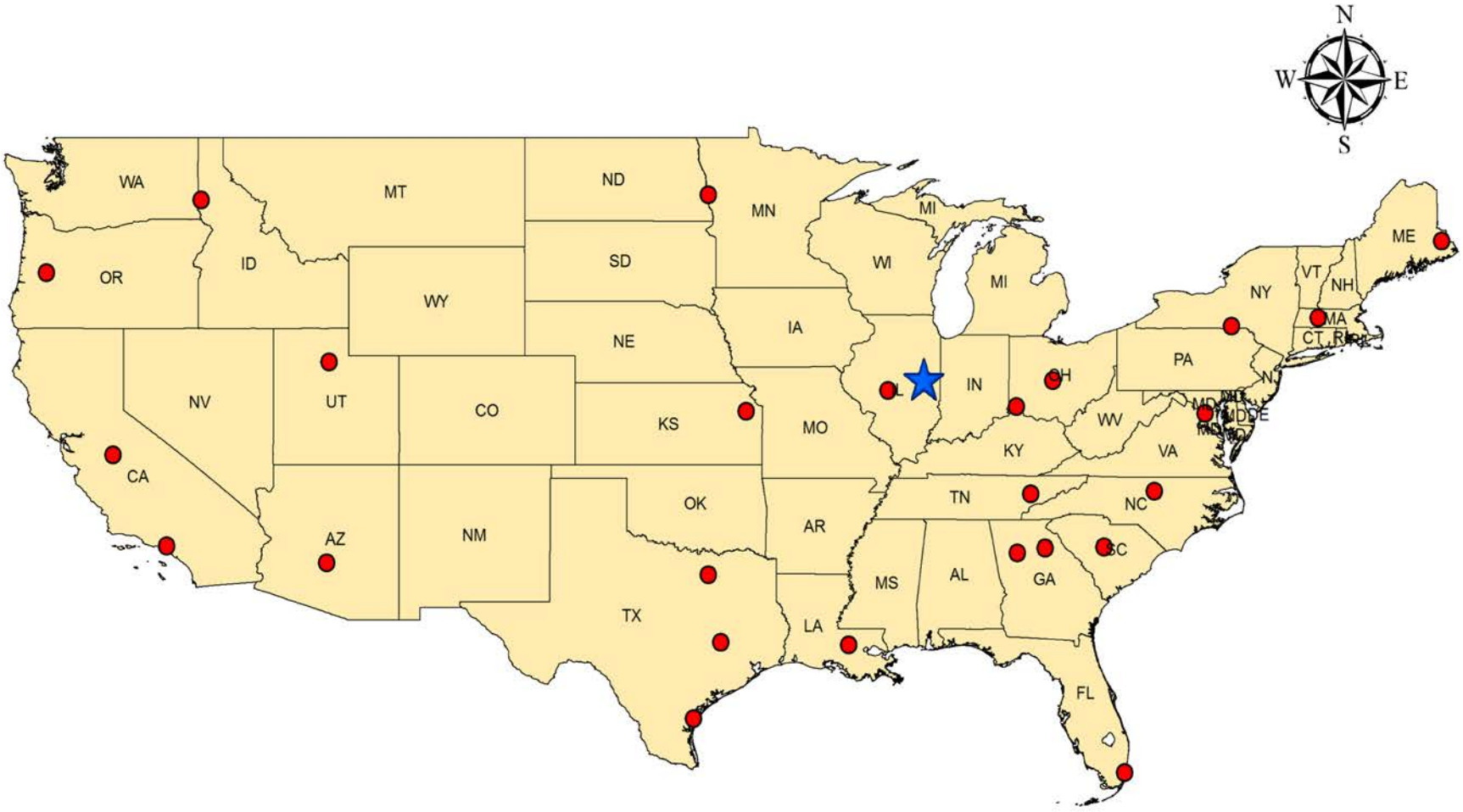
Sat Jun 8, 2019
TRELIS Washington DC 2019
Category: Other Events

Mon Jun 10, 2019
Symposium 2019
Category: Symposium

View Full Calendar

GSI

Toward a sustainable social and technical ecosystem to enable geospatial-inspired discovery and innovation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Miles
Distribution of 2019 summer school participants
University of Illinois at Urbana Champaign
Participants' institutions

Geospatial Digital Workforce

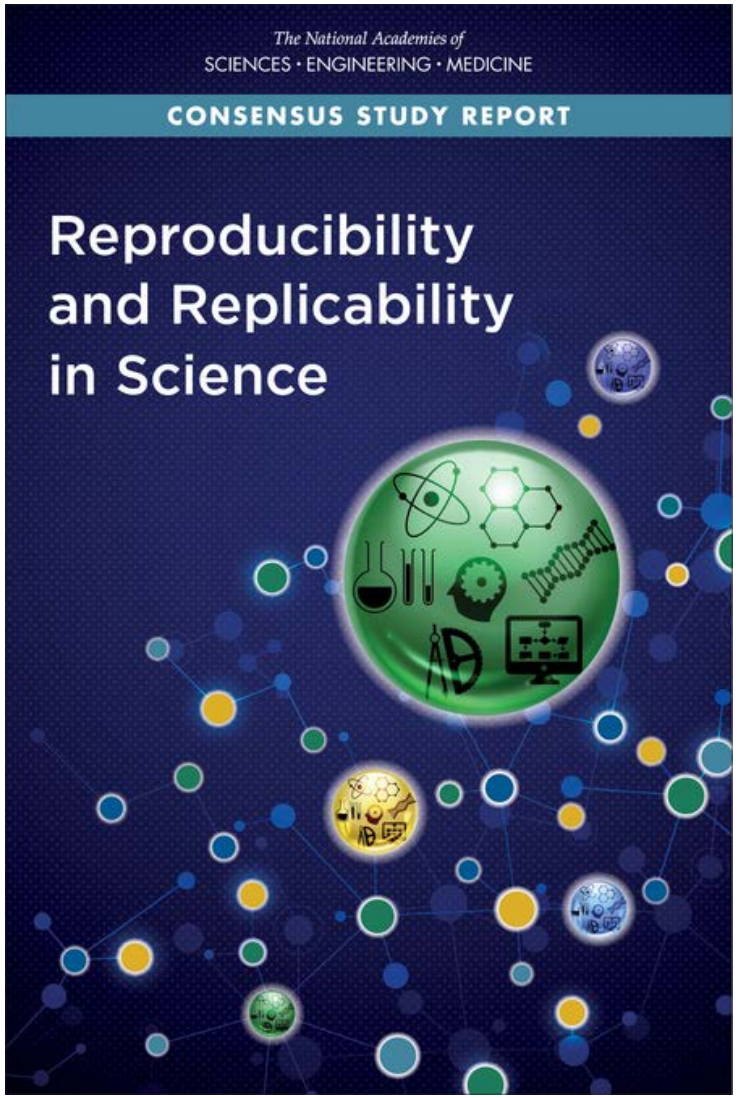
– Diana Sinton

- 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

Ethical and Open Geospatial Software

– Coline Dony

- Promote a culture of ethical and open geospatial software driven by diverse communities



COMMITTEE ON REPRODUCIBILITY AND REPLICABILITY IN SCIENCE

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THELMA COX, *Program Coordinator* (beginning January 2019)
LESLEY WEBB, *Program Assistant* (September 2018 through January 2019)
GARRET TYSON, *Program Assistant* (September 2017 through August 2018)
ERIN HAMMERS FORSTAG, *Consultant Writer*

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[1] Member of the National Academy of Medicine.

[2] Member of the National Academy of Engineering.

[3] Member of the National Academy of Sciences.

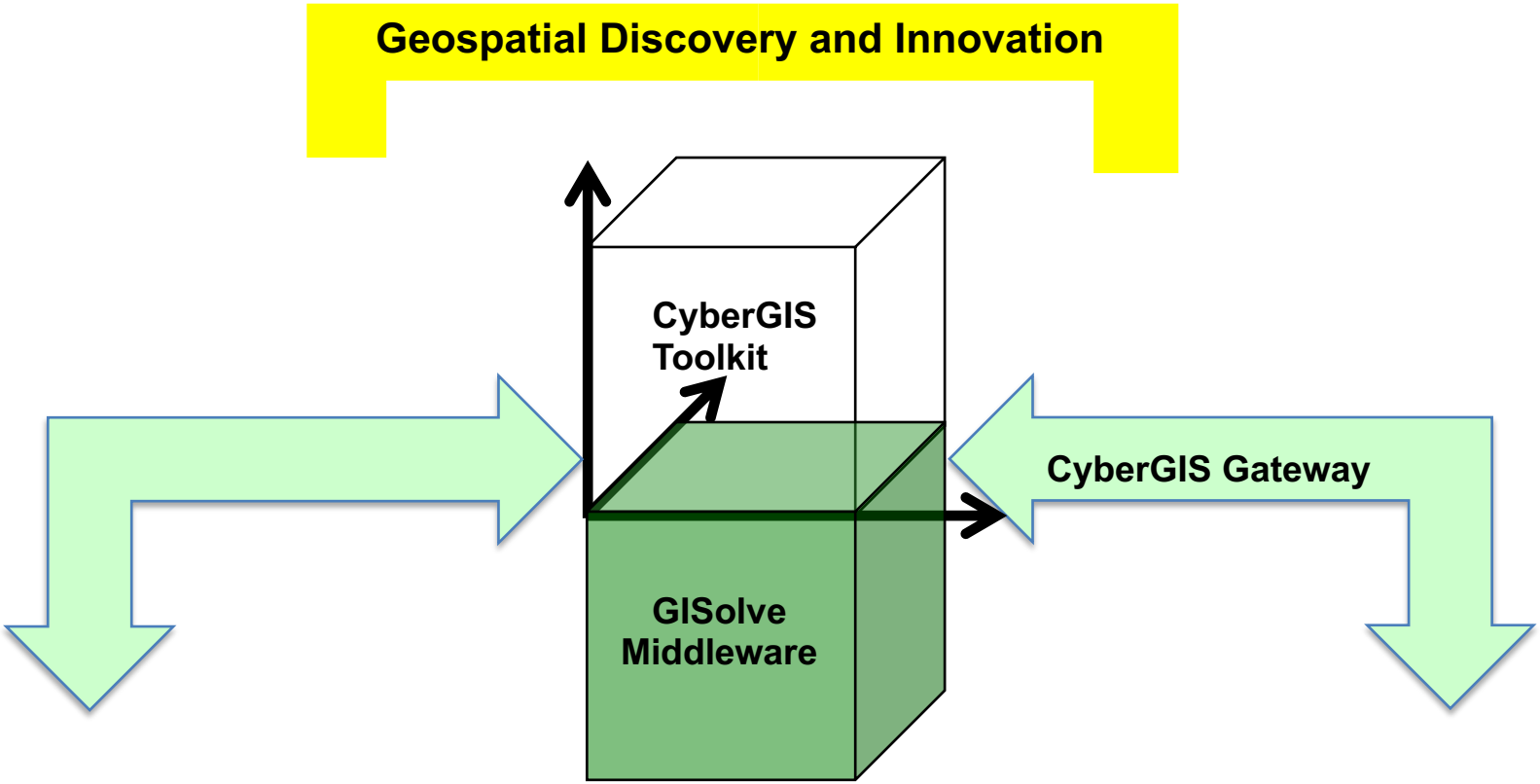
[4] Resigned from the committee July 24, 2018.

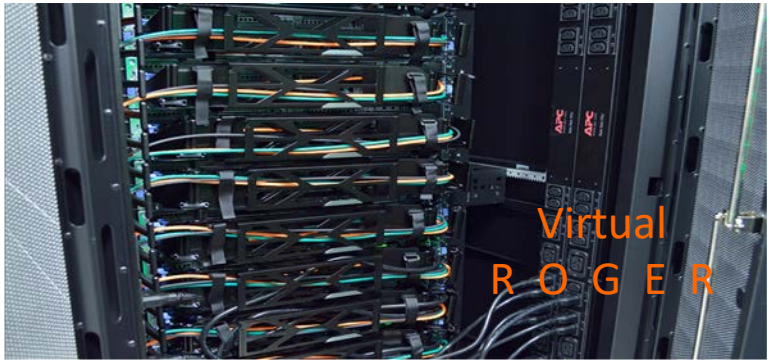
[5] Resigned from the committee October 11, 2018.

https://www.nap.edu/catalog/25303/reproducibility-and-replicability-in-science

Computational Reproducibility

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



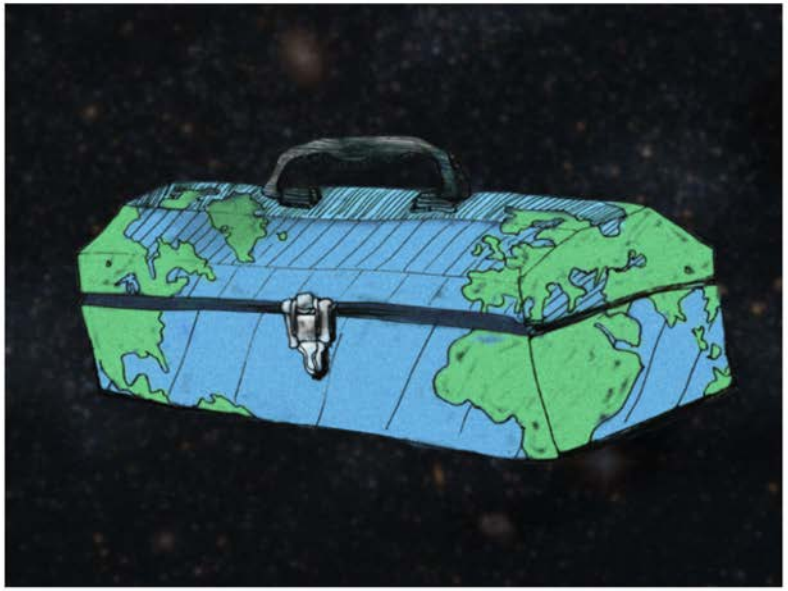


http://cybergis.illinois.edu

www.xsede.org

It's Time to Shift Emphasis Away from Code Sharing

Building well-documented, citable frameworks for Earth data analysis will encourage scientific replicability by addressing the underlying issues that inhibit code sharing.



As a community of Earth scientists, we need to develop holistically designed numerical toolboxes to ensure accuracy, transparency, and replicability. Credit: Adam S. Nelsen

By Chad A. Greene and Kaustubh Thirumalai · 20 February 2019

Have you ever watched a student struggle to perform a seemingly straightforward analytical procedure? It may be a routine preprocessing step, like detrending a time series or removing a seasonal cycle, but somehow the simple operations can stymie a student for weeks. It's tempting to assume that young people with their short attention spans are unwilling or unable to think through the task at hand,

Students may have little choice but to blindly tinker with code until things seem to work.

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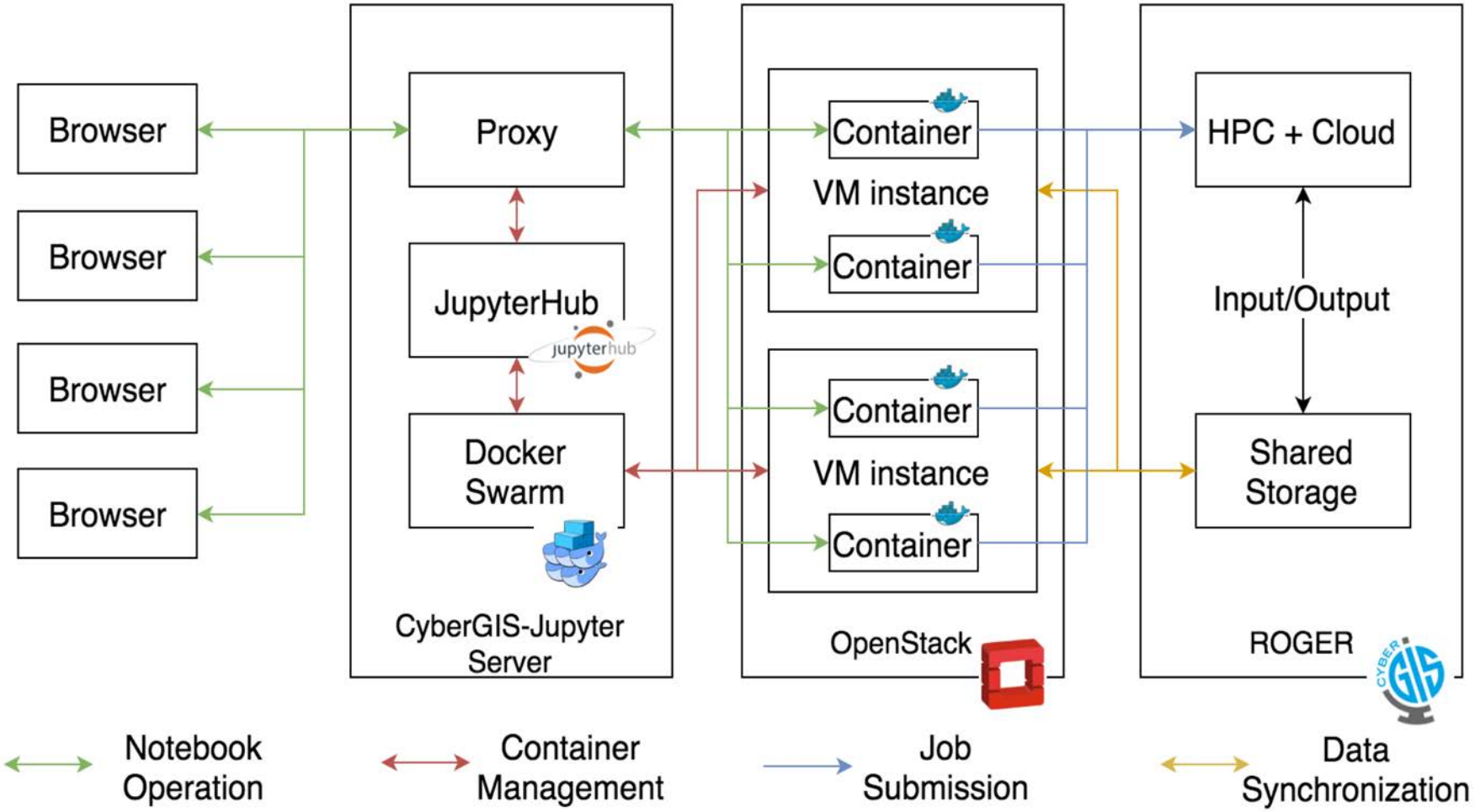
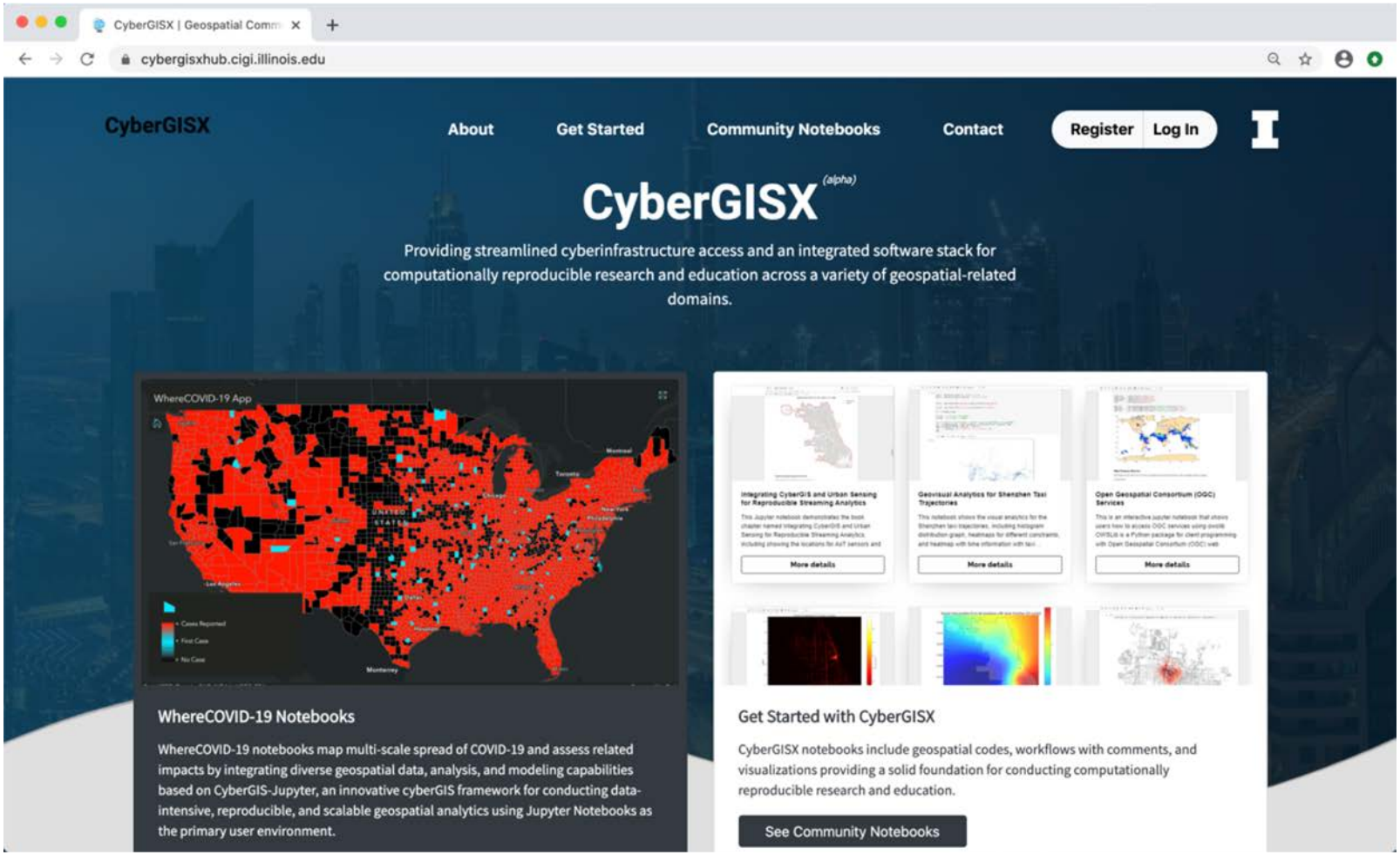
https://eos.org/opinions/its-time-to-shift-emphasis-away-from-code-sharing

CyberGIS-Jupyter



Yin, D., Liu, Y., Hu, H., Terstriep, J., Hong, X., Padmanabhan, A., and Wang, S. (2018) "CyberGIS-Jupyter for Reproducible and Scalable Geospatial Analytics". *Concurrency and Computation: Practice and Experience.* https://doi.org/10.1002/cpe.5040

Geospatial Hub for Convergent COVID-19 Research and Education



Community Engagement

- Collaboration commons
- Technical training
- Webinar series
- Virtual workshop

Eligibility

- Researchers and educators
  - Faculty of all career stages
  - Principal investigators of research groups
- Graduate students are not eligible to serve as principal investigators
  - They can work with their advisors who may serve as principal investigators
- Focus on institutions in the US
  - Exceptional cases can be made for international applicants
- No prior experience with cyberGIS or computational notebooks is required

Budget and Support

- Each Geospatial Fellow will be awarded between $2000 and $6000
- Focus on compensating for the time and efforts of Fellows
  - Most fellows might be paid honorariums
  - Fellows not eligible to receive honorariums will be accommodated on a case-by-case basis
- Fellows and their team members will be granted access to CyberGISX and associated cyberinfrastructure resources
- Travel support

Proposal Template & Submission

- Project summary (suggested length: 0.5 to 1 page)
- Project description (suggested length 2 to 3 pages)
- Deliverables and milestones (suggested length 0.5 to 1 page)
- References cited (not included in page count)
- Budget justification (not included in page count)
- NSF style 2-page bio-sketch (not included in page count)
- https://easychair.org/conferences/?conf=geospatialfellows2020

Activities and Timeline

- July 7, 2020: Call for Proposals released
- July 24, 2020: Introduction webinar
- July 31, 2020: Proposal submission due
- August 21, 2020: Notification of Geospatial Fellow awardees
- August 31, 2020: Announcement of selected Geospatial Fellows
- September 2020 to August 2021: Active collaboration among Geospatial Fellows
  - Biweekly calls (Dates and Times TBD)
  - Monthly community webinars led by Geospatial Fellows (Dates and Times TBD)
  - Tutorials on CyberGISX and Geospatial Hub

Key Deliverables of Geospatial Fellows

- A set of CyberGIS-Jupyter notebooks developed and contributed by a group of Geospatial Fellows for conducting cutting-edge COVID-19 research and education enabled by advanced cyberinfrastructure and geospatial software
- A COVID-19 Geospatial Hub for easy organization and sharing of these notebooks as computationally reproducible and scalable geospatial analysis and modeling software modules to foster collaborative research and education for the fight against COVID-19
- A white paper addressing the roadmap of geospatial software for advancing COVID-19 research and education by organizing a series of online community activities to bring together experts of both cyberinfrastructure and domain sciences

Community Inputs – So Important!

- This webinar
  - https://bit.ly/GeospatialFellowsQA
  - Recording will be available
- Strategic plan
  - http://bit.ly/GSIStrategicPlanDraft
- Twitter hashtag
  - #GSIfuture

GSI

Toward a sustainable social and technical ecosystem to enable geospatial-inspired discovery and innovation

Acknowledgments

- **National Science Foundation**
  - **OAC-1743184**
  - BCS-0846655
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  - OAC-1443080
  - OAC-1429699
  - OAC-1664119
  - OAC-1551492
  - OAC-1047916
  - XSEDE
- **AAG**
- **CUAHSI**
- **NORC, University of Chicago**
- **OGC**
- **UCGIS**

Thanks !

- **Comments / Questions?**
- **Email: shaowen@illinois.edu**