



SEED GRANT PROGRAM TO STIMULATE COLLABORATIVE RESEARCH (GISCoR)

REQUEST FOR APPLICATIONS

Key Dates

Date of Announcement: September 9, 2022

Letter of Intent (Required): September 30, 2022

Final Proposal: October 28, 2022 at 5:00 PM CDT

Anticipated Award Notice: December 16, 2022

Anticipated Period of Performance: 12-month performance period with a start date between

January 1, 2023 and July 1, 2023

To be submitted electronically via [Openwater](#)

Questions or inquiries regarding this RFA can be directed to: TGI@slu.edu

BACKGROUND

The Taylor Geospatial Institute (TGI), the nation’s leading academic center for geospatial science, is committed to making St Louis a global center of excellence in geospatial science research, education, and innovation. The St. Louis region is well-positioned to become the nation’s geospatial ‘Silicon Valley’ as laid out in the June 2020 “GeoFutures Strategic Roadmap,” a plan for strengthening St. Louis’s competitive advantage in geospatial research and technology. For more information on the Institute, please visit taylorgeospatial.org.

The Taylor Geospatial Institute envisions building a world-class, interdisciplinary geospatial science research collaborative to address scientific and societal grand challenges (e.g food systems, health systems, and national security). To achieve this goal, the Institute is committing to this **Geospatial Institute Seed** grant program to stimulate **Collaborative Research (GISCoR)**, which is designed to encourage collaborative research projects in core geospatial science and applied domains. The seed grant program in this Request for Applications seeks to develop exploratory research ideas that lead to large collaborative research grants from funding agencies such as NSF, NIH, DoD, NASA, USDA, or other foundations.

LETTER OF INTENT (LOI) (REQUIRED)

The LOI should include a descriptive title of the proposed research, a brief proposal summary, a list of senior personnel, and a list of partner institutions. The LOI cannot exceed two pages.

Please email a pdf of the LOI to TGI@slu.edu no later than Friday, September 30, 2022 at 5:00 PM CDT.

LOI submissions are for internal planning purposes only in order to assemble potential reviewers for this funding opportunity. Reviewers will not see your letter of intent and it will not affect how they score your application.

PROPOSAL DEADLINE

Proposals must be submitted via [Openwater](#) no later than **Friday October 28, 2022 at 5:00 PM CDT**. Late proposals will not be considered.

To submit through Openwater, please use the following link: <https://slu.secure-platform.com/a/organizations/main/home>. If you do not already have an Openwater account, please follow the instructions on the page to create a new profile. Once you have created a profile, you will be able to submit your application and materials by selecting the “Submit Now” link next to the GISCoR application in the list at the bottom of the page. We recommend you create your profile and access the system in advance of the proposal deadline to allow time for

any issues to be resolved prior to the deadline.

Please upload all materials in PDF format.

RESEARCH PRIORITIES AND SCOPE

Through this Request for Applications, the Taylor Geospatial Institute (TGI) aims to address grand societal challenges in food systems, health systems, and national security using cutting-edge geospatial technologies, data, and analytics, as well as to build upon the broad existing research strengths in the St. Louis region. The goal is to advance core geospatial science and adjacent fields, and foster research that can improve food security, health and social equity, as well as strengthen supply chains, smart cities, and resilient communities.

Applicants are encouraged to read the research priorities provided in Appendix A.

Proposals should have strong geospatial components that:

- 1) develop new geospatial tools (software, algorithms) that advance geospatial science,
- 2) design and develop sensors or robotic platforms to generate new data, or
- 3) use location-aware datasets to address societal and scientific challenges.

Proposals to develop new educational programs or training materials may be supported through this seed grant program, if the current and future benefits for research can be established.

Proposals that fall outside the scope of TGI research priorities as described above or that aim to conduct fundamental research that do not require geospatial data or tools will be deemed noncompliant and either returned without review or declined after review.

ELIGIBILITY

Principal Investigators (PI) must be full-time, tenure-track/tenured faculty members at a [TGI member institution](#) or full-time researchers at a TGI institution with permanent PI status. Faculty or research scientists without permanent PI status may participate in applications as Co-PIs or Co-Investigators. PIs can partner with Co-PIs and Co-Investigators from any research or academic institution located in the United States of America.

DESCRIPTION OF THE SEED GRANT PROGRAM

The seed grant program is designed to allow institutions to fund undergraduate and graduate students, post-docs, faculty effort, and research supplies and materials. Students and faculty at

different universities working on the same research will develop a genuine regional network for partners in geospatial research.

Proposals for two classes of research projects—differing in scope and goals—are supported through the GISCoR:

Small projects may request a total budget of up to \$75,000 for a period of up to 12 months. The small project grants are well suited for efforts to develop new partnerships and innovative ideas that may lead to an external proposal submitted to NSF, NIH, NASA, DoD, or other agencies. Submission of one major external grant proposal with at least one partner institution is required by the award completion.

Large projects may request a total budget of up to \$200,000 for a period of up to 12 months. The large project grants are well suited to develop proposals for new centers or large-scale multi-disciplinary research projects. Submission of at least two major grant proposals (of at least \$500,000 each) or one multi-million dollar grant proposal with at least two partner institution is required by the award completion.

The Institute will provide up to ten small projects awards and up to four large project awards in this RFP.

A major grant is a grant of at least \$500,000 or a grant which enables the research consortium and its faculty to make significant progress towards the TGI mission and vision. For example, major grants should enable significant progress in a particular TGI research area, create a new capability for the TGI consortium as a whole, and/or develop a real-world solution to a critical global challenge.

No-cost extensions are allowed if extra time is needed for a PI to submit grant proposals to the most appropriate calls and funding agencies.

It is desirable for the GISCoR applications and subsequent grant submissions to include 1) one or several TGI partner institution(s), and 2) the use of the Institute's research and data services.

TIMELINE

Key Dates	Deadline
Notice of Opportunity	September 9, 2022
Letter of Intent	September 30, 2022
Proposal Submission	October 28, 2022
Award Notice (anticipated)	December 16, 2022

Period of Performance (anticipated)	12-month performance period with a start date between January 1, 2023 and July 1, 2023
Deliverables (report, proof of external grant submissions, data, etc.)	End of the performance period. No-cost extension is allowed.

PROPOSAL CONTENT AND FORMAT

Proposals should be prepared in the following format and be submitted as pdfs in [Openwater](#).

Title Page:

- Include the project title and name of the proposing institutions along with the names, addresses, telephone numbers, and e-mail addresses of the PIs and senior/key personnel.

Body of Proposal (*no more than 3 pages, single-spaced, 12pt Arial or Times New Roman font with one-inch margins*):

- Project summary
- Research plan including specific aims, significance, preliminary studies (if any), approach, intrinsic merit, outcomes, and broader impacts.

Other Required Documents:

- List of targeted grants including but not limited to funding agency/foundation/company, anticipated total funding request, deadlines, and links to current or previous RFPs. Please provide an explanation of the benefits of the selected grant if the grant award is below \$500K.
- References
- Budget using the provided budget template
- Budget justification up to two pages in length
- Timeline up to one page in length with milestones for completing the scope of the work
- NSF-style biosketch(es) of PIs and Key/Senior Personnel

BUDGET

The total amount of funding requested should not exceed

- \$75,000 for small projects proposals and
- \$200,000 for large projects proposals

Allowable project expenses include salary for senior personnel and postdocs; fringe benefits; minor research equipment less than \$5,000 and supplies; domestic and international travel; stipend, tuition, and healthcare costs for students.

PIs can request funding to cover no more than two months summer salary over the course of the year. Funds may not be used to purchase capital equipment exceeding \$5,000.

No overhead can be charged to the seed grant.

Finally, the entire seed grant amount will be transferred to the home institution of the PI on the proposal. It is the responsibility of the PI and the PI's home institution to disburse the funds to the partners.

REVIEW PROCESS

The Taylor Geospatial Institute will assemble a panel of subject matter experts and geospatial experts to complete the review of the proposals. Reviewer feedback on the applications will not be provided.

Proposals will be reviewed, evaluated, and selected based upon the following criteria:

Relevance (30%): Proposed projects should relate to one or more of the research areas of emphasis (see Appendix A). Projects that advance the geospatial science field by creating new tools or algorithms, or that promote the creative use of geospatial data in other disciplines are highly desirable.

Partnerships (20%): Partnership with multiple institutions in the St. Louis region or national partners in the execution and dissemination of the proposed work is desirable. Using data collection, curation, and analytics services provided by the Taylor Geospatial Institute research infrastructure is of considerable interest.

Overall Merit (20%): The overall merit of the proposal includes (1) the feasibility to achieve the proposed project goals, (2) intellectual merit to advance knowledge, and (3) broader impacts that encompass the potential to benefit society. Program outcomes that justify the total program costs and evidence that the scale of the proposed activity is commensurate with funding will be used as a primary consideration in project selection.

Project Execution (15%): A plan and structure for the efficient operation of the proposed work must be evident.

Budget (15%): An appropriate and realistic budget that demonstrates the effective use of funds.

Although not directly reflected in the scoring criteria above, the past performance of the PIs and home institutions will be considered in the final selection process.

REPORTING REQUIREMENTS

A final report providing the outcomes of the funded activities will be required. Reports should include the following information:

- results and achievements of the initiative(s) as defined by the metrics and expected outcomes stated in the proposal,
- final financial summary including all income and expenses related to the project,
- proof of external grant proposal submission (including submission material), and
- data if collected as part of the project

Although not required as it falls outside of the performance period, the PIs are encouraged to present their work at the annual Geo-Resolution Conference and/or at a TGI Research Day or workshop.

A no-cost extension is allowed and will impact the timing of the reporting requirements.

FREQUENTLY ASKED QUESTIONS

Question: If I am a geospatial researcher who is not at any of the TGI [member institutions](#) can I apply for this seed grant?

If you are a faculty member or researcher at a university or institution that is not a TGI member, you can only apply as a Co-PI or a Co-I. The PI must be affiliated with a TGI member institution. Interested researchers at non-member institutions are encouraged to explore partnerships with eligible faculty and researchers at member institutions. Please consult the [directory of TGI associates](#) to learn about affiliated faculty members at TGI member institutions.

Questions: What research infrastructure will be available?

TGI has substantial research infrastructure and is actively building more. Available data services include indoor hyperspectral scanning, UAV data collection (hyperspectral, thermal, LiDAR, RGB), a machine-learning-ready data lake of various satellite data (SAR, optical, thermal), cloud computing, and big data analytics. If you have specific needs or questions in mind, inquiries can be directed to TGI@slu.edu

Question: Is the proposal content and format the same for both the small and large project grants?

Although this program will fund two classes of research projects that differ in scope and goals, the proposal content and format are the same. Applicants are encouraged, however, to make sure that their materials respond to the proposal criteria for the type of project grant to which they are applying.

Question: I have a project that would be good for this program, but I expect it will take longer than 12 months. Can I apply for a longer performance period?

The performance period for this program is 12 months, with a start date between January 1, 2023 and July 1, 2023. All work for proposals should be able to be completed in 12 months, even if it is part of a larger, longer project. No Cost Extensions (NCEs) are allowed only if needed because specific grant deadlines fall outside of the performance period.

The purpose of the grant is for a PI to perform some early research and build a team in order to apply to major multi-year grants. Successfully winning these major grants will ensure the long-term funding of the research and establish the PI and the region as leaders in the field.

Question: I am a post-doctoral researcher. Am I eligible for this program?

Only tenured or tenure-track faculty or full-time researchers with PI status at TGI partner institutions are eligible. However, the Geospatial Institute also has a postdoctoral researcher program available here: <https://slu.wd5.myworkdayjobs.com/Careers>

Question: If I have questions that aren't answered here, who do I contact?

Questions or inquiries regarding this RFA or other TGI initiatives can be directed to TGI@slu.edu.

APPENDIX A – RESEARCH FOCUS AREAS

OVERVIEW

Building upon the St. Louis region’s competitive strengths, the Geospatial Institute will address grand societal challenges in food systems, health, and national security with cutting-edge GeoAI and data analytics techniques. The Institute will generate research to improve food security, health and social equity, and build smart cities and resilient communities, and promote economic development through translation to commercial application and by training the next generation of the workforce (Figure 1).

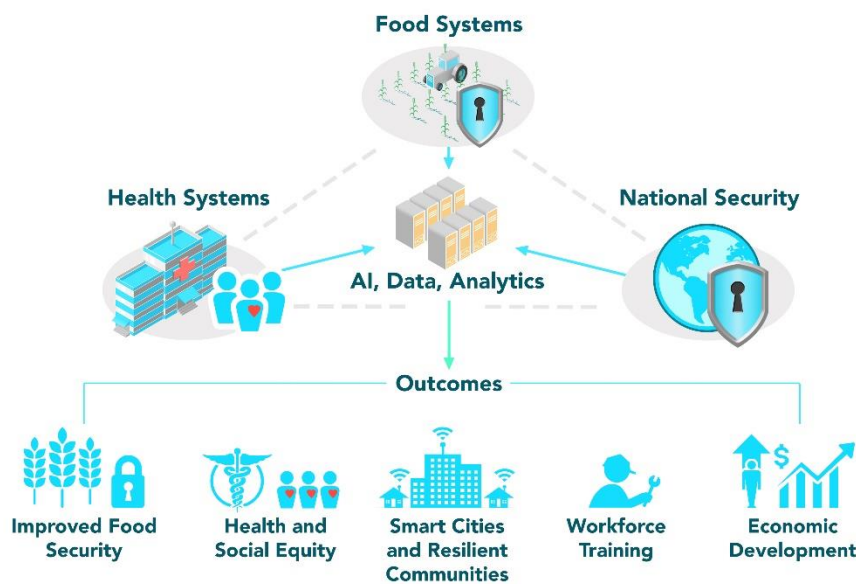


FIGURE 1. ADDRESSING GRAND SOCIETAL CHALLENGES AND OUTCOMES.

FOOD SYSTEMS

Everything comes from plants, not just the food on our dinner table, but everything from medicine, meat, to the strongest rubber used in spaceships.

One of the most challenging global problems today is feeding the growing global population, which will require increasing agricultural output by 70% in the next several decades. Food security is also an important national security issue and a major cause of social instability in many parts of the world. To address this challenge, we need to revolutionize the way we grow crops. We need to: create better crops that can thrive in the future climate with less water; utilize big data, advanced algorithms, and cloud computing at scale so we can monitor crops to improve yield and optimize resource use; and develop geospatial artificial intelligence to teach crops how to adapt to changing environments. To accomplish these goals, we must develop the capability to effectively harness big data and turn that into actionable crop intelligence with precision and speed. This important

technology should help address our societal needs and improve our quality of life.

Geospatial science is fueling innovation and adaptation in food security and agriculture ecosystems by enhancing efforts to develop new crops and improve existing ones that meet both economic demands and ecological requirements. Data-driven AI, multi-scale imaging from satellites, drones, and ground robots have pushed the envelope of technological developments. These advances can automate crop monitoring and compute precision farm directives for every farm in the world every week, covering about 1.76 billion hectares, and show farmers when to plant, fertilize, and harvest, as well as what their crop needs to improve yields and reduce input costs. With this technology, farmers can increase yields as much as 35% while lowering costs up to 25% using precision fertilization.

The St. Louis region boasts more than 1,000 plant science Ph.D. researchers, extensive research infrastructure, and a booming agtech sector, and thus is widely recognized as an international epicenter of agriculture research. The Geospatial Institute will build on this strong foundation, expanding on existing partnerships with regional institutions including the Donald Danforth Plant Science Center and regional universities, to address key challenges in food and ecosystem security including crop adaptation to changing climates and enhanced ecosystem functioning of our agricultural systems. Geospatial science is a powerful tool that is required to leverage agriculture as a means to combat climate change, regenerate soils and water systems, and reduce human impacts on biodiversity, while simultaneously producing food.

HEALTH SYSTEMS

Human health is largely determined by where we were born and live. From the air we breathe to the water that we drink, these resources are the building blocks of our health. Geospatial health builds on these very complex, and now easy to measure, air quality and water access and cleanliness concepts, to enhance what we know about where we work, live, and play. Geospatial technology and science have grown our

opportunities in measuring location and its influence each day as we travel through our communities. Data from smartphones and watches, activity trackers, social media, and satellite imagery can better inform the drivers of community health throughout the world. Some examples of how we continue to grow the knowledge and application of geospatial tools in health include developing and implementing multi-sensor infectious disease prediction modeling, perception health, and extended e-health tools such as telehealth and app and sensor-based tools.

Through advancements in technology, nontraditional public health and healthcare data from disparate sources can be combined to inform an early sensing system that would provide real-time COVID-19 risk assessments. The data sources include measures of community mobility such as app-based symptom tracking and contact tracing, anonymized smartphone data, geolocated social media mentions, satellite imagery analyses to identify vehicle traffic patterns of health care

"St. Louis region has substantial and highly specialized healthcare industry sector with significant activities and opportunities for innovation. Geospatial visualization and analysis is critical for improving healthcare delivery and health outcomes as demonstrated by use of spatial analysis in helping to guide health responses to COVID-19 pandemic, including identifying hotspots down to specific streets." – Geofuture Roadmap

locations, and geolocated search terms. Synchronizing these data sources and fusing them to develop real-time models provide insights into community-level COVID-19 risks. There is great value in having this type of real-time risk assessment that can be used to identify health-related risks including risks related to the global COVID-19 pandemic, and other, more local examples like food poisoning from a restaurant. This type of early sensing system can enhance health equity by providing continued real-time data and analytics to devise needed real-time interventions.

Geospatial health research informs opportunities for workforce training in disaster preparedness and linking a trained workforce to locations where there is a need for healthcare workers. The tools we are devising will assist in growing, training, and preparing a workforce prior to arrival in locations that are experiencing disasters and other needs. The COVID-19 pandemic highlighted the lack of infection control preparedness. These tools and skills are necessary to have comprehensive response plans for a diverse workforce. For example, advanced supply chain management techniques for diverse health-related needs can also be explored. In addition to training and linking the workforce to locations in need, we are conducting a vaccine optimization study that leverages community mobility as a predictive and prioritized variable in the way vaccination allocation decisions are made. These types of analyses can be applied to many other challenges as well.

NATIONAL SECURITY AND GEOINT

Geospatial technologies are the new macroscope to execute on NGA's vision of "Know the Earth...Show the Way...Understand the World".

In 2017, the U.S. Department of Defense (DoD) decided to locate the new \$1.75 billion National Geospatial-Intelligence Agency West (NGA-W) facility in North Saint Louis. When NGA-W opens in 2025, it will directly employ thousands of highly skilled employees. More importantly, a "geospatial ecosystem" of new knowledge-

intensive businesses is expected to grow and generate thousands of new high-skill jobs in the surrounding area.

As the home for NGA-W, St. Louis has a strong legacy in mapping, geospatial analysis, and research and development primarily related to national security and defense. With over 350 companies in St. Louis supporting the NGA's mission with technologies involving advanced computing and geospatial analytics, national security is an anchor for regional geospatial research, training, and innovation.

National security and GEOINT encompasses all aspects of a geospatial science core, adjacent fields, and application domains from food security, political unrest, public health, environmental hazards (droughts, earthquakes, wildfires), and climate change. It includes but is not limited to the analysis of literal imagery, geospatial data, and information derived from the processing, exploitation, literal, and non-literal analysis of spectral, spatial, and temporal fused products utilizing computer vision, AI/ML, cloud computing, cyber-physical systems/IoT, and autonomy, among other critical technologies. These types of data can be collected on stationary and moving targets by electro-optical, synthetic aperture radar (SAR), related sensor programs, social media, mobile devices, and non-technical means (including geospatial information acquired by personnel in the field).

U.S. National Security research aims to maintain a leading edge over adversaries in digital revolution and cutting-edge technologies such as GPS, GPS alternatives, GeoAI, etc. The lack of talent with deep expertise trained through years of research in geospatial core has been recognized as a major national security threat as revealed in a recent article from NGA Director Vice Admiral Sharp¹. Through the nexus of industry-university-government-community engagement around geospatial science and technology and research in food systems, health systems and application areas such as climate, water, and environment, the Geospatial Institute will make a significant impact on the national security complex through innovation and by creating tomorrow's highly skilled workforce required to keep America safe.

¹ <https://www.c4isrnet.com/opinion/2021/08/01/geomatics-is-vital-to-us-national-security-our-advantage-is-at-risk/>