Creating
Science Gateways
Success Stories

Offering resources, services, experts, and ideas for creating and sustaining science gateways

https://sciencegateways.org

SGCI

Science Gateways
Community Institute

A Note from Our **Director**

In work dating to 2003, we've seen firsthand how science gateways can change the face of research and scholarship. We saw the promise but also the challenges that gateway developers face. We wanted to make a difference.

Devising solutions through years of studies, we were thrilled to launch the Science Gateways Community Institute (SGCI), funded by the National Science Foundation in August of 2016. We envision a place for researchers, scientists, and students interested in building, improving, or using science gateways to turn for resources, expertise, community support, and education. Our selection of resources and services is based on more than five years of qualitative and survey research that helped us better understand how gateways succeed, how creators can benefit from supplemental services and resources, and where gateways might develop in the future.

With more than forty highly-qualified staff members with wide-ranging expertise covering everything from building custom gateway technologies to business planning and sustainability best practices, we help speed the development of more robust, less expensive, and more sustainable gateways.

Already, we have made a significant impact in the science gateway community and, in the pages that follow, we share some of the ways that we've done so. Our hope is that you'll discover ways to take advantage of our rich spectrum of resources so we can have an impact on your gateway, too.
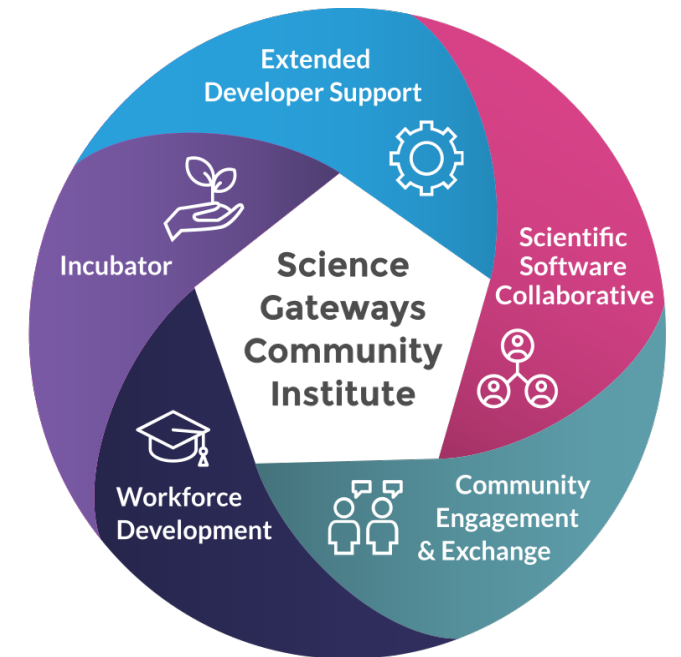
We look forward to welcoming you to the SGCI community!

Nancy Wilkins-Diehr
Director

Who We Are

Science Gateways are interfaces that provide researchers and scholars with access to tools, equipment, applications, data collections, and collaborative spaces that are integrated through community-designed web-based environments. They exist in all fields, from the sciences to digital humanities, and can serve many purposes. The use of gateways can significantly improve the productivity of researchers, but the process of developing, operating, and sustaining a gateway can be challenging and time-consuming.

The Science Gateways Community Institute (SGCI) was established to fill a clear need. We provide resources, services, experts, and ideas for creating and sustaining science gateways, at little or no cost to our clients. A collaboration among seven U.S. universities, SGCI strives to serve the gateway community by enabling innovation, collaboration, and efficiency. SGCI reaches and impacts the science gateways community in a variety of ways, allowing researchers, students, and others increased access to cutting-edge tools and resources.

Extended Developer Support

Scientific Software Collaborative

Incubator

Science Gateways Community Institute

Community Engagement & Exchange

Workforce Development

M. Drew LaMar
Assistant Professor
College of William and Mary
QUBES Science Gateway

SGCI is a community of like-minded colleagues interested in the same things we are, which is maximizing the impact and minimizing the pains of utilizing cyberinfrastructure in faculty's research and teaching.
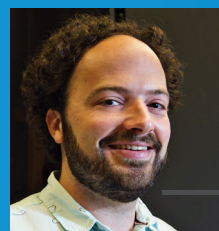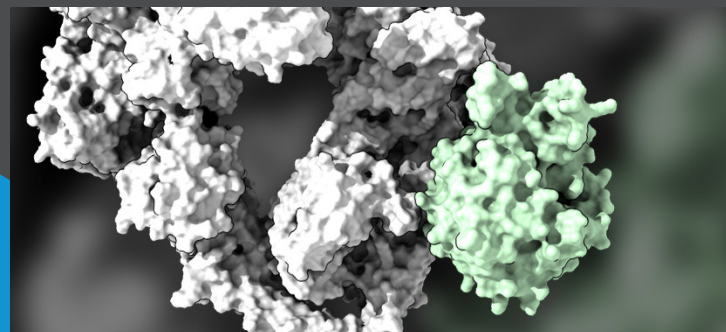
Consulting Services
Custom Development

Our team of hands-on consultants has experience with a wide range of programming languages and environments, gateway infrastructures, and tools for building gateways. By working with SGCI consultants, gateway project teams have had the benefit of working one-on-one with knowledgeable developers who helped them adapt to new resources, technologies, and users. Having this type of hands-on support from qualified developers would otherwise be too costly for most projects to afford.

Here are just a few examples...

COSMIC²

Over the last 5 years, cryo-electron microscopy (cryo-EM) has undergone advancements that has led to a revolution in the field of structural biology—so much so, that the Nobel Prize in Chemistry 2017 was awarded to three scientists for cryo-EM. The COSMIC² science gateway offers an easy, web-based platform for structural biologists to determine macromolecular structures using cryo-EM. The COSMIC² team worked with SGCI consultants to integrate new technologies that make it possible for structural biologists, who are not High-Performance Computing experts, to analyze and transfer terabyte-sized datasets.

Michael Cianfrocco
Research Assistant Professor
Life Sciences Institute,
University of Michigan

We knew that the need was there for a cryo-EM gateway, and having the experts at SGCI available made the gateway development process much more efficient since they have the starting technologies to work with and they know how to solve the unique problems facing gateway developers.
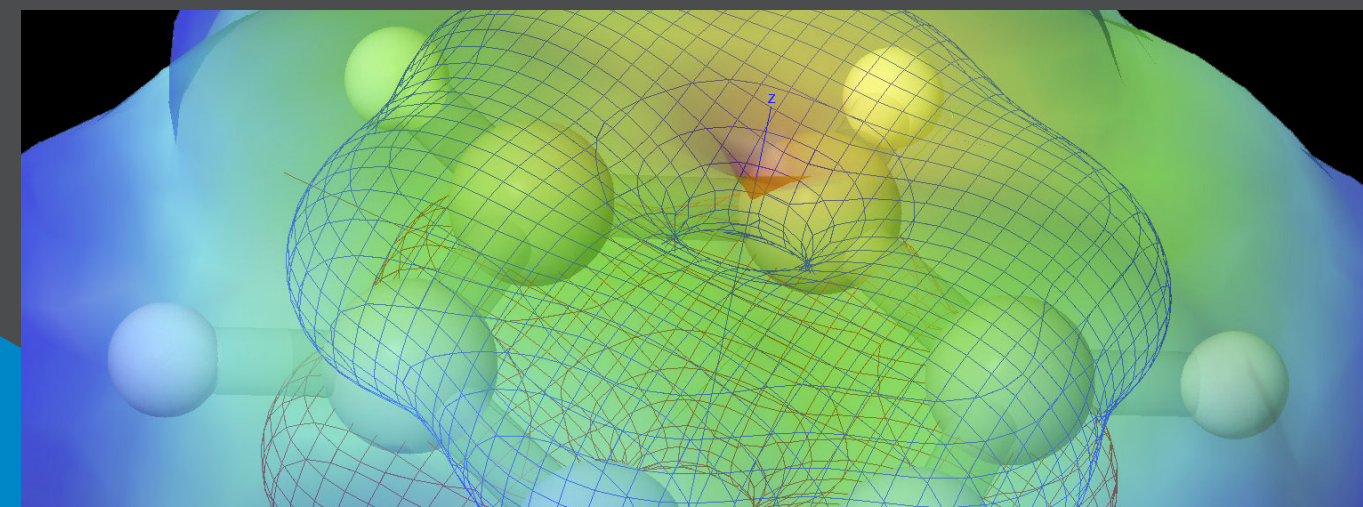

I was stuck using a small server provided by my university but, by working with SGCI, I was able to transition to much better hosting on Jetstream. Now our Chem Compute science gateway can serve many more undergraduate students simultaneously, and classes are already taking advantage of that.

I would definitely tell people to pursue services with SGCI. It's a big benefit to talk with other people who do the same things and to not work alone because you can waste a lot of time by working alone.

Mark Perri
Associate Professor of Chemistry
Sonoma State University

Chem Compute

The Chem Compute science gateway had humble beginnings as a small, classroom operation started by Mark Perri at Sonoma State University, a Hispanic-serving Institution. Mark wanted to grow the gateway and make it available to more users but also recognized that he couldn't do it all on his own. By engaging with SGCI, Mark was able to get his gateway set up on an improved web framework and also gained hosting capabilities that have allowed him to support more job submissions. Not only are his own students now submitting a significantly increased number of jobs, but Mark is also enjoying watching a growing user base of people across the U.S., with the number of users more than doubling and the number of jobs submitted quadrupling since SGCI implemented the changes.

Specialized Expertise

PlantingScience

PlantingScience is a Botanical Society of America program that serves middle- and high-school teachers and their students by providing online mentoring support and a host of resources for student-led, plant-science investigations. A recent site redesign was not completely intuitive to users and needed help. As a result of an in-depth consultation with master's-level usability interns within SGCI's Incubator area, the PlantingScience team successfully doubled the number of teachers and student teams supported by the program. The changes also position the team to grow even further.

QUBES

QUBES was born out of a desire to address the nation's growing need to better prepare undergraduate biologist with quantitative and computational skills. The gateway operates as a virtual hub providing resources for faculty, projects, and organizations interested in teaching these skills. The QUBES team has worked with SGCI in a variety of ways, but one feature that Extended Developer Support (EDS) helped them implement—and that their users are raving about—is the ability to "fork" existing teaching materials. Most commonly, forks are used to either propose changes to someone else's teaching materials or to use them as a starting point for one's own idea. The QUBES team knew that providing this feature would help their users to be more efficient, but an additional benefit is that QUBES can now better track how many times a resource has been forked, which has the potential to provide powerful evaluation metrics that can be shared with key stakeholders and funding agencies.

Sam Donovan
Lecturer, Biological Sciences
University of Pittsburgh

As education experts, we have some strong opinions about the types of faculty activities we want to support—but realizing those ideas in a gateway context was beyond our capacity. Working directly with programmers and development project managers through the EDS program was personalized, professional, and extremely productive.

Catrina Adams
Education Director
Botanical Society of America

The PlantingScience.org online mentoring program was scaling up and we needed to put more control into the hands of our teacher-users without overwhelming them. By working with the SGCI user experience consultants, we were able to design new interfaces that gave teachers the tools to set up their own students' teams and find scientist mentors to work with. Not only are teachers happier now because they have more control of their experience and timeline, but we have reduced the number of hours our staff team spends setting up projects and helping teachers with mentor matching. We were successfully able to double the number of teachers and student teams supported by the program, and the changes make it easier for us to grow.

Learning + Exchange

For both current and future gateway project leaders and developers

We create spaces for colleagues to meet and share experiences—both online and in person—across disciplinary, organizational, and international boundaries. We design these opportunities to engage and learn with the benefit and growth of the science gateways community in mind.

> *The SGCI Bootcamp has fundamentally altered, in a constructive way, my view toward developing and implementing the projects on which I work. The work during the week helped me to generate a new approach to the gateway on which I'm working that has much greater potential to be successful, and I intend to apply the ideas and concepts from the Bootcamp to all project phases, from idea to implementation.*
>
> **Christopher Lenhardt**
> *Domain Scientist for Environmental Data Science & Systems RENCI Data Observatory*

> *...a rip-roaring, intensive ride through tested methods that help project leaders define and execute successful projects.*
>
> **Nancy Maron**
> *Bootcamp Instructor & Founder and Principal, BlueSky to BluePrint*

Bootcamp: Flexing Management Muscles

Our Science Gateways Bootcamp is popular among leaders of gateway projects who are working toward further developing and scaling their work. During the intensive, week-long workshop, gateway teams learn from SGCI instructors how to articulate the value of their work to key stakeholders and how to create a strong development, operations, and sustainability plan. This is a unique opportunity for members of the science community to learn about business, technology, and sustainability best practices that are generally not part of what gateway creators are taught in their post-graduate programs.

Student Programs: Paving a Path for the Next Generation of Gateway Developers and Users

Our experts share their knowledge in a range of one-day to multi-week workshops for students, the next generation of science gateway users and developers. Geared toward teaching about the use or development of science gateways, our workshops are hosted at national conferences or during the summer.

Georgio Proctor | Student, Jackson State University
I really enjoyed the hands-on section of the workshop. The workshop will help me run computational experiments with my research and also allow me the opportunity to help my colleagues out with their research. I can now log on to SEAGrid and create projects which I couldn't do before, and I also learned new terminology and processes that are essential for using the program.

Eight-week summer internships are available to students interested in growing their gateway development skills. Students are placed at a variety of institutions and partner sites who are seeking interns to help them develop gateways.

Tatyana Matthews | Student, Elizabeth City State University
Considering all of my internships, it was my internship at TACC where I felt the most equipped to do the research assigned to me! My past experience with HTML, Bootstrap, building wireframes, and Python helped me tremendously in transforming research ideas into a reality.

Connecting and Sharing with New & Old Colleagues from around the World

The Gateways conference series is hosted each fall and offers gateway developers and users an opportunity to connect with and learn from colleagues with diverse experiences, approaches, and academic interests, building and expanding on related events held since 2005. The conference is hosted at a different U.S. location each year and features tutorials, paper and demo presentations, keynotes, and panels. A journal special issue, jointly organized with gateway workshops in Europe and Australia, has created a venue for valuable contributions to practice and experience, building a library of knowledge about gateways.

Growing Our Community Knowledge Base

Here are some other ways that we're having an impact on the science gateways community. Come explore and share your own resources and expertise!

FIND RESOURCES IN ONE PLACE

- **Gateway Catalog:** Find or share operational gateways and software components to use in your research and teaching.

- **Research:** Access a curated collection of relevant papers and reports.

- **Educational, Training + Curricular Materials:** Explore ready-to-use content for growing your skills and understanding.

- **Webinars:** Revisit our monthly webinars as well as links to recordings of other online events.

- **Technical Blog:** Learn from our team how to solve common technical problems or use gateway tools.

- **News and Event Announcements + Recaps:** Hear about the news that is driving the community forward.

- **Partner Services + Resources:** Connect with other organizations that support the gateway community.

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How to
Work with Us

If you're ready to get help from one of our consultants,
fill out our Consulting Services Request Form:
https://sciencegateways.org/request-services

Want to get involved with the SGCI community and stay up to date
on news, events, opportunities, and deadlines?
Sign up for our newsletter:
https://sciencegateways.org/community/newsletter

Are you writing a proposal and want to include our services in
your proposal? Want to become a partner? Do you have a general
question? We'd love to hear from you:
help@sciencegateways.org

https://sciencegateways.org

Twitter: @sciencegateways