

Science Gateways Institute Survey

You are invited to participate in the Science Gateways Institute Survey, which should take no more than 10-15 minutes of your time. This survey, funded by the National Science Foundation, is being conducted by Principal Investigator Marlon Pierce of Indiana University.

STUDY PURPOSE

In advance of an anticipated National Science Foundation Call for Proposals for Scientific Software Innovation Institutes (S2I2), the Science Gateways Institute is completing its conceptualization phase with a survey of the national research and education community. The Institute aims to identify the needs of researchers and educators who use, or may benefit from using, web portals to access advanced resources for science, commonly known as **science gateways**. The survey also seeks to gather insights about the needs related to the development and maintenance of science gateways, as well as how gateway technologies might be adapted to benefit areas beyond the traditional science, engineering, and technology fields.

PROCEDURES FOR THE STUDY

If you agree to take part in this survey, you will complete an online survey in which you will not be required to provide any identifying information. After an initial letter of invitation, only those who have not completed the survey or who not have opted out will receive subsequent (up to four) reminder messages.

CONFIDENTIALITY

Efforts will be made to keep any personal information that you inadvertently disclose confidential, although we cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Your identity will be held in confidence in reports in which the study may be published and databases in which results may be stored. Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the study investigator and his research associates, the Indiana University Institutional Review Board or its designees, the study sponsor, the National Science Foundation, and (as allowed by law) state or federal agencies, specifically the Office for Human Research Protections.

CONTACTS FOR QUESTIONS OR PROBLEMS

For questions about survey administration, contact Julie Wernert at 812-856-5517 or jwernert@iu.edu. For questions about your rights as a research participant, to discuss concerns about a research study, or to obtain information or offer input, contact the Indiana University Human Subjects Office at (812) 856-4242 or (800) 696-2949.

VOLUNTARY NATURE OF STUDY

Taking part in this study is voluntary, and you will not receive compensation for participating. You may choose not to participate and/or you may leave the survey at any time without penalty; doing so will not affect your current or future relations with Indiana University, the Science Gateways Institute, or the National Science Foundation.

[Button Selections:

Proceed to the survey

I do not wish to participate

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[New page: Screening questions to determine which sets of questions participants receive]

Introduction: Tell us about your work.

[Q1, Required] Which of the following describes your work role(s)? (Check all that apply.)

- a) Faculty (researcher, educator, etc.)
- b) Research scientist
- c) Technology developer (software engineer, programmer, etc.)
- d) Administrator (in the office of a CIO, CTO, IT director/service provider, or other high-level director)
- e) Post-doctoral fellow
- f) Other

[Q2, Required] Have you participated in the creation of applications (e.g., software, websites, portals, science gateways, mobile interfaces, etc.) that *support research and education* in any of the following roles? (Check all that apply.)

- a) No, I have not participated.
- b) No, I have not participated to date, but I would like to in the future.
- c) Yes, as principal investigator or project manager
- d) Yes, as a professional software developer or technology specialist
- e) Yes, as a graduate-student or post-doctoral programmer
- f) Yes, as a website or user experience designer
- g) Yes, as an outreach or community/educational engagement specialist
- h) Yes, as a domain-based expert or content specialist
- i) Yes, as part of the user support team
- j) Yes, as an advisory board or steering committee member
- k) Yes, other _____ [Allow 50 characters]

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[Note: Based on Q1 and Q2, recipients are directed to one or more of the following sections (in order): Administrators (starting at Q3), Application Creators (starting at Q6), Researcher/Educators (starting at Q17). All recipients receive a common set of questions at the end (starting at Q21).]

[New page: Questions for Administrators, identified by Q1, item d]

[Q3, Q4 & Q5 are matrix questions with the following multiple choice items across the top]

- Currently use*
- Would definitely use*
- Would use if cost was minimal*
- Would use if offered at no cost*
- Would not use*

[Q3] The Science Gateways Institute envisions providing information, training, and support in a range of topical areas related to the development and operation of Web-based applications for research and education. From your perspective as an administrator, would your *institution* make use of the following planning services provided by the Science Gateways Institute?

- a) Guidance with project sustainability (e.g., strategic planning, funding/business models, marketing)
- b) Choosing and adapting to technologies
- c) Legal perspectives (e.g., intellectual property, copyright, licensing)
- d) Developing open-source software (e.g., growing a developer base, handling code contributions, license options)

[Q4] From your perspective as an administrator, would your *institution* make use of the following building and maintenance consulting/contractor services from the Science Gateways Institute?

- a) Website construction
- b) Usability services (meeting the requirements of the community)
- c) Web/visual/graphic design
- d) Software engineering process consultation
- e) Management aspects of a project (e.g., staffing, leadership, timelines)
- f) Mobile technology development
- g) Cybersecurity consultation
- h) Community engagement mechanisms (e.g., social media outreach, feedback)
- i) Evaluation, impact analysis, website analytics

[Q5] From your perspective as an administrator, would your *institution* use the expertise of the Science Gateways Institute to access any of the following types of resources?

- a) Computational resources (e.g., local, remote, cloud)
- b) Scientific instruments or data streams
- c) High-bandwidth networks
- d) Visualization resources
- e) Data mining and analysis resources
- f) Data management resources (e.g., assembling, delivery, sharing, accessing, transferring)
- g) Database structure, optimization, and query expertise
- h) Education support resources (e.g., K-12 expertise, online course development)

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[New page: Questions for Application Creators, identified by Q2, items c, d, e, f, g, h, I, j, k (any answer other than a, b, or null)]

[Q6] Having participated in the creation of applications, what types of resources for *research and/or education* have you helped to create? (Check all that apply.)

- a) Computational tools
- b) Data collections
- c) Data analysis tools, including visualization and mining
- d) Collaboration tools
- e) Workflows
- f) Interfaces to scientific instruments (e.g., telescopes or microscopes)
- g) Interfaces to sensor data
- h) Educational tools
- i) Frameworks or platforms
- j) Citizen science resources
- k) Other _____ [Allow 50 characters]

[Q7A is a matrix question with the following multiple choice items across the top]

- Yes, had this*
- No, wish we had this*
- No, did not need*

[Q7A] Thinking of the resources that you have helped to create, what type(s) of people have worked on your project(s)?

- a) Usability consultant
- b) Graphic designer
- c) Community liaison/evangelist
- d) Project manager
- e) Professional software developer
- f) Student or post-doc programmer
- g) Security expert
- h) Quality assurance and testing

[Q7B] Thinking of the resources that you have helped to create, if your project(s) included other types of people, please list them here. [TEXT BOX: Allow 100 characters]

[Q8 is a matrix question with the following multiple choice items across the top]

- Yes*
- No*
- No, but would consider for the future*

[Q8] For the applications you helped to create, were they:

- a) Web-based?
- b) Mobile-based?

[If “Yes” or “No, but would consider for the future” go to Q9. If “No,” skip remaining application creator questions.]

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[New page: Questions for Application Creators, continued]

[Q9A, Q9B & Q9C are matrix questions with the following multiple choice items across the top]

Not applicable/not interested

No help

Some help

Much help

A great deal of help

[Q9A] The Science Gateways Institute envisions providing information, training, and support in a range of topical areas related to the development and operation of web- or mobile-based applications for research and education, commonly referred to as *gateways*. Based on your experience creating applications, for each of the following *planning and start-up activities*, how much help might your project want from the Science Gateways Institute?

[Section label] **Planning and start-up activities**

- a) Keeping your project running (e.g., guidance on strategic planning, funding/business models, developing a community, etc.)
- b) Choosing technologies
- c) Adapting technologies
- d) Legal perspectives (e.g., intellectual property, copyright, licensing)
- e) Developing open-source software (e.g., growing a developer base, handling code contributions, license options)

[Q9B] Based on your experience creating applications, for each of the following *building and maintenance activities*, how much help would you anticipate that your gateway project might need from the Science Gateways Institute?

[Section label] **Building and maintenance activities**

- a) Website construction
- b) Usability services (meeting the requirements of the community)
- c) Web/visual/graphic design
- d) Software engineering process consultation
- e) Management aspects of a project (e.g., staffing, leadership, timelines)
- f) Mobile technology development
- g) Cybersecurity consultation
- h) Source-code review and/or audit
- i) Community engagement mechanisms (e.g., social media outreach, feedback)
- j) Evaluation, impact analysis, website analytics

[Q9C] Based on your experience creating applications, if you were adding the following *features and capabilities* to your project, how much help would you anticipate that your gateway project might need from the Science Gateways Institute?

[Section label] **Features and capabilities**

- a) Computational resources (e.g., local, remote, cloud)
- b) Scientific instruments or data streams
- c) High-bandwidth networks
- d) Visualization resources
- e) Data mining and analysis resources
- f) Data management resources (e.g., assembling, delivery, sharing, accessing, transferring)
- g) Database structure, optimization, and query expertise
- h) Education support resources (e.g., K-12 expertise, online course development)

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[New page: Questions for Application Creators, continued]

[Respondents selecting “A great deal of help” for any items in Q9 receive Q10, customized with only the items they selected. This is a matrix question with the following multiple choice items across the top]

Most critical need 5
4
3
2
Least critical need 1

[Q10] You selected the following areas where you anticipate needing a great deal of help. Please rank the areas in the order of your most critical need, with 5 being the most critical.

[An example of an item that might be listed for Q10 might be “Choosing technologies” or “Website construction”]

[Q10 is repeated for each section that the respondents selected items as needing “A great deal of help.” The section label is included for each section as in Q9 (e.g., “Planning and start-up activities”)]

[Q11] For training your web-based technology development staff, which mechanisms do you prefer? Please select your top three (3) preferences. [Respondents are limited to no more than 3 items.]

- a) Certification programs
- b) On-site custom training (we come to you)
- c) Workshops or short courses (you come to us)
- d) Software boot camps
- e) Summer schools (in person or virtual)
- f) MOOCs (Massive Open Online Courses)
- g) Webinars
- h) Self-paced, online learning
- i) Mentoring programs
- j) Internships

[Q12] How do you keep up to date with web-based technologies? Please select your top two (2) choices. [Respondents are limited to no more than 2 items.]

- a) Online community via email or Web-based forum
- b) Quarterly newsletter
- c) Focused workshop or track as part of an existing conference
- d) Independent conference focusing on the needs of my niche community
- e) From my development team
- f) I prefer not to be updated regularly
- g) Other _____ [Allow 75 characters]

[Q13, branching question] In your projects, do you make decisions about and/or implement the web-based technologies you use?

- a) Yes [Respondent directed to Q15]
- b) No [Respondent directed to next relevant section. If for Q1, respondent selected items "a" or "b," then go to Q17. If for Q1, respondent selected other items, then go to Q21.]

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[Note: There is no Q14]

[New page: Questions for Application Creators who make decisions about and/or implement web-based technologies]

[Q15A, Q15B & Q15C are matrix questions with the following multiple choice items across the top]

- Very likely*
- Somewhat likely*
- Not sure*
- Somewhat unlikely*
- Very unlikely*

[Q15A] The Science Gateways Institute envisions providing the following hardware and software resources for gateway projects. How likely would you be to use the following API resources (modules accessed through an Application Programming Interface) provided by the Science Gateways Institute?

- a) Information services for remote resources (e.g., monitoring, cataloging)
- b) Security services (e.g., identity, authorization, profile)
- c) Execution services (e.g., compute job, workflow)
- d) Data services (e.g., metadata and collection management, access, movement, analytics)
- e) Event services (e.g., messaging, events)
- f) Accounting services (e.g., CPU and/or software usage, allocation)

[Q15B] The Science Gateways Institute envisions providing the following hardware and software resources for gateway projects. How likely would you be to use the following hardware resources provided by the Science Gateways Institute?

- a) Gateway web hosting services
- b) Pool of computing resources for testing (e.g., XSEDE, Amazon EC2, Open Science Grid, Microsoft Azure, Rackspace, Cycle Computing)

[Q15C] The Science Gateways Institute envisions providing the following hardware and software resources for gateway projects. How likely would you be to use the following repository resources provided by the Science Gateways Institute?

- a) Reference list of commonly used technologies for implementing gateways
- b) "Cookbooks" with "recipes" describing how to accomplish a function or set of functions
- c) Case studies of implemented gateways

[Q16] What have you used to build your Web-based resources? (Check all that apply.)

- a) Django
- b) Drupal
- c) HUBzero
- d) Joomla
- e) Liferay
- f) Ruby on Rails
- g) WordPress
- h) Other _____ [Allow 75 characters]
- i) I don't know

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[New page: Questions for Domain-based Researchers/Educators, identified by Q1, items a or b]

[Q17 is a matrix question with the following multiple choice items across the top]

Very important
Somewhat important
Neither important nor unimportant
Somewhat unimportant
Very unimportant

[Q17] From your perspective as a researcher and/or educator, how important to your work are Web-based applications that provide access to the following specialized resources?

- a) Computational tools
- b) Data collections
- c) Data analysis tools, including visualization and mining
- d) Simplified interfaces that eliminate the need to learn coding
- e) Platforms for fostering group or community collaboration
- f) Tools for rapidly publishing and/or finding articles and data specific to my domain
- g) Workflows that automate or capture tasks or processes
- h) Scientific instruments, such as telescopes, microscopes, or sensors
- i) Educational tools
- j) Citizen science and other public engagement resources

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[New page: Questions for Domain-based Researchers/Educators, continued]

[Respondents selecting “somewhat important” or “very important” for any items in Q17 receive Q18, customized with only the items they selected. This is a matrix question with the following multiple choice items across the top]

Developed by my own research group
Provided by a commercial service
Provided by a public/academic organization
Don't know

[Q18] Referencing the specialized resources you identified as “somewhat important” or “very important” in the previous question, who provides or developed *the Web-based applications used to access these resources?* (Check all that apply.)

[An example of an item that might be listed for Q18 might be “Computational tools” or “Educational tools”]

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[New page: Questions for Domain-based Researchers/Educators, continued]

[Q19] In your role as a *researcher and/or educator*, do you use mobile devices to access the specialized resources you selected in the previous question?

- a) Yes, I currently use mobile devices for this.
- b) Yes, I currently use mobile devices for this, and anticipate doing so even more in the future.
- c) No, I currently do not use mobile devices for this.
- d) No, I currently do not use mobile devices for this, but would like to in the future.

[Q20] How do you most often learn about new technologies, discoveries, and innovations in your field? Please select your top three choices. [Respondents are limited to no more than 3 items.]

- a) From colleagues (e.g., in department, social networks)
- b) From students
- c) Through mailing lists
- d) Through research publications
- e) Through advertisements or trade magazines
- f) At conferences/meetings
- g) From Web searches or specialty Websites
- h) Other _____

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[New page: Questions for all respondents, regardless of what sections they answer previously]

[Q21] Does your work involve hiring or supervising people with expertise in technology development or maintenance?

- a) Yes [Reveals Q21A]
- b) No [Respondent directed to Q22]

[Q21A] With regard to hiring and maintaining a highly qualified technology or science gateway development staff, how important are the following concerns?

[Q21A is a matrix question with the following multiple choice items across the top]

Very important
Somewhat important
Neither important nor unimportant
Somewhat unimportant
Very unimportant

- a) Identifying a pipeline for future staff
- b) Attracting staff from underrepresented groups (e.g., race, gender, ethnicity, etc.)
- c) Availability of staff who can work across disciplines
- d) Competing with industry for top performers
- e) Offering a viable career path
- f) Opportunities to outsource skilled work

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[New page: Questions for all respondents, regardless of what sections they answer previously]

[Q22] Assuming cost is not a factor, what are the most important factors you consider when adopting a new technology? Please select the three (3) most important factors in your decision-making process. [Respondents are limited to no more than 3 items.]

- a) Availability of documentation, including tutorials and demos
- b) Availability of support for bug fixes and feature requests
- c) Ability to adapt and customize
- d) Demonstrated production-quality reliability
- e) Available as open-source
- f) Project longevity
- g) Existing user community
- h) Testimonials and user ratings
- i) Reputation of those who built the software
- j) Availability of technical support
- k) Licensing requirements
- l) Interoperability with other systems
- m) Availability of long-term maintenance

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[New page: Questions for all respondents, regardless of what sections they answer previously]

[Q23] In your current work, what best describes your primary area(s) of expertise? (Check all that apply.)

[Note: The following 8 categories were displayed without the subcategories showing. At the top of the list, respondents could click “Expand all categories” or “Collapse all categories,” or they could individually expand/collapse a category to view the item options.]

- 1) Engineering
 - i) Aeronautical and Astronautical Engineering
 - ii) Bioengineering/Biomedical Engineering
 - iii) Chemical Engineering
 - iv) Civil Engineering
 - v) Electrical Engineering
 - vi) Environmental Engineering
 - vii) Manufacturing Engineering
 - viii) Mechanical Engineering
 - ix) Other Engineering

- 2) Computer and Information Sciences
 - i) Computer Engineering
 - ii) Computer Science
 - iii) Software Systems, Development, or Engineering
 - iv) Informatics
 - v) Information Technology & Organizations
 - vi) Other Computer Sciences

- 3) Environmental Sciences
 - i) Atmospheric, Meteorological, and Geospace Sciences
 - ii) Earth Sciences/Geology
 - iii) Ocean Sciences
 - iv) Polar Science
 - v) Other Environmental Sciences

- 4) Life Sciences
 - i) Agriculture and Related Sciences
 - ii) Biological Sciences
 - iii) Biochemistry
 - iv) Bioinformatics
 - v) Environmental Biology
 - vi) Genetics
 - vii) Medical, Health, and Biomedical Sciences
 - viii) Molecular and Cellular Biosciences
 - ix) Neuroscience
 - x) Physiological and Structural Systems
 - xi) Other Life Sciences

- 5) Physical and Mathematical Sciences
 - i) Astronomical Sciences
 - ii) Chemistry
 - iii) Materials Research
 - iv) Mathematical and Statistical Sciences
 - v) Physics
 - vi) Other Physical and Mathematical Sciences

- 6) Professional Disciplines
 - i) Architecture
 - ii) Education
 - iii) Information
 - iv) Law, Legal Professions and Studies
 - v) Library Science
 - vi) Management or Business
 - vii) Natural Resources, Forestry, and Conservation
 - viii) Public Administration
 - ix) Social Service Professions
 - x) Other Professional Discipline

- 7) Arts and Humanities
 - i) History or Archaeology
 - ii) Languages and Literatures
 - iii) Linguistics
 - iv) Visual and Performing Arts
 - v) Other Humanities

- 8) Social Sciences
 - i) Anthropology
 - ii) Behavioral and Cognitive Sciences
 - iii) Communication Studies, Journalism, and Related Programs
 - iv) Economic or Political Sciences
 - v) Geography
 - vi) Sociology
 - vii) Other Social Sciences

[Q24] Which best describes your institutional affiliation? (Check all that apply.)

- a) Academic
- b) Government
- c) Non-Profit
- d) Corporate
- e) Not applicable

[Q24A, revealed only if Q24, item “a” is selected] Does your institution enroll a significant number (>50%) of minority students, or is it officially designated as a Minority-Serving Institution (MSI)? (For the purpose of this survey “minority” is defined as American Indian, Alaska Native, Black [not of Hispanic origin] or Hispanic.)

- a) Yes
- b) No
- c) Don't know

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[New page: Questions for all respondents, regardless of what sections they answer previously]

Q25. Would you be willing to provide more detailed feedback to the Science Gateway Institute on the following topics? (Check all that apply).

- a) Workforce development
- b) Services offered by the Institute
- c) Community building
- d) Technology choices
- e) What a science gateway might do for me
- f) None of the above

Q26. I am interested in receiving a summary of the survey results.

- Yes
- No

Q27. Please keep me informed about the progress and services of the Science Gateway Institute.

- Yes
- No

Q28. If yes to any of the above, please provide your best email address:

[Text field]

Q29. Do you have any additional information, comments, or insights that you would like to share with the Science Gateways Institute?

[Text box]

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[New page]

Thank you very much for your responses.

For more information about the Science Gateways Institute, please visit www.sciencegateways.org.

[End of survey]