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Hi. I'm Dan Katz from the NSF Division of Advanced Cyberinfrastructure or ACI, and I'm the Program Director managing the Software Infrastructure for Sustained Innovation program, or SI2. Several other Program Directors that help with the SI2 program are here as well. Thank you for taking the time to join us today. In this webcast, I'll give a brief overview of the SI2 program and describe some of the most important things you need to know about submitting a proposal.

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Before discussing the solicitation I would like to inform you that the Division of Advanced Cyberinfrastructure in the Directorate for Computer and Information Science and Engineering at the National Science Foundation is conducting a nationwide search for a senior-level researcher to serve as Program Director for software in science and engineering. For more information, visit the following website:

<http://www.nsf.gov/pubs/2014/aci14001/aci14001.jsp?org=ACI>

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This webinar is intended to orient the research community that is interested in the SI2 competition, review program and peer-review criterion, answer questions, and ultimately improve the quality of proposals.

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Software Infrastructure for Sustained Innovation is a crosscutting program that involves program officers from every NSF Directorate. Participating program officers are listed here, and can be reviewed on the solicitation web page at:

<http://www.nsf.gov/pubs/2014/nsf14520/nsf14520.htm>

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Here is the agenda for today's presentation. I'll start by discussing the goals of the SI2 program and how SI2 is structured to achieve those goals. Next, I'll briefly cover some important aspects of the solicitation including the types of awards to be made, submission requirements, and deadlines. I will then survey the review criteria, with a particular focus on those review criteria that are unique to the SI2 program. Finally, I'll cover a few frequently asked questions, and invite further questions from you, the audience, and answer them with help from my colleagues.

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First, goals and implementation strategies for SI2.

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The SI2 program provides a framework for software development and support to advance NSF research in science and engineering. Priorities for the program include development of sustainable, robust, and reliable software; creation of pathways to include innovation in software; and incorporation of software engineering processes that work for different communities.

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The SI2 program seeks to transform innovations in research and education into sustained software resources that are an integral part of cyberinfrastructure. At the same time, it seeks to balance research with the development of deployable and sustainable software elements. In this, SI2 is different from other programs in that many general proposals do not produce infrastructure, while SI2 proposals must lead to infrastructure – software, specifically.

A successful SI2 program will develop and nurture the multidisciplinary research “processes” necessary for developing software that can enhance the productivity and capability of discipline-specific research; promote a software development ethic that will catalyze software that is manageable and sustainable, and can evolve with the needs of the disciplines and the emergence of new technologies; and promulgate and catalyze new approaches in using software to understand natural, human, and engineered systems.

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To accomplish these goals, the SI2 program will identify application areas in science or engineering where software elements are needed, and clarify how the use of the proposed software will have a significant impact on science and engineering research; identify one or more specific domain communities that are benefiting from the use of the SI2 software development and use paradigm; exemplify explicit description of the engineering process used for the design, development, deployment, testing and sustainability of the software; establish a list of tangible metrics, with end user involvement, to be used to measure the success of the software element developed; and provide examples of compelling potential use by broader communities of the software developed under SI2.

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Ultimately, NSF seeks to create a software ecosystem that scales from individual or small groups of software innovators to large hubs of software excellence. To create this ecosystem, we will use three interlocking levels of funding.

First is Software Elements, which map to SI2 Scientific Software Elements (SSEs), covered by this solicitation. SSE proposals focus on projects led by a small number of investigators, and can cost up to \$500,000 over up to three years.

Next is Software Frameworks, which map to SI2 Scientific Software Integrations (SSIs), also covered by this solicitation. SSI Proposals are for focused groups, and can cost between \$200,000 and \$1,000,000 per year for three to five years. Software frameworks can integrate multiple Software Elements, whether funded by NSF or not.

As the research ecosystem grows to include entire communities, support will be provided for software institutes, which will work on issues that support software development at all levels.

Projects at all levels are expected to impact the research done by communities, and the impacted communities for SSIs should be larger than for SSEs.

NSF's intent is that all the software developed under SI2 will be reusable outside the SI2 program as well as inside it.

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The current SI2 solicitation, NSF 14-520, can be found at [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf14520](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf14520). This solicitation includes information on SSE awards that target small groups that will create and deploy robust software elements for which there is a demonstrated need, encapsulating innovation in science and engineering. Information is also provided for SSI awards that target larger groups of principal investigators organized around common research problems as well as common software infrastructure, and that will result in a sustainable community software framework.

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Several minor changes from the fiscal year 2013 SI2 solicitation have been made to the SI2 solicitation for fiscal year 2014. Firstly, SSI due dates and decision processes have been split from SSE due dates and decision processes; visit [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf14520](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf14520) for more information on specific due dates. Secondly, explicit license information (most often, an open source license) must now be included in proposals as peer-review panels will be instructed to consider this as an additional review criterion. Finally, the Division of Electrical, Communications and Cyber Systems in the Directorate of Engineering is now participating in the SI2 program.

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The eligibility criteria for the SI2 program are as follows:

Proposals may only be submitted by universities and colleges or non-profit, non-academic organizations. Federally-funded research and development centers (FFRDCs) may not receive funds directly from NSF under this solicitation.

The number of proposals per principal investigator or co-principal investigator is limited to one. An individual may participate in a proposal as a principal investigator, co-principal investigator, or other senior personnel in at most one full proposal for each pair of SSE/SSI competitions that occurs in a given calendar year. In the case of multiple proposals that include the same individual, all but the earliest will be returned without review.

Please review the solicitation for details.

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Next, solicitation requirements.

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SI2 proposals should identify areas of science and engineering where the software is needed; compare the proposed approach to alternative or existing approaches; describe the process to design, develop and release the software; state which license(s) will be used – the expectation is a standard open source license will be used; provide a project plan with milestones; establish tangible metrics; discuss the software’s potential; identify concomitant outreach and education program(s); and propose a sustainability plan.

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Additional documents include:

A data management plan and postdoctoral trainee mentoring plan if the project includes such trainees. This is a standard NSF requirement. SI2 reviewers pay close attention to the data management plan since software is data and the goal of SI2 is to produce well-used software.

For SSI proposals, a management and coordination plan is also required. The specific roles of the principal investigators, co-principal investigators, other senior personnel, and paid consultants at all institutions involved must be outlined. Also, there must be a description of how the project will be managed across institutions and disciplines, identification of the specific coordination mechanisms that will enable cross-institution and/or cross-discipline scientific integration, and pointers to the budget line items that support these management and coordination mechanisms.

A list of project personnel is required that includes all senior personnel, i.e. those with a biosketch in the proposal.

And finally, a list of conflicts must be included for each senior person that outlines all conflicts-of-interest (as defined by NSF in the Grants and Proposals Guide). This information is submitted through FastLane/Grants.gov and also as spreadsheet via email to [si2@nsf.gov](mailto:si2@nsf.gov).

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Now I will review the review criteria for SI2 proposals, with a specific focus on review criteria that are unique to this program.

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As for all proposals received by NSF, SI2 reviewers and panelists will be asked to consider the intellectual merit and broader impact for each proposal for their reviews, panel discussions, and panel summaries. In addition to these standard criteria, SI2 reviewers and panelists will also be asked to consider additional review criteria that are unique to the SI2 program. More on this in a few moments.

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Since 14 January 2013, the intellectual merit and broader impacts review criteria for NSF proposals have been changed. When evaluating NSF proposals, reviewers are now asked to consider:

- what the proposers want to do,
- why they want to do it,
- how they plan to do it,
- how they will know if they succeed, and
- what benefits would accrue if the project is successful.

These issues apply both to the technical aspects of the proposal (the intellectual merits) and the way in which the project may make broader contributions (the broader impacts).

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In addition to the Intellectual Merit and Broader Impacts criteria, there are review criteria that are specific to the SI2 program. Additional criteria and questions that will be considered during peer-review are:

Does the proposal discuss how the proposed software will fill a recognized need and advance research capability within a significant area (or areas) of science and engineering?

Does the proposal provide a project plan and timeline, including a proof-of-concept demonstration of any key software element and the steps necessary to take the software from prototype to dissemination into the community as reusable software resources?

Does the proposal state and justify the software license to be used?

Are tangible metrics described to measure the success of any software that may be developed?

Does the software engineering and development plan include and/or enable the integration of relevant research activities to ensure the software is responsive to new computing developments?

To what extent are issues of sustainability, manageability, usability, composability, and interoperability addressed and integrated into the proposed software?

Does the project plan include user interaction, a community-driven approach, and a timeline of new feature releases? Does it plan to extend the work to additional user communities?

Reviewers will be asked to comment on all of these criteria and to explain their opinions, not just say yes or no, as to whether the proposal does or does not address these criteria.

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The slides and the script for this webcast, as well as an audio recording, will be available at <http://www.nsf.gov/events/>. On that page, you'll need to look for this webcast among the list of events. I invite your questions now, via email to [dkatz@nsf.gov](mailto:dkatz@nsf.gov), or via telephone to 703-292-2254. You can also find contact details for program officers from other NSF Directorates who are involved in the SI2 program on the solicitation web page at:

[http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf14520](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf14520).