SAND2016-4185PE

CINT User Program Overview

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User Program Manager

FY13-FY15 Peer Review

May 10, 2016

SAND Number: XXXX

Los Alamos NATIONAL LABORATORY
U.S. DEPARTMENT OF ENERGY | Office of Science
Sandia National Laboratories

CINT User Program

CINT is achieving a productive and satisfied user community by:

- **Executing a fair and effective proposal review process;**
- **Delivering balanced capability allocation & scheduling;**
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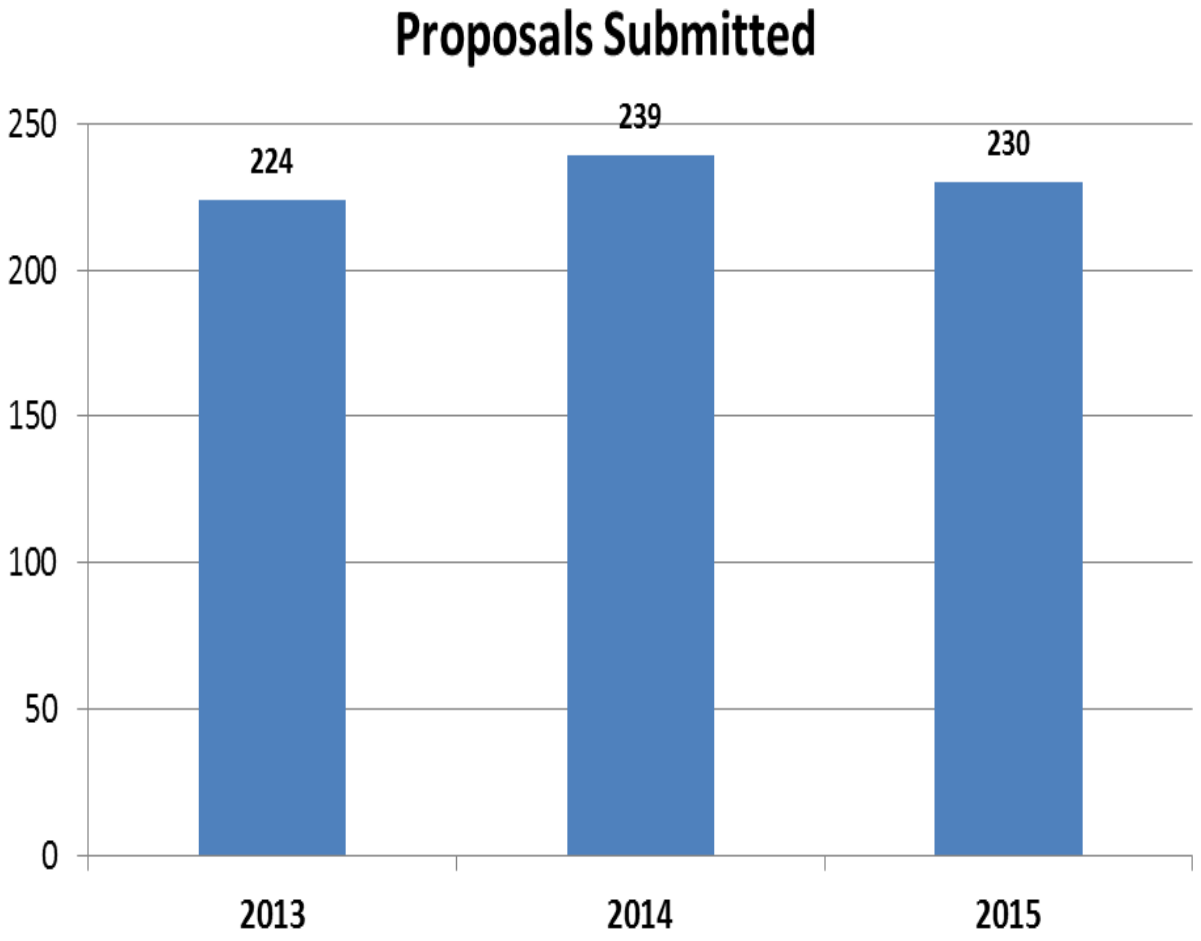
User Proposal Submissions

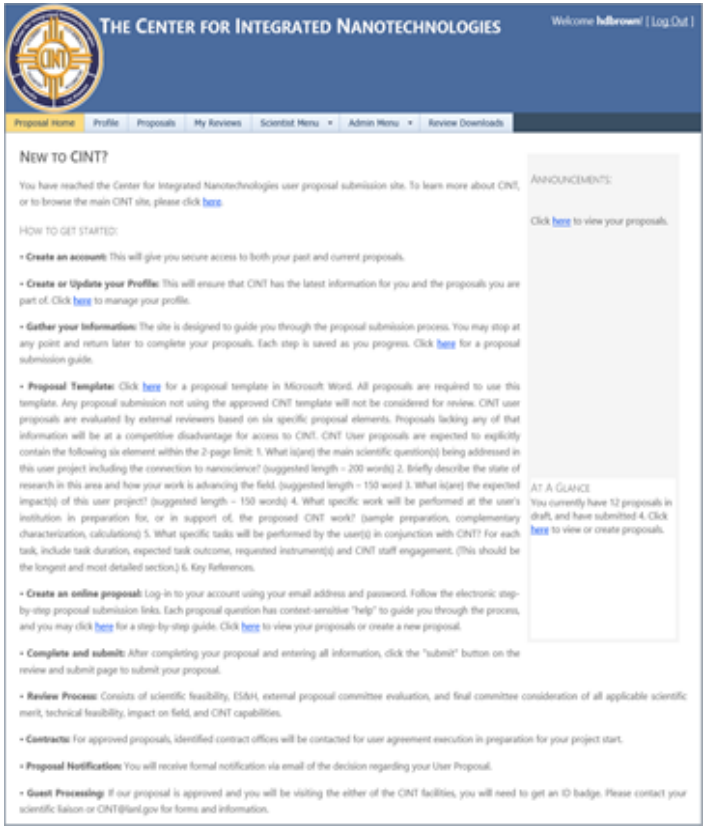
- 2 Call for proposals a year in March & September
- Receive ~230 proposals per year



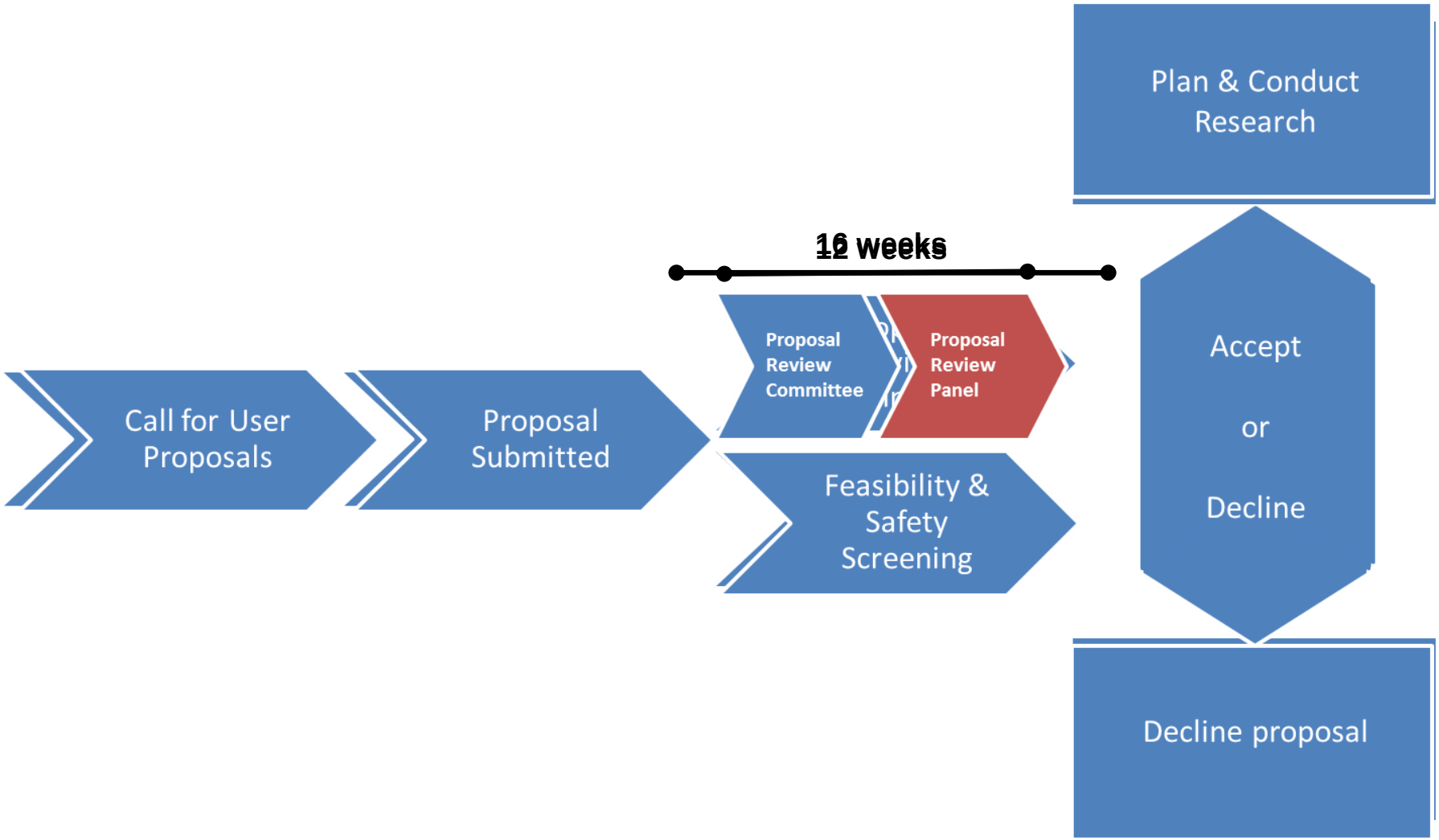
Proposal Template

All CINT User proposals are expected to use the CINT template and explicitly contain the following six elements within the 2-page limit:

- Main scientific question
- How work is advancing the field of research
- Expected impact(s) of user project
- Specific prep work to be performed at the user's institution
- Specific work to be performed with CINT
- Key References



Proposal Review Process



External Proposal Review Committee

- Three individual external reviews
- Score along with strengths and weaknesses comments returned to CINT electronically
- A list of PRC members and review guidance in Appendix

Score Range	**Relative Priority**	**Qualitative Assessment** *(Supported by reviewer comments)*
0.0 - 0.9	Decline	Seriously flawed proposal or other disqualifier
1.0 - 1.5	Low	Minimally acceptable proposal, not well-matched to CINT capabilities, little expected impact.
1.6 - 2.5	Medium	Good-to-excellent proposal, well-matched to CINT capabilities, significant anticipated impact.
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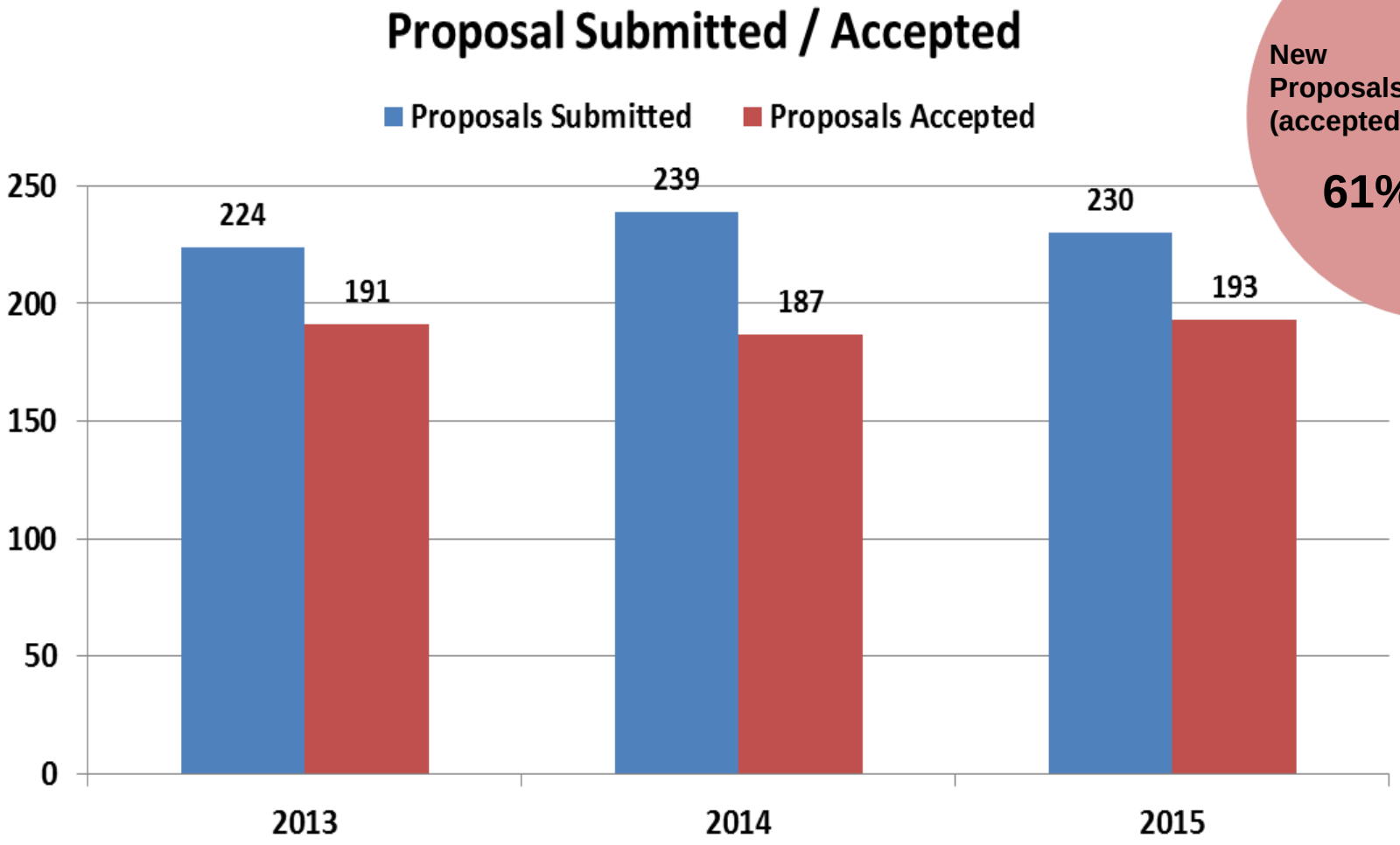
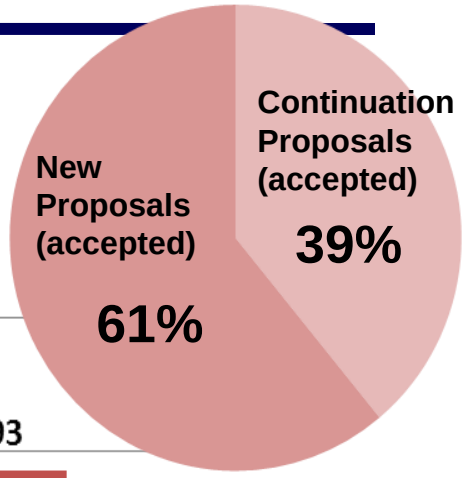
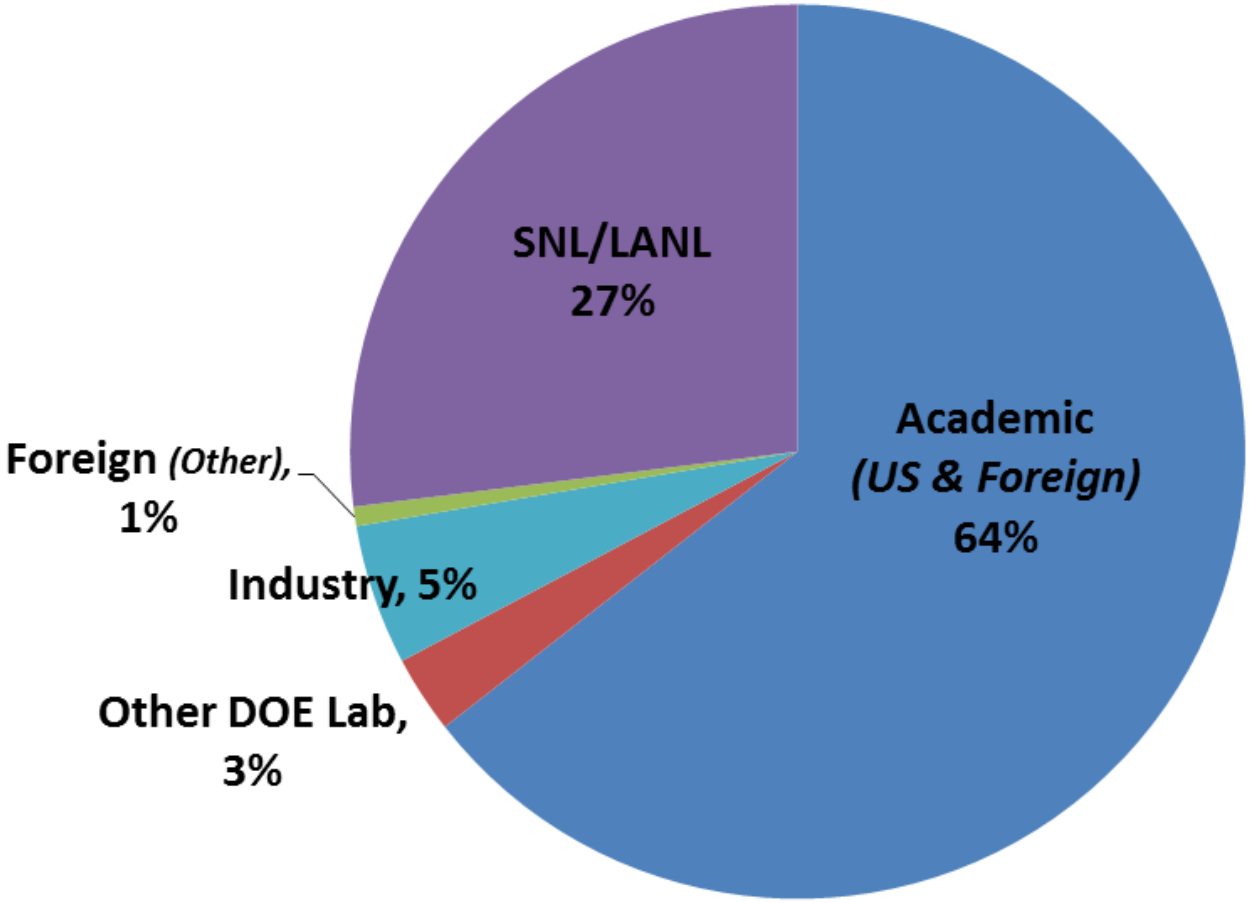
CINT Projects



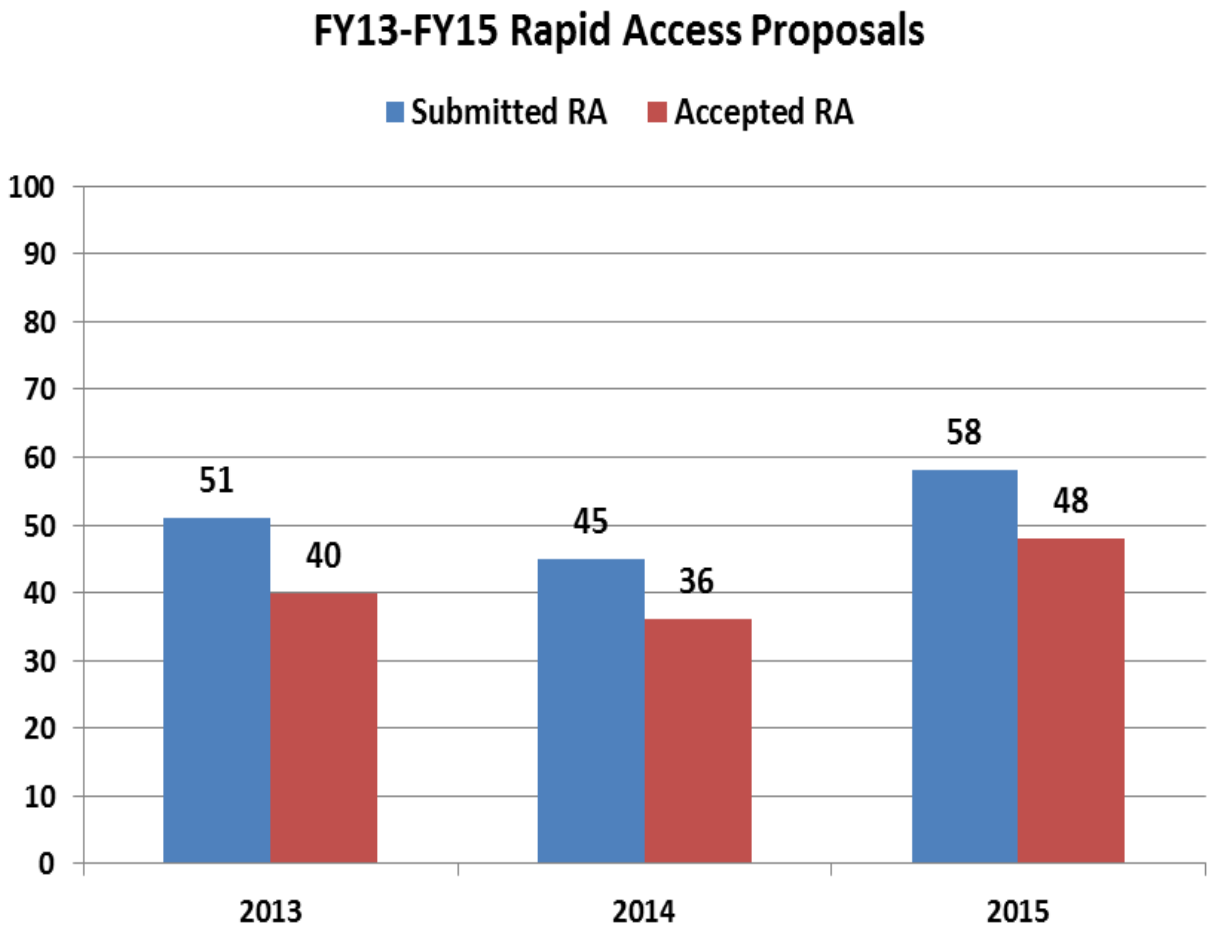


Project Institutions

FY13-FY15 Accepted User Projects by Institution Type



Rapid Access (RA) User Proposals enable "just-in-time" CINT access



- Access to CINT between regular proposal cycles for time-critical, focused, high-impact research.
- Expedited feasibility screening & technical review (2 weeks)
- RA user projects are granted up to 3 months access.

CINT User Program

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Resource Allocation & Scheduling

Most users come to CINT to work with our scientists. Typically, we are limited only by staff time, not tools.

- **Priority scheduling is considered when granting user access time and is based on:**
  - **External Proposal Review Committee score**
  - **Traveling external user with limited visit dates**
  - **Time-sensitive deliverables stated in proposal**

Exceptions include:

- **Technai F30 TEM , JEOL E-Beam Lithography and the Integration Laboratory (IL)**



Resource Allocation & Scheduling

Technai F30 TEM allocation – specific to proposal

- **Katie Jungjohann (TEM capability owner) works with the user to determine time needed to complete research and who will be doing a majority of the work (trained user, untrained user, CINT staff)**
- **Proposals are given a session allotments per month in their approval notification**
- **Average allocation between two and four 4 hr sessions/month**
- **These allotments are for peak hours (8am-5pm) when CINT scientists are available**
- **Off-peak hours can be granted for trained users**

Resource Allocation & Scheduling

JEOL E-Beam Lithography Scheduling – applies to all proposals

- **The planned allocation of available tool time is 70% User Proposals, 20% CINT Science and 10% maintenance**
- **Time allowed per proposal varies with the number of active projects**
- **Based on 100% utilization, policy gives 3-4 hours per week per proposal on the tool in addition to training time.**

Integration Lab (IL) Scheduling – applies to all proposals

- **A maximum of 2 users may work in the IL per proposal**
- **To be trained on the IL instruments users must commit to work in the IL for a minimum of 3 months to avoid training bottleneck**

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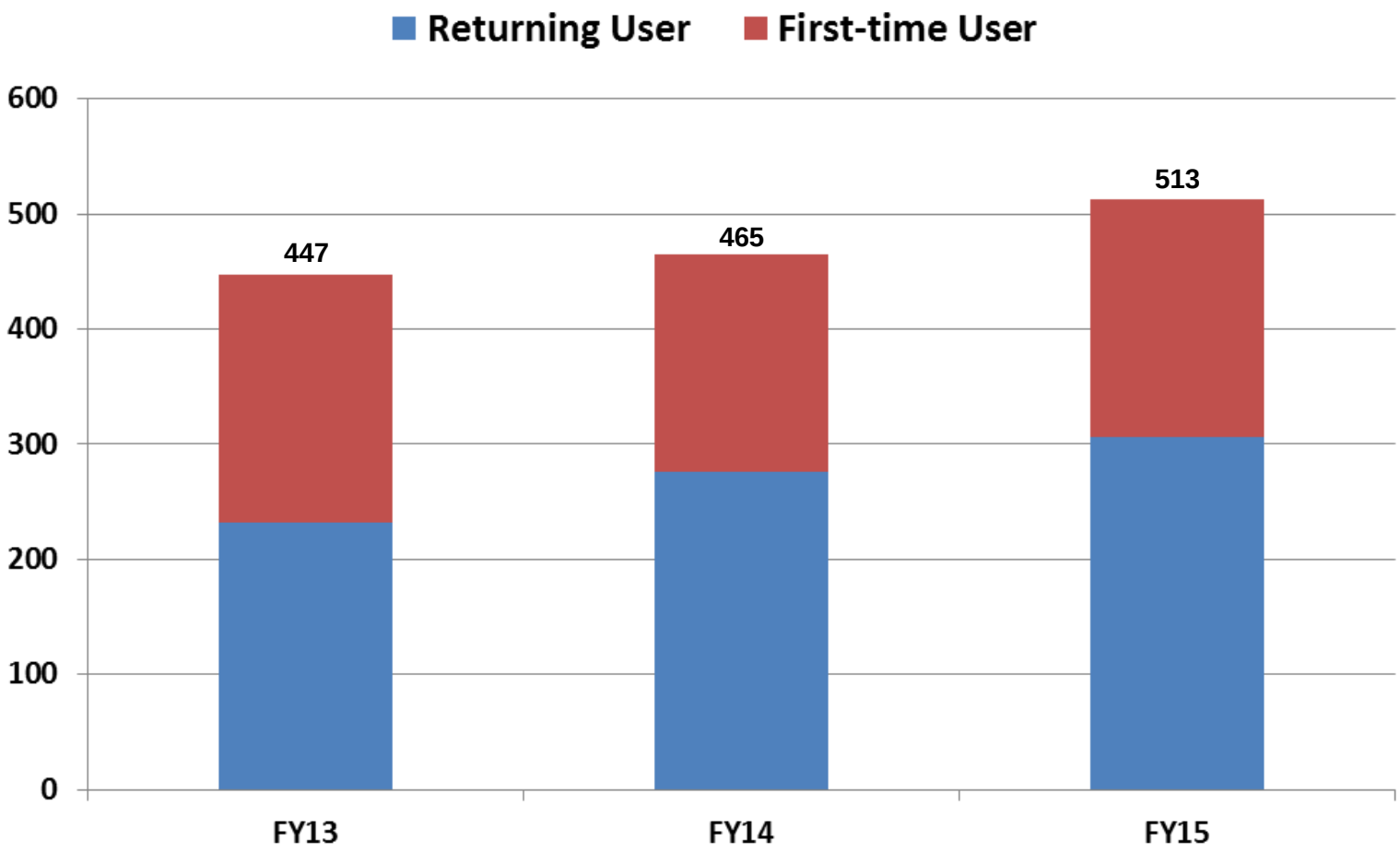
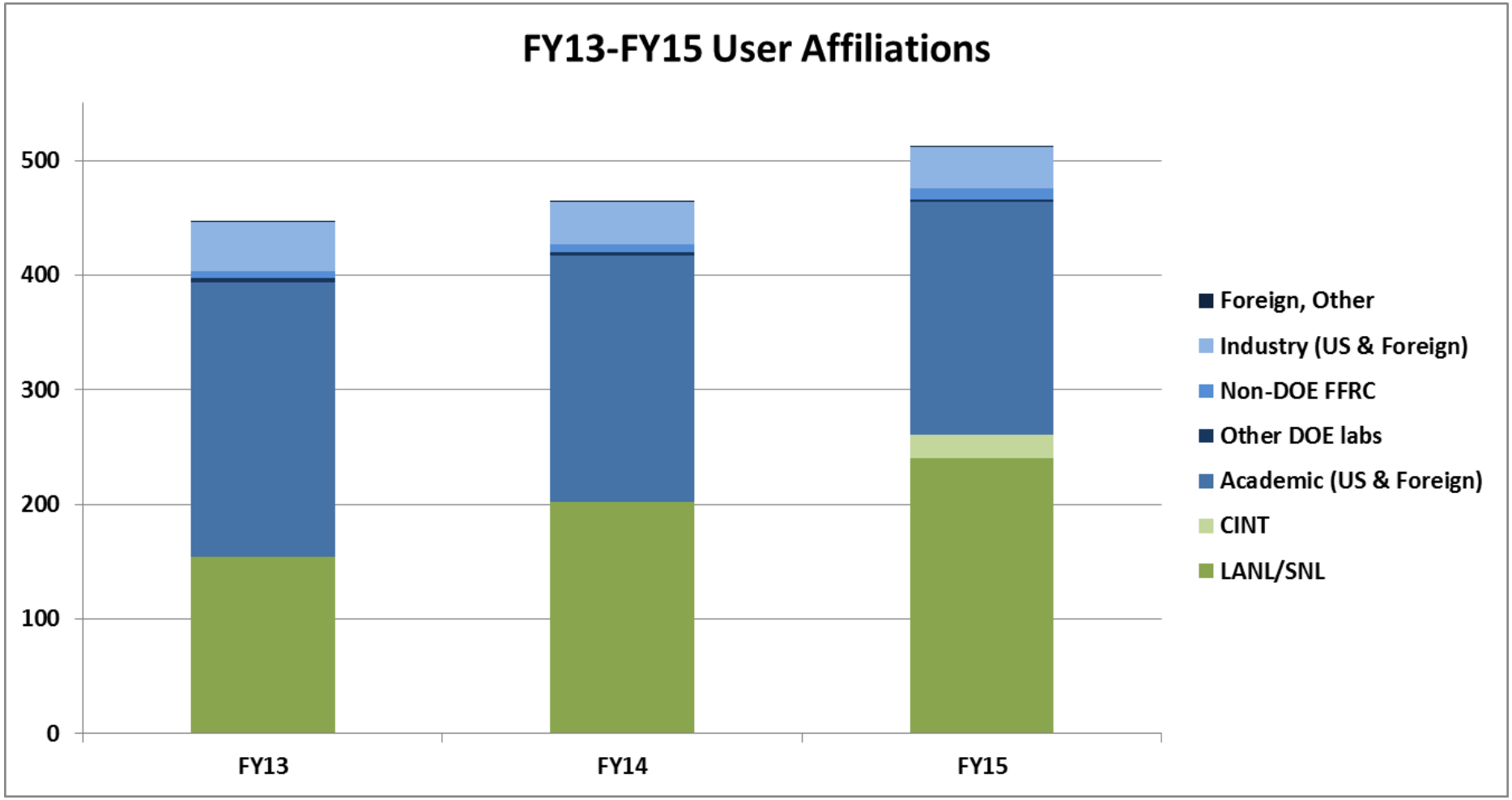
Steady User Growth



CINT attracts a broad community of users



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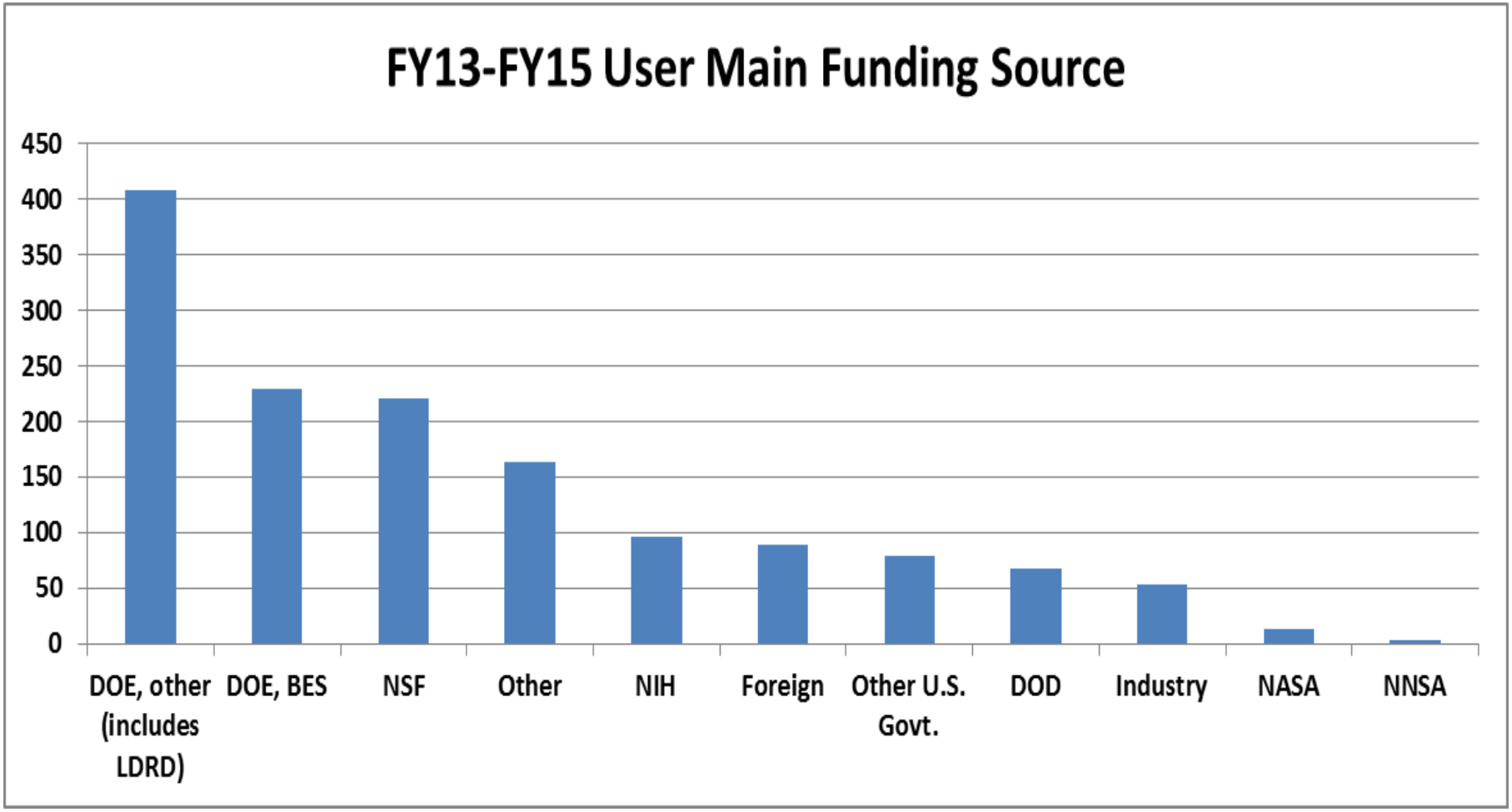
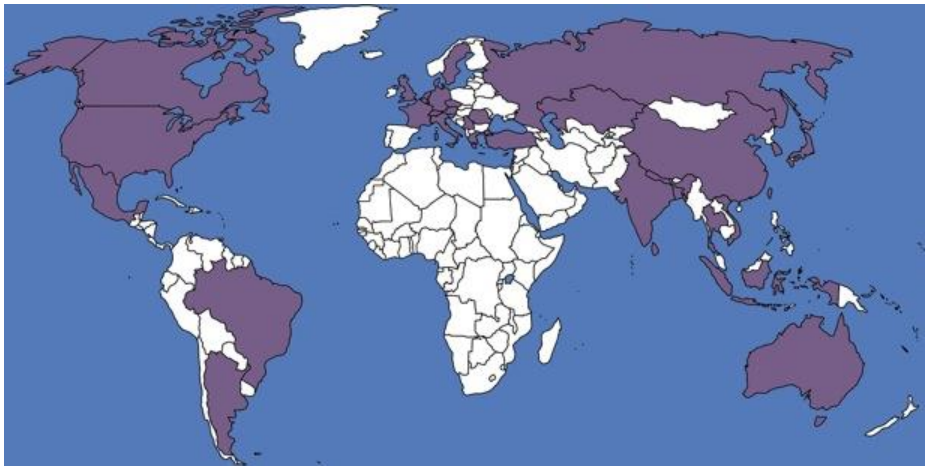


CINT is attracting users from both domestic and international institutions

CINT offers world-leading capabilities and expertise that attracts a broad and diverse User community



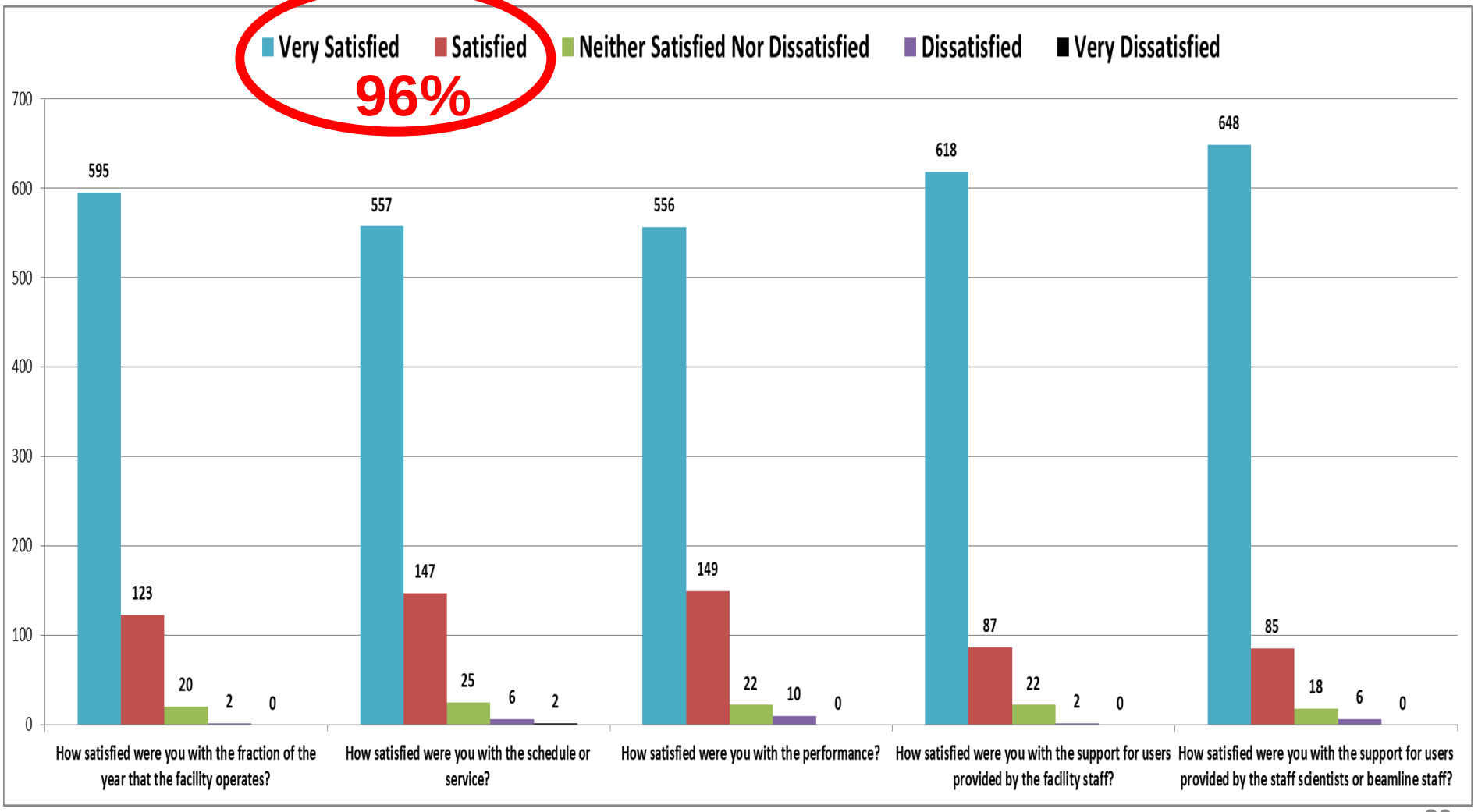
Users from 38 of 50 United States

User projects from 53 foreign institutions within 23 unique countries

CINT users are "very satisfied" with CINT

FY13-FY15 BES User Satisfaction Survey Results

FY13 – FY15 = 821 User responses



Users gain many benefits from CINT

FY13-FY15 CINT User Satisfaction Survey Results

- **73%** - Obtained access to unique capabilities not available elsewhere

(e.g., forefront experiments; one-of-a-kind instruments; distinctive materials or services)

- **71%** - Facilitated collaborative interactions

(e.g., stimulated new ideas for future experiments, increased multidisciplinary work; enabled a new approach within your discipline)

- **45%** - Furthered the goals of the Department of Energy

- **40%** - Trained students

(e.g., undergraduate, graduate or postdoctoral associate)

What has CINT done with our user feedback?

- User feedback: decrease proposal notification lead time
- *CINT action: adjusted review process to shorten notification time, 16 weeks to 12 weeks.*

- User feedback: grant training reciprocity between the sites
- *CINT action: training reciprocity granted for NANO101 and RAD210. More courses in process.*

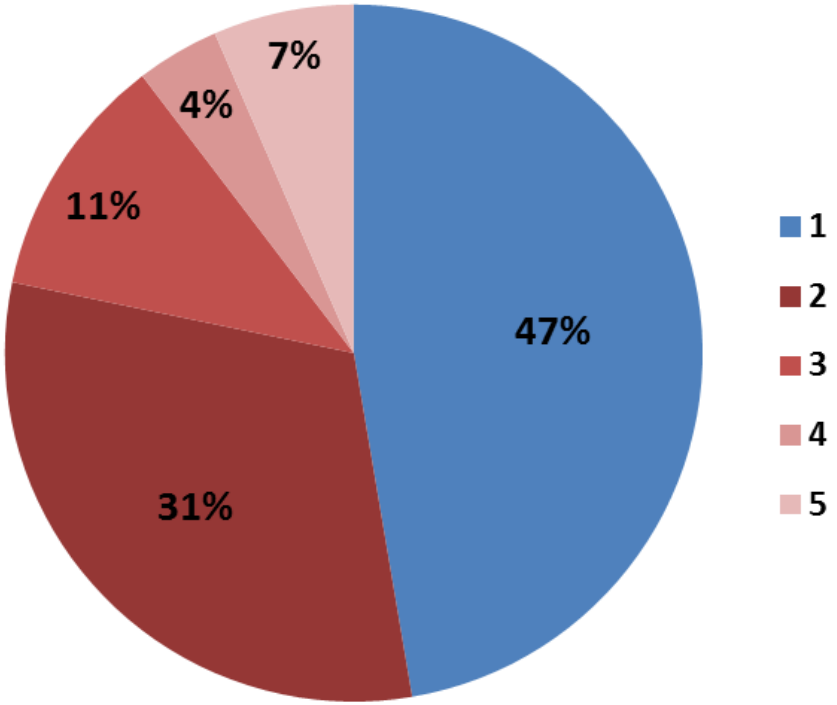
- User feedback: create a mechanism to search for capabilities & expertise available at the facilities
- *CINT action: CINT led the effort to develop the NSRC portal website.*

Other feedback:

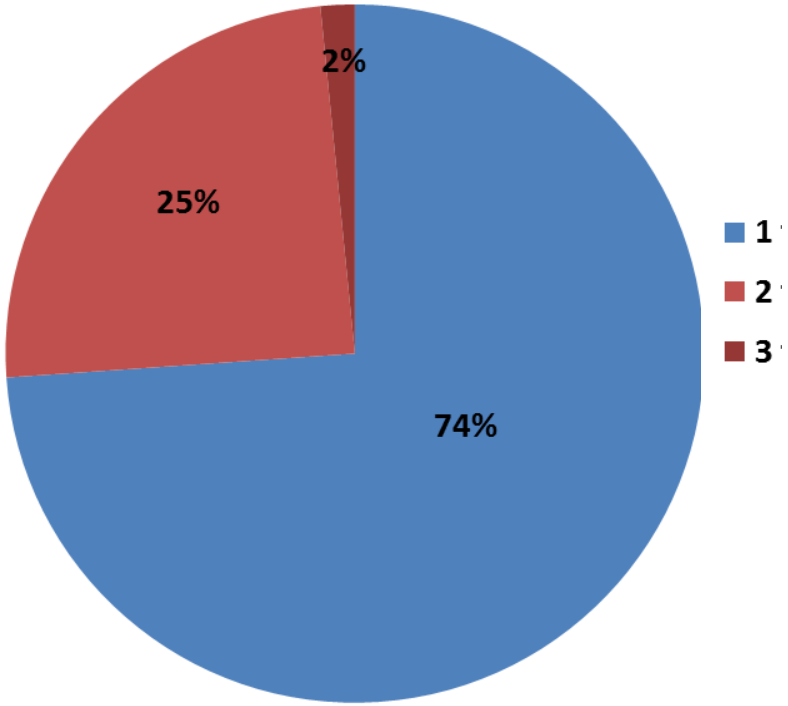
- Requests for travel funding – *unallowable per BES*
- Increase approved project duration – *18 months an appropriate duration with continuation option*

CINT user projects are interactive and multidisciplinary

Over 50% of projects request
2+ scientists

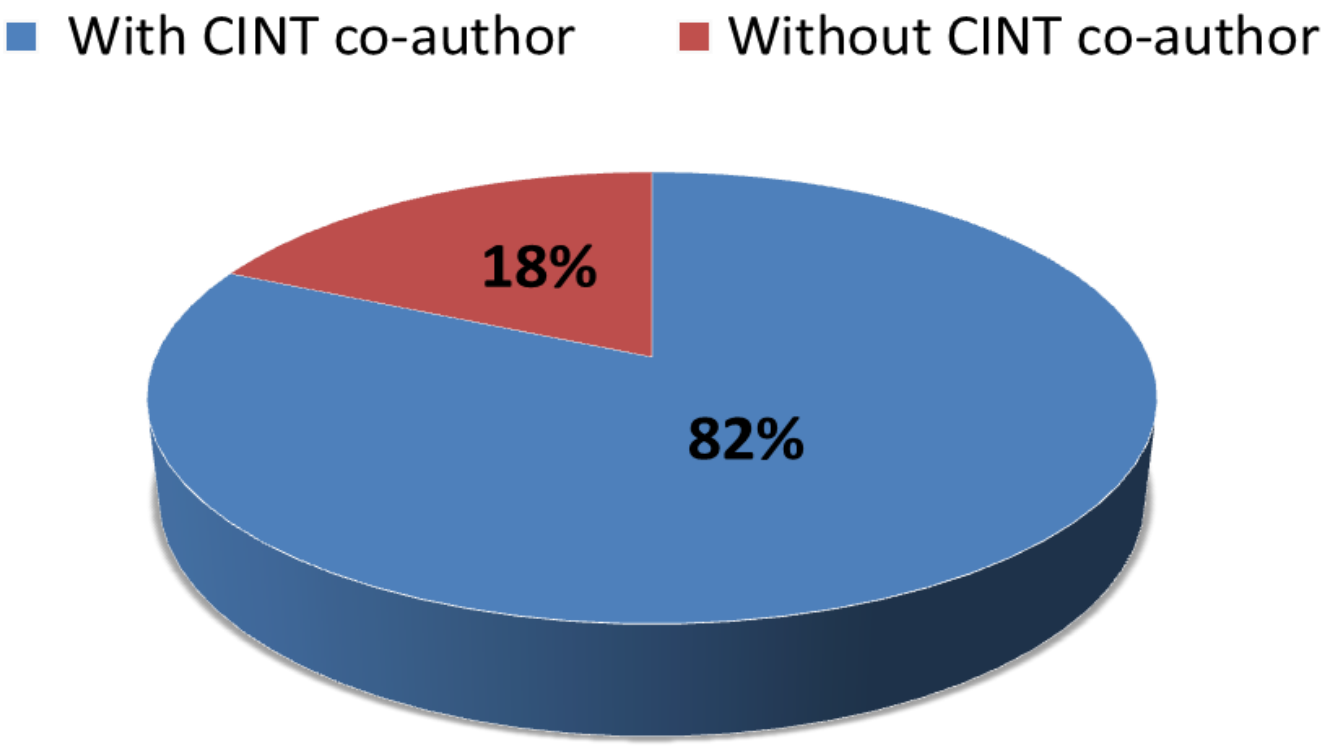


Over 25% of projects span
2+ thrusts



The value of our interactions is also evident in user publications

CY13–CY15 User Publications



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What do we want to accomplish?

Communications & Outreach objectives

1. To increase CINT's brand recognition among peers

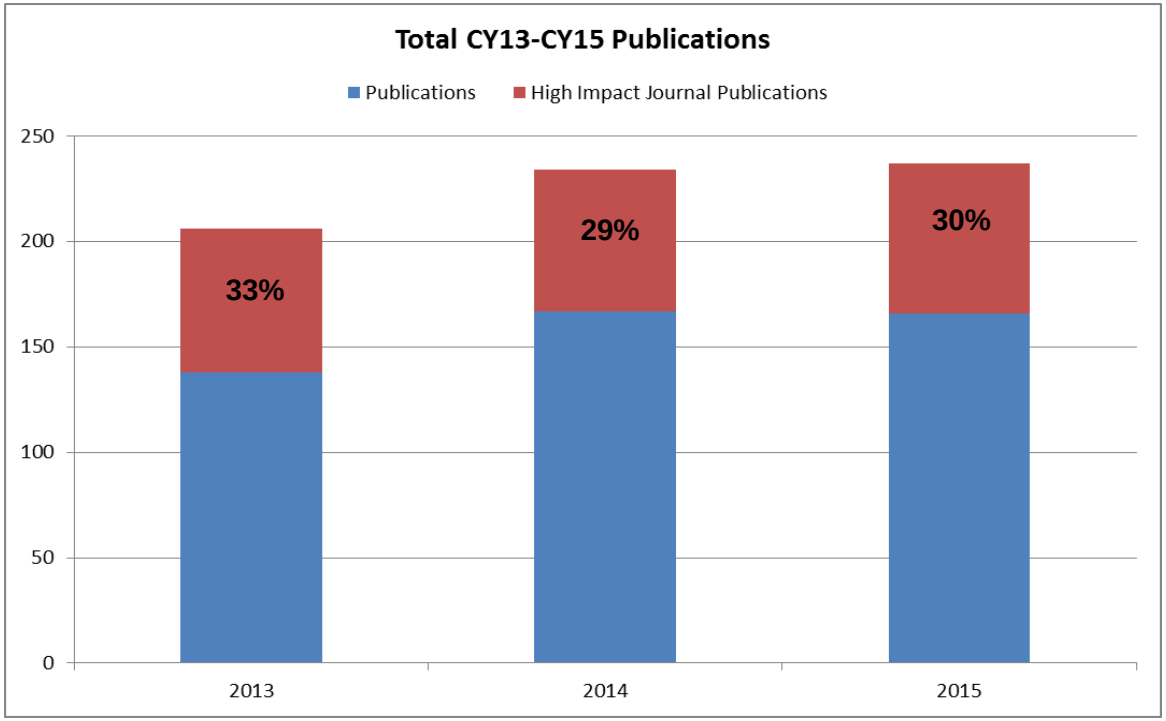
2. To recruit a vibrant, national user community including industry

3. To enhance interactions among our external and internal communities, and

4. To share our commitment to nanoscience integration through educational outreach

Increase brand recognition among peers: Scientific leadership

- **19 journal covers**
- **over 200 publications a year**
- **30% in high impact journals**



Increase brand recognition among peers: National meetings and Society leadership

<u>Workshop & Symposia Organized by CINT staff</u>:

-The International Chemical Congress of Pacific Basin Societies conference (Pacifichem 2015)
Symposia Organizer: **Sergei Tretiak**

-In Situ Electrochemical Electron Microscopy Conference, Sponsored by the Joint Center for Energy Storage Research
Workshop Organizer: **Katie Jungjohann**

-Materials Research Society Meetings, 2013, 2014 and 2015
Symposia Organizers: **Quanxi Jia, Rohit Prasankumar, Wally Paxton**

-The Minerals, Metals and Materials Society (TMS) 2014 annual meeting
Workshop Co-Organizer: **Nate Mara**

Over 60 meetings and symposia organized

<u>Society leadership</u>:
Sean Hearne, Materials Research Society (MRS) Secretary

Quanxi Jia, Chair of the Electronics Division of the American Ceramics Society

Gabe Montano, Board of Directors President, Society for the Advancement of Hispanics/Chicanos & Native Americans in Science (SACNAS)

Recruit a vibrant, national user community: strategic outreach

- **Joint NSRC activities**
  - 2015 ACS Meeting NSRC Director's hosted NSRC symposia
  - Big, Deep, and Smart Data Analytics in Materials Imaging Workshop
  - CLEO Workshop on Nanophotonics Research at the DOE Nanoscale Science Research Centers 2013
  - TechConnect 2016 Industrial User Panel & Expo *(upcoming)*

- **CINT Industrial Seminar Series**
  - Michelle Ostraat, Aramco Research Centers, *"Leveraging nanotechnology to address complex materials challenges in the oil & gas industry"*
  - Northrup-Grumman *(upcoming)*
  - IBM *(upcoming)*

Aramco

Recruit a vibrant, national user community: CINT User Executive Committee (UEC)

Don Lucca, *Chair*
Oklahoma State University

Judith Driscoll
University of Cambridge

John Grey
University of New Mexico

Karen Winey
University of Pennsylvania

Tito Busani
University of New Mexico

Diane Lidke
University of New Mexico

Erika Vreeland
Senior Scientific
Industrial Advisor

Meenakshi Singh
Sandia National Laboratories
Postdoc Representative

Eric Shaner
Sandia National Laboratories
Internal Lab Representative

Recruit a vibrant, national user community: User Meetings coupled with satellite workshops

2013 User Meeting

Satellite Workshop: Membrane Nanocomposite IFA

Plenary Speakers: Zhenan Bao (Stanford), Ichiro Takeuchi (Univ. of Maryland), and Axel Scherer (CalTech)

Symposia: Dynamics of Soft and Biological Nanocomposites: Manipulation and Integration, Complex Metal Oxides and Unconventional Interfaces, Light emission and interaction with Si and Ge nanostructures

2014 User Meeting

Satellite Workshop: 6th International Workshop on Electromagnetic Metamaterials (IWEM-VI)

Plenary Speakers: William Gerberich (Univ. of Minnesota), Federico Capasso (Harvard), and Michael Rubenstein (UNC)

Symposia: IWEM-VI, Nanostructure in Polymers, Nanomechanical Response of Composite, Complex, and Thin Structures

2015 User Meeting

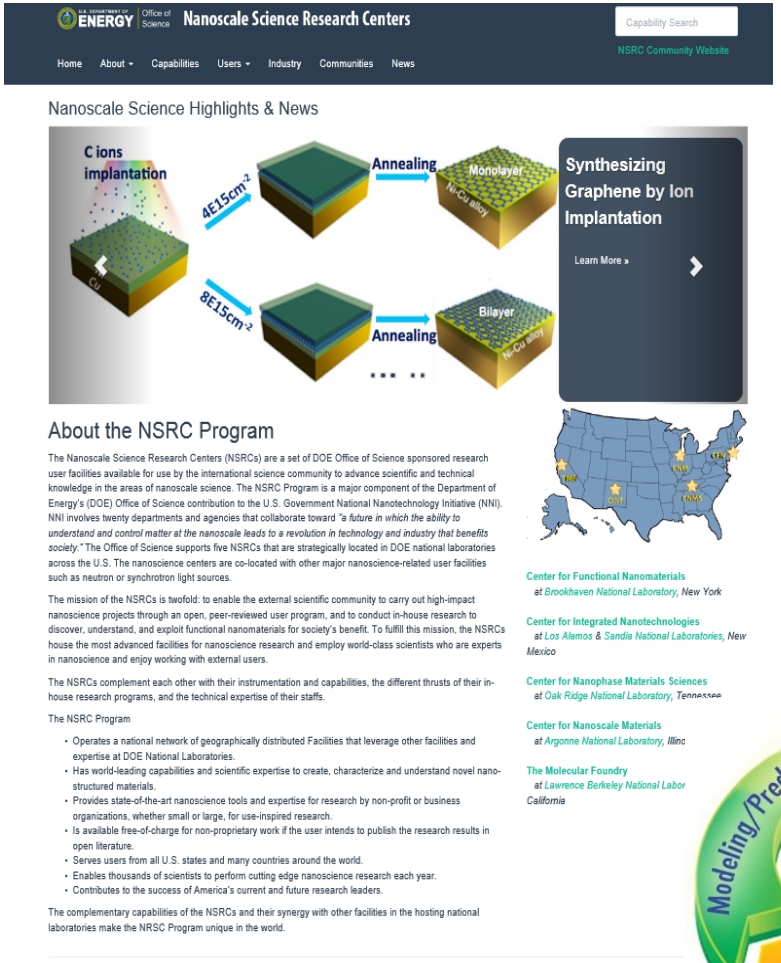
Plenary Speakers: Ian Robertson (UW-Madison), Carlo Montemagno (Alberta Ingenuity Lab), and Claus Ropers (Univ. of Göttingen)

Symposia: Real-time imaging of controlled nanoscale phenomena using S/TEM, Hybrid Photonic Materials Interactions for Integration and Novel Response, *Nanomotors & Molecular Machines: Understanding and Controlling the Catalytic Transport of Matter*

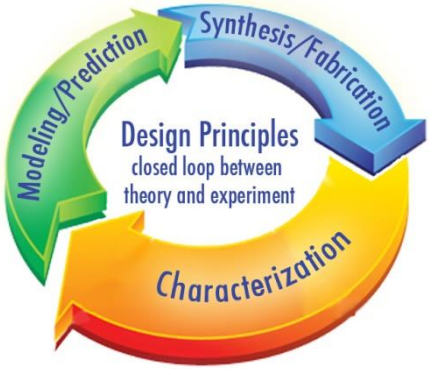
2016 User Meeting *(September 19-20)*

Satellite Meeting: Nanostructures for Electrical Storage (NEES) Energy Frontier Research Centers (EFRC) focused symposia (*Rubloff)* and External Advisory Board meeting *(Hemminger)*

Recruit a vibrant, national user community: NSRC Portal



- In response to user feedback and in partnership with BES and other NSRCs, CINT led the development of the NSRC portal
- Primary function:
  - Searchable capabilities database
  - Listing of technical expertise
  - Highlight specialties
  - Information on NSRC collaborators



https://nsrcportal.sandia.gov/

Enhance interactions with external and internal communities

CINT outreach videos

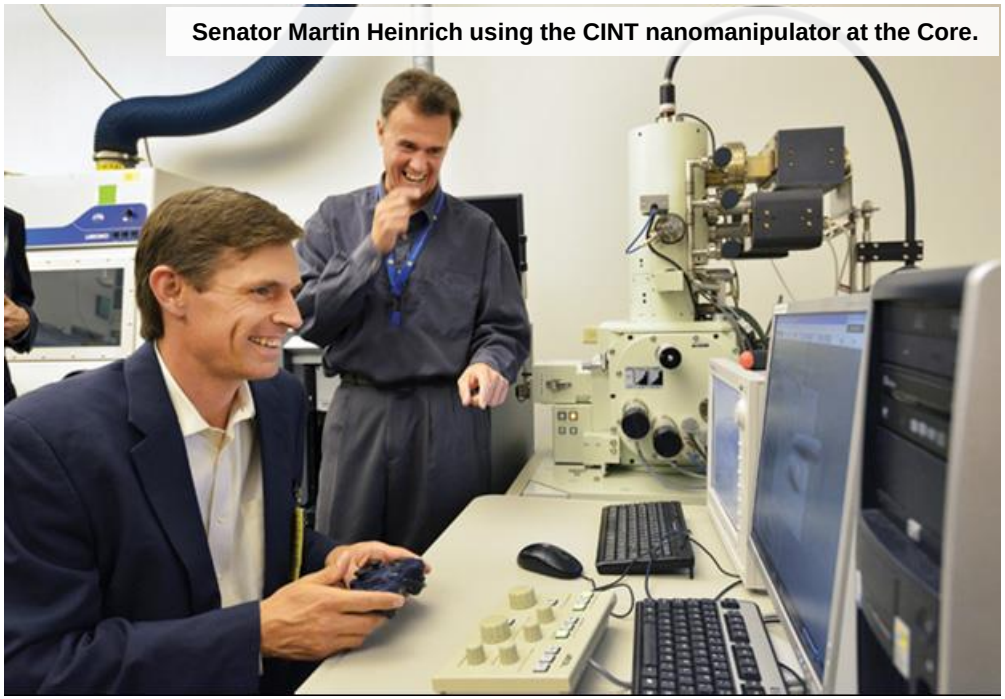
NBC Nightly News

Rohit Prasankumar: Ultrafast Science – Quicker Than a Blink of the Eye

Portable anthrax testing with a lab-in-a-pocket

Encouraging More Students To Pursue STEM Careers

Facility Tours



Senator Martin Heinrich using the CINT nanomanipulator at the Core.

Enhance interactions with external and internal communities

LANL Institute for Materials Science

Los Alamos National Laboratory — National Security Education Center

Institute for Materials Science

Incubate – Innovate – Integrate

- Interdisciplinary research and educational center focused on fostering the advancement of materials science at LANL.

- Aids in defining research directions and serves as a focal point for materials research collaboration inside and outside the laboratory.

Institute Director:

Alexander (Sasha) Balatsky, former CINT thrust leader

Deputy Directors:

Jennifer Martinez (CINT scientist)

Nate Mara (partner science leader)

Share our commitment to nanoscience integration through educational outreach

Career Fair,
Santa Fe High School

Bradbury Science Museum, CINT display

National User Facility Organization user science exhibition for Congress, 2014

DOE National Lab Day, 2016

Looking ahead: strategic directions

- Develop additional partner user agreements, adding capabilities with national user appeal
- Target industrial users focused on nanoscience integration
  - Seminar series
  - Outreach at industrial events
- Continuous improvements of operational efficiencies to enhance User experience
  - Proposal review length
  - Further reciprocity agreements between SNL and LANL

Looking ahead: strategic directions

- Increased exposure of CINT at national meetings
  - Organized symposium highlighting CINT staff and user science
  - Staff highlighting user facility within invited talks
- Outreach with other NSRCs
  - Host joint workshops
  - Participate in joint outreach efforts

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"We received unexpectedly good samples The ability to both make and characterize the samples was a major benefit. Could not have done my experiment without these capabilities. "

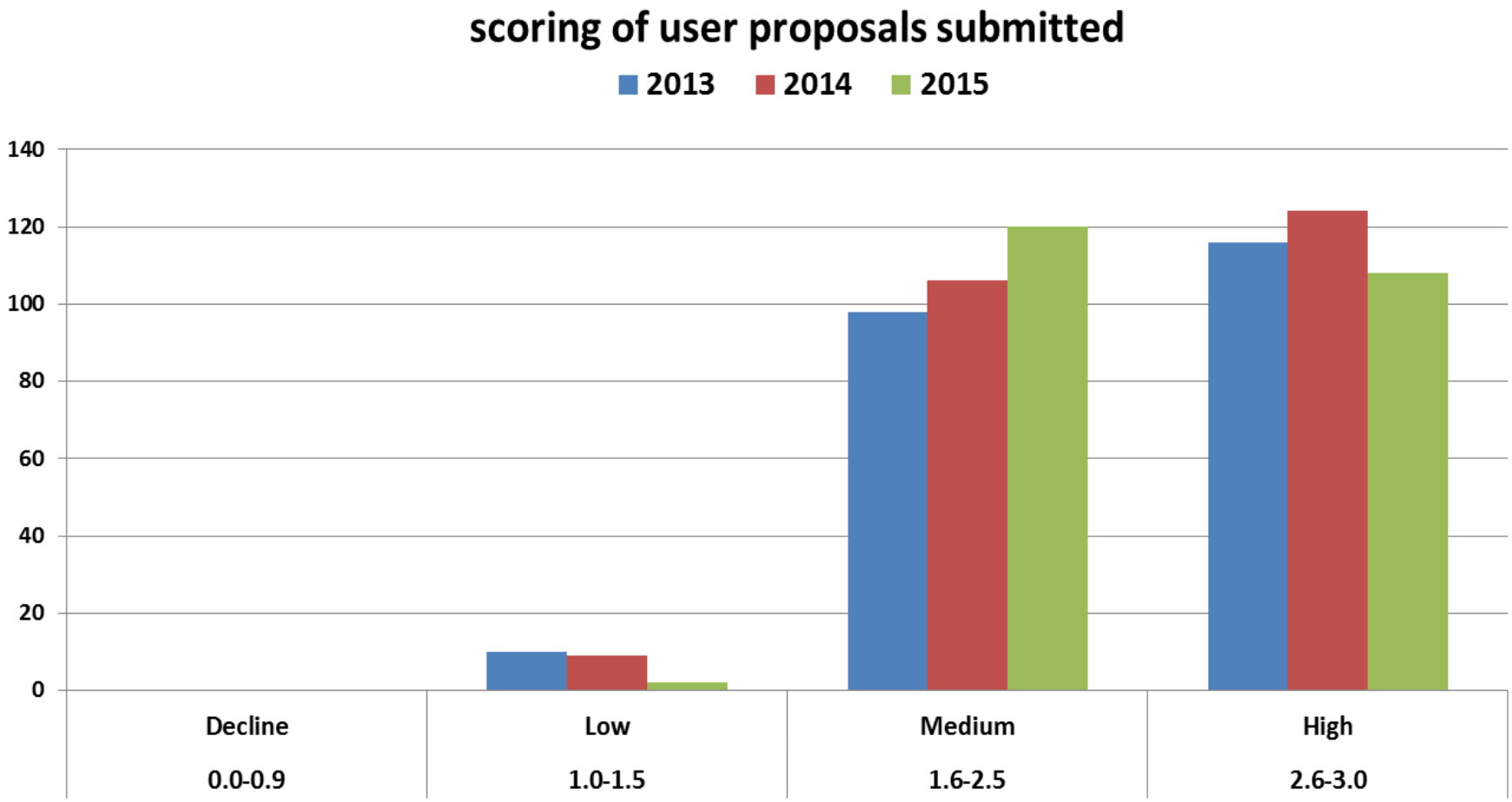
"CINT is a unique and valuable resource to scientists working in a broad spectrum of fields.

"I think the work we are undertaking with CINT collaborators is among the most exciting in my labs portfolio. CINT is an excellent resource for academic research collaborations. It makes projects possible that I would otherwise have difficulty realizing. "

Questions

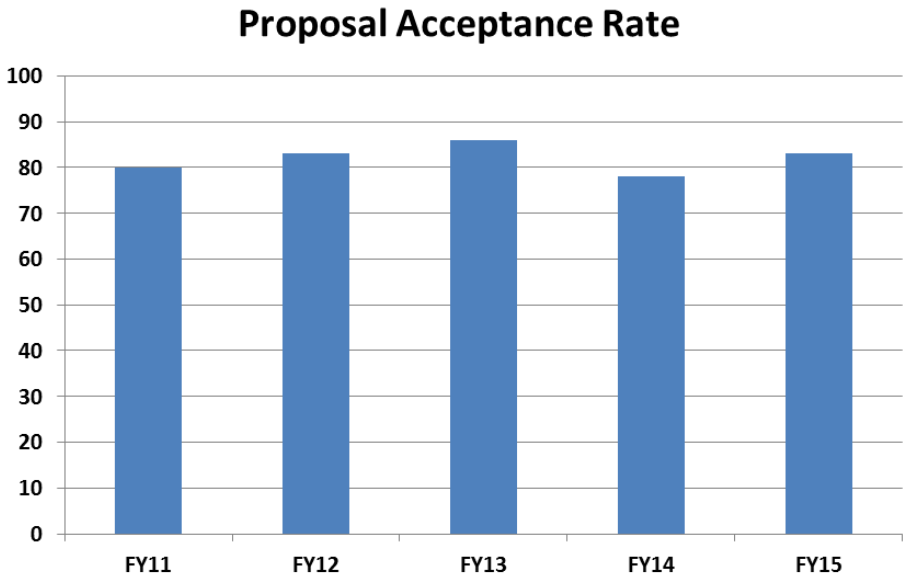
Back up Slides

CINT Proposals are reviewed as excellent

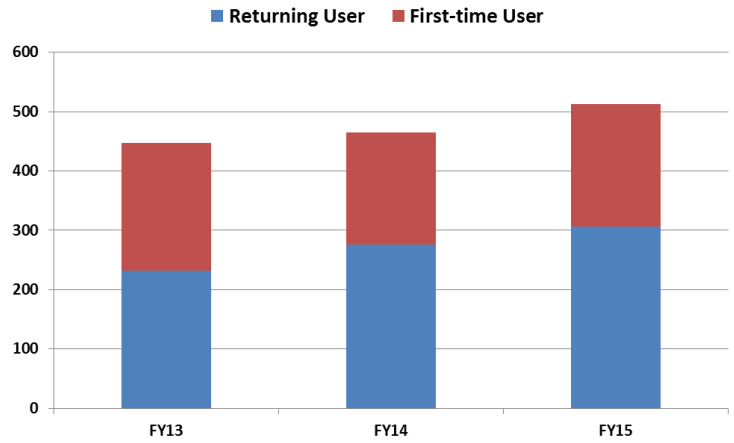


High Impact Projects

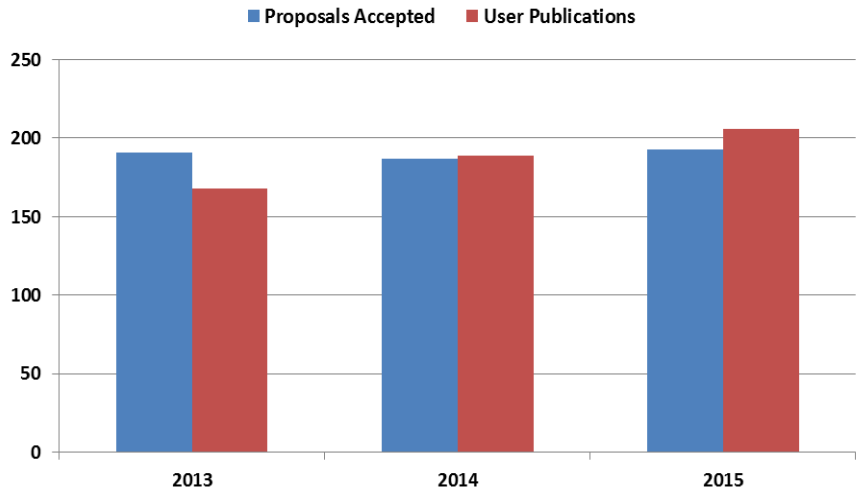
Managing the acceptance rate……



…While *Ensuring Access to New Users*



And *Focusing on Project Impact*



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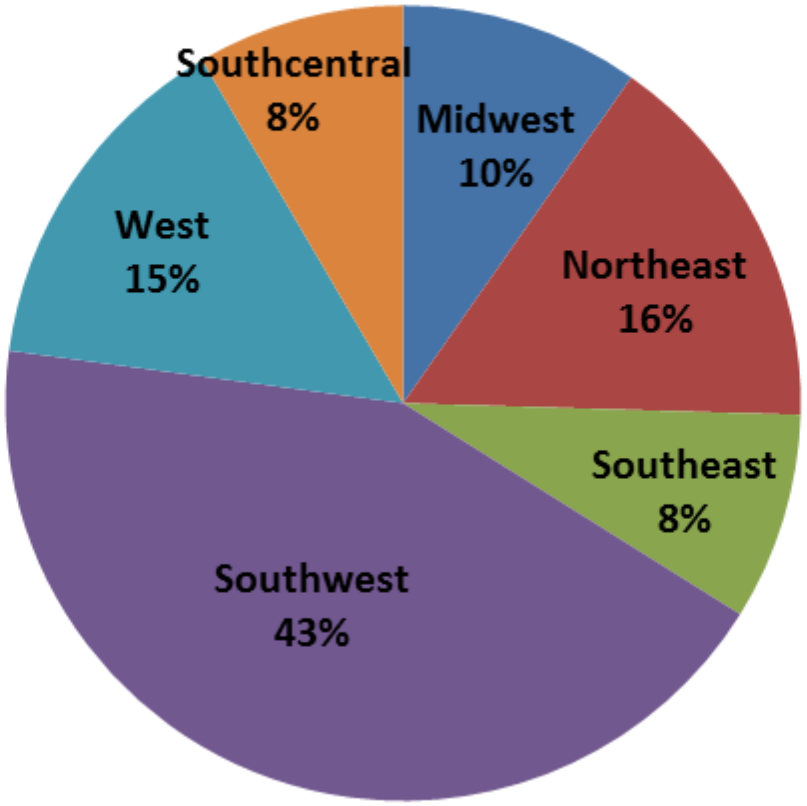
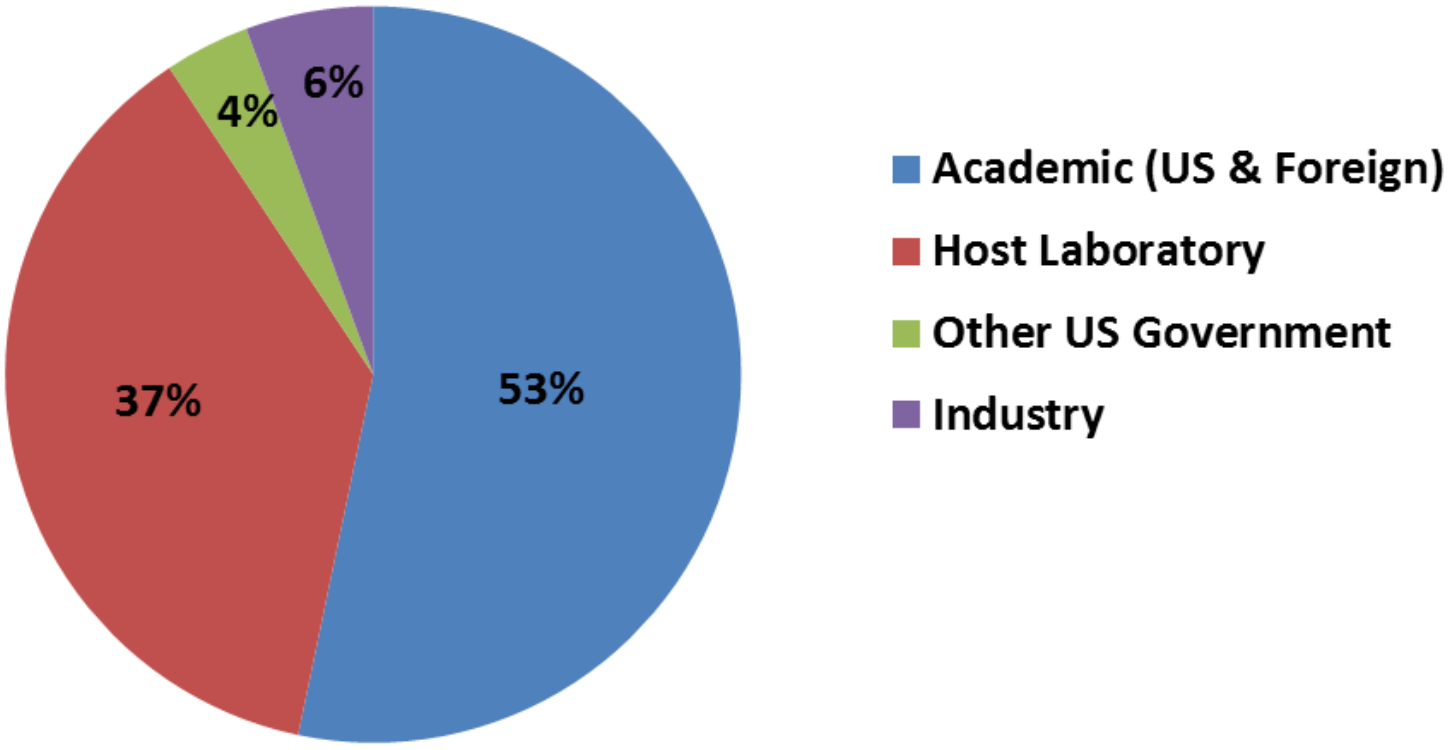
External US Users by region

FY13-FY15 External US Users

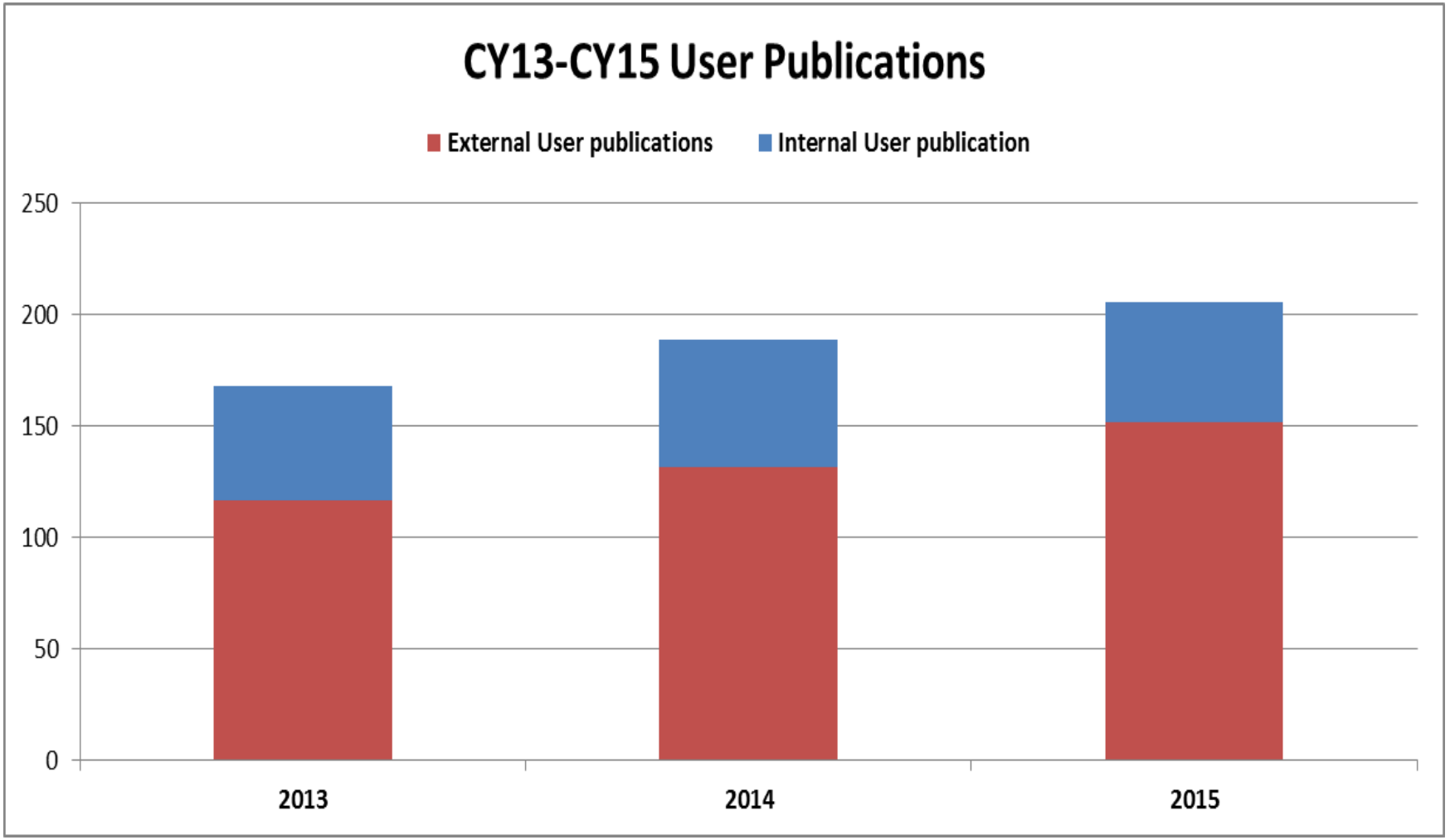


Rapid Access Proposal Institutions

FY13-FY15 Accepted Rapid Access Proposal Insitution Type



Productive User Community



How BES defines a User

* Users are researchers who propose and conduct peer-reviewed experiments at a scientific facility.

• The primary type of user is a Badged User, i.e., a researcher who conducts experiments within the facility.

• There are two other types of users who conduct experiments: (1) Remote User — a researcher who has been granted authority to remotely produce data (this excludes persons who can "look at data"); and (2) Off-Site User — a researcher to whom the facility provides custom-manufactured materials, tools, or devices that the facility has unique or unusual capabilities to fabricate (this applies only to such activities at Nanoscale Science Research Centers). For both types of these users, **only one user** is to be counted per proposal regardless of the number of co-investigators, and only if no individual is counted in any user category the other categories under the same proposal.

• For annual totals, an individual is counted as 1 user at a particular facility no matter how often or how long the researcher conducts experiments at the facility during the fiscal year. A Badged User cannot also be counted as another type of user. Users must submit a successful, peer-reviewed research proposal and conduct experiments, as described above. Therefore, users do not include individuals who only send in samples to be analyzed, even if such activities are part of a peer-reviewed experiment. Users do not include individuals who pay to have specialty services performed or visit the facility for tours or educational purposes. Users also do not include researchers who collaborate on the proposal or subsequent research papers but do not conduct experiments at the facility.