

*Science and Technology Centers:
Integrative Partnerships*

Science and Technology Centers: Integrative Partnerships

Class of 2026 (NSF 24-594) Competition

stc2026@nsf.gov



Webinar Agenda

- **Introduction:** Rebecca Morss, NSF Office of Integrative Activities (reellis@nsf.gov)
- **Part I: STC program overview and solicitation highlights**
 - Dragana Brzakovic, NSF Office of Integrative Activities (dbrzakov@nsf.gov)
- **Part II: Presentation on Center leadership realities**
 - Bill Treasurer, Giant Leap Consulting (billtreasurer@giantleapconsulting.com)
- **Part III: Panel discussion with leadership from three STCs**, moderated by Justine Foo, Giant Leap Consulting (jfoo@giantleapconsulting.com)
 - Wallace Marshall, Center for Cellular Construction (CCC), 2016 cohort
 - Ed Brook & Danielle Whittaker, Center for Oldest Ice Exploration (COLDEX), 2021 cohort
 - Zan Luthey-Schulten, Center for Quantitative Cell Biology (QCB), 2023 cohort
- **Part IV: Q&A**



Webinar Information

- **Goals for this webinar**
 - Highlight key elements of the NSF STC solicitation
 - Provide insight into NSF STC leadership – recognizing that every Center is different
 - Address frequently asked questions from potential applicants
- **Giant Leap Consulting** has worked with the NSF STC program since 2010 and brings valuable perspectives on STC leadership
- **Webinar slides and recording** will be posted on the NSF STC web site in 1-2 weeks.
- A **second STC informational webinar**, focusing on partnerships, is planned for October 2024



Instructions for questions

- Please ask questions using the Q&A in Zoom, at any time during the webinar
 - Indicate whether your question is for **NSF**, **Bill Treasurer**, or the **STC panel**
- We will collate questions and begin answering them later in the webinar
 - Note: We do not anticipate having time to answer all questions



Science and Technology Centers: Integrative Partnerships

- STC program supports large scale, long term, exceptionally innovative, complex research and education projects in all areas of research funded by NSF.
- Individual STCs focus on creating new scientific paradigms, establishing entirely new scientific disciplines and developing transformative technologies which have the potential for broad scientific or societal impact.



Eligibility

- Lead institution must be US institution of higher education and have doctoral degree in any area supported by NSF
- Limit of number of proposals as a lead: 3
- Principal Investigator (PI) must be full time faculty member
- Limit of Number of Proposals per PI or co-PI: 1
- PI=Center Director



STC Particulars

- Award mechanism: Cooperative agreements
- Budget: up to \$6 million / year¹
- Initial five-year award duration, renewal proposal and review in the fourth year
- Unsuccessful renewals phased out (year 5) with reduced support
- Successful 5-year renewals begin in year 6 with phased-out support in years 9 and 10

¹ Subject to availability of funds



STC program in numbers

Typical center statistics

- 5 core partners, mostly academic
- 20+ senior researchers and educators
- 20-100 graduate students
- 2-5 administrative personnel



Characteristics of STCs

- **Research:** portfolio of integrated frontier investigations
- **Education:** evidence-based practices developed in the context of current education research and be monitored through a formal evaluation
- **Knowledge transfer:** significant intellectual exchange between the Center and external non-academic stakeholders
- -----**Broadening participation**-----



STC program in numbers

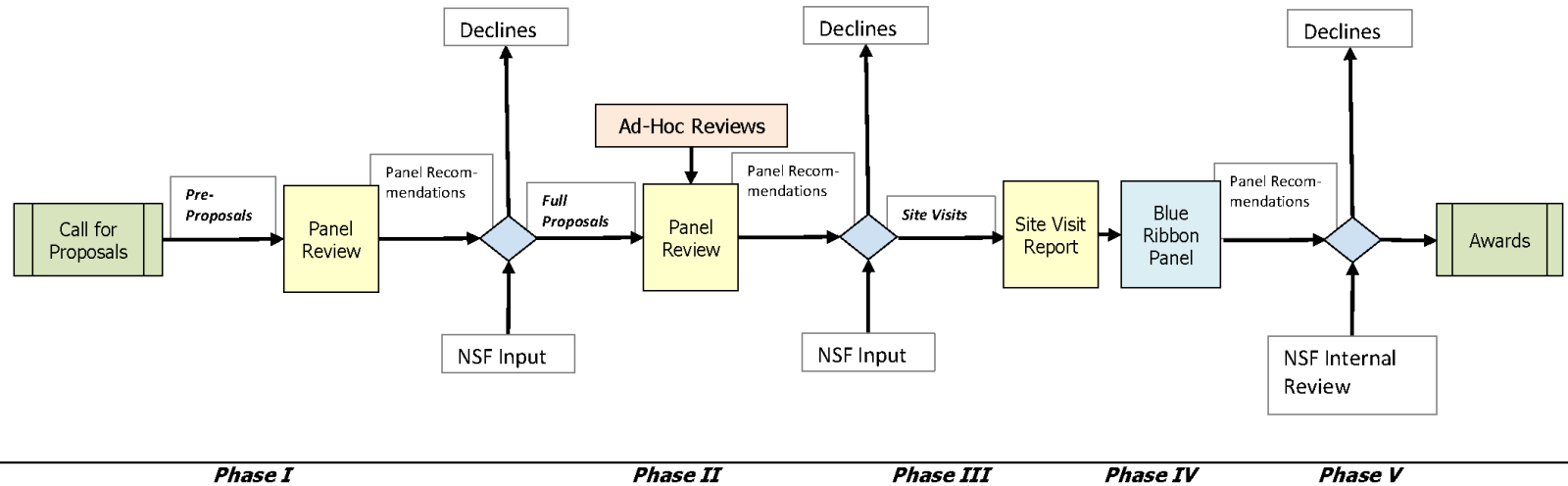
Typical STC competition

- Competition duration about 18 months
- 300-500 different reviewers
- 3-6 awards



Science and Technology Centers: Integrative Partnerships

STC Review Process Flowchart



STC Preliminary Proposal (center concept, 12 pages)

- Center Rationale
- Center Plan
- Team Description
- Integration Strategies
- Institutional Commitment to Broadening Participation



This is
my first
rodeo

Let's
go!

Reporting
for duty

LEADERSHIP REALITIES



FNG

Put me
in coach

NEW

This is
my first
rodeo

New
leader

BILL TREASURER



Leadership Realities!

- Your success depends on helping others be successful.
- Leading takes more than scientific smarts.
- You're an unqualified psychiatrist!
- Causing discomfort is your job.
- Nobody hands you a playbook!

Tension Points

Long - term Aims



Short - term Urgencies

Driving for Results



Striving for Consensus

Pioneering Research



Fundamental Progress

Center Development

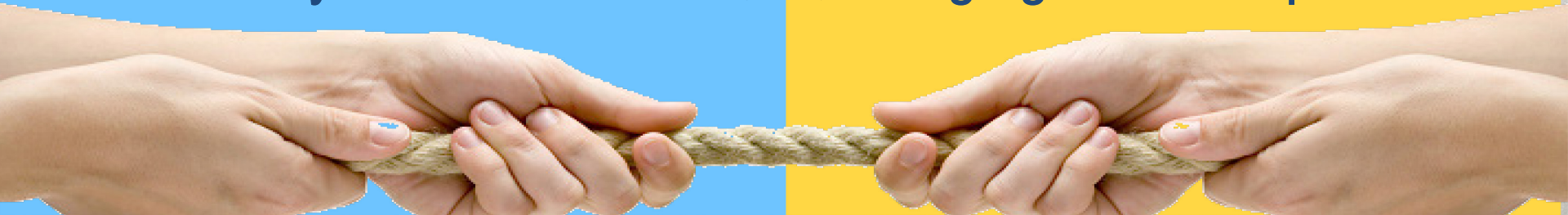


Individual Career
Development

Fidelity to Plans



Being Agile and Responsive



3 Leadership Focus Areas



Leading Yourself

Awareness
Discipline
Improvement



Am I fit to lead?



Leading Others

Inspiration
Caring
Development



Will others follow?



Leading Work

Organizing
Prioritizing
Results



Can we get great results?

Today's Whirlwind



Advancing the vision



Part III: Panel discussion with STC leadership

- **Moderated by Justine Foo**, Giant Leap Consulting
- **Wallace Marshall** (Wallace.Marshall@ucsf.edu)
 - Center for Cellular Construction (CCC), 2016 cohort
- **Ed Brook** (Edward.Brook@oregonstate.edu) & **Danielle Whittaker** (danielle.whittaker@oregonstate.edu)
 - Center for Oldest Ice Exploration (COLDEX), 2021 cohort
- **Zan Luthey-Schulten** (zan@illinois.edu)
 - Center for Quantitative Cell Biology (QCB), 2023 cohort



Wallace Marshall, Center for Cellular Construction, 2016

- **Center vision:** To develop an engineering discipline that will allow us to design and build cells and tissues with specific three-dimensional structures for use as living factories and building blocks to develop better and sustainable products, materials, and devices to benefit humankind
- **Key Success:** Implemented a data-driven computer aided design strategy to increase organelle size that results in increases production of useful chemical products by cells



Ed Brook & Danielle Whittaker, COLDEX, 2021

Center for Oldest Ice Exploration (COLDEX)

- COLDEX is exploring the Antarctic ice sheet to find Earth's oldest ice and use it to understand the history of climate and the atmosphere.
- We have discovered and analyzed ice as old as 6 million years – the oldest ice core samples known.



CLIMATE SCIENCE

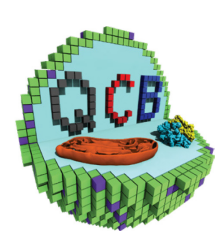
Oldest ice offers view of Earth before the ice ages

Bubbles from ancient warm period contain surprisingly low amounts of carbon dioxide



www.coldex.org

edward.brook@oregonstate.edu



Zan Luthey-Schulten, STC Quantitative Cell Biology, 2023

Mission: Develop 4D Whole Cell Models & Experiments
Bacteria, Yeast, and Mammalian Cells

Key Successes: (ongoing and planned)

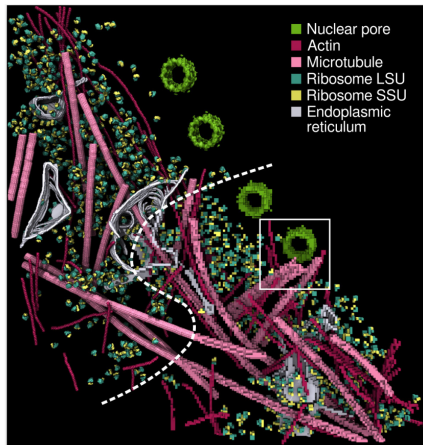
MINFLUX

Cryo-ET & Soft X-ray T

Bringing Cells to Life & to Minecraft

- ❖ Live cell imaging
- ❖ 2 nm spatial resolution
- ❖ 0.1 ms resolution tracking for minutes

- ❖ Cell shape and architecture



LM, VMD, NAMD, GROMACS,
Martini, ARBD

Label-free in-cell IR microscopy w. ML

- ❖ Spatial mapping of chemical composition



UIUC, Harvard Medical, UTRGV, UMBC, EMBL, U. Groningen, U. Stockholm, NVIDIA, Abberior, JCVI, MS Minecraft, NCSA
Beckman Inst., CCIL, Woese IGB
See QCB.illinois.edu

Thank you for joining!

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- A second STC informational webinar, focusing on partnerships, is planned for October 2024.
 - Details will be posted on the NSF STC web site and mailing list when available.
- STC program contact information: stc2026@nsf.gov

