

Cancer Systems Biology Consortium (CSBC)

Request to reissue CSBC U54 and U24 RFAs

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The NCI Cancer Systems Biology Consortium (CSBC)

The CSBC defines systems biology as the **explicit integration of experimental biology and computational or mathematical modeling** to build, test and/or validate hypotheses or ideas.

**CSBC Steering Committee
Collaborative Projects
Working Groups
Annual Meetings
Outreach**

Total Awards: **37**
[13 U54s + 1 U24 + 23 U01s]

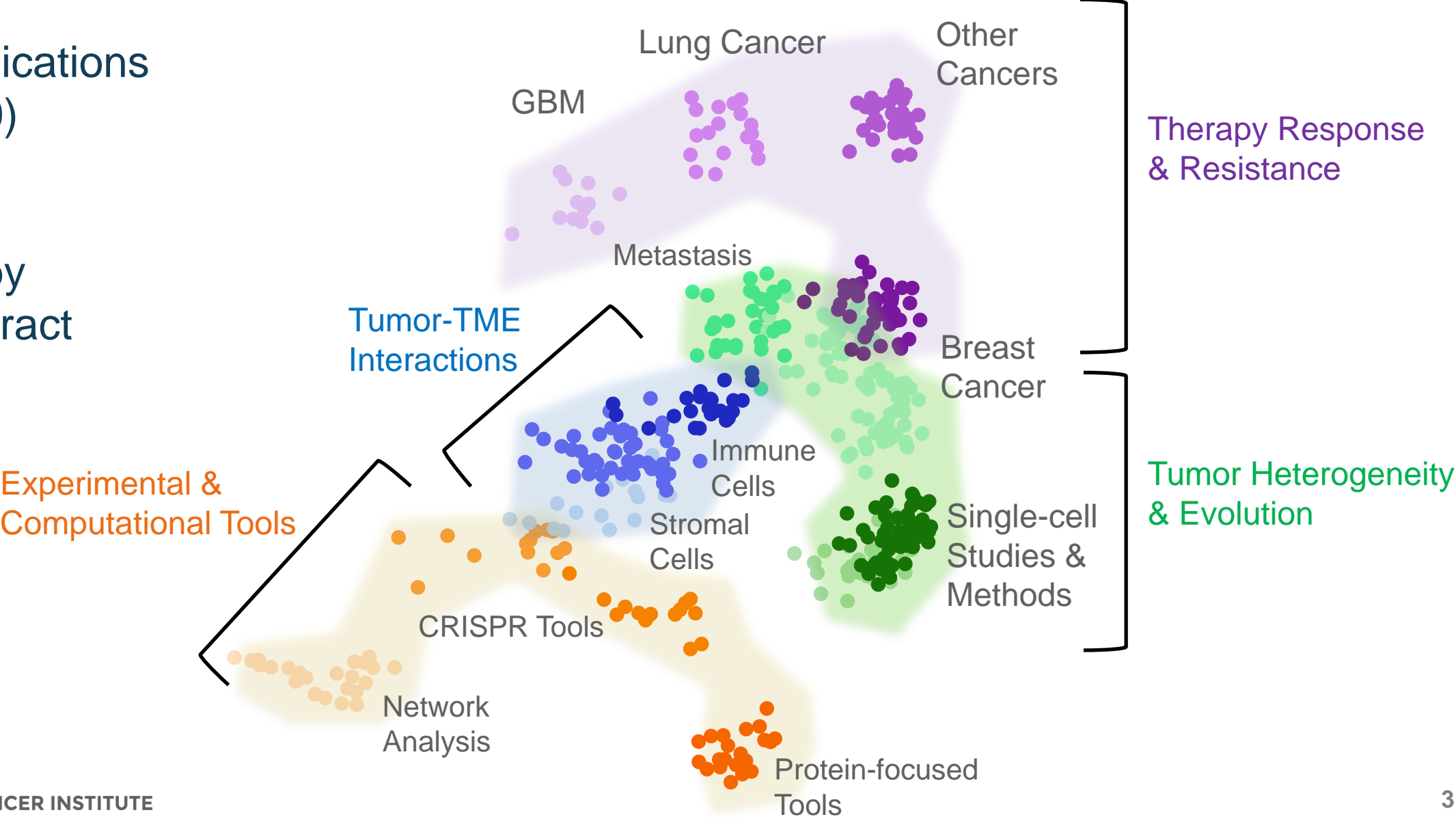
The FY16 U54 and U24 awards
will end in August 2021

U01s are supported through PAR-19-287; reissuance is not requested here

CSBC Goal #1: Advance understanding of mechanisms that underlie fundamental processes in cancer

CSBC Publications
(2017-2020)

Clustered by
Title & Abstract



CSBC Goal #2: Support the broad application of systems biology approaches in cancer research

CSBC resources are available on the Cancer Complexity Knowledge Portal (<https://www.cancercomplexity.synapse.org/>)

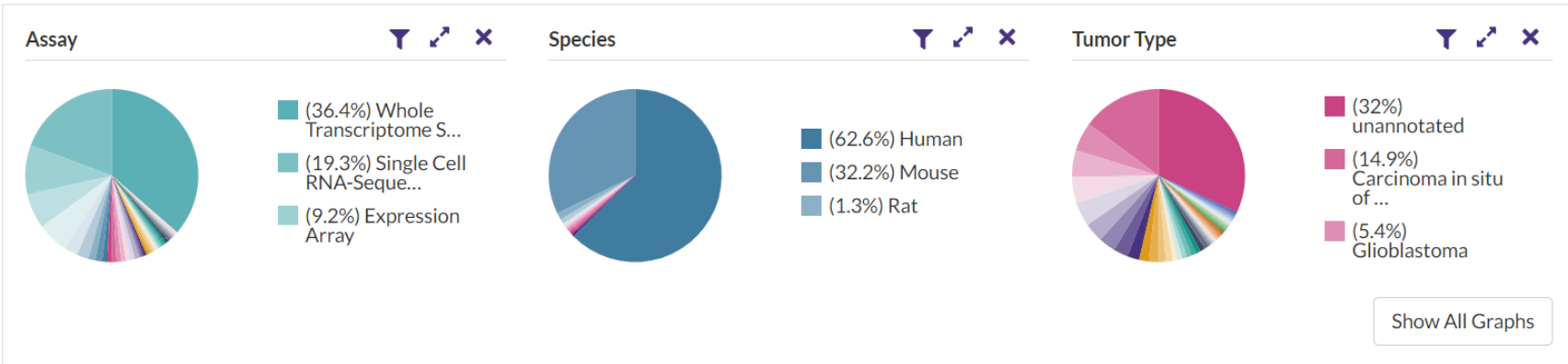


Cancer Complexity Knowledge Portal

EXPLORE

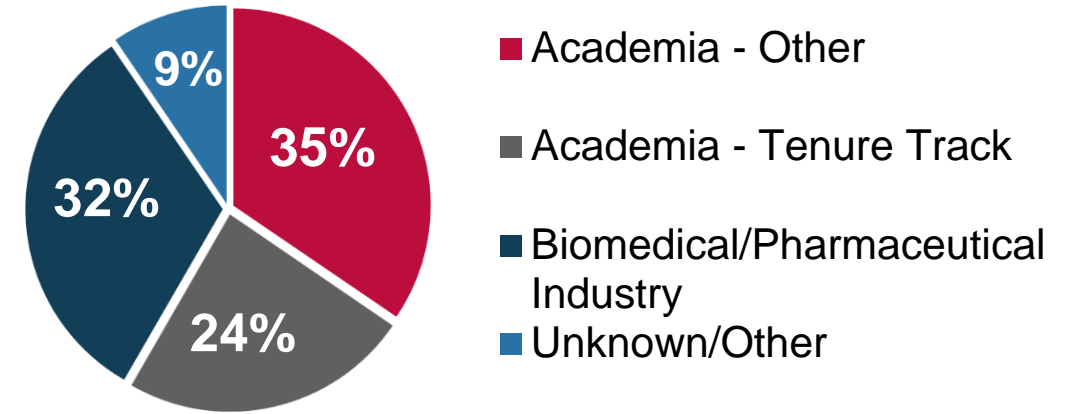
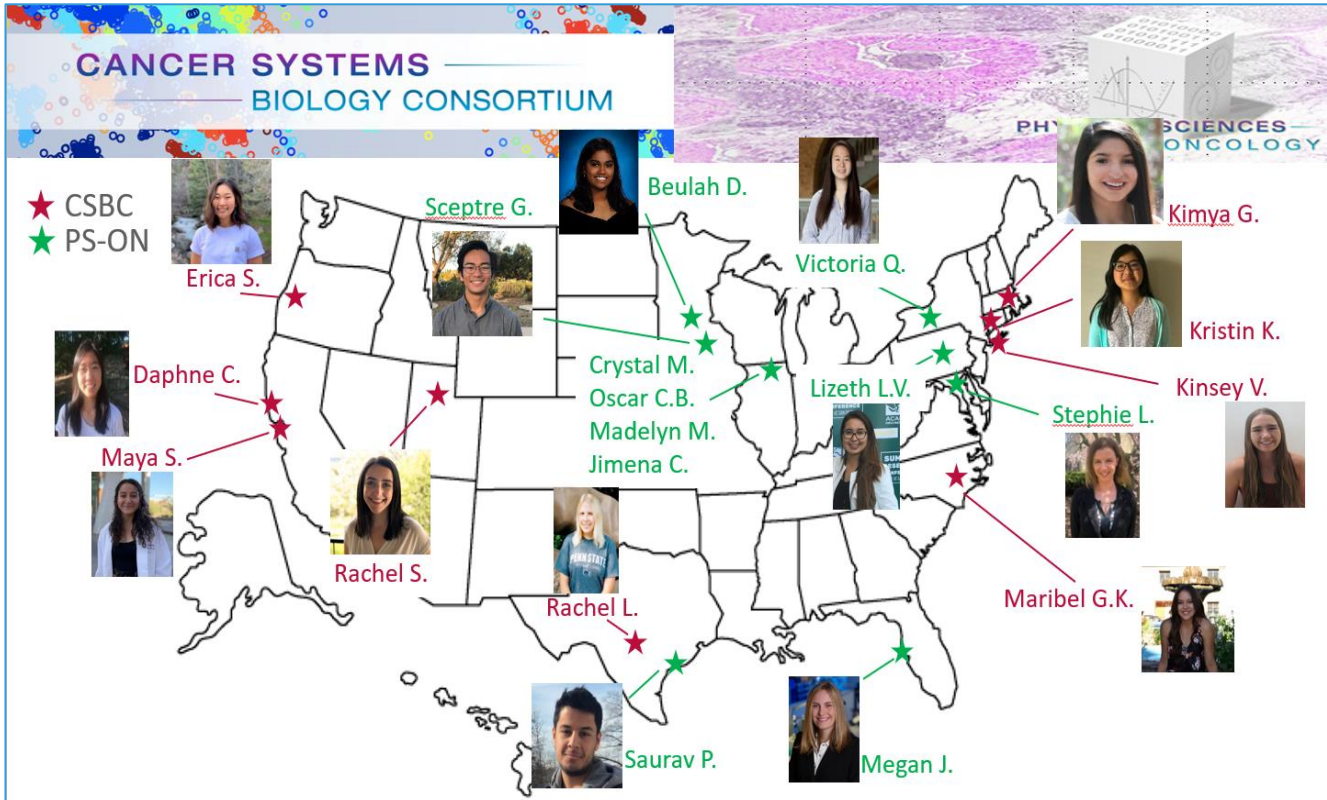
GRANTS PUBLICATIONS DATASETS FILES TOOLS

Datasets (213)



Goal 3: Supporting growth of the systems biology field

Training the next generation of cancer systems biologists



Where are post-graduate trainees going?

- 86 have left CSBC positions 2017-2020
- 21 of 25 Asst. Prof describe their work as cancer systems biology

Summer Undergraduate Research Program

Evaluation of CSBC (2016-2020)

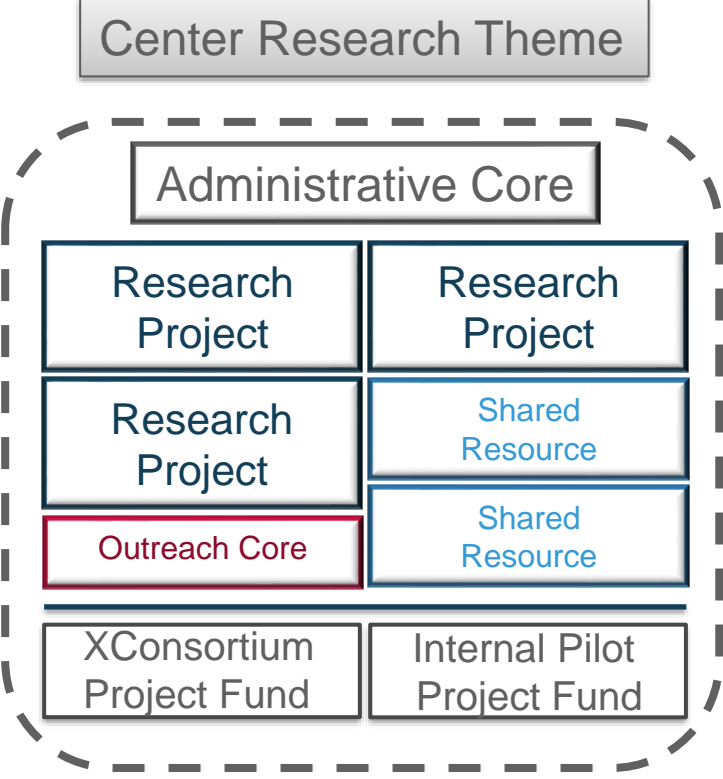
Expert panel findings and recommendations included:

- CSBC “fosters a **productive research community**” that is “**producing high-impact** publications, tools, and resources that otherwise would not have been generated” and “**generating a stable research community**”
- Creating relationships between **CSBC investigators and clinicians**
- **Validating computational model predictions** in systems relevant to human health
- Increasing opportunities for **focused cross-consortium collaborations**
- Requiring that CSBC investigators and coordinating center **share FAIR datasets and tools** for the cancer research community and
- **Expanding outreach efforts** to grow the field of cancer systems biology and recruit involvement of cancer biologists and clinicians

Reissuance of RFA-CA15-014 (U54)

Each U54 research theme should tie the projects/cores together and require a coordinated systems biology approach

A **\$75K dc cross-consortium project fund** to facilitate joint projects on areas of high value and common interest



\$1.5M/yr DC, 5 years
8-10 Centers
2 receipt dates (FY22/23)

A requirement to strive towards **interoperable datasets and community accessible tools** in collaboration with the U24 coordinating center

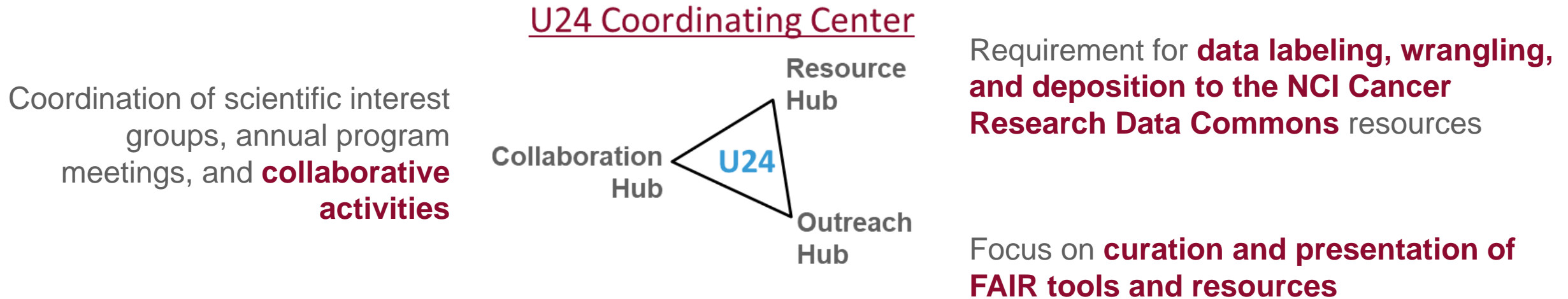
A requirement for \$50K dc internal pilot award teams to include non-U54 funded investigators; **projects that increase the diversity of the CSBC community and/or move Center findings towards clinic encouraged**

New U54 research themes that could benefit from a coordinated systems biology effort include, but are not limited to:

- Prediction and subsequent **control of tumor, stroma, or immune cell plasticity** promoted by regulatory network rewiring, metabolic reprogramming and/or tumor-stroma crosstalk;
- Identification of **generalizable mechanisms** underlying multiscale and dynamic molecular, cellular, and patient-level heterogeneity;
- Elucidation of the mechanisms of **cellular communication within and across all cells** of the tumor eco-system, including the microbiome;
- Investigation of the **biological basis of effective combination therapies** and their dosing strategies, including predicting patients most likely to benefit from a given treatment, converting transient responses into durable responses, and identifying rational, clinically actionable combinations;
- Delineation of **local and systemic microenvironment states** that permit or suppress cancer initiation and progression, studied using computational models incorporating diverse stromal and immune cell types, and local and systemic effects;
- Integration of **population-level risk factors and systemic stresses**, such as obesity, chronic inflammation, and polypharmacy with molecular and cellular processes.

Reissuance of RFA-C15-015 (U24):

The U24 will coordinate five programs in the Division of Cancer Biology (CSBC, PS-ON, MetNet, TEC, CCBIR)



An open competition will encourage innovation in all aspects of the U24.

Evaluation criteria for CSBC

The CSBC will continue to be evaluated based on the following three long-term goals:

1. Advance understanding of mechanisms that underlie fundamental processes in cancer,
2. Support the broad application of systems biology approaches in cancer research, and
3. Support the growth of a strong and stable research community in cancer systems biology.

The second CSBC funding period will be considered successful if additional milestones are met at the end of the proposed five-year funding period. Such examples could include, but are not limited to:

- *(In support of Goal 1)* Predictions derived from cancer **systems biology approaches are utilized as the basis for clinical trials and/or patient care** due to a greater fundamental understanding of the underlying complex cancer biology.
- *(In support of Goal 2)* **New collaborations are formed** between CSBC investigators and external cancer researchers that result in independent grant funding and/or **increase the diversity of the cancer systems biology field**.
- *(In support of Goal 3)* The **success rate of system biology research grant applications** to parent funding announcement is comparable to that of traditional NCI R01 applications.

Summary of request

- 8-10 CSBC U54s across 2 receipt dates (FY22/FY23)
 - \$1.5M direct cost per year / U54
 - Up to 5 Centers per receipt date; \$12.375M total cost (65% indirect)
- 1 U24 (FY22)
 - Coordination of 5 Division of Cancer Biology programs
 - \$1.5M direct cost per year; \$2.475M total cost per year
- First year total budget request: \$14.85M
- Max total budget request: \$136.125M (FY22-27, with 10 U54s)

Questions from BSA reviewers

1. Provide some measure of the scientific impact of the CSBC

- Expert evaluation panel found that the CSBC was having a significant impact on the field of cancer biology
- Bibliometric indicators -- CSBC publications from 2017-2018: 35% of articles are in top 10% of cited articles in the field (>5500 citations); < 1% self-citation rate

2. Provide characteristics of CSBC awardees

- Of 70 PI or MPIs on current CSBC awards; 9 were ESI or NI at time of award
- Of 606 participants on CSBC RPPR in FY20; 94 are ESI or NI
- Nearly all CSBC awards are to R1 Institutions

3. How has the CSBC impacted the NIH/NCI portfolio?

- 2163 grant applications have cited CSBC research (2017-2020)
- Collaborative pilot projects supported by the CSBC have resulted in NIH applications and funding (R21, R01, U01)

4. Are there successes related to trainee and faculty advancement?

5. Have there been successes in collaborating or partnering with industry?

6. What changes are being made in the second phase of the program?

Thank you