



Jill Heemskerk  
Deputy Director



David George  
Associate Director



Richard Leapman  
Scientific Director



Kris Kandarpa  
Strategic Initiatives



Jason Ford  
Executive Officer

# NIBIB Council Director's Report *05-20-2020*





# Remembering Bob Nerem



Robert Nerem  
1937-2020

- Instrumental in the creation of NIBIB and served as a part-time Senior Advisor from 2003-2006
- Professor Emeritus, Founding Executive Director of the Parker H. Petit Institute for Bioengineering and Bioscience, Georgia Institute of Technology
- Founding President of AIMBE (1992-1994)
- Global leader in the Biomedical Engineering community

# Welcome!



Luisa Russell, PhD  
*DDST Program Director*

- BS, Materials Science and Engineering, Stanford University
- PhD, Materials Science and Engineering, JHU; Institute for NanoBioTechnology (INBT)
  - standardize the way nanomedicines for passive accumulation in solid tumors are characterized*
- NCI, CRTA Postdoctoral Fellow
  - Nanodelivery Systems and Devices Branch, Cancer Imaging*
- NIBIB: biochemical engineering

# Welcome!



Joan Greve, PhD

*Scientific Program Manager, DIDT*

- BS, Engineering (Bioengineering), University of Washington
- PhD, Bioengineering, Stanford University
  - *First data to combine MRI and computational fluid dynamics modeling of the cardiovascular system in murine and rat models*
- Imaging Researcher, Genentech, Inc.
- Assistant Professor, Biomedical Engineering, University of Michigan

# Welcome!



Robert Moore  
*Scientific Program Analyst*  
*Office of Scientific Review*



Kaluthanthrige (Dilhari) Peiris [C]  
*Web Developer*  
*Office of Science Policy and Communications*

# Welcome!



William Heetderks, MD, PhD  
*Office of the Director*

- Previously served as the Associate Director for Science Programs at NIBIB
- Re-joined NIBIB as Special Senior Advisor to Director



# *Thank you, Council Members!*



David Grainger, PhD  
*University of Utah*

Drs. Grainger and Buxton have completed their terms serving on NIBIB's Advisory Council and will be rotating off at the end of Summer 2020.



Richard Buxton, PhD  
*University of California, San Diego*

# Dr. Grace Peng Inducted AIMBE Fellow!

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## **Grace Peng, PhD**

Director of Mathematical Modeling, Simulation and Analysis Programs,  
Chair of the Interagency Modeling and Analysis Group (IMAG)

Election to the American Institute for Medical and Biological Engineering (AIMBE)  
College of Fellows on March 30, 2020.

The College of Fellows is comprised of the top two percent of medical and biological engineers, honoring those who have made outstanding contributions.

*For creation of the Interagency Modeling and Analysis Group and the Multiscale Modeling Consortium, and promoting new neurotechnology development.*

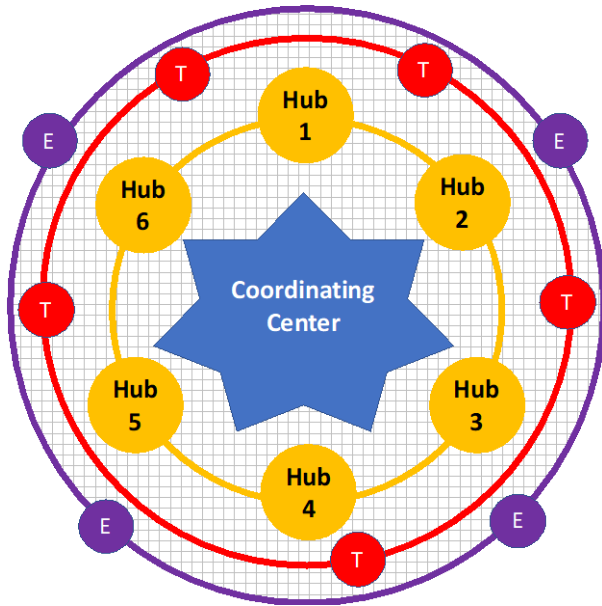


# Harnessing Data Science for Health Discovery and Innovation in Africa

<https://commonfund.nih.gov/africadata>



DS-I Africa



1. Research Hubs focused on key health problems

2. DS-I Training Programs

3. Ethical, Legal and Social Implications of DS-I Research

4. Open Data Science Platform and Coordinating Center

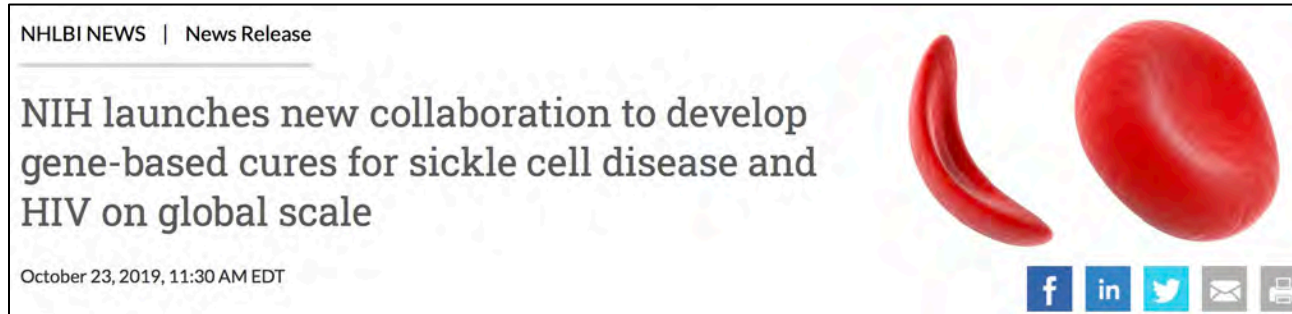
5. Symposia (years 1 and 6)

- Notices of Intent to Publish and Funding Opportunity Announcements released for **Harnessing Data Science for Health Discovery and Innovation in Africa (DS-I Africa)**
  - [Research Hubs \(U54 Clinical Trial Optional\) \(NOT-RM-20-010\)](#)
  - [Research Training Program \(U2R Clinical Trial Optional\) \(NOT-RM-20-011\)](#)
  - [Ethical, Legal, and Social Implications Research \(U01 Clinical Trial Not Allowed\) \(NOT-RM-20-012\)](#)
  - [Open Data Science Platform and Coordinating Center \(U2C Clinical Trial Not Allowed\) \(NOT-RM-20-013\)](#)
- Onboarding NIH Data Science Scholar

# NIH Technology Accelerator Challenge (NTAC)



Tiffani Lash



*\$1,000,000 challenge:  
NIBIB, OD, NIAID, NIDDK, FIC*



Jill Heemskerk



Behrouz  
Shabestari



**25 participants intend to submit!**  
**Challenge applications accepted through**  
**June 2, 2020!**



Taylor Gilliland

**BMGF POC team:** *Dan Wattendorf, Andrew Trister, Arunan Skandarajah, Jessica Lee*

## 2020: \$100,000 in Prizes

- Application Deadline: **June 1**
- Winners Announced: August 25
- Awards: October 15, 2020 BMES SD

### NIBIB-sponsored prizes:

The Steven H. Krosnick Prize: **\$20,000**

Second Prize: **\$15,000**

Third Prize: **\$10,000**

HIV/AIDS Prize: **\$15,000**

★ NIMHD Prize for Low-Resource Settings: **\$15,000**

★ 5 Honorable Mentions: **\$1,000** each

### VentureWell-sponsored prizes:

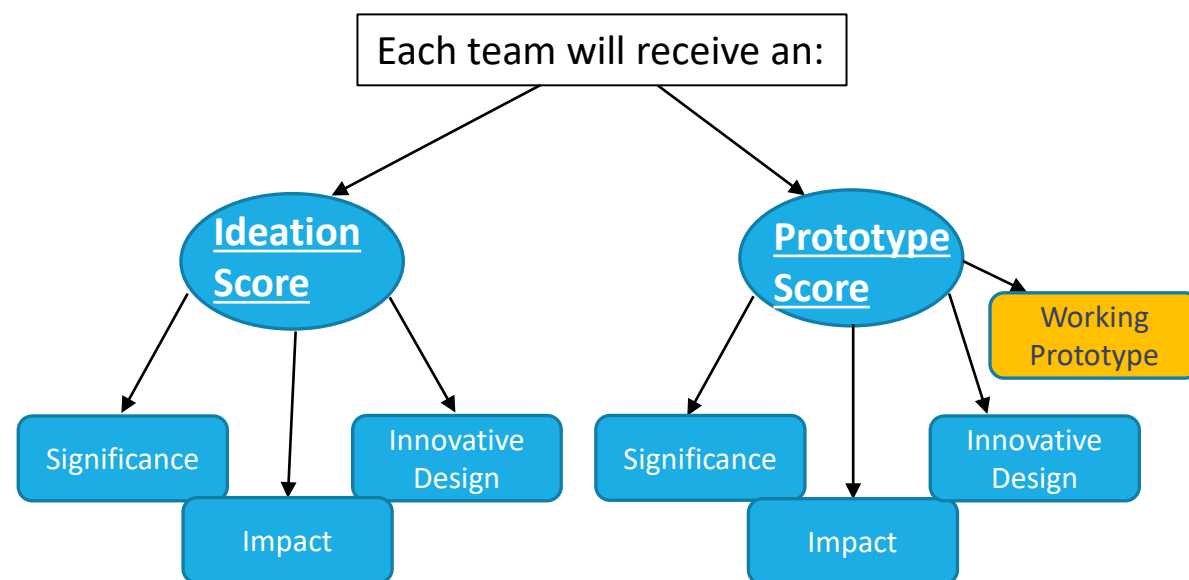
Venture Prize: **\$15,000**

Design Excellence Prize: **\$5,000**



Zeynep  
Erim. Ph.D.

## Rules Changes Due To COVID-19



Each team's final score will be the higher of the two!



# Reissue NIBIB P41 Program

National Centers for Biomedical Imaging and Bioengineering  
(NCBIB) (P41 Clinical Trials Optional) PAR-20-169

Key Changes from previous FOA:

- Letter of Intent due 12 weeks prior to application due date
- Push-pull relationship between the CPs and related TR&D Project(s)
- NIBIB limits funding for NCBIB to 15 years



**Behrouz Shabestari, Ph.D.**  
**Director, NIBIB National**  
**Technology Centers Program**

# COVID-19 Pandemic



## Social Engineering



## Bio-Engineering



# Coronavirus: *Congressional Acts*

Coronavirus Supplements - FY 2020	Enacted	Total Amount	Total NIH Amount	IC Amount	Purpose
Third Supplement (Coronavirus Aid, Relief, and Economic Security (CARES) Act)	March 27, 2020	\$2.3* trillion	\$804.4 million	<b>NIBIB - \$60,000,000</b> NIAID - \$555,000,000 NIEHS - \$10,000,000 NHLBI - \$103,400,000 NLM - \$10,000,000 NCATS - \$36,000,000 OD - \$30,000,000	Prevent, prepare for, and respond to the coronavirus.

\*Revised to \$1.8 trillion due to a change in estimated cost for loan guarantees that are included in this Act.



# NIBIB Notices of Special Interest (NOSIs) for COVID-19

## NIBIB \$60M Allocation

Applicant(s)	NOSI Number	Contact
Current Grantees (most mechanisms)	NOT-EB-20-008	Program Director on existing award
SBIR/STTR (R41, R42, R43, R44)	NOT-EB-20-006	<a href="mailto:NIBIB-SBIR@mail.nih.gov">NIBIB-SBIR@mail.nih.gov</a>
RPGs (R01, R21, R03)	NOT-EB-20-007	<a href="mailto:COVID19NIBIB@mail.nih.gov">COVID19NIBIB@mail.nih.gov</a>

For more information:

<https://www.nibib.nih.gov/nibib-response-covid-19>


- Rapid POC and home-based testing/diagnostics
- Sensors/imagers for physiological monitoring
- Imaging algorithms/AI for rapid detection, dx, monitoring of lung infection
- Digital health platforms for data integration, risk assessment, surveillance
- Technologies/simulation platforms to train, protect healthcare workers and caregivers.
- Oxygenation systems and components for rapid deployment, access
- High-confidence disinfection technologies
- Novel therapies using engineered biological systems

[Home](#) > [Radiology: Artificial Intelligence](#) > Vol. 2, No. 3

[< PREVIOUS](#)

[NEXT >](#)

Editorial

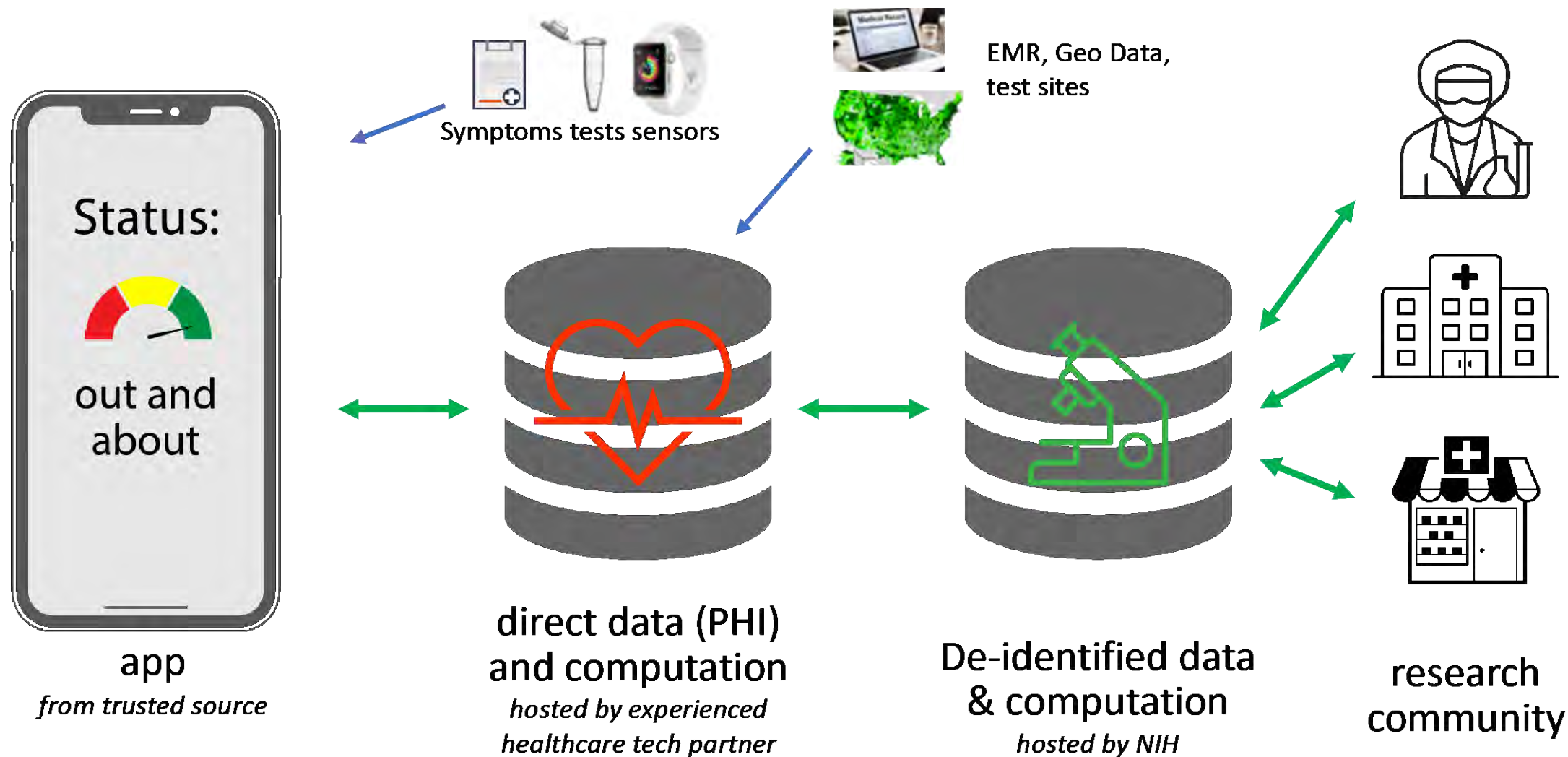
 [Free Access](#)

## How Might AI and Chest Imaging Help Unravel COVID-19's Mysteries?

 Shinjini Kundu ,  Hesham Elhalawani,  Judy W. Gichoya,  Charles E. Kahn, Jr

▼ [Author Affiliations](#)

# Digital Health Platform





# SARS CoV 2 Testing in the United States

Positive  
Tests

1,499,722

Negative  
Tests

10,334,786

Results  
Pending

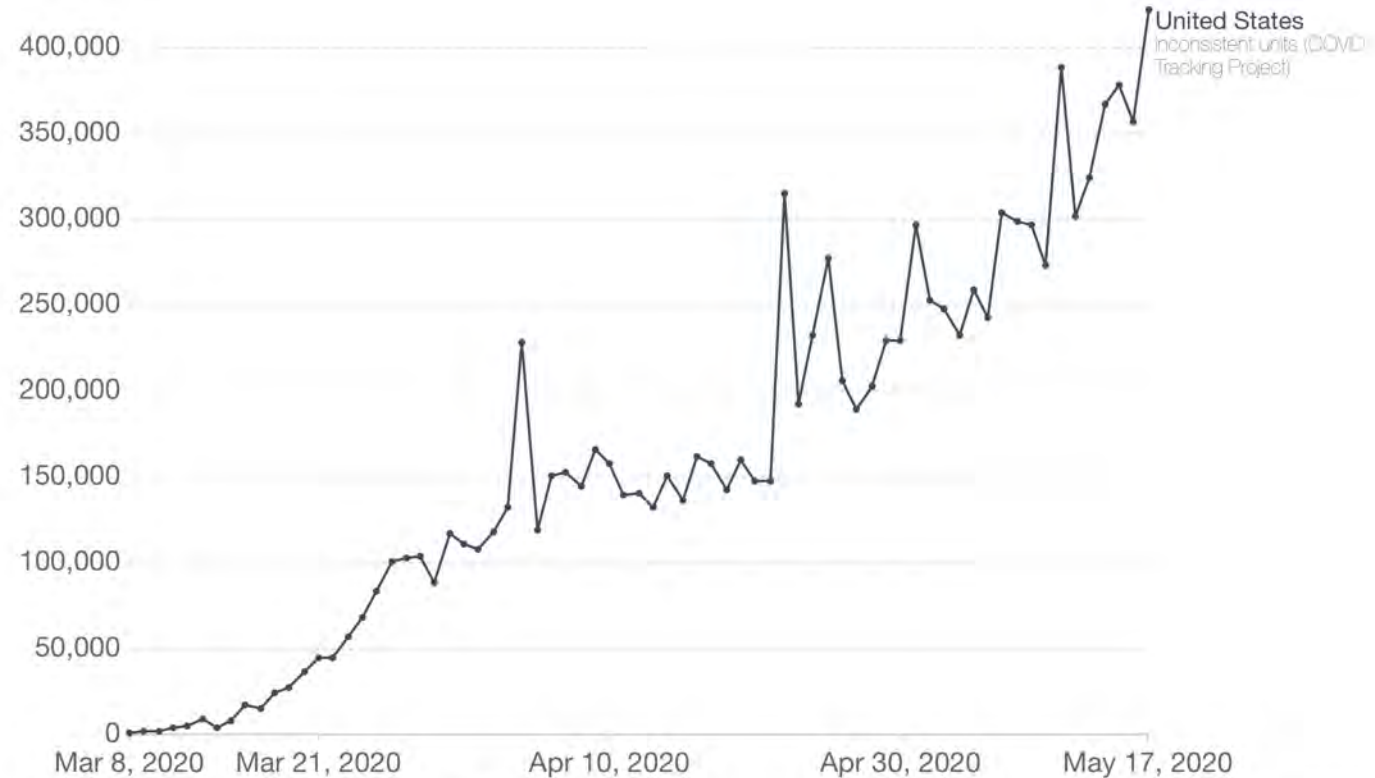
3596

Total: **11,834,508**

## Daily COVID-19 tests

Because not all countries report testing data on a daily basis, daily test figures are not available for some countries in our dataset.

Our World  
in Data



Source: Official sources collated by Our World in Data

OurWorldInData.org/coronavirus • CC BY

Note: For testing figures, there are substantial differences across countries in terms of the units, whether or not all labs are included, the extent to which negative and pending tests are included and other aspects. Details for each country can be found at the linked page.

# More Accessible Tests are Needed

## Estimated Number of Tests/Day Needed to Reopen America

Organization	Publication	Testing Estimate (millions of tests/day)	% of US population tested/day
Safra Center for Ethics at Harvard University	<a href="#">Roadmap to Pandemic Resilience</a>	5-20	1.5-6%
Microsoft (via Safra Center for Ethics at Harvard)	COVID-19 Rapid Response Impact Initiative   <a href="#">White Paper 6 - Why We Must Test Millions a Day</a>	2.5 (precise tracing)	0.75%
		30 (imprecise tracing)	9%
		90 (universal)	27.5%
Paul Romer	<a href="#">Roadmap to Responsibly Reopen America</a>	25-35	7.5-10.5%
Harvard Global Health Institute	<a href="#">Why we need at least 500,000 tests per day to open the economy</a>	0.5-1.5	0.15-0.45%

”Shark Tank for Testing...”

Sen. Lamar Alexander, R TN

*Video content removed for posting to website.*

**April 24, 4<sup>th</sup> Congressional Supplement:**  
*\$1.8 Billion to NIH for Testing*  
*(\$500M to NIBIB)*

<https://www.nih.gov/news-events/news-releases/nih-mobilizes-national-innovation-initiative-covid-19-diagnostics>

# Rapid Acceleration of Diagnostics (RADx) Initiative

*Signed into law, April 24 → Launched April 29 (2020)*

## Rapid Acceleration of Diagnostics (RADx)



**Innovate:** *Expand Number, Type, Access, Throughput of Testing Technologies*

**Optimize:** *Technology Performance for Range of Essential “Use Cases”*

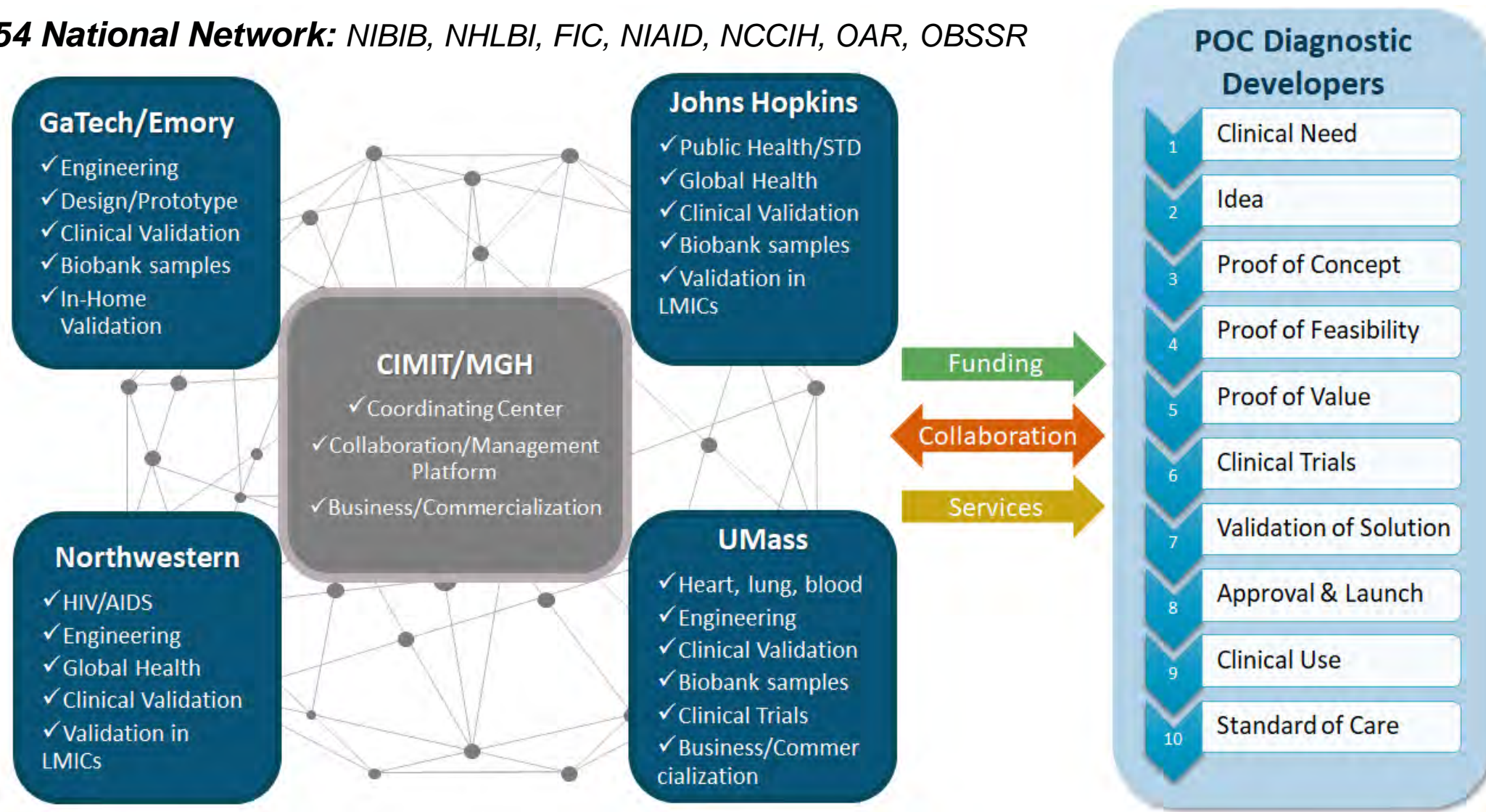
- Home-based
- Point of Care (POC)
- Hospital
- Testing Laboratory

<https://www.nibib.nih.gov/news-events/newsroom/nih-mobilizes-national-innovation-initiative-covid-19-diagnostics>



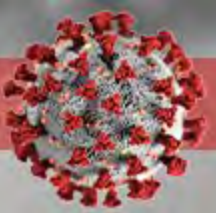
# Point-of-Care Technologies Research Network (POCTRN)

**U54 National Network:** NIBIB, NHLBI, FIC, NIAID, NCCIH, OAR, OBSSR



# RADx Tech

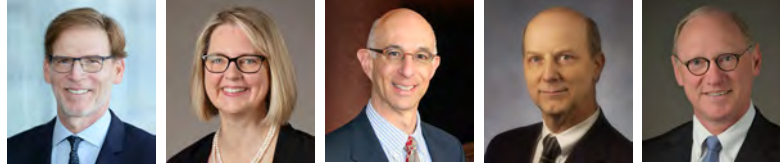
Rapid Acceleration of Diagnostics Tech



- Teams Alpha, Gamma, Beta, X, Neutron



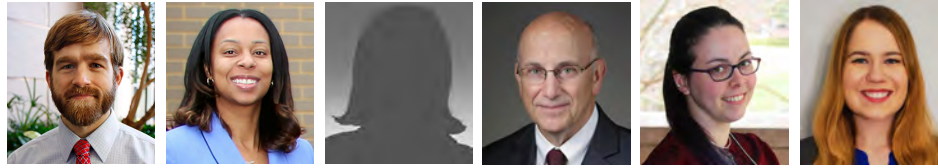
Alpha  
Leadership



Bruce Tromberg ♦ Jill Heemskerk ♦ David George ♦ William Heetderks ♦ James Anderson



Beta  
Program



Todd Merchak ♦ Tiffany Lash ♦ Maureen Beanan ♦ Robert Eisinger ♦ Asha Storm ♦ Sara Rosomoff ♦



Mark Snyder ♦ Alexa Monti ♦ Charles Anamelechi ♦ Jue Chen ♦ Erin Hurriaga ♦ David Rao



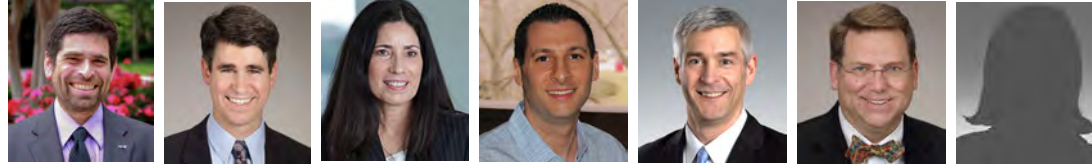
Gamma  
Comms & Policy



Taylor Gilliland ♦ Kate Egan ♦ Ray MacDougall ♦ Chris Cooper ♦ Patty Wiley ♦ Jackie Martinez ♦ Shirley Coney-Johnson ♦ Rachael Fleurence



X  
Partnerships



Michael Wolfson ♦ Gene Civillico ♦ Jodi Black ♦ Andrew Weitz ♦ Matthew McMahon ♦ Douglas Sheeley ♦ Jennifer Jackson



Neutron  
Budget

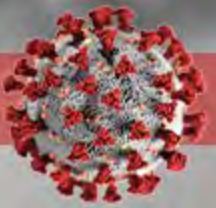


Jason Ford ♦ Deborah Kelly ♦ Truc Le ♦ Holly Taylor



# RADx Tech

Rapid Acceleration of Diagnostics Tech



- Teams Alpha, Gamma, Beta, X, Neutron



Alpha  
Leadership



Beta  
Program



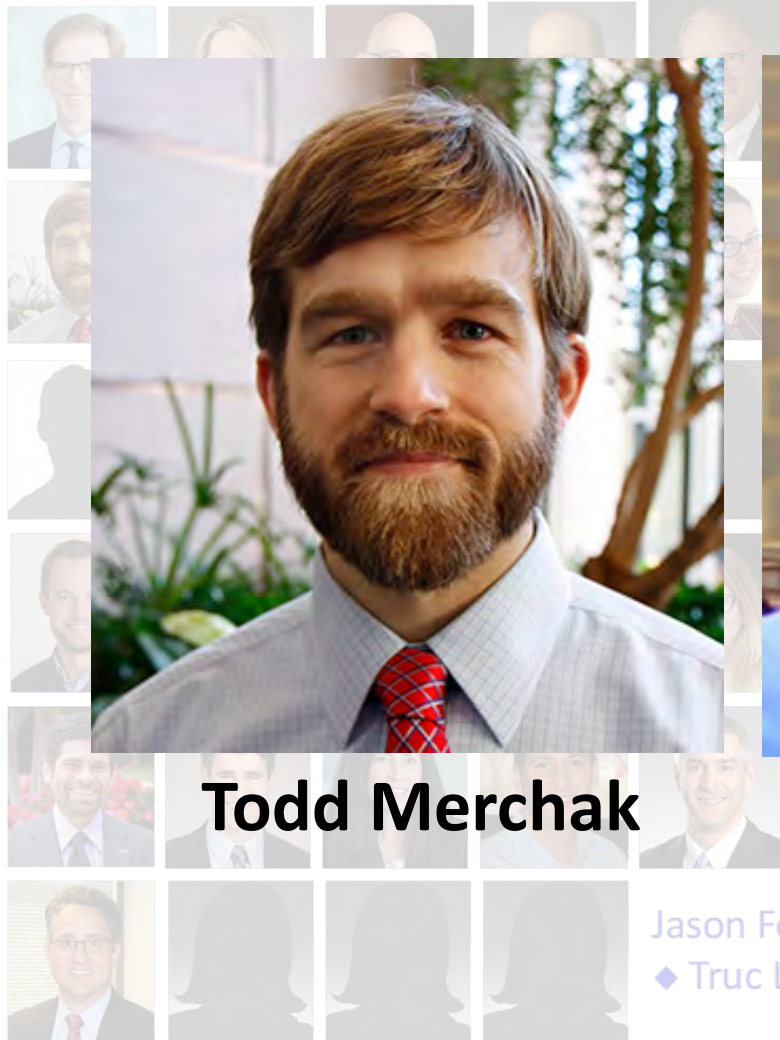
Gamma  
Comms &  
Policy



X  
Partnerships



Neutron  
Budget



**Todd Merchak**

Bruce Tromberg ♦ Jill Heemskerk ♦ David  
James Anderson



**Tiffany Lash**

Lash ♦ Maureen Beanan ♦  
Storm ♦ Sara Rosomoff ♦  
Monti ♦ Charles Anamelechi  
aga ♦ David Rao

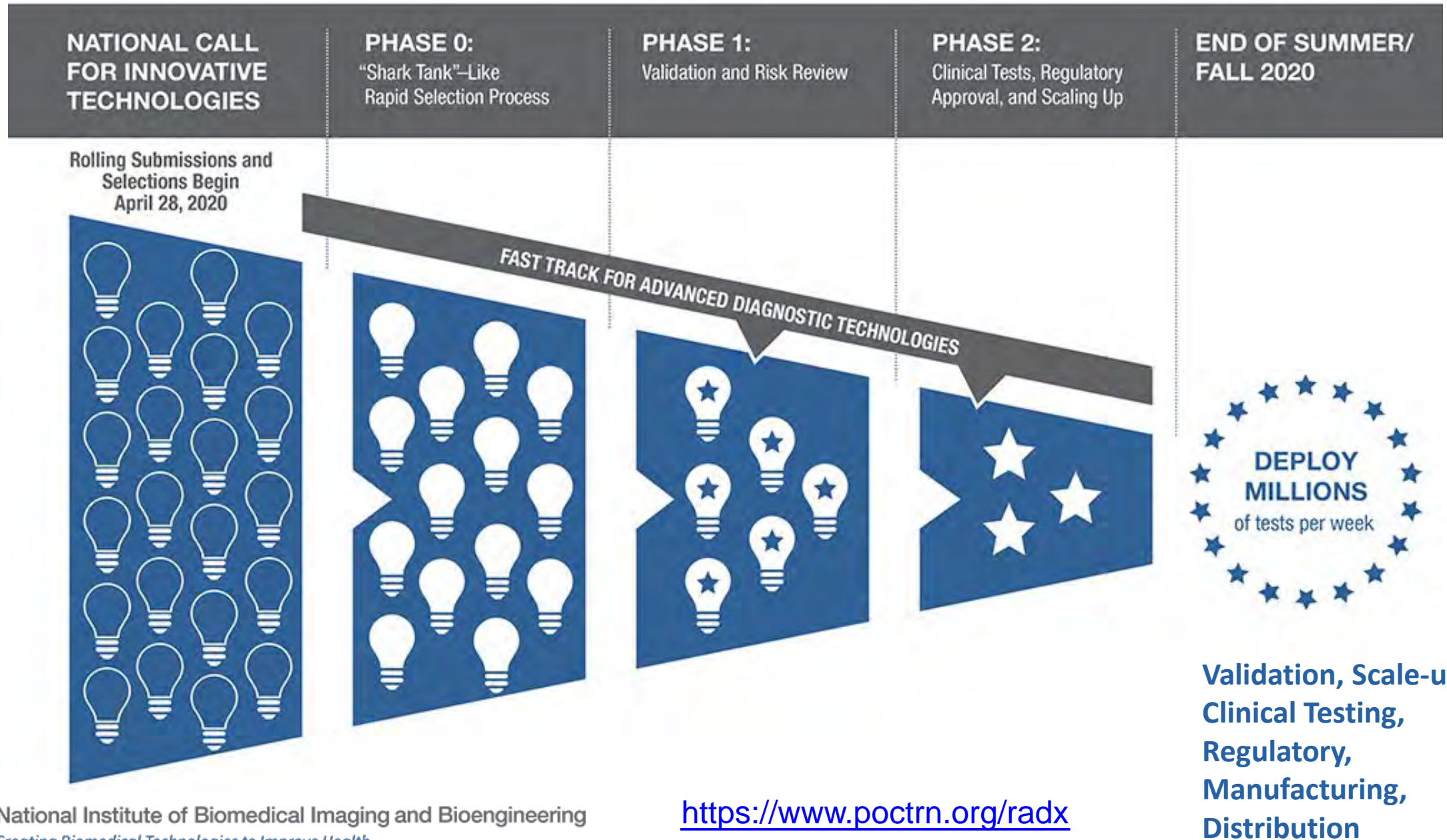
♦ Kate Egan ♦ Ray MacDougall  
♦ Patty Wiley ♦ Jackie  
Michael Fleurence

♦ Gene Civillico ♦ Jodi Black

♦ Andrew Weitz ♦ Matthew McMahon ♦  
Douglas Sheeley ♦ Jennifer Jackson

Jason Ford ♦ Deborah Kelly  
♦ Truc Le ♦ Holly Taylor

# RADx-Tech Innovation Funnel





# RADx Tech: *Strong Interest Around the Country*

Proposals <u>Initiated</u> *	Proposals <u>Completed</u> *	Proposals Entering "Shark Tank"
1726	261	36 ( <i>in process</i> )

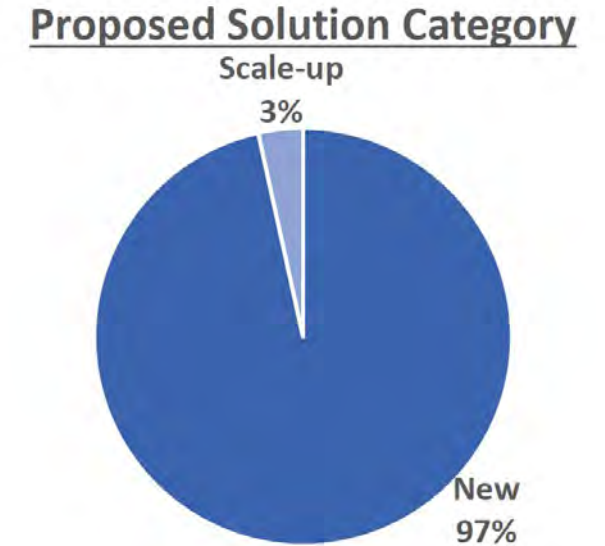
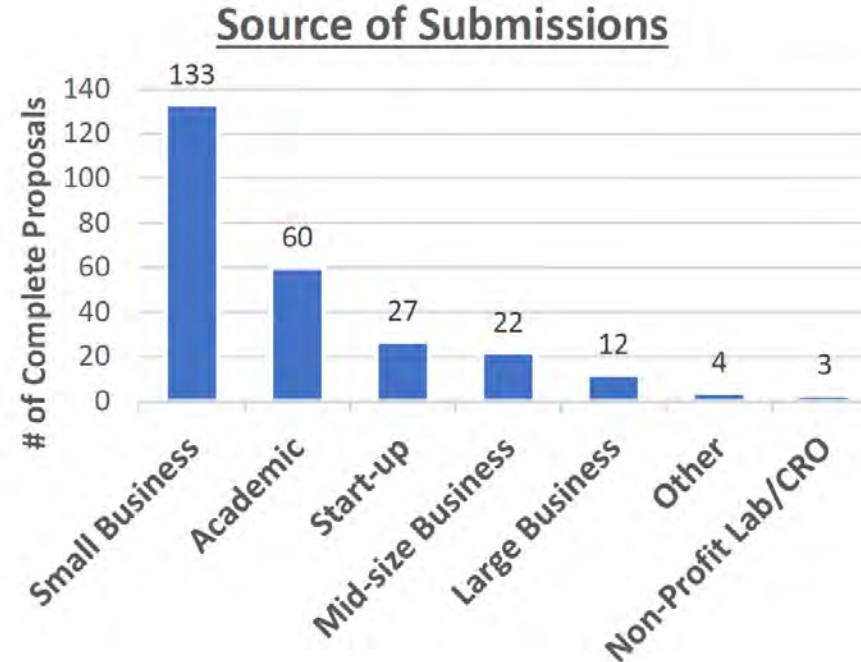
*\*As of 4:00 pm 5/19/20*



**400+**

Expert Volunteers to  
Support RADx Project  
Review & Management

## Characteristics of Completed Proposals



# Landscape of RADx Tech Proposals

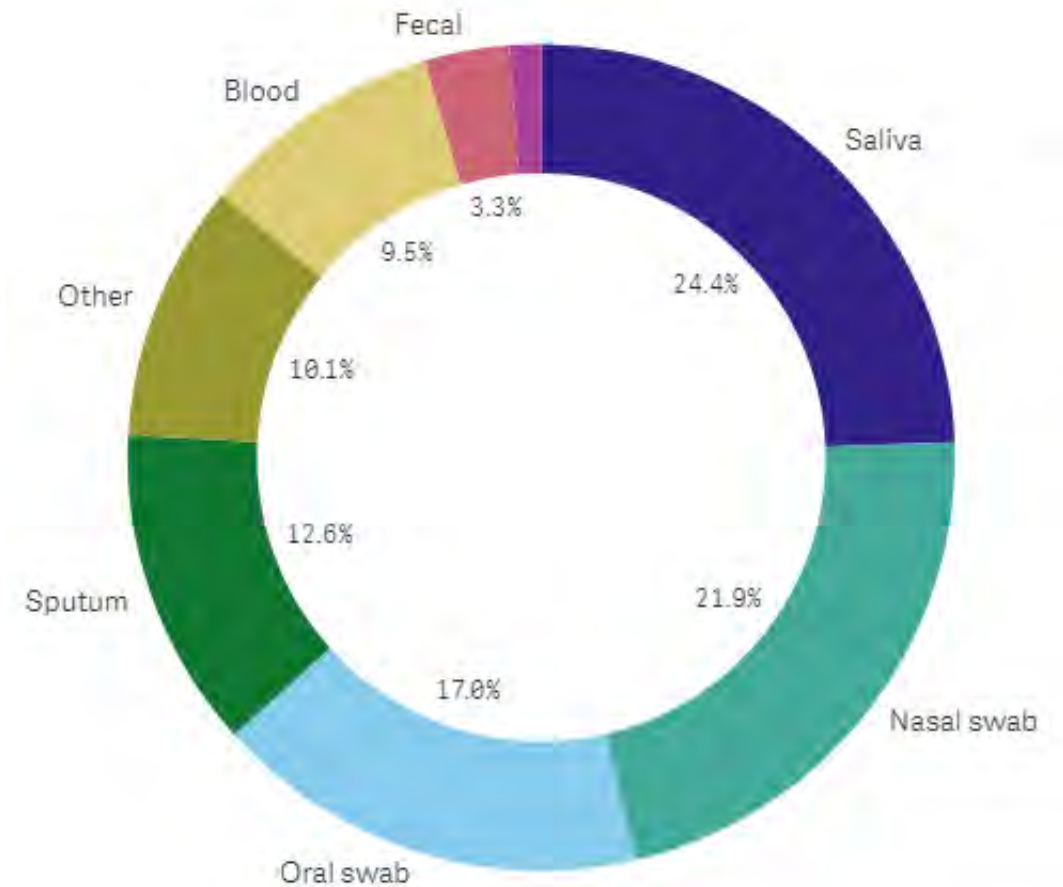
*\*As of 4:00 pm 5/19/20*

261 Completed Proposals\*  
1726 Applications Started

**Requested Support**



**Sample Type**



# Study to Quantify Undetected Cases of Coronavirus Infection

How many w/o confirmed history of COVID-19 have Antibodies to the virus?

Kaitlyn Sadtler, PhD

*Study lead, Chief of NIBIB Section for Immuno-engineering*

**"Donor Dashboard" for Proper Representation of Race/Sex/Ethnicity in 10,000 Sample Dataset**



*Video content removed for posting to website.*

**Combinatorial Antigen ELISA Workflow Resulting in 100% Specificity for IgG, IgM and IgA ( $n = 100$  archival controls)**

NIBIB, NIAID, NCATS, NCI collaboration



## **RADx Tech – \$500M**

*Highly competitive, rapid three-phase challenge to identify the best candidates for at-home or point-of-care tests for COVID-19 and to make millions of accurate and easy-to-use tests per week available*



## **RADx Underserved Populations (RADx-UP) – \$500M**

*Interlinked community-based demonstration projects focused on implementation strategies to enable and enhance testing of COVID-19 in underserved, under-resourced, rural, and/or vulnerable populations*



## **RADx Radical (RADx-Rad) – \$200M**

*Develop and advance novel, non-traditional approaches or new applications of existing approaches for testing, including unconventional screening, biological or physiological markers, new platforms, POC devices, etc.*



## **RADx Advanced Testing Program (RADx-ATP) – \$230M**

*Rapid scale-up of advanced technologies to increase rapidity and enhance and validate throughput – create ultra-high throughput machines and facilities*

\*Remaining \$70M of OD funds for Data Management Support for Testing for Safe Release Project



# Expanding Access

## Part 1

Rapid Acceleration of  
Diagnostics  
(RADx-Tech)



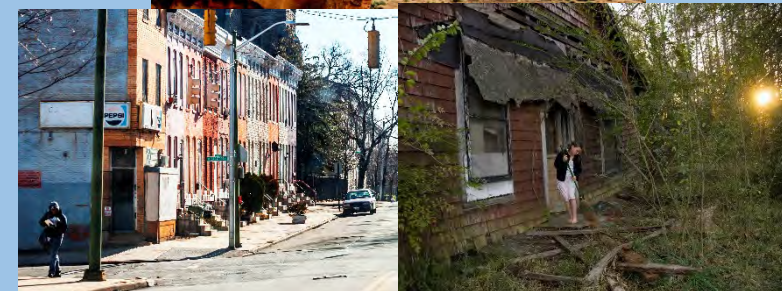
## Digital Health Platforms



NIBIB, NCI, NIMHD, FIC,  
NLM, ODS, OBSSR

## Part 2

RADx-UP: projects  
in **U**nderrepresented  
**P**opulations



*Video content removed for posting to website.*

# Operation Warp Speed

Friday May 15, 2020



Co-Chairs: Secs. Azar and Esper

**Overall Head:** Moncef Slaoui

**COO:** General Gus Parna

**Agency Directors:**

NIH, Francis Collins

FDA, Steve Hahn

CDC, Robert Redfield

ASPER (BARDA): Robert Kadlec

**Divisions:**

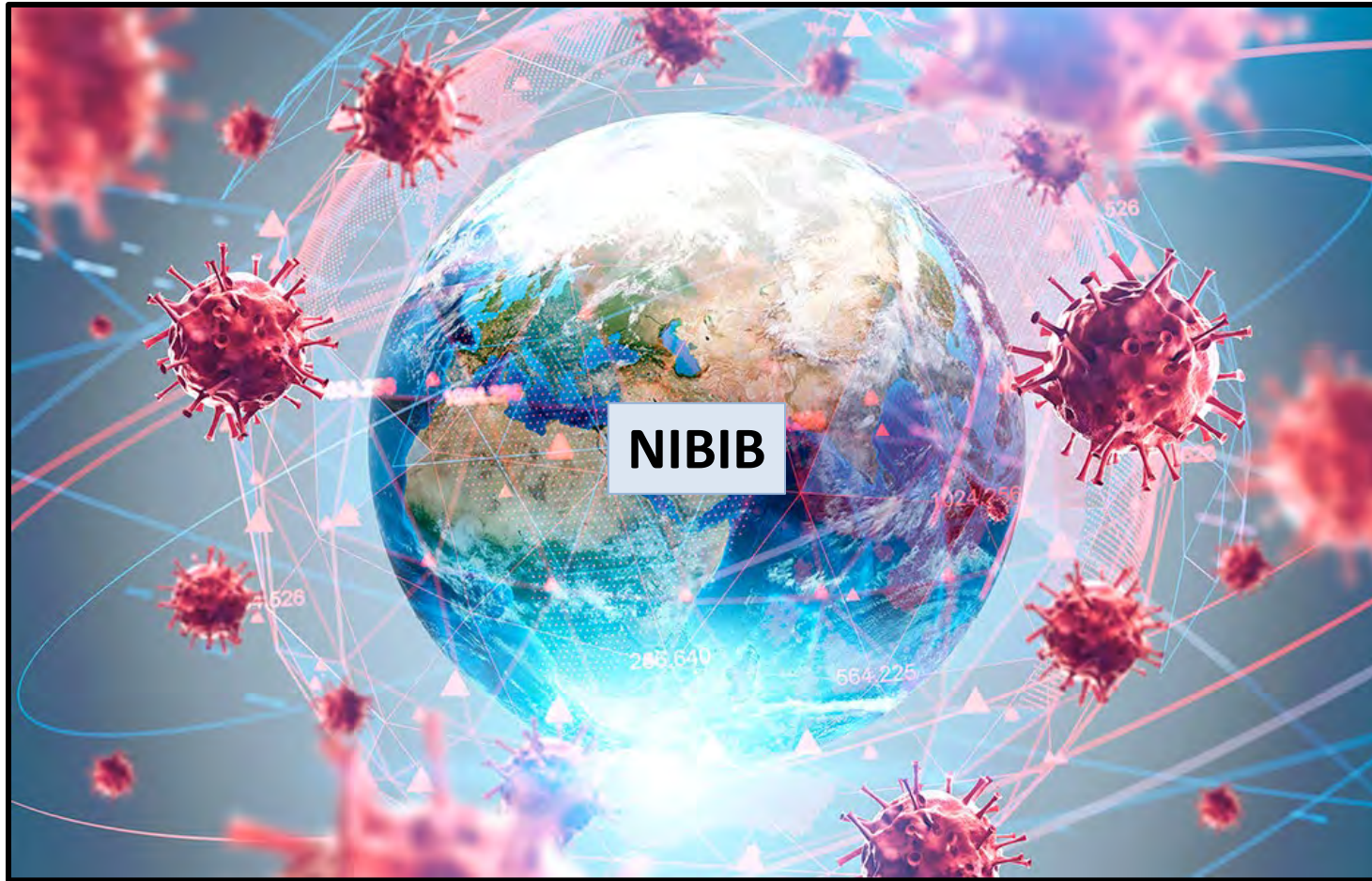
Vaccines, Peter Marks

Therapeutics, Janet Woodcock

Diagnostics, Bruce Tromberg



# COVID 19 Pandemic



## “Super-Bowl” for Our Field

- Expand Budget, Visibility, Impact
- Implement Vision & Mission
- Galvanize Community
- Rapid Growth → Sustain Long Term?
- Help from Council: RADx submissions, review, project teams