



# Team science at the scale of research networks and networks of networks



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# NSF supports team science at multiple levels

Networks of Networks

Research Networks

Centers, Institutes, Consortia

Collaborative Research Proposals

Individual Research Teams: Single Investigator Grants



# Multidimensional opportunities to advance discovery and prepare the next generation

- Constructing/coordinating research collaborations
- Training in team science
- Studying/evaluating team science

... complex challenges, particularly at large scale and across geographic boundaries





# Sample of NSF-funded Research Networks

- Research Coordination Network; RCN-Undergraduate Biology Education
- Arctic Observing Network
- INCLUDES Alliances
- Science of Learning: Collaborative Networks
- Research Networks in the Mathematical Sciences



# International Collaboration in Neuroscience

## Next Generation Networks for Neuroscience (NeuroNex)

Technology-enabled, Team-based Neuroscience

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### PROGRAM SOLICITATION

NSF 19-563

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### REPLACES DOCUMENT(S):

NSF 16-569

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National Science Foundation

Directorate for Biological Sciences  
Division of Biological Infrastructure  
Division of Integrative Organismal Systems

Office of International Science and Engineering



Canadian Institutes of Health Research



Deutsche Forschungsgemeinschaft

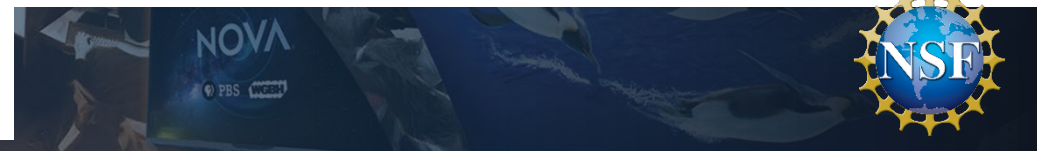


Fonds de Recherche du Québec



Medical Research Council (part of UK Research and Innovation)

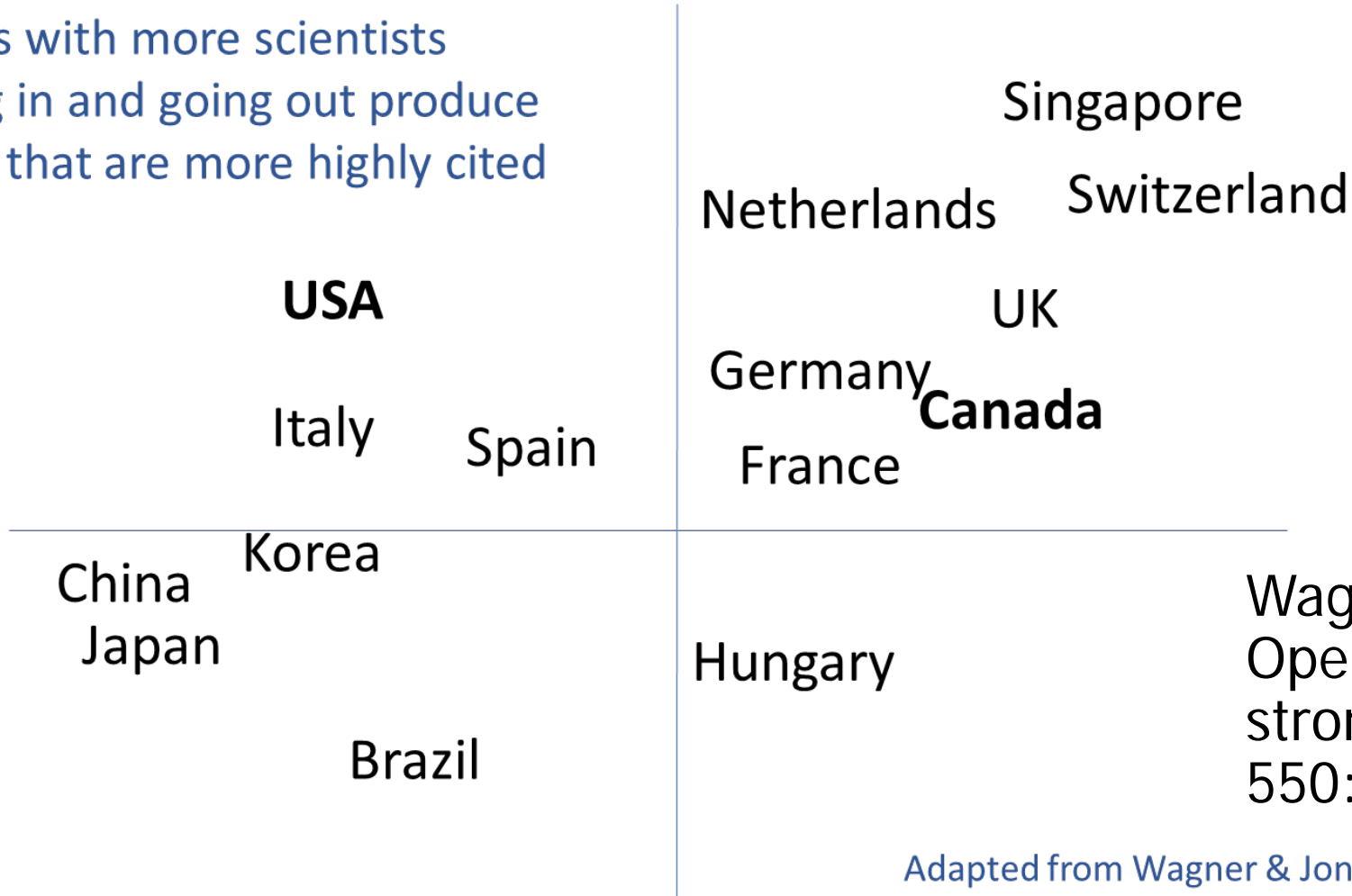
- To support collaborative networks (~ 15-20 investigators in each network) ... enable experimentation, analysis and discovery in neuroscience at scales much larger than currently possible.



# Open international science has impact

Nations with more scientists coming in and going out produce papers that are more highly cited

↑  
Impact



Wagner and Jonkers.  
Open countries have  
strong science. *Nature*  
550: 32-33. (2017)

Adapted from Wagner & Jonkers 2017

Openness →



# A look into the process of launching a new program to foster international networks of networks



An Artist in His Museum. By Charles Willson Peale -  
[www.vcdh.virginia.edu](http://www.vcdh.virginia.edu), Public Domain,  
<https://commons.wikimedia.org/w/index.php?curid=175516>





# Initial Activities to Inform Program

- Dear Colleague Letter NSF 17-131 – Call for community input
  - White Paper Submissions on research areas ready for opportunity
- Subcommittee of Advisory Committee on International Science and Engineering – Expert study group

*Report of the Subcommittee on International Network-to-Network Collaboration*

<https://www.nsf.gov/od/oise/OISE-AC/Report/InputOnAcceleratingResearchThroughInternationalNetwork-to-NetworkCollaboration.pdf>



# Report Definitions and Considerations

**Network:** established, **coordinated and distributed** groups of scientific researchers who **cooperate** within or across fields to collect and share **resources, knowledge, and expertise**

**Network of Networks:** formal link among networks as a “force multiplier” and connectors to advance the frontiers of science

- *Share over arching goals, recognizing unique goals*
- *Have clear roles and contributions*
- *Develop shared understanding data/equipment, copyright, IP, etc.*



# Accelerating Research through International Network to Network Collaborations (AccelNet)

## PROGRAM SOLICITATION

NSF 19-501



National Science Foundation

Office of International Science and Engineering

Directorate for Biological Sciences

Directorate for Computer & Information Science & Engineering

Directorate for Education & Human Resources

Directorate for Engineering

Directorate for Geosciences

Directorate for Mathematical & Physical Sciences

Directorate for Social, Behavioral & Economic Sciences

Office of Integrative Activities

Supports **strategic linkages** among U.S. research networks and complementary networks abroad to tackle **grand scientific challenges**

For the purposes of:

- Accelerating the progress of scientific discovery
- Preparing US students, postdoctoral scholars and early career researchers in conducting and leading multiteam international collaborations

<https://www.nsf.gov/pubs/2019/nsf19501/nsf19501.pdf>



# Network of Network Characteristics

- International engagement integral to success of activities
- Aligned mission and goals among the participating networks
- Leveraged resources across networks for mutual benefit
- Professional skills and global research perspectives developed
- Protocols, activities, products developed that reduce barriers to international collaboration



# AccelNet Status and Looking Forward

- Workshops for the community to: (1) prepare for submissions and (2) consider international data issues
- Inaugural competition ongoing
  - Planning for the first project awardees meeting
- Workshop for funders on international partnership models
- Building a community of practice; Linking expertise

