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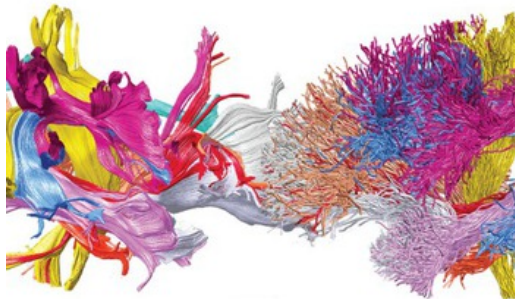
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Press Release

Connecting data scientists to regional challenges

NSF awards $11 million to Big Data Spokes projects and associated planning activities

Researchers are working to develop methods to capture, harmonize and share neuroscience data.
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September 28, 2016

Today, the National Science Foundation (NSF) announced $10 million in awards to 10 "Big Data Spokes" to initiate research in specific areas identified, supported, and organized by the Big Data Regional Innovation Hubs (BD Hubs). The spokes reflect the unique priorities and capabilities of the four disparate U.S. geographic regions serviced by the BD Hubs.

NSF is also making available an additional $1 million toward planning efforts and EArly-concept Grants for Exploratory Research (EAGER) awards in support of the nation's big data innovation ecosystem.

In March 2012, the Administration launched the National Big Data Research and Development (R&D) Initiative to improve our ability to solve the nation's most pressing challenges by extracting knowledge and insights from large, complex collections of digital data.

The BD Hubs <https://www.nsf.gov/pubs/2015/nsf15562/nsf15562.htm> , announced last year <http://www.nsf.gov/news/news_summ.jsp?cntn_id=136784> , are one way NSF is addressing this need. NSF established four BD Hubs, one each in the Midwest, Northeast, South, and West regions of the country, to foster multi-sector collaborations among academia, industry, and government. Each BD Hub is helping to bring together a wide range of big data stakeholders in order to solve regional challenges.

Each Big Data Spoke (BD Spoke) will work on a challenge that requires big data approaches and solutions. Like the BD Hubs, the BD Spokes will take on a convening and coordinating role as opposed to directly conducting research. Each will gather important stakeholders; engage end users and solution providers; and form multi-disciplinary teams to tackle questions no single field can solve alone. However, unlike the BD Hubs, which aim to span the full range of data-driven challenges and solutions in a geographic region, each BD Spoke will have a specific, goal-driven mission.

Data analyses of social network activity can help understand mental health behavior.
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"The BD Spokes advance the goals and regional priorities of each BD Hub, fusing the strengths of a range of institutions and investigators and applying them to problems that affect the communities and populations within their regions," said Jim Kurose, assistant director of NSF for Computer and Information Science and Engineering. "We are pleased to be making this substantial investment today to accelerate the nation's big data R&D innovation ecosystem."

Examples of the types of activities that the awards will support include efforts led by Samuel Madden, professor of Electrical Engineering & Computer Science at the Massachusetts Institute of Technology (MIT), to develop a data licensing approach and automated platform that will allow individuals and organizations to share data. The platform will ensure that data sharing conforms to the imposed licensing restrictions. Partners on the project include Elsevier, Intel, Microsoft Research, Oracle, Rhode Island Hospital, and Thomson Reuters.

"The Big Data Hub and Big Data Spokes have been a great way to connect those of us working in Big Data in the Northeast," Madden said. "As a computer scientist focused on software for sharing data, I've been able to connect to a diverse group of researchers and leaders interested in a wide range of broader issues, ranging from hardware infrastructure to software architectures to the legal, ethical, and societal implications of data sharing."

Another project, led by Gari Clifford, associate professor of Biomedical Informatics at Emory University, will investigate how to use data from diverse sources, including fitness trackers and environmental monitors, to improve patient care. As its first pilot, the project will focus on African-Americans and Hispanics/Latinos diagnosed with cardiovascular disease. Partners include Amazon, Emory Critical Care Center, Cerner, Relus Technologies, and the University of Texas Southwestern Medical Center.

The 10 BD Spokes projects are:

- NORTHEAST: A Licensing Model and Ecosystem for Data Sharing (MIT <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636766&HistoricalAwards=false> , Brown University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636698&HistoricalAwards=false> , Drexel University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636788&HistoricalAwards=false>)

- NORTHEAST: Grand Challenges for Data-Driven Education (University of Massachusetts, Amherst <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636847&HistoricalAwards=false> ; Worcester Polytechnic Institute <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636782&HistoricalAwards=false> ; University of Pennsylvania <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636851&HistoricalAwards=false>)

- NORTHEAST: Integration of environmental factors and causal reasoning approaches for large-scale observational health research (Harvard University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636870&HistoricalAwards=false> , Columbia University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636832&HistoricalAwards=falsehttp://www.nsf.gov/awardsearch/showAward? AWD_ID=1636786&HistoricalAwards=false> , University of Pittsburgh <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636786&HistoricalAwards=false> , Pennsylvania State University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636795&HistoricalAwards=false>)

- SOUTH Large-scale Medical Informatics for Patient Care Coordination and Engagement (Emory University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636933&HistoricalAwards=false>)

- SOUTH: Smart Grids Big Data (Texas A&M <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636772&HistoricalAwards=false> , Temple University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636770&HistoricalAwards=false> , Georgia Institute of Technology <http://www.nsf.gov/awardsearch/showAward?

AWD_ID=1636783&HistoricalAwards=false>)

- SOUTH: Using Big Data for Environmental Sustainability: Big Data + AI Technology = Accessible, Usable, Useful Knowledge (Georgia Institute of Technology <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636848&HistoricalAwards=false> , Smithsonian Institution <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636859&HistoricalAwards=false>)

- MIDWEST: Advanced Computational Neuroscience Network (ACNN) (University of Michigan <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636840&HistoricalAwards=false> , Indiana University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636893&HistoricalAwards=false> , Ohio State University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636846&HistoricalAwards=false> , Case Western University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636850&HistoricalAwards=false>)

- MIDWEST: Digital Agriculture - Unmanned Aircraft Systems, Plant Sciences and Education (University of North Dakota <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636865&HistoricalAwards=false>)

- WEST: Accelerating and Catalyzing Reproducibility in Scientific Computation and Data Synthesis (Arizona State University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636796&HistoricalAwards=false>)

- WEST: MetroInsight: Knowledge Discovery and Real-time Interventions from Sensory Data Flows in Urban Spaces (University of California, San Diego <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636879&HistoricalAwards=false> ; University of California, Los Angeles <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636916&HistoricalAwards=false> ; Arizona State University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636936&HistoricalAwards=false>)

Among the planning grants being announced today, Robin Gandhi from the University of Nebraska at Omaha will investigate how Big Data can be used to improve America's infrastructure, starting with sensors on bridges. Abani Patra from the University of Buffalo will lead a collaboration to spur innovations in the energy sector using Big Data. The full list of planning projects is as follows:

- NORTHEAST: Big Data Literacy: Building Capacity for Regional Collaboration in Closing the Big Data Divide (New York Hall of Science <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636736&HistoricalAwards=false>)

- NORTHEAST: Cross-organization Big Data Cyber Attack Awareness (Pennsylvania State University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636899&HistoricalAwards=false>)

- NORTHEAST: Planning for Privacy and Security in Big Data (Rutgers University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636764&HistoricalAwards=false> , Pennsylvania State University <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636785&HistoricalAwards=false>)

- NORTHEAST: Partnerships for Energy cycle Innovation through Big Data (PPEID) (University of Buffalo <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636818&HistoricalAwards=false>)

- SOUTH: Rare Disease Observatory (North Carolina State Universit <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636733&HistoricalAwards=false> y, University of North Carolina <http://www.nsf.gov/awardsearch/showAward? AWD_ID=1636708&HistoricalAwards=false>)

- MIDWEST: Big Data Innovations for Bridge Health (University of Nebraska
  <http://www.nsf.gov/awardsearch/showAward?
  AWD_ID=1636805&HistoricalAwards=false>)

- MIDWEST: Cyberinfrastructure to Enhance Data Quality and Support Reproducible
  Results in Sensor Originated Big Data (Purdue University
  <http://www.nsf.gov/awardsearch/showAward?
  AWD_ID=1636891&HistoricalAwards=false>)

- MIDWEST: Networked Resilience of Communities Facing Natural and Social
  Emergencies (University of Illinois at Urbana-Champaign
  <http://www.nsf.gov/awardsearch/showAward?
  AWD_ID=1636942&HistoricalAwards=false>)

- WEST: Big Data for Policing in the western United States (Boise State University
  <http://www.nsf.gov/awardsearch/showAward?
  AWD_ID=1636962&HistoricalAwards=false>)

- WEST: Increasing collaborations in proteogenomics applications of genetic data
  (Institute for Systems Biology <http://www.nsf.gov/awardsearch/showAward?
  AWD_ID=1636903&HistoricalAwards=false> ; University of California, San Diego
  <http://www.nsf.gov/awardsearch/showAward?
  AWD_ID=1636804&HistoricalAwards=false>)

The BD Hubs and Spokes programs are part of a larger effort at NSF to advance data science
and engineering. In fiscal year 2017, NSF will invest more than $110 million in Big Data
research.

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Related Websites
Midwest Big Data Hub: http://midwestbigdatahub.org/ (/cgi-bin/good-bye?
http://midwestbigdatahub.org/)
West Big Data Innovation Hub: http://westbigdatahub.org/ (/cgi-bin/good-bye?
http://westbigdatahub.org/)
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http://nebigdatahub.org/)
South Big Data Regional Innovation Hub: http://www.southbdhub.org/ (/cgi-bin/good-bye?
http://www.southbdhub.org/)
Establishing a brain trust for data science: http://www.nsf.gov/news/news_summ.jsp?
cntn_id=136784 <http://www.nsf.gov/news/news_summ.jsp?cntn_id=136784>
Big Data Regional Innovation Hubs: Establishing Spokes to Advance Big Data Applications
(BD Spokes): https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505264
<https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505264>

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competitive proposals for funding and makes about 12,000 new funding awards. NSF also
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