

**NIH** > The BRAIN Initiative®

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## **The NIH BRAIN Initiative: An Overview**

John Ngai, Ph.D.  
*Director, NIH BRAIN Initiative*

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## The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative

- *Mission: to enable and revolutionize our understanding of the human brain by accelerating the development and application of innovative technologies*
- Partnership between five U.S. federal agencies & private foundations
- Announced by the White House in 2013, first awards in 2014

***Goal: to develop and apply new tools for understanding how neural circuits underlie complex behaviors in health and disease***



- Leverage technological innovations to enable new discoveries about neural circuit function
- Use these discoveries as a foundation for new therapeutic strategies for human brain disorders
- Disseminate and democratize technologies for basic discovery and clinical applications





**Brain Cell Types**

1. Discovering diversity



**Tools for Circuit Diagrams**

2. Maps at multiple scales



**Technology to Monitor Neural Activity**

3. The brain in action



**Precise Interventional Tools**

4. Demonstrating causality



**Theory and Data Analysis Tools**

5. Identifying fundamental principles



**Advance Human Neuroscience**

6. Creating human brain research networks



**Integrate Approaches**

7. From BRAIN Initiative to the brain

**\*\*NEW CROSS CUTTING\*\***

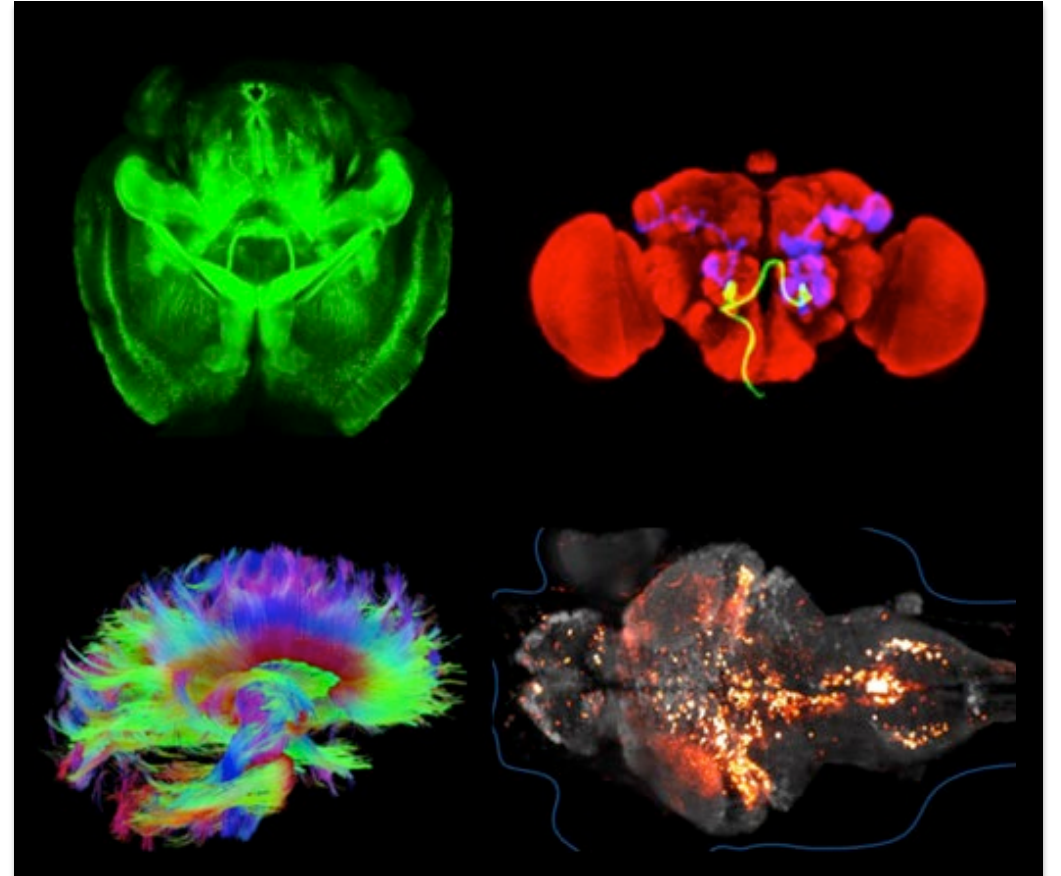
8. Organization of Science



## *The BRAIN Initiative 2.0: From Cells to Circuits, Toward Cures*

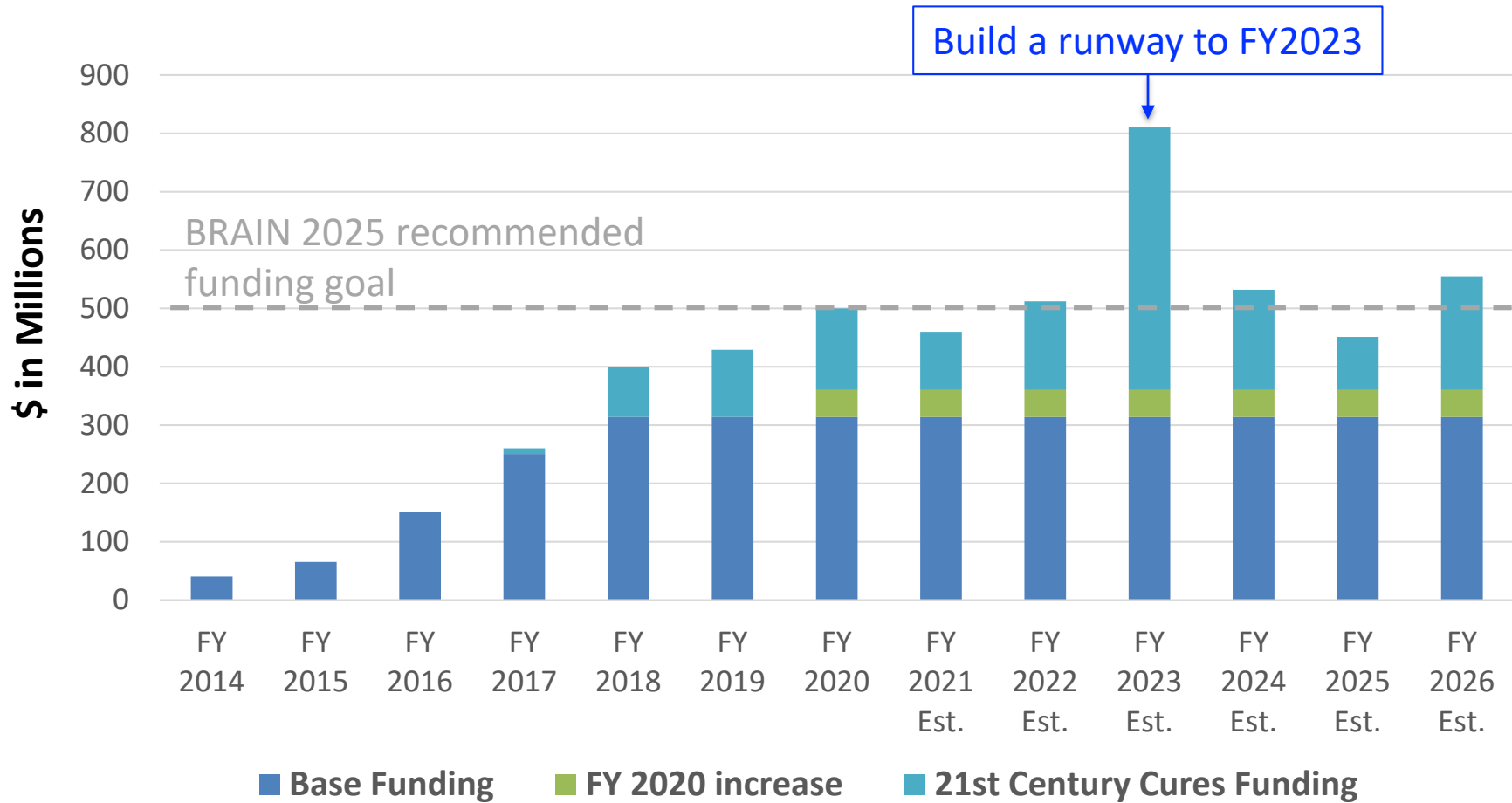
### Working Group 2.0 Major Findings:

- **Stay on the productive path already underway** for the NIH BRAIN Initiative; continue support for technology development and targeted study of circuit components
- **Balance individual-investigator research with team science** – both levels of inquiry are vital for advancing our understanding of the brain
- Devote ample BRAIN Initiative resources to large-scale **transformative projects**





Since 2014, BRAIN has supported over **700 awards** with over **900 publications** to date






**\$1.3B** invested through 2019  
**\$5.2B**= projected total for lifetime of BRAIN

*BRAIN 2.0 Transformative Projects...*



## Building on a solid foundation of discovery and technological innovation

-  **Phase III Brain Cell Census (parts list)**
  - Will build on success of BICCN mouse brain cell census
  - Shift emphasis to construct a human brain cell atlas
-  **Next-Generation Technologies for Brain Microconnectivity Analysis (wiring diagram)**
  - A wiring diagram of the brain at multiple scales and species
-  **Organizing Resources for Brain Cell Type Access and Manipulation Across Species (cell type-specific armamentarium)**
  - Develop tools for cell access in rodent and NHP brains, human cells and tissue
  - Long-term goal: new therapeutic strategies for human brain disorders
  - *First RFA (RFA-MH-20-556) just issued!*



## Discoveries supported by BRAIN lay the foundation for novel interventions in human brain disorders

*BRAIN-supported technologies are unraveling the circuits and computations underlying complex behaviors*

- => Identification of cells and circuits affected in neurologic and neuropsychiatric disorders
- => Closed-loop deep brain stimulation devices
- => Targeted molecular/gene therapies





**Neuroethics is a partner to neuroscience, working to anticipate and address ethical questions raised by innovative research.**

- The **Neuroethics Working Group** of NIH BRAIN Multi-Council Working Group help integrate neuroethics into the BRAIN Initiative at NIH.
- Group has developed a set of **Neuroethics Guiding Principles for the NIH BRAIN Initiative**



**NCCIH**

Agonafer, Afomeya  
Chen, Wen  
Edwards, Emmeline  
Liu, Irene  
Mudd, Lanay  
Murray, Peter  
Sabri, Merav  
Shurtleff, David  
Wang, Yisong  
Weber, Wendy

McGowan, Melissa  
McLinden, Kristina  
Roberts, Luci  
Stoeckel, Luke  
Sutterer, Matt  
Vahedi, Shahrooz  
Wagster, Molly  
Wise, Bradley  
Yuan, Jean

**NIAAA**

Cao, Nanwei  
Cui, Changhai  
Donodeo, Fred  
Grakalic, Ivana  
Liu, Qi-Ying  
Matochik, John  
Noronha, Antonio  
Powell, Elizabeth  
Regunathan, Soundar  
Tepas, Kathleen  
Xu, Ben

**NIBIB**

Atanasijevic, Tatjana  
Bacas, Angelos  
Binger, Monique  
Bittmann, Moria  
Duan, Qi  
Eldridge, Angela  
Ellis, Katie  
Erim, Zeynep

**NIA**

Dibattista, Amanda  
Kelley, Melinda  
Luo, Yuan  
Mackiewicz, Miroslaw  
Masliah, Eliezer

Goldberg, Ilana  
Greve, Joan  
Hayes, John  
Heemskerk, Jill  
Hlasta, Dennis  
Holden, John  
Huff, James  
King, Randy  
Liu, Guoying  
MacDougall, Raymond  
McAndrew, Rudy  
Peng, Grace  
Wang, Shumin  
Wolfson, Michael  
Wright, Kwesi  
Zhou, Ruixia  
Zubal, I George

**NICHD**

Cernich, Alison  
Cruz, Theresa  
Henken, Deborah  
Huynh, Linda  
Jackson, Jennifer  
Kaeser, Lisa  
Lee, Sonia  
Mann Koepke, Kathy  
Miller, Brett  
Mukhopadhyay, Mahua  
Parisi, Melissa  
Ravindranath, Neelakanta  
Toyama, Reiko  
Williams, Paul

**NIDA**

Angelone, Leonardo  
Avila, Albert  
Berton, Olivier  
Berzhanskaya, Julia  
Frost Bellgowan, Julie  
Grant, Steven  
Johnson, Ellie  
Little, Roger  
Moore, Holly  
Pariyadath, Vani  
Pollock, Jonathan  
Rankin, Michele  
Satterlee, John  
Sorensen, Roger  
Tsai, Anne  
Valentino, Rita  
Volman, Susan  
Weiss, Susan  
Wright, Susan  
Wu, Da-Yu

**NIDCD**

Cole, Laura  
Cyr, Janet  
Dambrauskas, Susan  
Miller, Roger  
Poremba, Amy  
Prakash, Pragya  
Rivera-Rentas, Alberto  
Wong, Baldwin

**NIDCR**

King, Lynn  
Vallejo, Yolanda

**NIMH**

Alvarez, Ruben  
Anderson, Paige  
Ankudowich, Lizzy  
Arguello, Alexander  
Beckel-Mitchener, Andrea  
Bennett, Yvonne  
Brady, Linda  
Churchill, Jay  
Driscoll, Jamie  
Farber, Greg  
Ferrante, Michele  
Fox, Meredith  
Freeman, Janay  
Friedman-Hill, Stacia  
Gaiano, Nick  
Garcia, Rebecca  
Gitik, Miri  
Grabb, Margaret  
Gray, Erin  
Haim, Adam  
Hillefors, Mi  
Kim, Douglas  
Kinnane, Megan  
Koester, Susan  
Lin, Ti  
Lisanby, Holly  
McMullen, David  
Michelotti, Enrique

Michelotti, Enrique  
Miller, David  
Murphy, Eric  
Panchision, David  
Rossi, Andrew  
Rowland, Laura  
Sarampote, Christopher  
Senthil, Geetha  
Simmons, Janine  
Spicer, Olivia  
Subedi, Abhi  
Szczepanik, Joanna  
Van't Veer, Ashlee  
Wijtenburg, Andrea  
Yao, Yong  
Zalcman, Steven  
Zhan, Ming

**NINDS**

Adams, Amy  
Ashmont, Kari  
Bellgowan, Patrick  
Benzing, William  
Breedon, Andrew  
Calabrese, Ryan  
Caporello, Emily  
Crawford, Devon  
Cummings, Diana  
David, Karen  
Doss, Argenia  
Douaji, Nadia  
Dupre, Kristin  
Fang, Christina

Frankowski, Megan  
Gallagher, Alissa  
Gill, Marie  
Gnadt, Jim  
Gross, Brooks  
Hossain, Mir Ahamed  
Hsu, Nina  
Hudak, Eric  
Jia, Li  
Jones-London, Michelle  
Korn, Stephen  
Kukke, Sahana  
Lam, Christine  
Langhals, Nick  
Lavaute, Timothy  
Litvina, Liza  
Lungu, Codrin  
Ly, Quynh  
Lyden, Timothy  
Lyons, Ernest  
McMakin, Barbara  
Milescu, Mirela  
Miller, Daniel  
Myers, Paul  
Olenick, Mara  
Owens, David  
Pasternak, Tania  
Pearson, Michele  
Rajaram, Shantadurga  
Ramos, Khara  
Saydoff, Joel  
Schor, Nina  
Scott, Paul

Stokes, Kalynda  
Strunnikova, Natalia  
Talley, Ned  
Taylor-Burds, Carol  
Thomas, Christopher  
Torborg, Christine  
Torres, Delany  
Varea, Andrea  
Ward, Jackie  
Warren, Margo  
White, Samantha  
Wymbs, Nick  
Zalutsky, Robert

**NIHES**

Humble, Michael

**NINR**

Anderson, Kathy  
Hamlet, Michelle  
Tully, Lois

**CSR**

Aschrafi, Armaz  
Thompson, Kirk

**OD**

Hunter, Chyren  
Mazzucco, Anna  
Schloesser, Dana  
Thomas, David

<https://www.braininitiative.nih.gov>

