NIMH Priorities, Opportunities, and Challenges

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GCC Mental Health Research Symposium – 5/18/18
Agenda

• NIMH Strategic Priorities
• NIMH Director’s Initiatives
• BRAIN update
• Common Fund Programs
• Training
• Budget update
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To transform the understanding and treatment of mental illnesses through basic and clinical research, paving the way for prevention, recovery, and cure.

www.nimh.nih.gov

Research = Hope
Objective 1: Define the mechanisms of complex behaviors

Objective 2: Chart mental illness trajectories to determine when, where, and how to intervene

Objective 3: Strive for prevention and cures

Objective 4: Strengthen the public health impact of NIMH-supported research
NIMH Updated Strategic Research Priorities

• In September 2017, NIMH posted its annual update to the NIMH Strategic Research Priorities

• Provides revised guidance to grantees and staff
  • Encourages computational approaches
  • Emphasizes rigor and reproducibility
  • Highlights data sharing and common data elements

• Continues to align with NIMH Strategic Plan for Research

https://www.nimh.nih.gov/about/strategic-planning-reports/strategic-research-priorities
From Basic Research to Implementation

NIMH Research Divisions
- DNBBS
- DTR
- DSIR

Basic  Translational  Intervention

Cross-Cutting Offices
- AIDS, Disparities & Global Mental Health,
  Genomics, Technology Development

Service Delivery
- Federal agencies
- Local organizations
- Healthcare systems

NIH National Institute of Mental Health
NIMH Portfolio Analysis by Division and Office

Data Source: PARIS
Not included: MH co-funds; ARRA; Common Fund; BRAIN Initiative
* DTR formed in 2014; dotted line represents DDTR + DATR (FY2007-2013); DPTR (FY2007); non-AIDS DAHBR (FY2007-2009)
** DAR formed in 2010; dotted line represents AIDS-related DAHBR (FY2007-2009); CMHRA (FY2009)
*** ORDGMH formed in 2010
**** OTDC formed in 2011 (from DNBBS)
***** OGRC formed in 2011 (from DNBBS)
NIMH Portfolio Analysis by Research Area

Data Source: PARIS
Not included: MH co-funds; ARRA; Common Fund; BRAIN Initiative
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Research Priorities

• **Near-term Goals:** Suicide Prevention and Early Intervention
  ■ Identify implementable evidence-based practices and knowledge gaps

• **Medium-term Goals:** Neural Circuits
  ■ Develop technologies to interrogate neural circuits, and ultimately improve the understanding and treatment of mental health disorders

• **Long-term Goals:** Computational Psychiatry
  ■ Develop computational perspectives and approaches to improve the understanding and treatment of mental health disorders
Near-Term Goal: Suicide Prevention

Age-Adjusted Suicide Rates in the United States (1999-2014)

- Male
- Total
- Female

Data courtesy of CDC
• Applied Research Towards Zero Suicide Healthcare Systems (RFA-MH-16-800)

• Detecting and Preventing Suicide Behavior, Ideation and Self-Harm in Youth in Contact with the Juvenile Justice System (PAR-16-299)

• Addressing Suicide Research Gaps: Aggregating and Mining Existing Data Sets for Secondary Analyses (RFA-MH-18-400)

• Addressing Suicide Research Gaps: Understanding Mortality Outcomes (RFA-MH-18-410)
Medium-Term Goal: Understanding Neural Circuits

- Understanding brain function and dysfunction
  - Characterize molecular identity, anatomy, and activity patterns in a cell-type specific manner

- Monitor and manipulate circuits for improved function
  - Drive and inhibit circuits with precise behavioral effects
Circuit Neuroscience and Hope for Circuit Psychiatry
Long-Term Goal: Computational Psychiatry

- Test links across multiple levels of analyses (genetic, molecular, cellular, circuit, behavior)
  - Formalize behavioral analysis, defining underlying algorithms and facilitating neurobiological and clinical studies
- Provide quantitative assessment of utility of biomarkers
- Lead to an enhanced and integrative nosology

Data Mining
Biophysical Modeling
Computational Modeling
Computational Phenotyping
Evaluation of the Field:

- What would success look like?
- Can we develop a common language?
- Clinical translation - how to do it?
- Implementation – how to get it into the clinic?
- Pragmatics - how can we make better diagnosis, prognosis, and assign precision treatment?
- How can we foster scientists/science in this area?

Computation:

- How to handle heterogeneous data?
- How to incorporate “big data” analyses?
- Models and theories - how to translate computational theories into practice?
- Levels of analysis - where to concentrate?
- What are the fundamental computational constructs that we should start from?
- RDoC and DSM - Where do these fit in? How do they relate?

Psychiatry:

- Nosology
- Data driven and theory driven
- How to handle subjective reports?
- How to handle population heterogeneity?

Basic/Fundamental Science Research:

- Functional translation and causal translation
- Cross-validation
- Quantitative tasks and questionnaires
- Bidirectional pipelines
- What’s the role of animal models?
- Phenocopies vs biological mechanisms

Principal Recommendations from the Genomics Workgroup

- Appropriate and rigorous statistical methods
- Unbiased genetic association studies
- All types of genetic variation for disease association
- Genetic association efforts beyond the DSM
- Genetic and phenotypic variation across diverse populations.
- Develop and share research resources
- Robust genome-wide significance to select genes for further study
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BRAIN Initiative

- A focus on circuits and networks
- Measure the fluctuating electrical and chemical patterns within circuits
- Understand how all of this helps generate our unique thoughts and actions
110 FY17 awards to over 178 investigators at 56 institutions
- NIMH-led BRAIN Initiative Brain Cell Census Network (BICCN)
- The Human Brain/Portable Imaging
- Whole Brain Mapping
- Neuroethics

See [www.braininitiative.nih.gov](http://www.braininitiative.nih.gov) for active Funding Announcements
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Supporting exceptionally creative scientists proposing high-risk, high-impact research

Visit us at http://commonfund.nih.gov/highrisk
High-Risk, High-Reward Research Program

Supports individual scientists proposing bold approaches to major challenges in biomedical research

- Open to all career stages
- Requires 3 letters of reference
- Minimum of 51% research effort
- Awards up to $700,000 per year for up to 5 years
- Next receipt date Sept. 14, 2018

Visit us at http://commonfund.nih.gov/highrisk
High-Risk, High-Reward Research Program

Supports unconventional research projects with the potential to overturn fundamental paradigms

- Open to individuals or teams at all career stages
- No limit on budget requests
- No prior approval required for large budget requests
- No preliminary data required

Visit us at http://commonfund.nih.gov/highrisk
Supports early career investigators proposing innovative, high-impact research

- Early Stage Investigator (within 10 years of doctoral degree or medical residency & no R01 or equivalent NIH grant)
- No preliminary data required
- Minimum of 25% research effort
- Awards up to $1.5 million for up to 5 years

Visit us at http://commonfund.nih.gov/highrisk
High-Risk, High-Reward Research Program

Allows early career scientists to skip the postdoc and enter independent research positions

- Within 15 months of terminal research degree or medical residency completion or 12 months before completion
- In non-independent position at time of application
- Requires support and commitment of host institution
- No preliminary data required
- Requires 80% effort for first 2 years
- Awards up to $250,000 per year for 5 years
- Next receipt date Sept. 27, 2018

Visit us at http://commonfund.nih.gov/highrisk
High-Risk, High-Reward Research in Neuroscience and Mental Health

- Early Independence awardee Hilary Finucane uses large-scale genomic datasets to understand how GWAS signals translate into cellular functions in psychiatric disorders.

- Transformative Research awardees Long Cai, Carlos Lois, & Michael Elowitz are creating methods to “record” cell lineage and gene expression history during development.

- New Innovator awardee Priya Rajasethupathy uses outbred mice to link genetic loci to circuit changes underlying cognitive dysfunction.

- Pioneer awardee Amit Etkin studies the neural basis of emotional disorders and their treatment.

Visit us at http://commonfund.nih.gov/highrisk
NIMH BRAINS - Program Goals

• To solicit highly innovative, creative, and ambitious research proposals from Early Stage Investigators (ESI) who have the potential to transform our understanding of the etiology, pathophysiology, treatment of, and service delivery for mental disorders.

• Support promising new investigators early in their careers so they can develop independent, high risk/high payoff research programs that address the highest priorities for NIMH.

• Reduce the age at which promising ESI receive their first R01 and increase the number of innovative ESI supported by NIMH.

Eligibility Requirements

• Address a critical knowledge gap identified in the NIMH Strategic Plan

• Tenure track ESI with no prior R01 support

• Highly innovative and impactful project

5 years of support, up to $1.6 million per award

RFA-MH-19-130; next receipt date: June 20, 2018
Recent BRAINS Publications


**Effects of early life stress on amygdala and striatal development.** Fareri DS, Tottenham N. *Dev Cogn Neurosci.* 2016
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Three ways individuals can receive training funds from NIMH:

- Directly from NIH (individual awards: F, K, R36)
- From an academic institution with an NIH-supported training program (T32)
- From an administrative supplement to an existing NIH grant awarded to the mentor (diversity and reentry)

NIMH also supports institutional training (T32) and research education (R25) grants.

NIMH offers training grants across the career timeline.
NIMH Training and Career Development Awards

Training Grants (Fs)  Career Development Grants (Ks)

- F30  - F32  - K01  - K24
- F31
- F31
- R36
- K08
- K23
- K99/R00

Diversity Supplements to Parent Grant
Reentry Supplements to Parent Grant
R25 Short Courses

For PhDs
For MD/PhDs
For health-professional degree holders
For diversity
For all applicants
For institutions
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NIMH Applications, Awards, and Success Rates for Research Project Grants

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Number of Applications/Awards</th>
<th>Success Rate (Rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>512</td>
<td>19%</td>
</tr>
<tr>
<td>2014</td>
<td>548</td>
<td>19%</td>
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<tr>
<td>2015</td>
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<tr>
<td>2016</td>
<td>587</td>
<td>23%</td>
</tr>
<tr>
<td>2017</td>
<td>571</td>
<td>21%</td>
</tr>
<tr>
<td>2018 Est.</td>
<td>600</td>
<td>23%</td>
</tr>
</tbody>
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NIMH Program Level in Appropriated Dollars and Constant 2000 Dollars
NIMH FY 2017 Awards and Applications for R01s and Equivalents
Additional NIMH Resources

- NIH Guide: for updates on new Funding Opportunities
- NIMH Director’s Messages: Approximately monthly blog post
- National Advisory Mental Health Council meeting open session: Available at videocast.nih.gov
- Inside NIMH: Institute newsletter published 3x yearly
- Social Media:
  - Facebook: National Institute of Mental Health
  - Twitter: @NIMHgov; @NIMHDirector
  - YouTube Channel: National Institute of Mental Health
NIMH’s Mission

To transform the understanding and treatment of mental illnesses through basic and clinical research, paving the way for prevention, recovery, and cure.

www.nimh.nih.gov

Research = Hope