NACC & Gates Ventures
AD/ADRD Digital
Pilot Program

Informational Webinar | January 22, 2024
Welcome!
About:
The NACC & Gates Ventures AD/ADRD Digital Biomarker Pilot Program aims to accelerate AD/ADRD research and discovery through impactful digital data collection.

We will fund up to three proposals at $250,000 to $1,000,000 (direct costs) each.

We are interested in projects that leverage digital technology to capture richer and more objective data with less burden and/or that advance the development and/or validation of digital biomarkers for early detection, diagnosis, prognosis, or monitoring.

Applications are open to anyone with at least two ADRC collaborators.

Application Deadline Extended to February 21!
Digital Biomarker Webinar Speakers and Panelists

Gates Ventures

NIRANJAN BOSE, PhD
Managing Director of Health & Life Sciences at Gates Ventures

ADRC Program

NINA SILVERBERG, PhD
Alzheimer's Disease Research Center (ADRC) Program Director at the National Institute on Aging (NIA)

Academic-Industry Partnerships

RHODA AU, PHD, MBA
Professor of Anatomy and Neurobiology at Boston University, Director of Neuropsychology for the Framingham Heart Study, and Consultant to Global Cohort Development for the Davos Alzheimer's Collaborative

NACC & Digital Pilot Program Overview

SARAH BIBER, PHD
Executive Director of the National Alzheimer's Coordinating Center (NACC)
Gates Ventures’ Alzheimer’s Disease Program Focuses on Five Programmatic Pillars

1. **Disease Biology**
   - Better understanding the etiology and disease pathways

2. **Biomarkers & Dx**
   - Easy to use diagnostic

3. **Therapeutic Pipeline**
   - More shots on goal

4. **Clinical Trials**
   - Faster and more efficient clinical trials

5. **Data**
   - Facilitate broader data sharing, access and usability

- **AMP®-AD**
- **AHA-SFRN**
- **Chariot: Pro**
- **Dementia Discovery Fund**
- **PART THE CLOUD**
- **EQT**
- **IQVIA**
- **USC**
- **ADDI**
- **EPNC**
- **Swedish Bioprospecting Study**
In 2023, we expanded our portfolio of philanthropic investments in diagnostics via some new partnerships.

1. Disease Biology
   - Better understanding the etiology and disease pathways

2. Biomarkers & Dx
   - Easy to use diagnostic and implementation science/research
ADRC Program

Nina Silverberg, PhD (NIA)
ADRC Data, Sample and Participant Sharing Infrastructure

**Data**

- **NACC**
  National Alzheimer’s Coordinating Center
  (University of Washington, Seattle WA)
  - ADRC Data
  - Sample and Participant Sharing Infrastructure
  - Investigators

- **GAAIN**
  Global Alzheimer’s Association Interactive Network
  (University of Southern California, Los Angeles CA)
  - MRI/PET Images
  - Genomic/genetic data

- **SCAN**
  Standardized and Centralized AD Neuroimaging
  (U of Michigan, UC Berkeley, Mayo Clinic, UC Davis)
  - MRI/PET Data
  - Genomic/genetic data

- **NCRAD**
  National Centralized Repository for AD/ADRD
  (Indiana University, Indianapolis IN)
  - UDS data for sample selection
  - Biomarker Results
  - Investigators

- **ADRCs**
  Alzheimer’s Disease Research Centers
  (33 ADRCs + 4 Exploratory ADRCs across 26 states)
  - Other studies, including Clinical Trials
  - Participants

**Samples**

- **ADGC/ADSP**
  Alzheimer’s Disease Genetics Consortium
  - Investigators
  - Genomic/genetic data

- **NIAGADSD**
  Genetic Data
  (University of Pennsylvania, Philadelphia PA)
  - Phenotypic Data
  - DNA and biosamples for genotyping and sequencing

**Biospecimen samples for sharing**

Other studies, including Clinical Trials
ADRCs global role in AD/ADRD research

• Lead the field scientifically, develop new approaches
• Support justice and equity
• Provide standardized data, samples and participants across dementias and severity to support recruitment for clinical trials and other national research efforts (e.g., ADNI, AGMP, ACTC, Diverse VCID, MarkVCID)
• Sustained support enables strong community ties, better retention
• Train the next generation in a multidisciplinary environment
• Autopsy services support participants, families and major research advancements
• Part of a larger infrastructure – NACC, NCRAD, SCAN, NIAGADS/AGSP
• Work both as part of a network and locally within the (public and research) community
ADRCs uniquely cover the etiologic spectrum whereas other projects are in one etiologic lane.

### Table 1. Prominent active cohort studies related to ADRD and their primary enrolling diagnosis

<table>
<thead>
<tr>
<th>Cohort*</th>
<th>Size (Goal)</th>
<th>AD</th>
<th>VCID</th>
<th>LBD</th>
<th>FTLD</th>
<th>Atypical</th>
<th>LATE</th>
<th>Imaging A/T PET</th>
<th>purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLARiTI</td>
<td>(2,000)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>nk</td>
<td>Y</td>
<td>Etiologic characterization of ADRD mixture</td>
</tr>
<tr>
<td>DVCID**</td>
<td>(2,250)</td>
<td>n</td>
<td>Y</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>nk</td>
<td>N</td>
<td>vascular risk for cognitive decline* will partner</td>
</tr>
<tr>
<td>ADNI4</td>
<td>(1,100)</td>
<td>Y</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>nk</td>
<td>Y</td>
<td>Clinical trial planning for AD with biomarkers</td>
</tr>
<tr>
<td>LEADS</td>
<td>(700)</td>
<td>Y</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>nk</td>
<td>Y</td>
<td>Clinical trial planning in early onset AD</td>
</tr>
<tr>
<td>ALLFTD</td>
<td>1,479</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>Y</td>
<td>n</td>
<td>nk</td>
<td>N</td>
<td>Clinical and biomarker progression</td>
</tr>
<tr>
<td>PPMI</td>
<td>(4500)</td>
<td>n</td>
<td>n</td>
<td>Y</td>
<td>n</td>
<td>n</td>
<td>nk</td>
<td>N</td>
<td>Biomarker progression in PD</td>
</tr>
<tr>
<td>DLBC</td>
<td>200</td>
<td>n</td>
<td>n</td>
<td>Y</td>
<td>n</td>
<td>n</td>
<td>nk</td>
<td>N</td>
<td>Dementia with Lewy bodies</td>
</tr>
<tr>
<td>DIAN</td>
<td>(600)</td>
<td>Y</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>nk</td>
<td>Y</td>
<td>Cohort of autosomal mutation carriers</td>
</tr>
</tbody>
</table>

Notes: *Single-site aging and AD-risk cohorts are not listed.

Nk= not known

LATE is a neuopath entity—clinical criteria are not defined and it is assumed all older cohorts contain some as yet unknown burden of LATE-NC; LBD includes Dementia with Lewy Bodies and Parkinson’s disease dementia and their prodromes. Other abbreviations: VCID vascular cognitive impairment. LEADS Longitudinal early onset AD study; PPMI Parkinson’s Progression marker initiative; DLBC Lewy Body consortium;

**DVCID Diverse VCID study: Participants may co-enroll because DVCID does not do PET and the core MRI is the same and will be at SCAN**
LIMITATIONS OF TRADITIONAL COGNITIVE ASSESSMENTS

**ARTIFICIAL**
- Assessments very removed from patient’s reality.
- Environments and social contexts fundamentally dissimilar.
- Feeling of being “tested” by other person.
- “White-coat” testing effects.
- Effects of daily stressors (fatigue, mood, illness, traveling to sites).

**“ONE-SHOT”**
- Testing typically completed in one extended session

High Variability = Drastic reductions in statistical power.
In home technology – Changing the clinical research paradigm

- Brief
- Episodic
- Clinic-based
- Subjective
- Obtrusive
- Inconvenient

- Real-time
- Continuous
- Home-based
- Objective
- Unobtrusive
- Ambient

- Pervasive Computing
- Wireless Technologies
- “Big Data Analytics”

- New Observations & Discovery
- Maximally Effective Clinical Research
- Better Outcomes for Patients & Families

Measure the real thing!!!

EVIDENCE

Slide Credit: Jeff Kaye
Fig. 2. Overview of sensors, devices, and data streams that can be integrated into the CART platform to monitor several health and wellness domains. CART, Collaborative Aging Research Using Technology; EHR, electronic health record.
Connecting with technology partners from an academic lens

Rhoda Au, PhD, MBA (Boston University)
Our Scientific Dream
Our Scientific Infrastructure
Our Research Objective
Can’t Get There From Here
Establishing Successful Academic-Industry Collaborations
Clearly Define Strategic Objectives

Digital Biomarker Discovery

Achieve Representativeness

Shift to Ambient Monitoring

Proactively Seek Researcher Diversity

One-Stop-Shop for All ADRC Data

Broad Data Sharing

https://www.youtube.com/watch?v=gLQC0gMrSoo

Sensors 2019, 19(9), 2164; https://doi.org/10.3390/s19092164
https://www.guidestar.org/profile/52-1443811
Clearly Define Decision Criteria

Cost versus Benefit
- Clinical Grade
- Active Use
- Open Source API for Processed Data
- Single Purpose
- Internet of Things
- Passive Use
- Open Source API for Raw Processed Data
- Multi-Purpose

Secure

Cost vs Reach

Raw Digital Data for Future Proofing
### Value Proposition

<table>
<thead>
<tr>
<th>User/Participant</th>
<th>Researcher</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Health measures of personal interest</td>
<td>• Reliable e-health data collection platform</td>
<td>• Market ready health products/services</td>
</tr>
<tr>
<td>• Personalized device mix</td>
<td>• New study design/methods</td>
<td>• New business spin-offs</td>
</tr>
<tr>
<td>• Confidentiality needs met</td>
<td>• Quality data to develop novel analytic approaches</td>
<td>• Tech validation process to de-risk e-health investments</td>
</tr>
<tr>
<td></td>
<td>• New tech screening &amp; validation studies</td>
<td></td>
</tr>
</tbody>
</table>
Barriers to Academic-Industry Collaborations
The Evil Empire
Who Owns What

INTELLECTUAL PROPERTY
Protection of Proprietary Information

Reverse Engineering

- Process for Manufacturing
- Physical Model
- CAD Model and drawing for manufacturing
- CAD readiness, accuracy and smoothness
- 3D Scanner
- Point Cloud Data
- Surface Model
Versioning Lifecycle

The Cost of Outdated Technology

Workers waste an average of 40 minutes a day because of slow technology.

- 55% of IT-decision-makers say existing solutions hinder adoption of new technologies.
- 75% of the government’s IT budget is spent on maintaining legacy systems.

Obsolescence

Experts estimate there will be 38.6 billion IoT-connected devices by 2025.
Data Harmonization
Change in Leadership
OUT OF BUSINESS
A Prepared Partnership

THANK YOU!
NACC and Digital Pilot Program Overview

Sarah Biber, PhD (NACC)
NACC serves as the data coordination hub and centralized data repository for NIA's ADRC Program
Independent ADRCs collect standardized longitudinal data

- Centers enroll research participants who are healthy, at risk, and with dementia symptoms
- Centers collect standardized longitudinal data through annual visits using tools co-developed and provided by NACC

NACC collects, harmonizes, integrates, and shares ADRC data

- NACC has been collecting, harmonizing, integrating, and sharing ADRC Data for 23+ years

**Uniform Data Set Impact**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants with data at NACC</td>
<td>48,605+ (17,000+ active participants)</td>
</tr>
<tr>
<td>Clinical assessments</td>
<td>180,004+ (1-18 visits per participant; median =3)</td>
</tr>
<tr>
<td>Neuropathology datasets</td>
<td>7,565+ (From 58% of deceased participants)</td>
</tr>
<tr>
<td>Published studies using NACC data</td>
<td>1,184+</td>
</tr>
<tr>
<td>ADRCs and 4 Exploratory Centers (Across 26 states)</td>
<td>33</td>
</tr>
</tbody>
</table>
Unique Value of NACC Data

- One of the largest and most comprehensive longitudinal, standardized, clinical and neuropathological datasets in the world
  - Includes participants with normal cognition, MCI, and dementia
  - Data captured for participants prior to and post dementia onset
  - Infrastructure in place for ongoing participant tracking
  - Robust criteria-based diagnoses
- Rich multi-domain neurocognitive data
- Neuropathology data for diverse etiologies
NACC Data Platform: A Modern Cloud-based Multimodal Data Integration and Harmonization Platform

Existing Data Streams
- Longitudinal clinical (UDS)
- Neuropathology
- Heterogeneous MRI/PET

Data integration and harmonization

NACC Data Platform

Free for researchers everywhere!
www.naccdata.org
NACC Data Platform: A Modern Cloud-based Multimodal Data Integration and Harmonization Platform

Expanded Partner Metadata and Analysis Data
- SCAN/LONI Standard MRI/PET
- NCRAD Biospecimen samples
- ADGC & NIAGADs Genomic/genetic data

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- Longitudinal clinical (UDS)
- Neuropathology
- Heterogeneous MRI/PET
- Digital data/biomarker
- Digital neuropathology
- EHR/CMS

**Future Data Streams**

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Expanded Partner Metadata and Analysis Data

- CLARITI: Advanced MRI, digital NP, blood biomarker
- SCAN/LONI: Standard MRI/PET
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Future Data Streams

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Future Data Streams
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Scalable to new data streams
Real-time data search, visualization, and access
Ready for AI-driven discovery

Data integration and harmonization

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Quick Access Files
Dashboards & Cohort selection
Data Front Door - Advanced Data Search and Access

One-Stop-Shop for All ADRC Data

Quick Access Files
- NACC
- Powered by REDCap

Dashboards
- SCAN imaging data and more!

Cohort Selection
- Build your own multimodal dataset!

ADRC Data & Metadata Modalities
- Socio-demographic
- Neurocognitive tests
- Neuropathology
- Imaging (MRI/PET)
- Genetic and genomic
- Biomarker
- Electronic Health Record (EHR)
- Digital biomarker

Investigators everywhere
Submit a data request (15 min)

Step 1. Sign a Data Use Agreement and submit a title with specific aims.

Step 2. NACC reviews request.

Step 3. Approved requests typically receive datasets in 48 hours.

Login into the existing data request system:
https://naccdata.org/requesting-data/data-request-process
Why Digital Data?
Digital Data Opportunities

Enormous unmet need in AD/ADRD research for high-resolution, high-value, and objective measures that can be captured frequently over time

Digital measures/tools hold promise for:
- Supporting earlier detection/diagnosis
- Defining disease phenotypes
- Predicting prognosis
- Monitoring disease progression and treatments (longitudinal)
- Reducing participant burden (passive collection)
- Optimizing clinical trials
### Digital Data and Phenotyping

Clinically meaningful data collected through digital technologies (active or passive)

<table>
<thead>
<tr>
<th>Clinically Administered</th>
<th>Remotely Administered</th>
<th>Out of Clinic Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOCA, Balance and Gait</td>
<td>Remote Cognitive Assessments</td>
<td>Heart Rate, Mobility, Gait, Steps, Accidental Falls, Sleep, Cognitive Testing, Home Monitoring</td>
</tr>
</tbody>
</table>
Overview

Digital data collection covers a lot of concepts and is very heterogenous.

Many are collecting data and there are few, if any, standards or standardization.

Slide borrowed from Sean Mooney
Bringing Some Harmonization

At NACC, we feel that we should help standardize, harmonize, ensure efficacy, and collect established instruments

... And ...

Facilitate discovery using new technologies that have research and clinical value that are very likely to be unharmonized
Digital Data Collection, Integration, and Sharing
NACC Data Platform: A Modern Cloud-based Multimodal Data Integration and Harmonization Platform

Expanded Partner Metadata and Analysis Data

- CLARiTI: Advanced MRI, digital NP, blood biomarker
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NACC Data Platform
Data integration and harmonization

Free for researchers everywhere! www.naccdata.org

Quick Access Files
Dashboards & Cohort selection
Digital Tools Enable AI-Based Decision Support

Human interpretation takes time, is variable, and could potentially be replaced by supervised machine learning algorithms
Ultimate Goal

Standardized and clinically-validated digital biomarkers for AD/ADRD

These will:
- Support earlier diagnosis
- Define disease phenotypes
- Predict prognosis
- Monitor disease progression and treatments (longitudinal)
- Optimize clinical trials
Gates/NACC Digital Pilot Program
• Goals:
  • Accelerate impactful digital data collection and sharing across the ADRC Program to advance AD/ADRD research and discovery
  • Leverage technology to capture richer and more objective data with less burden for participants and ADRCs
  • Advance the development and/or validation of digital biomarkers for early detection, diagnosis, prognosis, or monitoring.

• Budget: 1-3 pilots ranging from $250K to $1M (direct costs), 15% indirect cap

• Pilot length: 1-2 years
AD/ADR Digital Biomarker Pilot Program

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• Eligibility: Open to any ADRC or non-ADRC groups or companies. Applicants must have at least two ADRC collaborators. (naccmail@uw.edu)
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• Funding will be provided through NACC and will support:
  • Partners: Provide digital instruments*
  • ADRCs: Data collection with digital technologies
  • NACC: Integrating this data into the NACC Data Platform and sharing it with the AD/ADRD researchers through the Data Front Door

*Instruments can be from a variety of sources and offered in kind
AD/ADRD Digital Biomarker Pilot Program

- **Goals:**
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- **Review Committee:** Expertise in scalable digital technologies from across academia, industry, and government
Pilot Requirements:
• Adds research value and enhances metrics
• Reduces burden (participant or staff)
• Expands accessibility/reach and addresses diversity
• Involves multiple ADRCs
• Demonstrates scalability (ADRCs and beyond)
• Amenable to a data challenge down the line
• Partnering companies must provide the raw digital files to NACC
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Example Modalities: Sleep, movement, gait (phone gyroscope measures), fall detection, voice, video, language, eye tracking, digitized UDS, non-UDS, mood, diet, biological measures, driving, keystrokes

Example Tools: Wearables, sensors, multi-sensor, smart phone apps, algorithms
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Proposed Timeline for Pilot Launch:
• October 19, 2023: Release the RFA
• February 21, 2024: Application deadline
• April 2024: Select 1-3 winners
• July 2024: Launch pilots
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Potential Follow-Up Support:
• Funded Data Challenge using data collected from the pilot
• Promising digital pilots may be scaled to the full ADRC Program via NACC’s U24 renewal
• NIA SBIR/STTR
• AD Diagnostic Accelerator

Proposals will be scored based on the following selection criteria:

1. **Significance:**
   - How does the proposed digital data collection contribute critical data needed in the Alzheimer’s Disease field?
   - Is the team addressing a real problem/need in AD/ADRD research or healthcare?
Proposals will be scored based on the following selection criteria:

1. **Significance:**
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   - Is the team addressing a real problem/need in AD/ADRD research or healthcare?

2. **Innovation/Impact:**
   - Does the proposal demonstrate how this data will open the door to better early detection/diagnosis, phenotypes, predicting prognosis, monitoring disease progression and/or treatment (longitudinal), and optimizing clinical trials in AD/ADRD?
   - Could this project lead to the development of a validated digital biomarker (biomarkers can include diagnostic, monitoring, predictive, prognostic, and susceptibility/risk factors) in research and clinical settings?
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3. **Feasibility:**
   - Does the project have a realistic plan and timeline for execution of the solution?
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3. **Feasibility:**
   - Does the project have a realistic plan and timeline for execution of the solution?

4. **Scalability:**
   - Does the project design allow for scalability across the ADRC Program and beyond?
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   - Is the team addressing a real problem/need in AD/ADRD research or healthcare?

2. **Innovation/Impact:**
   - Does the proposal demonstrate how this data will open the door to better early detection/diagnosis, phenotypes, predicting prognosis, monitoring disease progression and/or treatment (longitudinal), and optimizing clinical trials in AD/ADRD?
   - Could this project lead to the development of a validated digital biomarker (biomarkers can include diagnostic, monitoring, predictive, prognostic, and susceptibility/risk factors) in research and clinical settings?

3. **Feasibility:**
   - Does the project have a realistic plan and timeline for execution of the solution?

4. **Scalability:**
   - Does the project design allow for scalability across the ADRC Program and beyond?

5. **Accessibility and Equity:**
   - Does this project enable AD/ADRD research and discovery to be more inclusive?
Q&A Session

Informational Webinar | January 22, 2024

Gates Ventures  NACC  NIH

National Institute on Aging (NIA)
Alzheimer's Disease Research Center Program
FAQs

• Are applicants' budgets held to the NIH salary cap?
  • As this grant is not funded by NIH, there is no requirement to adhere to the NIH salary caps.

• Are non-US based companies eligible for funding?
  • Yes! Non-US companies are eligible for funding as long as they have at least two Alzheimer’s Disease Research Center (ADRC) Program collaborators.
  • All data generated or used in each pilot project must be made accessible to the research community through the National Alzheimer’s Coordinating Center (NACC) Data Platform.

• Are sites under the requirement to adhere to the single-site IRB?
  • There is no requirement to adhere to the single-site IRB – IRB requirements are met so long as each site is clear to collect the data described in the proposal and share this data with NACC.

• Can the institutions involved in an application submit the budgets separately for the proposal?
  • Each of the four institutions as well as any technology partners on your application can submit a separated budget for your application. NACC would then setup subawards for each institution to maximize the amount of funding that goes towards the actual research.
FAQs

• Are postdocs eligible to be the PI on the application?
  • If the PI on the application is a postdoc, most institutions will ask for a faculty sponsor when they submit and go through their internal approval process.
  • If that is the case for your institution and your proposal is awarded funding, that award may need to be listed under the faculty sponsor’s name.

• The requirements for the RFA state that "industry partnerships are strongly encouraged" - should we interpret this statement to mean that we should not apply for the program if we are not currently partnered with a wearable device company?
  • This statement is meant to encourage those applying to have a strong plan for how their pilot proposal will be implemented across several piloting sites. An industry partnership or plan that supports this would make for a stronger application.

• Are there any system requirements for sharing data in NACC’s cloud?
  • NACCID must be affiliated with data
  • Documentation on datatype, metadata descriptors, etc.
  • Tooling & code necessary for QC/processing of data
  • All data generated or used in each pilot project must be made accessible to the research community through the National Alzheimer’s Coordinating Center (NACC) Data Platform.

FAQs available at: bit.ly/DGP_Awards
Q&A Format

1. Please raise your hand and the moderator will call on you to ask your question

2. You may also add your question to the Q&A box at the bottom of the screen

3. If we do not get to your question, please reach out to naccmail@uw.edu

Panelists:

- **Niranjan Bose, PhD** – Gates Ventures, Managing Director

- **Nina Silverberg, PhD** – NIA, ADRC Program Director

- **Rhoda Au, PhD, MBA** – Boston University, Professor

- **Sarah Biber, PhD** – NACC, Executive Director
Thank you!

Learn more at: bit.ly/DGP_Awards
Connect with NACC

Have questions?

Contact us at:
NACCmail@uw.edu
Digital Biomarker Pilot: RFA Eligibility

Funding is open to researchers and clinicians worldwide at:

- Academic institutions or nonprofits
- For profit companies; existing companies and new spinouts are both eligible
- Industry partnerships are strongly encouraged

NOTE: Pilot Principal Investigators can come from any institution, but proposal submitters must have multiple (two or more) ADRC collaborators to be considered for funding.
Digital Biomarker Pilot: RFA Modalities and Tools

Example modalities or data sources include but are not limited to: (Examples of clinical measures of interest in parenthesis)

- **Sleep** (e.g. biological measures such as heart rate, time sleeping, sleep interruptions, body temperature, etc.)
- **Movement and/or Phone gyroscope measures** (e.g. gait measures and disorders, motor and physical functioning)
- **Fall detection** (e.g. motor and physical functioning)
- **Mood State**
- **Speech** (e.g. cognition, mood state)
- **Video** (e.g. movement characteristics, cognition, mood state)
- **Language** (e.g. cognition, mood state)
- **Eye tracking** (e.g. eye movement characteristics)
- **Digitized UDS (Uniform Data Set) and non-UDS**
- **Diet** (e.g. biological measures, cognition, mood state)
- **Driving** (e.g. cognition, motor and physical functioning)
- **Keystrokes** (e.g. cognition, motor and physical functioning)

Examples of digital tools include, but are not limited to:

- Wearable devices (e.g. smart watch)
- Single and/or Multi-sensors
- Mobile/tablet apps
- Smart home systems
- Virtual and augmented reality platforms
- Desktop/web apps
- Deep machine learning-AI-driven Algorithms
- Single Digital Modality Processing Software
- Multi-Digital Modality Processing Software
- Large Language Models
The proposed pilot project should:

• Add research value and increase accuracy and/or objectivity of measures

• Reduce burden: projects must demonstrate how they will reduce burden on patients and/or providers and medical center staff

• Expand and address diversity

• Involve multiple ADRCs

• Demonstrate scalability

• Be amenable to open science experiments that include broad data sharing (such as data challenges) down the line

• Funded projects, including for-profit companies, must agree to broad, raw, data sharing.

Data sharing: All data generated or used in each pilot project must be made accessible to the research community through the National Alzheimer’s Coordinating Center (NACC) Data Platform.
Open Science on Digital Data

Data Science ‘Community Challenges’ are a popular way to do science

They pose questions that data scientists can answer and the answers are only known by the organizers

These challenges have facilitated unbiased improvement in machine learning in many fields

My group (Mooney) has been leading, participating, and advising these challenges for decades
Open Science on Digital Data

Collection of digital data opens the possibility of doing new approaches to facilitate open science

DREAM Challenges and Kaggle, have platforms for building and evaluating machine learning

We are strategizing a potential challenge around data on the most technical forefront of potential markers of disease or treatment response such as Digital Recordings of clinics