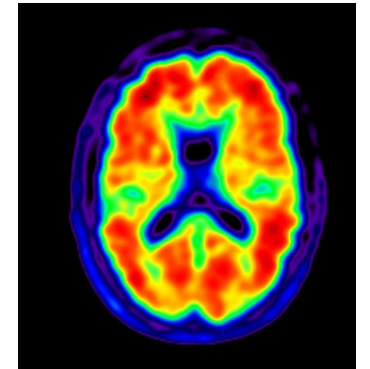# NACC Update
Imaging Core Session

Sarah Biber, PhD, NACC Program Director

May 13, 2022 – ADRC Spring Meeting

NACC's Expanded Data Coordination Role for the ADRC Program

Coordinate data collection

Communication
Education
Evaluation/tracking
Meeting coordination

Co-develop pipelines

In collaboration with partners e.g. SCAN, LONI, ADRCs

Integrate the data

Connect all ADRC data types to NACC IDs (with NCRAD and NIAGADS)

Make data inter-operable, harmonized, and FAIR

Share and facilitate use of the data for impactful research

Co-develop and host the "front door/one-stop-shop" for ADRC data

Provide tools for effective cohort selection (e.g. Leaf)

Collaborate with ADRC researchers and provide biostatistics consultations

Fund the ADRCs and early investigators

Conduct Alzheimer's research

Coordinate and synergize across interrelated data initiatives for the ADRCs

Track and coordinate across initiatives

Streamline and reduce redundancies to maximize impact

NACC Support for ADRC Imaging Initiatives

ADRC Imaging Initiatives that NACC Actively Supports

MRI Legacy

- **Charlie DeCarli and NACC**

- **Goal:** Curate and utilize invaluable imaging data from last 20 years by applying QA/QC, metadata, connecting to NACC IDs and making it searchable through the Data Front Door

PET Legacy Project

- **Beth Mormino, SCAN, and NACC**

- **Goal:** Capture, curate, and analyze all sharable amyloid PET data on NACC participants that was collected before Jan 2021

U24 – ADSP Phenotype Harmonization

- **Tim Hohman**

- **Goal:** Harmonize data for participants in the ADSP across 50+ studies (Including NACC data)

SCAN

- **Bill Jagust & Cliff Jack, LONI and NACC**

- **Goal:** Standardization of MRI/PET image acquisition protocols

CLARITi – ATN RO1

- **Beth Mormino, Sterling Johnson, and NACC**

- **Goal:** Amplify SCAN pipeline and better characterize AD heterogeneity

UDSv4 – Pipeline and Database
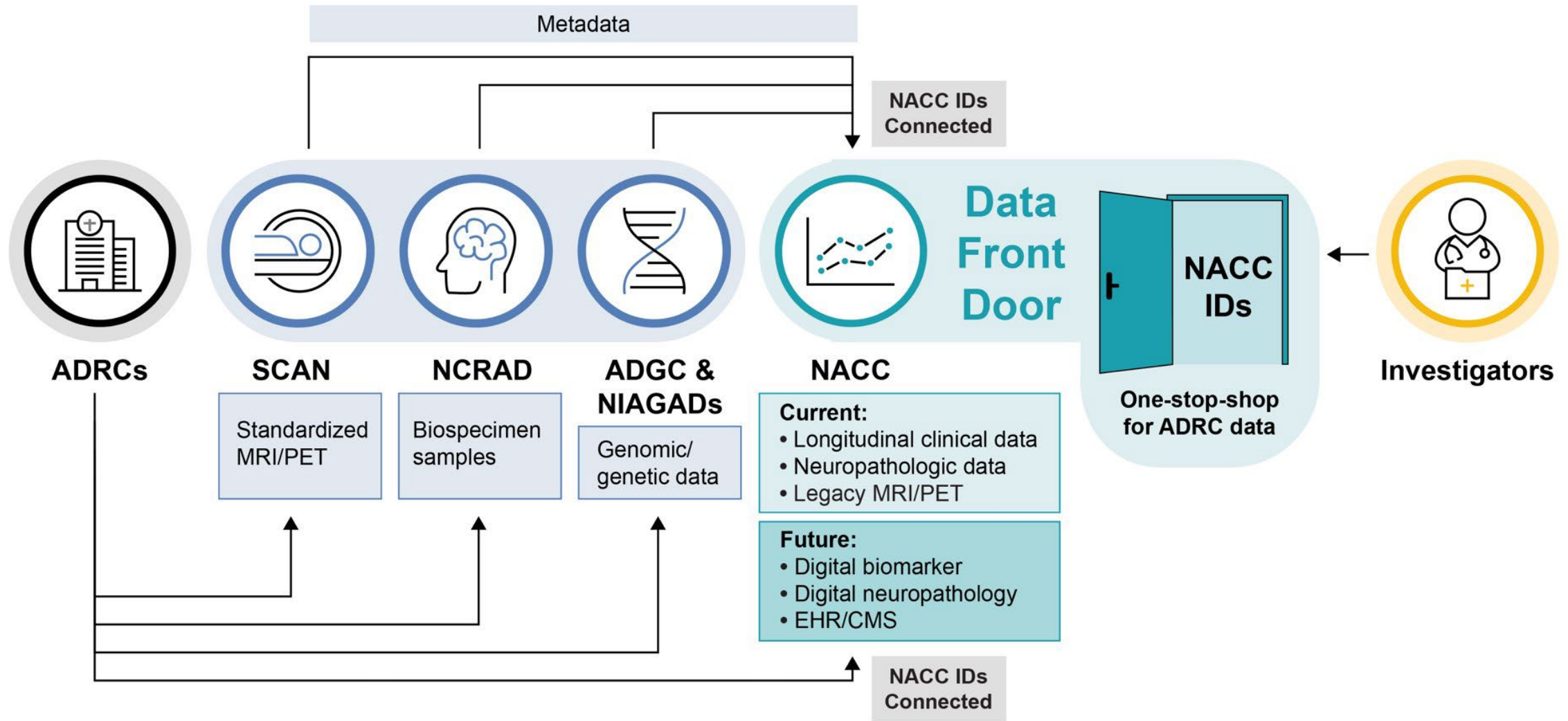
SCAN Overview

Goal: Collect large quantities of standardized imaging data and connect them to NACC IDs to advance the field

- Standardization of image acquisition protocols

- Infrastructure for curation and analysis

- Funding (via NIA) for image acquisition through short-term ADRC administrative supplements

- https://scan.naccdata.org

SCAN Imaging Data Pipeline

ADRCs

Data generation and submission

- Collect standard data via SCAN protocol
- Submit data to LONI via NACC web portal

Coordination / messaging

PET SUVRs and MRI volume data returned to sites

UDS

NACC

Data coordination, collection, sharing and integration

- Coordinate data collection: communication, education, evaluation
- Collaborate to build data pipeline
- Integrate imaging data with NACC IDs and all other ADRC data
- Host ADRC data "front door" for the scientific community

NACC ID is generated or existing NACC ID is updated - sent back to LONI so that image can be ID tagged

Raw image files

NACC ID generated/updated

Site reporting

Summary data

Data pipeline and collection

- Store and index images
- Check for subject identifiers
- QA images for SCAN protocols
- Build the data pipeline in collaboration with NACC
- LONI/SCAN submission site hosted at NACC

LONI

Raw image files (ID tag)

Curated files

scan

SCAN data analysis

- Curate images
- MRI measurements (e.g. volume)
- PET measurements (e.g. SUVR for amyloid and tau)
- QA/QC checks (checking for adherence to SCAN protocols)

Amplifying the SCAN Pipeline

Institution	First Contacts	SCAN Connection
UNIVERSITY OF CALIFORNIA AT DAVIS	Charles DeCarli, MD	SCAN Collaborator, Imaging Steering Committee
MAYO CLINIC ROCHESTER	Kejal Kantarci, M.D.	SCAN Co-I, Imaging Steering Committee
UNIVERSITY OF MICHIGAN AT ANN ARBOR		SCAN Collaborator
UNIVERSITY OF SOUTHERN CALIFORNIA	Paul E. Kim	SCAN Collaborator, Supplement
UNIVERSITY OF WISCONSIN-MADISON	Sterling Johnson	Imaging Steering Committee, Supplement
STANFORD UNIVERSITY	Elizabeth Mormino	Imaging Steering Committee
RUSH UNIVERSITY MEDICAL CENTER	Konstantinos Arfanakis	Imaging Steering Committee, Supplement
UNIVERSITY OF PENNSYLVANIA	John D'etre	Imaging Steering Committee
NORTHWESTERN UNIVERSITY AT CHICAGO	Emily Rogalski	Imaging Steering Committee
NEW YORK UNIVERSITY	Henry Rusinek	Supplement
UNIVERSITY OF KENTUCKY	Brian Gold	Supplement
UNIVERSITY OF KANSAS MEDICAL CENTER	William Brooks, Ph.D	Supplement
MOUNT SINAI		Supplement
UNIVERSITY OF CALIFORNIA, SAN DIEGO	Anders Dale	Supplement
EMORY UNIVERSITY	Deqiang Qiu	Supplement
UNIVERSITY OF WASHINGTON		Supplement
UNIVERSITY OF PITTSBURGH AT PITTSBURGH	James T. Becker, Ph.D	Supplement
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO	Howard J. Rosen	Supplement
CLEVELAND CLINIC LERNER COM-CWRU		Supplement
UNIVERSITY OF CALIFORNIA-IRVINE		Supplement

SCAN Checklists – MRI and PET

- Roadmap for getting SCAN ready
- Standard tool for assessing SCAN progress and participation
- Can be updated in real-time on NACC SCAN portal (via REDCap)

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Site Interviews: May through June 2022

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- Will assess barriers and potential next steps

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Summary Report

- SCAN status at each site
- Challenges and barriers to SCAN participation
- Will inform development of revamped SCAN web portal at NACC

SCAN Live Leaderboards

SCAN Live Leaderboard Building Plans

- To be built in collaboration with LONI and SCAN
- Will live on SCAN web portal at NACC
  - Tracks MRI and PET SCAN readiness (checklists) and participation
  - # Participants that imaging data has been submitted for
  - # PET and # MRI scans submitted
  - % that adhere to the SCAN protocol

Rapid QA/QC Feedback Loop

- Exploring options with SCAN and LONI for expediting and standardizing feedback process
- Monthly reports: % that meet QA/QC requirements
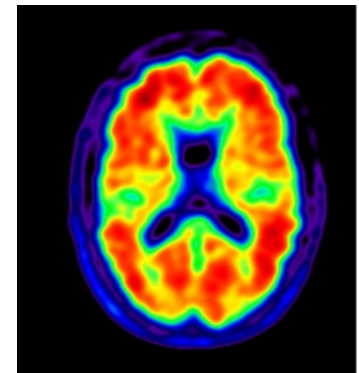
SCAN Live Leaderboards

SCAN Readiness

Institution	Update your SCAN status	SCAN Readiness									
		Liason information submitted	Regulatory approval obtained	MRI Readiness				PET Readiness			
				Scanner option selected	Protocol eFile received	Scanner certified	Eligible particpants identified	Scanner qualified	Tracer sources established	PET protocol and upload form reviewed with imaging cennter staff	Eligible particpants identified
Center 1	REDCap										
Center 2	REDCap										
Center 3	REDCap										

SCAN Participation

Institution	Total # participants	SCAN Participation						
		MRI Participation				PET Participation		
		# Participants	# Exams submitted	# Series submitted	% of series that adhere to the SCAN protocol	# Participants	# scans submitted	% of series that adhere to the SCAN protocol
Center 1								
Center 2								
Center 3								

SCAN Next Steps

Next Steps

- Conduct and analyze interviews
- Revamp SCAN web portal
- Build live leaderboard to incentivize and track ADRC participation
- Finish pipeline build in collaboration with LONI
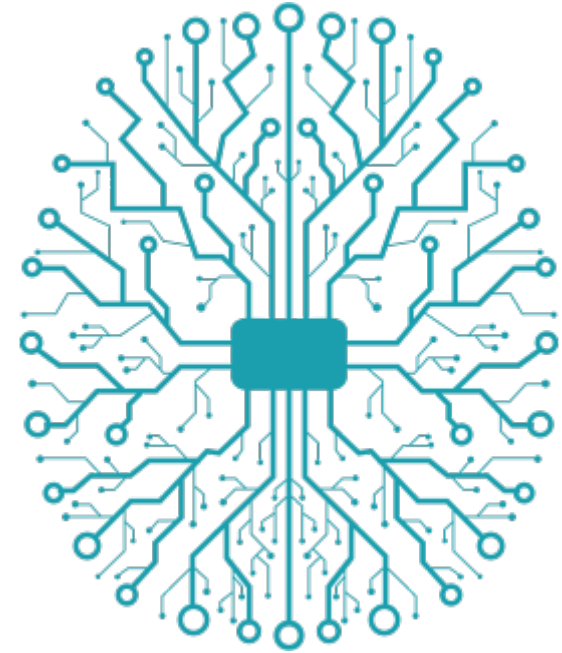
CLARiTI - Prospective RO1

Goals

- Amplify and support the SCAN initiative and expand standard image acquisition

- Develop innovative new methodologies to better characterize heterogeneity and predict disease progression

CLARiTI - Prospective RO1

Survey 100% Response Rate with Valuable Information

- **Survey outcomes informed:**
  - ADRC interest level
  - Site budget needs
  - Estimated cohort size
  - Barriers to MRI/PET submission
  - Site collaborators

Imaging Data Pipeline: SCAN

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Imaging Data Pipeline: SCAN + CLARiTI

CLARiTI – Research collaboration

NACC Team

Gary Chan, PhD
Associate Director

Dean Shibata, MD
Co-Investigator

Yen-Chi Chen, PhD
Co-Investigator

Assist study design, including power analysis

Analyze the data using innovative machine learning or biostatistical methods

- Development and validation of probability profile
- Multi-view dimensional reduction
- Topological data analysis
- Elastic shape analysis

Thank you!

Connect with NACC

Sarah Biber – Program Director

biber@uw.edu