

Establishing the Frontotemporal Dementia Research Center (FTDRC)

Fen-Biao Gao, PhD

Professor

Governor Paul Cellucci Chair in Neuroscience Research

RNA Therapeutics Institute

UMass Chan Medical School

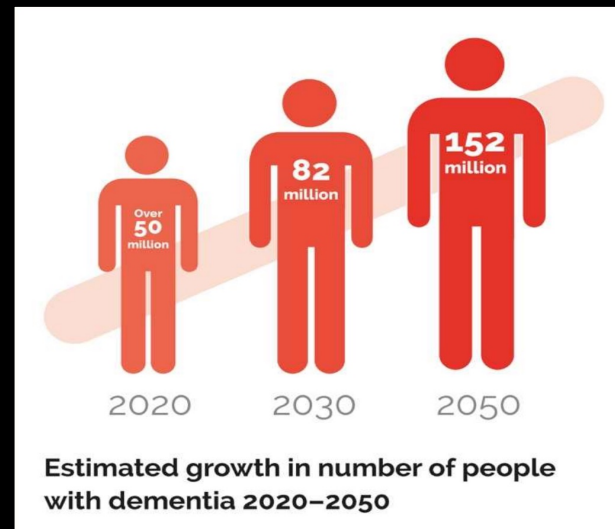
“There's really realistic hope that we will get a breakthrough and unlock the mystery of ALS and even other neurodegenerative diseases like Alzheimer's. So it's a very promising time.”

--Governor Paul Cellucci (1948–2013)

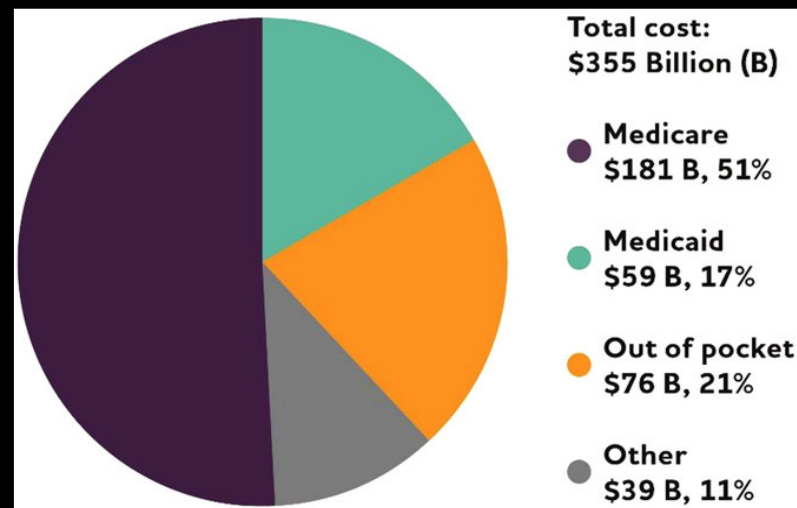


UMass Chan Medical School Chancellor Michael Collins,
Dr. Robert Brown and the late Gov. Paul Cellucci in 2011

Alzheimer disease (AD) and AD-related dementias (ADRDs) such as frontotemporal dementia (FTD), vascular dementia, dementia with Lewy bodies, and others (such as after a stroke and HIV infection) are a major health challenge in the 21st century.

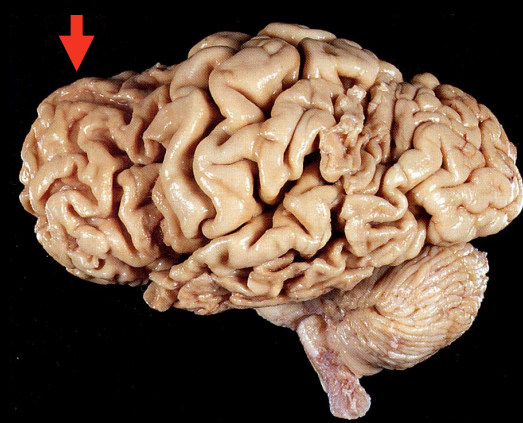


“For FY 2024, NIH estimates the overall funding needed for AD and ADRD totaling \$3.87 billion.”



(Alzheimer’s Association, 2023)

Frontotemporal Dementia (FTD)



- One of the major Alzheimer's disease-related dementias (ADRDs), and the most common dementia for people under age 60.
- Refers to a group of brain disorders including behavioral variant FTD (bvFTD), primary progressive aphasia (PPA), corticobasal syndrome (CBS), progressive supranuclear palsy (PSP), FTD-motor neuron disease (FTD-MND).
- Progressive deficits in cognitive behaviors (such as social disinhibition and loss of empathy) and/or language, as well as personality changes.
- Affecting 60,000 people in the US, 40% of FTD cases are familial.
- Significant genetic, pathological and clinical overlaps with ALS.



Dementias and Frequency of Criminality

<u>Clinical Diagnosis</u>	<u>Frequency of Criminality</u>
Behavioral Variant FTD	37.4%
Vascular Dementia	14.8%
Alzheimer's Disease	7.7%
Mild Cognitive Impairment	3.3%

Thus, FTD is not only a medical issue but also a social issue.

(Liljegren et al., *JAMA Neurol.* 2015)

Vision for the FTD Research Center

Within 5-10 years, build the Center into a leading place in the nation and the world for FTD (and related neurodegenerative disorders) research and RNA-based therapeutic development.

My Qualifications

>130 papers. Representative papers in FTD/ALS research since I came to UMass Chan in 2010:

As the (co) corresponding author

Almeida et al., *Cell Reports* 2012
Lu et al., *Mol. Cell* 2013
Gascon et al., *Nat. Med.* 2014
Yang et al., *Acta Neuropathol.* 2015
Tran et al., *Neuron* 2015
Freibaum et al., *Nature* 2015
Lopez-Gonzalez et al., *Neuron* 2016
Gao et al., *EMBO J.* 2017
Gao et al., *Cell* 2017
Yuva-Aydemir et al., *Trends Neurosci.* 2018
Lopez-Gonzalez et al., *PNAS* 2019
Yuva-Aydemir et al., *Nat. Commun.* 2019
Choi et al., *Nat. Neurosci.* 2019
Krishnan et al., *Acta Neuropathol.* 2020
Lu et al., *Acta Neuropathol.* 2021
van't Spijker et al., *RNA* 2021
Loveland et al., *Nat. Commun.* 2022
Krishnan et al., *Nat. Commun.* 2022
Jun et al., *Autophagy* 2023
Lee et al., *Neuron* 2023

As a collaborator

Boxer et al., *Alzheimer's and Dementia* 2013a
Boxer et al., *Alzheimer's and Dementia* 2013b
Filiano et al., *J. Neurosci.* 2013
West et al., *J. Cell Biol.* 2015
Peters et al., *Neuron* 2015
Burguete et al., *Elife* 2015
Woehlbier et al., *EMBO J.* 2016
Kramer et al., *Science* 2016
Yin et al., *Cell Reports* 2017
Markmiller et al., *Cell* 2017
Chen et al., *Neuron* 2019
Li et al., *Cell Reports* 2020
Maor-Nof et al., *Cell* 2021
Sonobe et al., *Nat. Commun.* 2021
Arredondo et al., *Neuron* 2022
Meijboom et al., *Nat. Commun.* 2022
Hung et al., *Cell* 2023
Philips et al., *Neuron* 2023

(with UMass Chan collaborators)

My Qualifications

Leadership positions and professional services:

- Vice Chair of Research, Department of Neurology
- Chair of Tenure Committee, Department of Neurology
- Member of the University Tenure Committee

- Co-organizer of “RNA Metabolism in Neurological Disease” conferences 5 times
- Co-organizer of other meetings
- Member of the NIH Cellular Molecular Neurodegeneration study section (2019–2023)
- Member of the NIH F03A Fellowship Study Section (2011–2015)
- Member of the NIH Synapse and Trafficking study section (2007–2011)
- Senior Editor, Brain Research (2011–2021)

2023–present: Member of the Medical Advisory Council, Association for FTD

2023–present: Member of the Postdoctoral Fellowship Review Panel, King Trust

2020–present: Member of the SAB, NINDS Human Cell and Data Repository

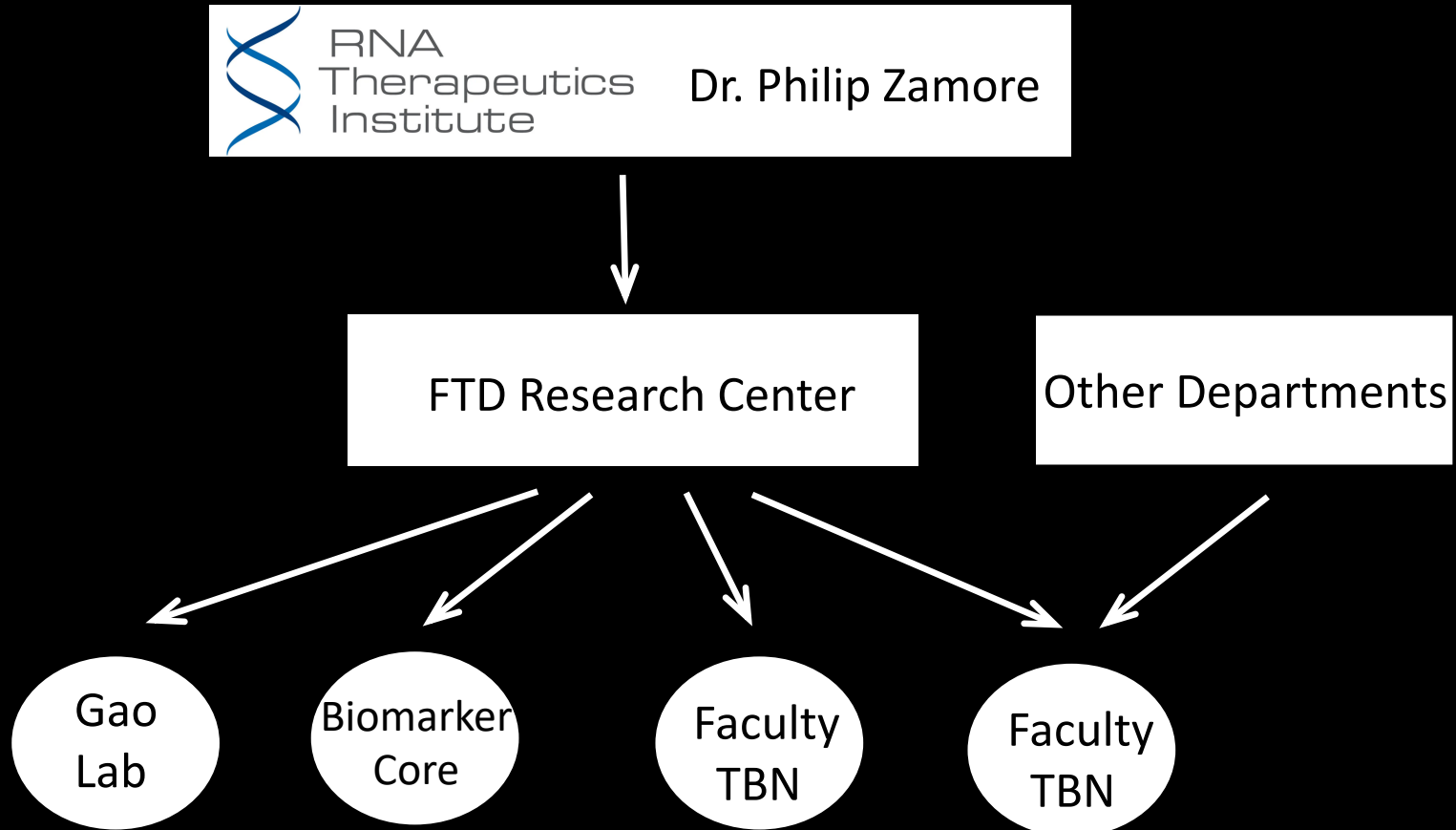
2018–present: Section Editor, *Translational Neurodegeneration* (IF>12)

2017–present: Member of the Research Advisory Council, Muscular Dystrophy Association

2015–present: Member of the Grant Review Panel, ALS Association

2015–present: Member of the Grant Review Panel, Association for FTD

Organizations



Recruitments

2-3 highly talented, driven, and diverse young faculty in 4-6 years.

- At least one woman. One from a minority group, if possible.
- Dysregulation of RNA metabolism in FTD.
- Synaptic and circuit mechanisms underlying abnormal behaviors in FTD.
- Neuropathologist (MD/PhD), dementia brain bank, scRNA-seq, AI etc.
- Other cutting-edge research areas.
- Focus on people (next Craig Mello, Phil Zamore.....), not projects.

Fundings

- Private donations.
- Foundation grants (Alzheimer's Association, Association for FTD, etc.).
- NIA FTD program grant (P01) (Due January 25, 2024, \$1.5–1.7 million direct/year).
- Campus-wide NIH/NINDS T32 training grant on FTD (Due May 25, 2024).
- Future multi-PI R01 and P01 grants, once the Center grows.

Services to RTI and UMass Chan

- Contribute to the exciting, respectful and inclusive research and teaching environment at the RTI.
- Use my expertise in grant writing to help junior faculty and trainees in the Center and the Department to obtain external fundings.
- Foster scientific excellent in the FTD Research Center and encourage collaborations with other departments.
- Bridge the interactions between basic scientists and clinicians in dementia field across the UMass Chan campus.
- Engage with the public in Massachusetts and promote dementia awareness.

Vision for the FTD Research Center

Within 5-10 years, build the Center into a leading place in the nation and the world for FTD (and related neurodegenerative disorders) research and RNA-based therapeutic development.