

# Summer Research Fellowship Proposal for 2020

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## **FACULTY INFORMATION:**

**NAME:** Srinivas Ayyadevara

**DEPARTMENT:** Geriatrics

**LOCATION:** Reynolds institute on Aging, UAMS

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## **PROJECT INFORMATION:**

**TITLE:** Identification of influential protein-protein interactions in Alzheimer's-like aggregates

**LOCATION OF THE PROJECT:** 4<sup>th</sup> floor, Reynolds institute on Aging, UAMS

**BRIEF DESCRIPTION OF THE PROJECT:** Alzheimer's disease (AD) is the only major cause of death for which there is no preventive or effective treatment. AD is a progressive neurodegenerative disorder and also one of the most prevalent forms of dementia impacting cognitive function. Neocortex and hippocampus, the brain regions associated with cognition, are most impacted by AD pathology. A key characteristic of these diseases is the deposition of protein aggregates in glial cells and neurons. Protein-protein interactions play a crucial role in aggregate formation and stability in multiple neurodegenerative diseases including Alzheimer's disease. Recently, based on our proteomics approach, we found novel protein-protein interactions present in aggregates from Alzheimer's like model system. Machine learning and neural network approach predicted influential candidate protein-protein interactions from the large proteomics dataset. Knockdown of top 10% protein-protein interactions via dual knockdown strategy that we developed in *C.elegans* or in human cell culture models would identify influential proteins and their crucial interactions involved in aggregate formation and maturation at the same time confirming neural network predictions. Confirmed protein-protein interactions would serve as an attractive therapeutic targets for treatment against Alzheimer's disease.

## **STUDENT'S RESPONSIBILITIES-DUTIES IN THE PROPOSED PROJECT:**

Maintaining *C. elegans* or human cell culture (AD model) proposed in this study, perform siRNA knockdown experiments, and monitor physiological changes.

**ESTIMATED TIME FOR PROJECT COMPLETION:** \_\_\_6-8\_\_\_ weeks

**DOES THE WORK INVOLVE ANIMAL RESEARCH?** YES -----  
NO -X-----