



Xavier Velez

Chambers/Jones Award

Ph.D. Student, Electrical and Computer Engineering
First Year ARCS Scholar

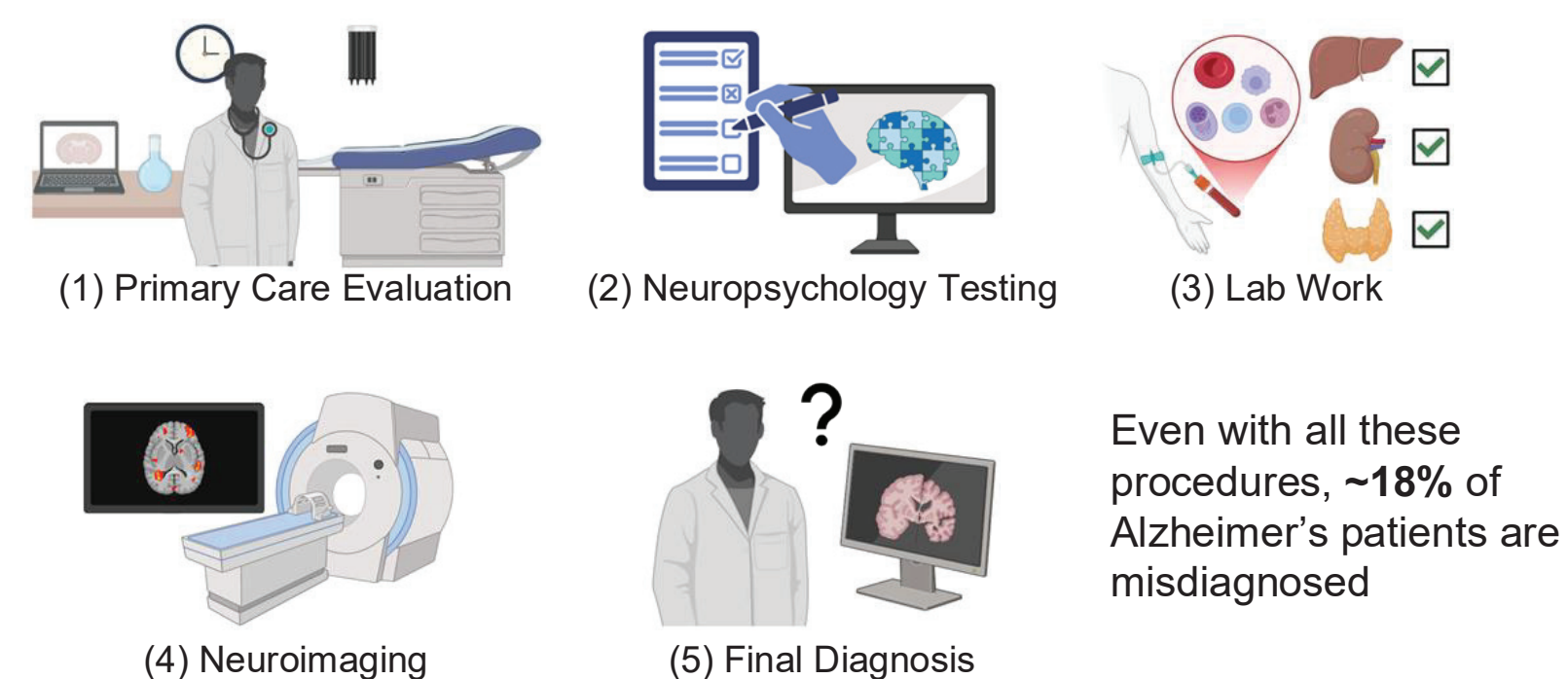
**Georgia
Tech**



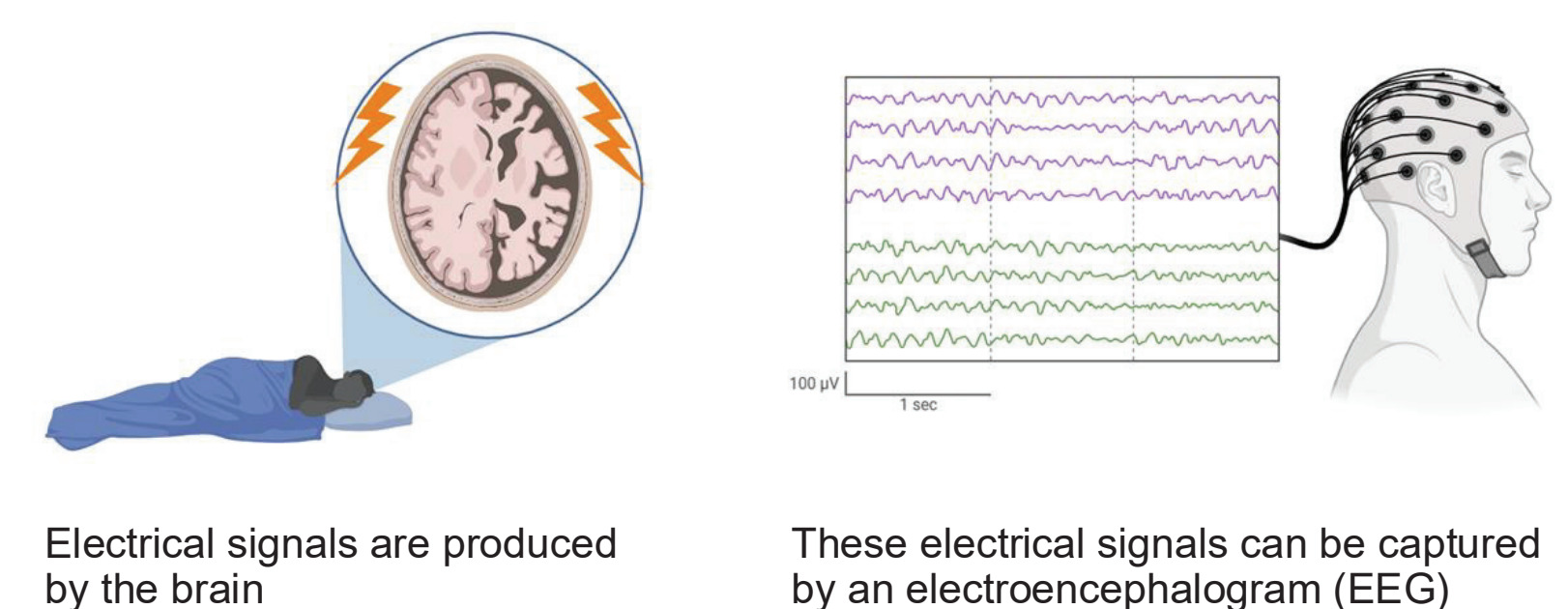
Transfer Learning Frameworks for Diagnosing Neurodegenerative and Psychiatric Conditions

This work hypothesizes that objective physiological measures of neural dysfunction can be revealed during sleep, and that by leveraging deep learning models that analyze sleep patterns, we can detect neurodegenerative and psychiatric conditions with only electroencephalography (EEG), even while the patient is awake.

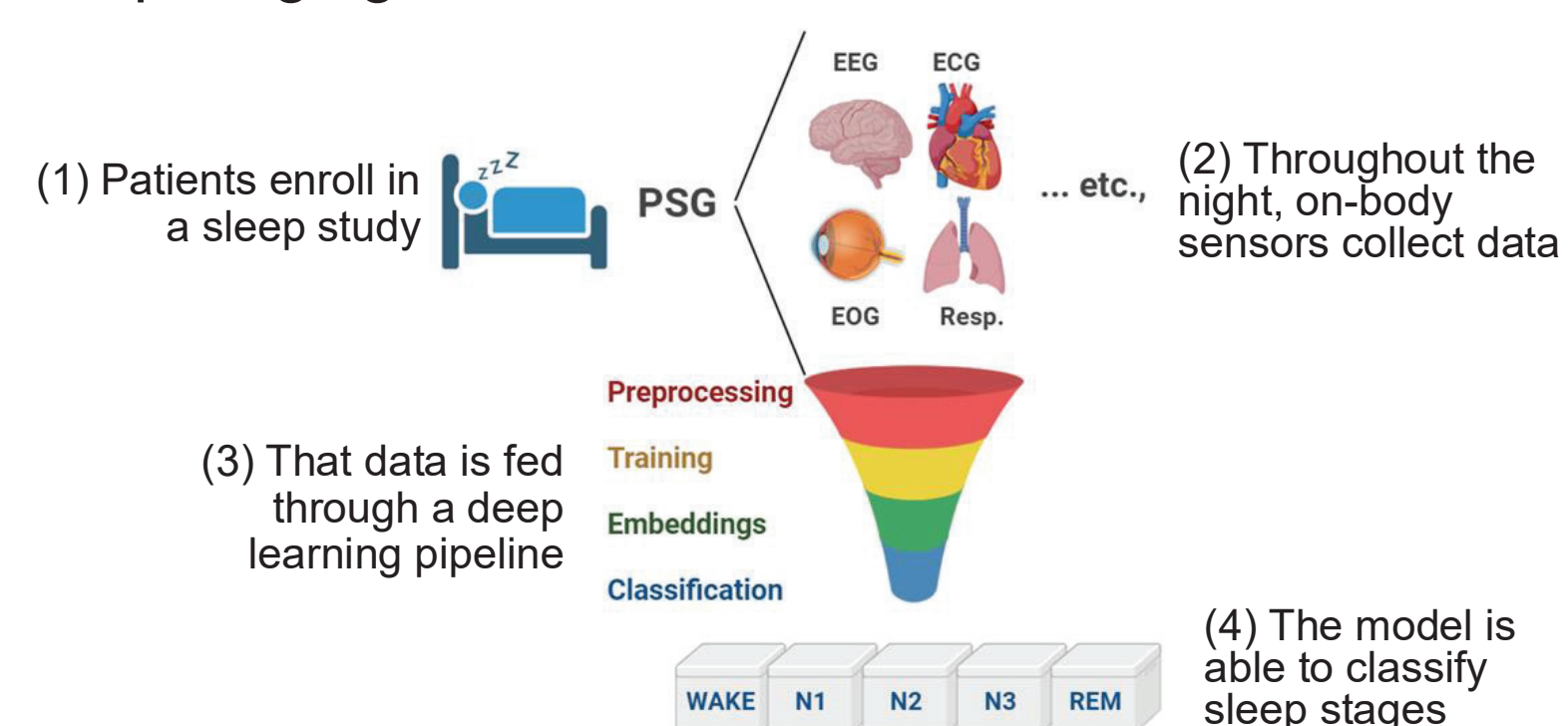
The average time from symptom onset to a dementia diagnosis is **~3.5 years**



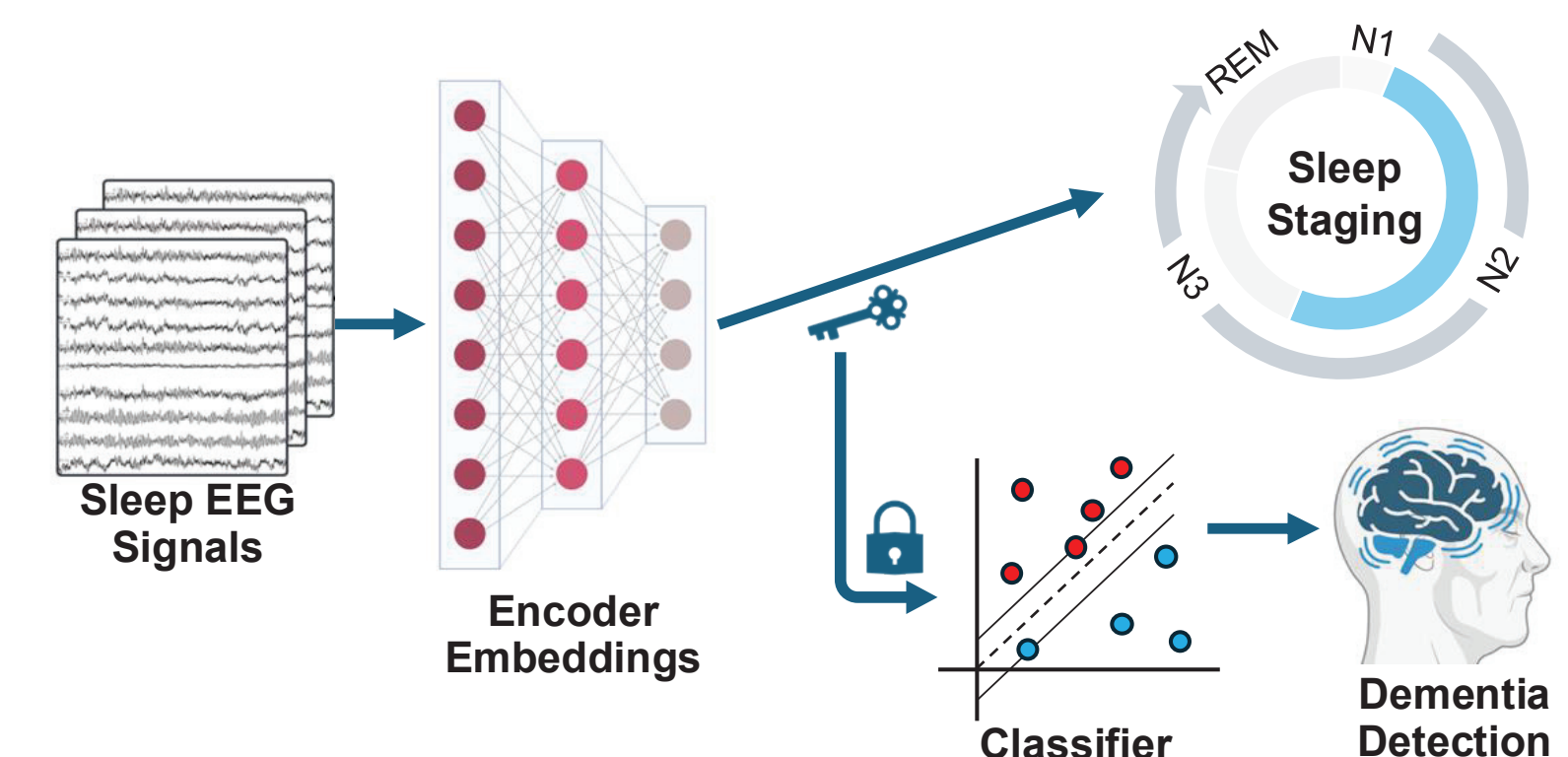
Your brain reveals dementia-induced neural dysfunction during sleep



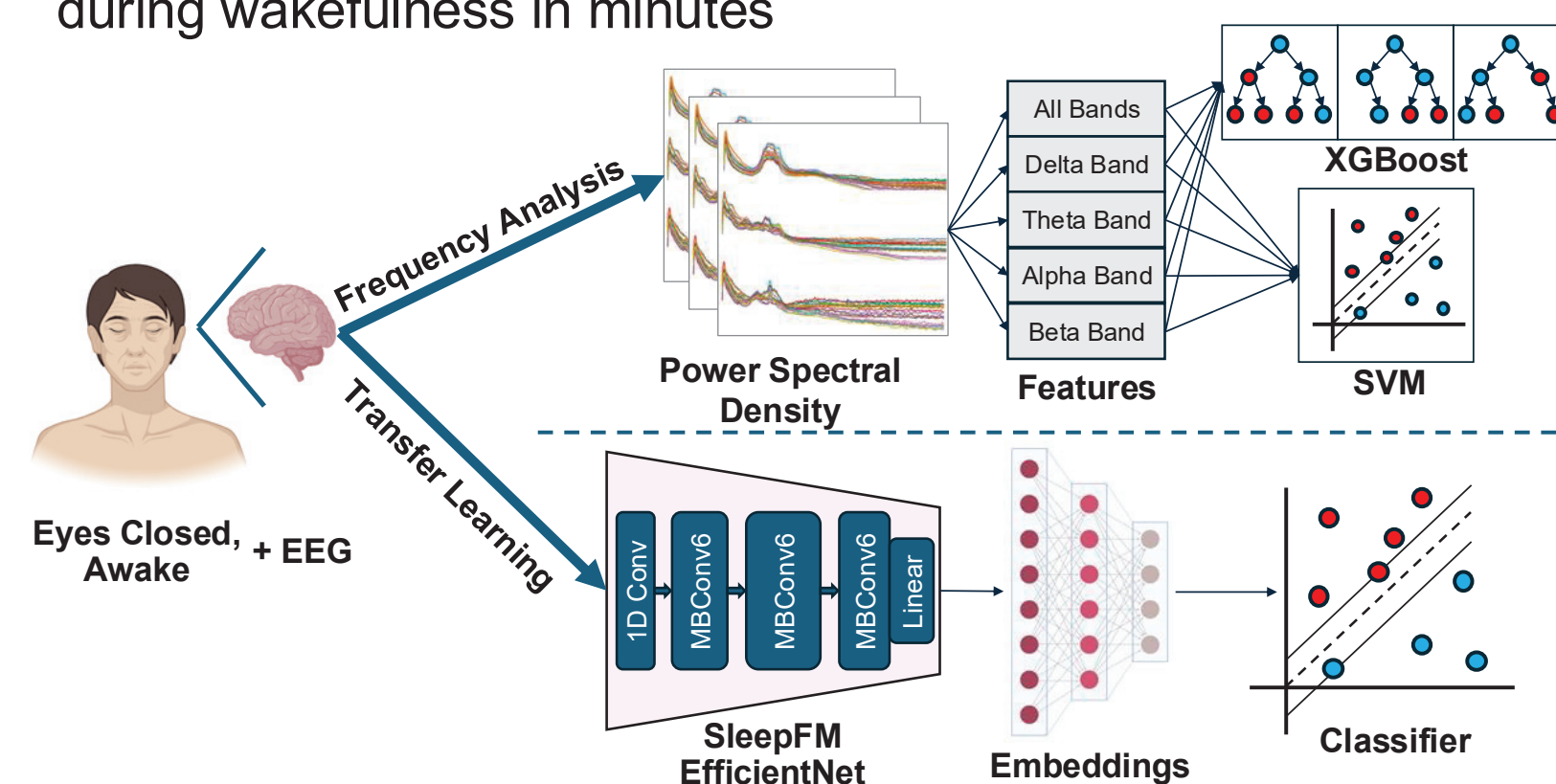
Deep learning models can use on-body sensors for sleep staging



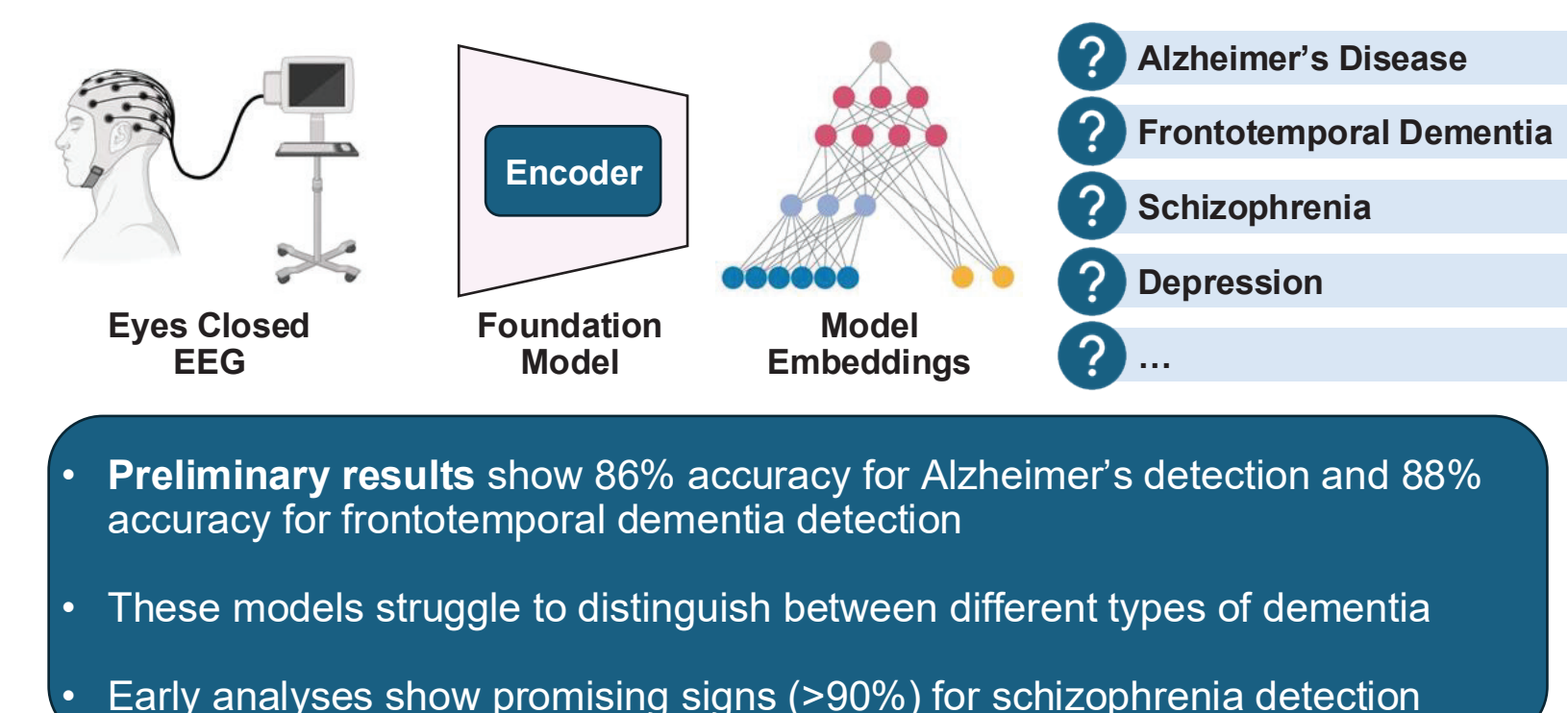
The model embeddings that classify sleep stages also capture information that can be used to detect dementia



Once these models are trained, they can detect dementia during wakefulness in minutes



We can apply this same technique to psychiatric disorders such as schizophrenia and depression



Scholar Awards Celebration
November 12, 2025



**Igniting
Innovation
in Georgia**