NGG 5500 – Current Alzheimer's Disease & Related Dementia Concepts
Fall 2025: Tuesdays 1:45 – 4:45pm
Richards B207

Course Directors:

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Course Description:
This course aims to provide an important foundation in the clinical and biological concepts and cutting-edge research topics on Alzheimer's disease and related dementias (ADRD). The course will survey clinico-path correlations, biomarkers, genomics, basic science, and translational drug discovery.

Course Objectives:
1. Prepare students with a foundational understanding of the clinico-pathological spectrum of Alzheimer's disease and related dementias (ADRD) including clinical and neuropathological criteria for Alzheimer's disease (AD), frontotemporal dementia (FTD), dementia with Lewy bodies (DLB), and vascular cognitive impairment (VCID).
2. Introduce students to current key research concepts in the scientific literature so that they can critically evaluate and integrate into their potential research careers.
3. Provide a comprehensive foundation in multidimensional approaches to understanding ADRD including genetic/genomic, neuroimaging, biofluid biomarkers, and therapeutic strategies.
4. Attract students to the field of ADRD research in an effort to address a national priority to enhance the ADRD workforce.

Course Format:
This 1-credit course will be offered every fall semester in a weekly 3-hour session. Each week there will be a 3 hour session that will include a ~90 minute guest lecturer presentation on a designated topic related to ADRD concepts (e.g., neuroimaging biomarkers) that will provide a conceptual overview of the topic and include a discussion about relevant Responsible Conduct of Research (RCR) and Scientific Rigor & Reproducibility (SRR) relevant to the topic with an emphasis on special considerations related to ADRD (e.g., incidental MRI findings). In each session there will also be a student led journal article discussions with reflecting either foundational evidence (e.g. first PET amyloid paper) or a recent state-of-the-art evidence (e.g., amyloid PET evidence of anti-amyloid clearance). Students are expected to attend all classes in person and to actively engage in discussion. Students will be graded on their overall participation, presentation of assigned journal articles, and a final oral presentation.

Required Reading:
Each week's lecture will be followed by a journal club discussion of an article that is either a foundational paper or a paper reflecting the current state of the field. Articles will be chosen by

course directors and lecturers and will be posted to Canvas at least one week prior to the designated lecture.

Grading:
- *Class participation (30%):* Regular in-person attendance and engaging participation in weekly lectures and journal article discussions
- *Journal club presentation (30%):* Journal articles will be assigned to students at least one week prior to their presentation and students will be requested to sign up for their presentation week in the first week of the course. Each student will be required to present at least one journal article assigned by the course directors. Each article presentation should be approximately an hour in duration and include a clear summary of the article content and critical interpretation of the article strengths and limitations. Drawing upon relevant background literature will be encouraged. We expect each presentation to be interactive and incorporate discussion with the class.
- *Final oral presentation (40%):* The final oral presentation will require a 10-minute presentation of a feasible experimental idea that has potential to have significant impact in addressing one of the ADRD concepts discussed in the course. This presentation should take the form of an NIH specific aim and include a clear statement of a clinical or biological problem and the significance in addressing it, a rigorous and feasible hypothetical study design that includes an interpretation of potential outcomes, and clear consideration of potential pitfalls and challenges in executing the experiment. Each presentation will be followed by a 5-minute question-and-answer period.

Course Schedule:

Week	Date	Section	Topic	Lecturer
1	8/26/25	Clinico-Pathological Features	Alzheimer's disease and mild cognitive impairment	Dave Wolk
2	9/2/25		Frontotemporal dementias	Allison Snyder
3	9/9/25		Dementia with Lewy Bodies	Dave Irwin
4	9/16/25		Vascular disease	John Detre
5	9/23/25	Biomarkers	Biofluid Biomarkers	Katie Cousins
6	9/30/25		Neuroimaging (MRI and PET)	Jeff Phillips
7	10/7/25	Genomics	Neuropsychology	Dawn Mechanic-Hamilton
8	10/14/25		Familial ADRD	Laynie Dratch

9	10/21/25	Basic Science	Microglia/immunology in AD	Michael Haney
10	10/28/25		Animal models	Kelvin Luk
11	11/4/25	Biomarkers	Neuropsychology	Dawn Mechanic-Hamilton
12	11/11/25	Drug Discovery	Small molecule and immunotherapy approaches	Kurt Brunden
13	11/18/25		Gene therapy	Defne Amado
14	11/25/25	no class - Thursday/Friday class schedule		
15	12/2/25		Final Student Presentations	