	U-LAS70 10002 SE50							
< >	ILAS Seminar-E2 :Applying Data Science to Healthcare - Novel Approaches in Modern Epidemiology ILAS Seminar-E2 :Applying Data Science to Healthcare - Novel Approaches in Modern Epidemiology					LUO Yan		
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	2024	**(1)**	12 (8)					
	5		23					
	Healthcare / Epidemiology / Evidence-based medicine / Data science							

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Epidemiology studies of the patterns and determinants of health-related conditions in a defined population. With the great advancements in data science in recent years, epidemiology has evolved and adopted new approaches to tackle unresolved issues. This seminar will begin with the fundamentals of traditional epidemiology and explore how data science is helping improve healthcare. Potential topics include machine learning methods used in clinical research, causal inference, clinical trial/epidemiological study designs, and evidence synthesis (students can vote for topics of their interest). Real-world examples will be used for demonstration. Students are encouraged to actively participate in discussions, presentations, and practice simple analyses on statistical software.

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To learn about data science methods that are applied to modern epidemiology.
To gain a basic understanding of the mechanism, benefits and drawbacks of each approach, as well as how to conduct simple analyses.
To understand how data science can improve healthcare and how it may be misinterpreted.
To enhance problem-solving abilities and critical thinking skills.

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In principle, the course will be offered according to the following plan. The order and content may be subject to slight changes.

Week 1: Introduction and overview
Week 2: Basics of epidemiology
Week 3-6: Machine learning methods that are used in clinical research (linear/logistic and nonlinear regression, penalization methods, KNN, decision tree, random forest, SVM, etc.)
Week 7-9: Causal inference
Week 10-12: Clinical trial & Epidemiological study design
Week 13-15: Evidence synthesis methods
Week 16: Feedback

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Analysis practice will utilize the statistical software R.

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Attendance and active participation - 50%
Presentation - 30%
Final assessment - 20%

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No textbook will be used. Materials will be provided in class or on PandA.

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Students are expected to prepare for group or individual short presentations after some lectures.

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Students may ask questions or request to schedule an in-person appointment via email.