KCNI Summer School 2021

Krembil Centre for Neuroinformatics Summer School

Solving Problems in Mental Health using Multi-Scale Computational Neuroscience

JULY 5-9th, 12-14th, 2021.

Krembil Centre for Neuroinformatics, Centre for Addiction and Mental Health

Please register at: https://www.crowdcast.io/e/kcni-summer-school-2021

- The full schedule:
  - Day 1: Welcome! Understanding Clinical Research Questions and Reproducible Science (July 5, 2021)
  - Day 2: Applied Ethics in Machine Learning and Mental Health (July 6, 2021)
  - Day 3: Fundamental Methods for Genomic and Single-Cell Transcriptome Analysis (July 7, 2021)
  - Day 4: Simulating Brain Microcircuit Activity and Signals in Mental Health (July 8, 2021)
  - Day 5: Whole-Brain Modelling and Neuroimaging Connectomics (July 9, 2021)
  - Day 6: Bayesian Models of Learning and Integration of Neuroimaging Data (July 12, 2021)
  - Day 7: Digital Health and Population-Based Data Resources (July 13, 2021)
  - Day 8: Integrative Research Methods and Final Panel Discussion (July 14, 2021)

Day 1: Welcome! Understanding Clinical Research Questions and Reproducible Science (July 5, 2021)

Instructors: Erin Dickie, Sean Hill, Sejal Patel, Victor Tang, Brett Jones

TA's: Kevin Kadak, Taha Morshedzadeh, Kevin Witczak

Time (EST)	Session	
9:00-10:30	Lecture 1: Welcome and Orientation	Watch on Crowdcast
10:45-12:15	Lecture 2: Problems and opportunities in the diagnosis and treatment of major depression	Watch on Crowdcast
1:00-2:30pm	Workshop 1: Guiding principles for FAIR and open science	Watch on Crowdcast
2:45-4:15pm	Workshop 2: Tools for Reproducible Science	Watch on Crowdcast

Day 2: Applied Ethics in Machine Learning and Mental Health (July 6, 2021)

Instructors: Daniel Buchman, Marta Maslej & Laura Sikstrom

Time (EST)	Session	
9:00-10:30	Lecture 1: Introduction to AI Ethics	Watch on Crowdcast
10:45-12:15	Lecture 2: Fairness and Health Equity	Watch on Crowdcast
1:00-2:30pm	Workshop 1: Research Design, Data Collection, Model Construction and Validation	Watch on Crowdcast
2:45-4:15pm	Workshop 2: Analysis, Interpretation and Knowledge Exchange and/or Translation	Watch on Crowdcast

Day 3: Fundamental Methods for Genomic and Single-Cell Transcriptome Analysis (July 7, 2021)

Instructors: Shreejoy Tripathy & Dan Felsky

TA's: Keon Arbabi, Sonny Chen, Micaela Consens, Amin Kharaghani

Time (EST)	Session	
9:00-10:30	Lecture 1: Basics of genotype, central dogma, GWAS, and polygenic risk scores	Watch on Crowdcast
10:45-12:15	Lecture 2: Transcriptomics at the single-cell and bulk level level	Watch on Crowdcast
1:00-2:30pm	Workshop 1: Intro to transcriptomic data types, including single-cell and bulk RNAseq	Watch on Crowdcast
2:45-4:15pm	Workshop 2: Explore cellular changes in major depression using bulk and single-cell RNAseq data	Watch on Crowdcast

Day 4: Simulating Brain Microcircuit Activity and Signals in Mental Health (July 8, 2021)

Instructors: Etay Hay & Frank Mazza

Time (EST)	Session	
9:00-10:30	Lecture 1: Simulating brain microcircuit activity in mental health	Watch on Crowdcast
10:45-12:15	Lecture 2: Simulating EEG from brain microcircuits in mental health	Watch on Crowdcast
1:00-2:30pm	Workshop 1: Simulating and analyzing spiking from neurons and microcircuits	Watch on Crowdcast
2:45-4:15pm	Workshop 2: Simulating and analyzing EEG signals from brain microcircuits	Watch on Crowdcast

Day 5: Whole-Brain Modelling and Neuroimaging Connectomics (July 9, 2021)

Instructors: Erin Dickie & John Griffiths

TA's: Shreyas Harita, Jerrold Jeyachandra, Kevin Kadak

Time (EST)	Session	
9:00-10:30	Lecture 1: Introduction to neuroimaging connectomics	Watch on Crowdcast
10:45-12:15	Workshop 1: Calculating Neuroimaging Connectomes	Watch on Crowdcast
1:00-2:30pm	Lecture 2: Intro to whole-brain modelling (Lecture)	Watch on Crowdcast
2:45-4:15pm	Workshop 2: simulating whole-brain activity, EEG, evoked responses, brain stimulation	Watch on Crowdcast

Day 6: Bayesian Models of Learning and Integration of Neuroimaging Data (July 12, 2021)

Instructors: Andreea Diaconescu

TA's: Colleen Charlton, Daniel Hauke, Peter Bedford, Povilas Karvelis

Time (EST)	Session	
9:00-10:30	Lecture 1: Bayesian Models of Learning	Watch on Crowdcast
10:45-12:15	Turorial 1: Hierarchical Gaussian Filter and Simulating Learners	Watch on Crowdcast
1:00-2:30pm	Lecture 2: Computational Modelling of EEG Data	Watch on Crowdcast
2:45-4:15pm	Tutorial 2: Single-trial EEG Modelling	Watch on Crowdcast

Day 7: Digital Health and Population-Based Data Resources (July 13, 2021)

Instructors: Daniel Felsky, Abhi Pratap & Joanna Yu

TA's: Mohamed Abdelhack, Grace Jacobs, Amin Kharaghani, Marta Maslej, Milos Milic, Earvin Tio

Time (EST)	Session	
9:00-10:30	Lecture 1: Digital Health for Mental health	Watch on Crowdcast
10:45-12:15	Lecture 2: Population-based resources and the BrainHealth Databank	Watch on Crowdcast
1:00-2:30pm	Workshop 1: accessing reproducible datasets from Synapse as part of integrated workflow	Watch on Crowdcast
2:45-4:15pm	Workshop 2: Introduction to interactive methods	Watch on Crowdcast

Day 8: Integrative Research Methods and Final Panel Discussion (July 14, 2021)

Instructors: Daniel Felsky & Abhi Pratap + All Instructor Panel

TA's: Mohamed Abdelhack, Amin Kharaghani, Marta Maslej, Milos Milic, Earvin Tio

Time (EST)	Session	
9:00-10:30	Lecture 1: Types of integrative research and Whole Person Modelling	Watch on Crowdcast
10:45-12:15	Workshop: SNF / Subtyping	Watch on Crowdcast
1:00-2:30pm	Group Panel Discussion	Watch on Crowdcast
2:45-4:15pm	Final Social Hour	Watch on Crowdcast

2020 Summer School Overview