EMORY COLLEGE OF ARTS AND SCIENCES | Theory and Modeling of Living Systems

Virtual Workshop Series
Spring-Summer 2020

The Emory Theory and Modeling of Living Systems initiative is organizing a series of online workshops to explore the future of our field, and to retain a sense of community at the interface of physics, biology, and statistical inference. Our next workshop is

Can machine learning learn new physics, or do we need to put it in by hand?

May 28, 10:00 - 13:00 EDT

Registration (free): https://bit.ly/3fC9uxr

Workshop information and online access details:
http://livingtheory.emory.edu/programs/conferences-symposiums.html

There has been a surge of publications on using machine learning (ML) on experimental data from physical systems: social, biological, statistical, and quantum. However, can these methods discover fundamentally new physics? It can be that their biggest impact is in better data pre-processing, while inferring new physics is unrealistic without specifically adapting the learning machine to find what we are looking for — that is, without the “intuition” — and hence without having a good a priori guess about what we will find.

Is machine learning a useful tool for physics discovery? Which minimal knowledge should we endow the machines with to make them useful in such tasks? How do we do this?

Eight speakers below will anchor the workshop, exploring these questions in contexts of diverse systems (from quantum to biological), and from general theoretical advances to specific applications. Each speaker will deliver a 10 min talk with another 10 minutes set aside for moderated questions/discussion. We expect the talks to be broad, bold, and provocative, discussing where the field is heading, and what is needed to get us there.

Speakers

Lucy Colwell (Cambridge University)
Sam Greydanus (Google Brain)
Roger Melko (University of Waterloo)
Max Tegmark (MIT)
Bryan Daniels (Arizona State University)
Andrea Liu (University of Pennsylvania)
David Schwab (CUNY)
Aleksandra Walczak (CNRS/ENS Paris)

Scientific Organizer: Ilya Nemenman, Emory University
Organization: Tiera Ward, Emory University