THE UNIVERSITY OF CHICAGO | THE COMMITTEE ON COMPUTATIONAL AND APPLIED MATHEMATICS

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Computing And Mathematical Sciences
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Learning Operators

THURSDAY, April 21, 2022 at 4PM
Jones 303, 5747 S. Ellis Ave. Chicago, IL 60637

Consider map F: U --> V. Given data pairs {u_j,F(u_j)} the goal of supervised learning is to approximate F. Neural networks have shown considerable success in addressing this problem in settings where X is a finite dimensional Euclidean space and where Y is either a finite dimensional Euclidean space (regression) or a set of finite cardinality (classification). Motivated by the need for surrogate modeling and for scientific discovery, we focus on the design and analysis of algorithms which address supervised learning for settings where U and V comprise spaces of functions; thus F is an operator.

The talk describes emerging methodology in this area, emerging theory which underpins the methodology and numerical experiments which elucidate the efficiency of different approaches. Various applications from continuum mechanics are described, including the Navier-Stokes equation, the Helmholtz equation, nonlinear elasticity and the advection equation.

Organizer:

Daniel Sanz-Alonso, Department of Statistics (CAMI), sanzalonso@uchicago.edu

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