



THE UNIVERSITY OF
CHICAGO

THE COMMITTEE ON
COMPUTATIONAL AND
APPLIED MATHEMATICS

GEORGE CYBENKO

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Dartmouth College

**Formal Languages, Graphs, Machine Learning
and Topology**

THURSDAY, June 2, 2022 at 4PM
Jones 303, 5747 S. Ellis Ave. Chicago, IL 60637

This talk will describe relationships between various state-of-the-art neural network architectures and formal languages as, for example, structured by the Chomsky Language Hierarchy. We will present a generalization of Cayley graphs to context-free languages by which some interesting graphs structures can be related to language structures and properties. By specifically comparing analytic results relating formal languages to topology via algebraic word problems with empirical results based on neural networks and persistent homology calculations, we see evidence that certain observed topological properties match analytically predicted properties. Such results are encouraging for understanding the role that modern machine learning can play in formal language processing problems.

Organizer:

Daniel Sanz-Alonso, Department of Statistics (CAMI), sanzalonso@uchicago.edu
CAM Colloquium URL: <https://cam.uchicago.edu/events/cam-colloquium/>

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