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*Departmental Colloquium*

# Compositional Generalization in Minds and Machines


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**Monday, June 14th, 2021 | 15:00-16:00**

**Zoom link**:
https://huji.zoom.us/j/83005306875?pwd=VWpxcWMzdXc3Z3JCcVNWKy9PNnpYUT09

# Abstract

People learn in fast and flexible ways that elude the best artificial neural networks. Once a person learns how to “dax,” they can effortlessly understand how to “dax twice” or “dax vigorously” thanks to their compositional skills. In this talk, we examine how people and machines generalize compositionally in language-like instruction learning tasks. Artificial neural networks have long been criticized for lacking systematic compositionality (Fodor & Pylyshyn, 1988; Marcus, 1998), but new architectures have been tackling increasingly ambitious language tasks. In light of these developments, we reevaluate these classic criticisms and find that artificial neural nets still fail spectacularly when systematic compositionality is required. We then show how people succeed in similar few-shot learning tasks and find they utilize three inductive biases that can be incorporated into models. Finally, we show how more structured neural nets can acquire compositional skills and human-like inductive biases through meta learning.

Brenden M. Lake is an Assistant Professor of Psychology and Data Science at New York University. He received his M.S. and B.S. in Symbolic Systems from Stanford University in 2009, and his Ph.D. in Cognitive Science from MIT in 2014. He was a postdoctoral Data Science Fellow at NYU from 2014-2017. Brenden is a recipient of the Robert J. Glushko Prize for Outstanding Doctoral Dissertation in Cognitive Science, he is a MIT Technology Review Innovator Under 35, and his research was selected by Scientific American as one of the 10 most important advances of 2016. Brenden's research focuses on computational problems that are easier for people than they are for machines, such as learning new concepts, creating new concepts, learning-to-learn, and asking questions.