Contribution ID: **280**   Type: **Plenary**

Foundation Models for Accelerated Discovery

Thursday, 27 October 2022 10:00 (30 minutes)

AI is making an enormous impact on scientific discovery. Growing volumes of data across scientific domains are enabling the use of machine learning at ever increasing scale to accelerate discovery. Examples include using knowledge extraction and reasoning over large repositories of scientific publications to quickly study scientific questions or even come up with new questions, applying AI surrogate models to speed up simulation campaigns and generate critical new data and knowledge, leveraging generative models to construct new hypotheses and make predictions about them, and automating experimentation through robotic labs to enable tighter loops of hypothesis-test cycles. At the same time, new machine learning techniques based on "foundation models" are gaining focus in AI. Foundation models aim to learn "universal representations" from enormous amounts of data, typically using self-supervised or unsupervised training, with the goal to effectively enable subsequent downstream tasks. Prominent examples are large-language models, which have been driving state-of-the-art performance for natural language processing tasks. In this talk, we review how foundation models work by learning representations at scale and show examples of how they can further accelerate scientific discovery. By targeting bottlenecks in the scientific method, we discuss the potential of foundational models to impact a broad set of scientific challenges.

Presenter: SMITH, John (IBM T. J. Watson Research Center)

Session Classification: Plenary