Distinguished Lectures Fall 2018

Colorado State University's Information Science and Technology Center (ISTeC) presents two lectures by Dr. Vipin Kumar

Regents Professor and William Norris Endowed Chair
Department of Computer Science and Engineering
University of Minnesota

Dr. Vipin Kumar delivers two lectures on the following topics:

**Physics Guided Machine Learning: A New Paradigm for Modeling Science and Engineering Problems**

**Big Data in Climate and Earth Sciences: Challenges and Opportunities for Machine Learning**

### Wednesday, September 19, 2018

**Physics Guided Machine Learning: A New Paradigm for Modeling Science and Engineering Problems**

Lecture: 11:00 a.m.-12:00 noon
Morgan Library Event Hall

**Big Data in Climate and Earth Sciences: Challenges and Opportunities for Machine Learning**

Lecture: 2-3 p.m.
Morgan Library Event Hall

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**Physics Guided Machine Learning**

**Physics Guided Machine Learning: A New Paradigm for Modeling Science and Engineering Problems**

Physics-based models of dynamical systems are often used to study engineering and environmental systems. Despite their intuition and simplicity, these models have severe limitations due to their approximate or inappropriate representation of the relevant physical processes. In order to limit model error, these models require very large amounts of data. However, this data is often expensive to generate, and there are limits to our ability to obtain such data. In order to come up with an effective model, we need to use the data efficiently and effectively. This talk will present two approaches to this challenge: one for modeling complex and large-scale systems, and another for developing physics-based models of dynamical systems. The first approach is to use a combination of data and physics to create a physics-based model of the system. The second approach is to use a combination of data and artificial intelligence to create a data-driven model of the system. Both approaches have the potential to significantly improve our ability to model complex and large-scale systems.

**Big Data in Climate and Earth Sciences: Challenges and Opportunities for Machine Learning**

Big data, as data sets with many thousands of dimensions and millions of data points, presents a number of challenges. The amount of data that is available can be overwhelming, and there is often a scarcity of labeled data. This talk will present two approaches to this challenge: one for modeling complex and large-scale systems, and another for developing physics-based models of dynamical systems. The first approach is to use a combination of data and physics to create a physics-based model of the system. The second approach is to use a combination of data and artificial intelligence to create a data-driven model of the system. Both approaches have the potential to significantly improve our ability to model complex and large-scale systems.

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**Upcoming Distinguished Lectures**

**October 15**

**How 2G Computational Social Science Can Revolutionize the Study of ‘Dark’ Networks**

Lecture: 11 a.m.-12 noon
Morgan Library Event Hall

**October 22**

**Laws for Cybersecurity?**

Lecture: 11 a.m.-12 noon
Morgan Library Event Hall