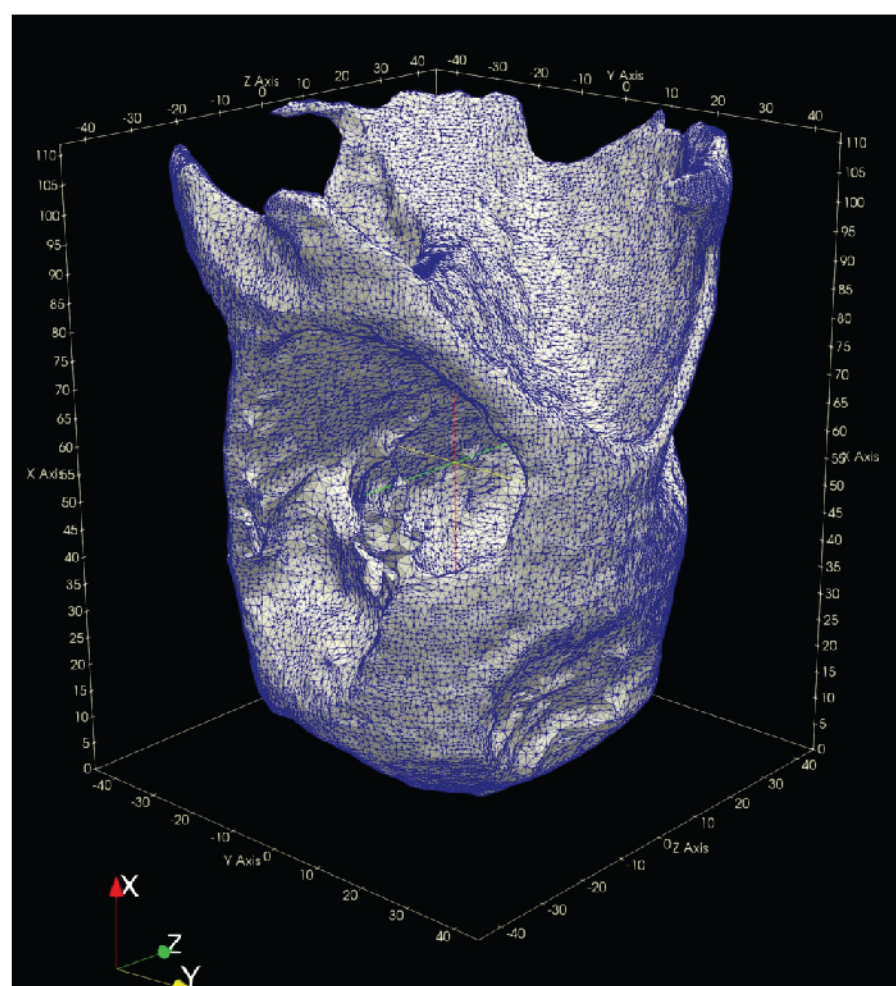# Prasanna Balaprakash
Scientific Domain-informed Machine Learning

As the U.S. DOE has moved toward data-driven scientific discovery, machine learning (ML) has become a critical technology in the modeling of complex phenomena in concert with current computational, experimental, and observational approaches. However, development of ML approaches for many scientific domains poses several challenges such as data paucity, domain-knowledge integration, and adapt-ability. In this talk, we will discuss our work on scientific domain-informed ML approaches that seek to overcome these challenges. We will present our recent work on image-based deep-learning methods for compressed sensing and segmentation, the diffusion-process- based deep-learning method for large-scale transportation network modeling, and reinforcement learning approaches for automated scientific ML. We will conclude with some exciting avenues for future research in scientific ML.

Prasanna Balaprakash is a computer scientist with a joint appointment in the Mathematics and Computer Science Division and the Leadership Computing Facility at Argonne National Laboratory. His research work spans the areas of artificial intelligence, machine learning, optimization, and high-performance computing. He is a recipient of a U.S. Department of Energy 2018 Early Career Award. Prior to Argonne, he worked as a Chief Technology Officer at Mentis Sprl, a machine learning startup in Brussels, Belgium. He received his Ph.D. from CoDE-IRIDIA (AI Lab), Université Libre de Bruxelles, Brussels, Belgium, where he was a recipient of the European Commission's Marie Curie and Belgian F.R.S-FNRS Aspirant fellowships.

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