Harnessing Exascale: Transforming Science and Innovation with El Capitan

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Abstract:
El Capitan, the first exascale supercomputer for the National Nuclear Security Administration (NNSA) and currently the world's fastest, is set to revolutionize the way we tackle humanity's most complex scientific and security challenges. With a peak performance of over 1.7 exaflops, this technological marvel represents a monumental leap in computational capability, enabling breakthroughs that were previously unimaginable.

This talk delves into the transformative potential of exascale computing, highlighting its role in addressing critical challenges in areas such as bioresilience, artificial intelligence, energy security, and stockpile stewardship. At the forefront of this revolution is Lawrence Livermore National Laboratory's Project ICECap (Inertial Confinement on El Capitan). Building on the groundbreaking success of achieving ignition and net fusion energy gain at the National Ignition Facility (NIF), ICECap leverages artificial intelligence to enhance simulation accuracy, optimize complex designs, and prototype a new era of scientific exploration. By integrating exascale and cloud technologies into a hybrid workflow, ICECap exemplifies the innovative possibilities of next-generation computing.

Join us as we explore how El Capitan is not just a computational powerhouse but a catalyst for interdisciplinary collaboration and groundbreaking solutions. From advancing fusion research to tackling global challenges, this exascale system heralds a new chapter in the pursuit of knowledge and innovation.

Bio:
Dr. Jayson "Luc" Peterson is the Associate Program Leader for Data Science within the Space Science and Security Program at Lawrence Livermore National Laboratory, overseeing a portfolio of several projects at the intersection of data science and space. Dr. Peterson has worked across modeling & simulation, experimental design, digital engineering, uncertainty quantification, verification & validation, data analytics, high-performance computing, and machine learning in a variety of application, from nuclear fusion to COVID-19 response. He holds a Ph.D. and M.S. in Astrophysical Sciences (Plasma Physics) from Princeton University and a B.A. in Physics and Science, Technology, and Society from Vassar College.