



**Pacific Northwest**  
NATIONAL LABORATORY

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## PNNL's Scientific

### *Vision*

Our scientific vision is to understand, predict, and control the behavior of complex adaptive systems, with an emphasis on scientific earth, energy, and security systems that are central to the Department of Energy's strategic objectives.

In earth systems, we are developing new climate models that can represent the interactions of, and tradeoffs between, energy and water resources. In energy systems, we are advancing the science to achieve sustainable energy production, conversion, storage, and use. In security systems, we are developing and deploying new measurement and analytical systems to reduce threats.

## *Director's Distinguished Lecture Series*

# Dr. John C. Doyle

**Jean-Lou Chameau Professor of Control and Dynamical Systems,  
Electrical Engineering, and BioEngineering  
Division of Engineering and Applied Science  
California Institute of Technology**

November 30, 3:30 – 4:30 pm, with reception following | Battelle Auditorium

### ***Universal Laws and Architectures: Theory and Lessons from Brains, Nets, Hearts, Bugs, Grids, Flows, and Zombies***

Dr. Doyle will discuss progress on a universal theory that explains complex networks. The principles behind this are relevant to large-scale distributed systems such as the smart grid, the Internet, and the human sensorimotor system. He will share insights about what causes systems to adapt and evolve, tradeoffs and constraints in achieving efficient performance, robust yet fragile behavior in systems, and principles for designing complex networks.

#### **ABOUT DR. DOYLE**

Dr. John Doyle is well known for applying complex ideas of robust design and control to a variety of fields. His current research interests are in theoretical foundations for complex networks in engineering, biology, and multiscale physics. Early work was in the mathematics of robust control, including extensions to nonlinear and networked systems. He developed a control analysis tool for high-performance commercial and military aerospace systems and other industrial systems and has co-developed software toolboxes currently used at more than 1,000 sites worldwide. Outside of the research laboratory and classroom, he has had world records and championships in various sports.



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**ENERGY**