



## Towards Commercially Viable Fusion Energy: Innovation, Challenges, and the Growing Contributions from AI/ML



This is a pivotal moment in the quest for fusion energy. Much of the scientific foundation has been laid. A recent surge in private sector investment has introduced a new dynamism and mindset. The Biden administration has declared a goal to build a fusion pilot plant on a 'decadal time scale'. Simulation capabilities are maturing and providing rigorous predictions of many aspects of fusion performance. Additionally, new AI/ML technologies are being integrated with extensive datasets from simulations and experiments, opening vast opportunities. However, significant uncertainties and challenges persist. In this talk, I will focus on three inter-related topics: (1) my view of the state of fusion energy research; (2) the contribution of my work to advancing commercially viable fusion energy, drawing on experiences from both the University of Texas at Austin and ExoFusion, a startup I co-founded; and (3) an examination of the expanding and accelerating role AI/ML is playing in fusion research.

### David Hatch, Ph.D

Research Professor,  
Institute for Fusion Studies,  
The University of Texas at Austin

**Date:** Monday, February 19th, 2024

**Time:** 2:00 – 3:00 pm, US Central Time

**Location:** Blocker 220

**Online:** 974 9688 4861 (ID) & 923446 (PWD)

**Faculty host:** Ulisses Braga Neto, ECEN

## Biography

Dr. David Hatch is a research professor at the Institute for Fusion Studies at the University of Texas at Austin, with a Ph.D. in Physics from the University of Wisconsin-Madison. He has previously worked as a Postdoctoral Research Associate at the Max-Planck-Institut für Plasmaphysik in Garching, Germany. Dr. Hatch is focused on fundamental and applied aspects of fusion plasma physics. He uses high-performance computing to understand and optimize turbulent transport in fusion devices, particularly in the critical edge transport barriers that will determine the practicality of fusion as an energy source. He is known for his contributions to understanding the velocity space spectrum of gyrokinetic turbulence, the identification of nonlinear couplings among linear eigenmodes in gyrokinetic turbulence, and the importance of the size and field scaling of transport through the tokamak periphery. Dr. Hatch was the lead principal investigator for the SciDAC Partnership for Multiscale Gyrokinetic Turbulence and led the DOE Office of Fusion Energy Sciences FY19 Theory Performance Target. Dr. Hatch has recently co-founded a fusion startup company, ExoFusion, in partnership with UT Austin colleagues with the goal of rapidly enabling commercially viable fusion energy.

You can also click this link to join the seminar <https://tamu.zoom.us/j/97496884861?pwd=Y2ZXRERyMU1EY1A2d2ZNS1JQTDIxdz09>.

