GridFM: Enabling Secure, Collaborative AI for Grid

DOE ASCR

Scientific Achievement

- Developed Grid Foundation Models (GridFMs) as a key use case for the **AI4S Privacy-Preserving Federated Learning (PPFL) project**, proposing a visionary framework for the electric grid management using scalable, privacy-aware AI.
- Identified and addressed **key challenges aligned with the AI4S PPFL project**, including secure data sharing, grid complexity, and uncertainty.
- Successfully fostered interdisciplinary community collaboration by hosting the 3rd **in-person GridFM workshop at Argonne National Laboratory**, convening over 100 international stakeholders from national labs, academia, industry, and utilities.
- Published a perspective paper in the high-impact journal *Joule* in collaboration with community members.

Significance and Impact

- Positions GridFMs as a foundational approach for next-generation power grid analytics, setting the stage for substantial advancements in real-time grid operation and long-term planning.
- Demonstrates **Argonne and DOE's leadership** in convening the international research community and shaping the direction of GridFMs through collaboration.
- Accelerates innovation of AI integration across the power sector by fostering partnerships among utilities, technology providers, academia, and policymakers.
- Delivers broad societal benefits by enhancing grid efficiency, reliability, and resilience, while safeguarding stakeholder data through **privacy-preserving federated learning**.

*Participants of the 3rd GridFM Workshop at Argonne National Laboratory, gathering experts from academia, industry, and government sectors to advance foundational AI models for electric grid innovation. **Privacy-preserving federated learning** has been identified as an **important, promising approach** to training GridFMs across multiple institutions in the energy sector.*