

Electromagnetic Transient Training



ESIG

ENERGY SYSTEMS
INTEGRATION GROUP

Alex Shattuck and Lukas Unruh

December 16-18, 2025

Funding Acknowledgement



This Electromagnetic Transient (EMT) course is presented through partnership with [Lawrence Berkeley National Laboratory](#) and the [Interconnection Innovation e-Xchange](#) program which is a **DOE initiative supported by the Office of Critical Minerals and Energy Innovation (CMEI)**

Thank You Texas Reliability Entity



Thank you to **Texas Reliability Entity** for donating this venue.

The donation of this venue keeps registration costs low.

Thanks again!

ESIG Background



1989

UWIG Established

ESIG started as the Utility Wind Interest Group (UWIG) in 1989, a group of six utilities interested in learning more about wind energy

Early 2000's

Understanding Improves

Wind integration understanding rapidly improved, and was helped by consolidation of balancing areas and growth of larger market operators (ISO/RTOs) in early 2000's

2011

UWIG becomes UVIG

Solar energy emerged at scale and with similar integration issues, and UWIG became the Utility Variable Generation Integration Group (UVIG) in 2011

2018

UVIG becomes ESIG

With renewables, storage and decarbonization as mainstream pathways to the future, UVIG merged with the International Institute for Energy Systems Integration (iiESI) and became the Energy Systems Integration Group (ESIG) in March 2018

ESIG Differentiators and Mission



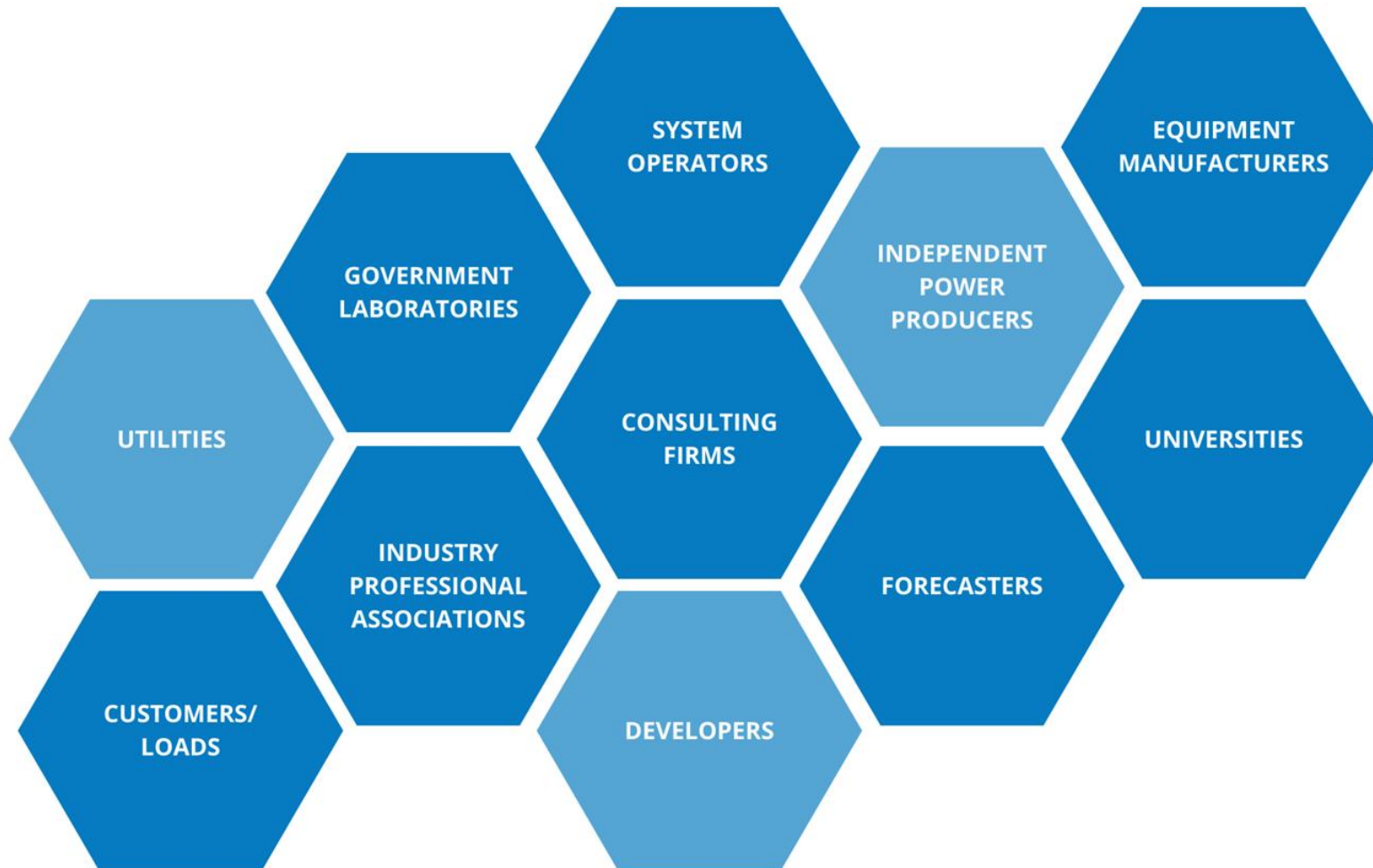
DIFFERENTIATORS

Stellar Technical Reputation | Best in Class, Global Reach | Independent and Trusted

MISSION

- Address the technical challenges for transforming energy systems through collaboration, education and knowledge sharing
- Work with all industries, energy vectors and applications globally
- Forward leaning, but not advocating, keeping everyone at the table
- Working at the cutting edge of the technical pathways toward 100%
- Pragmatically progressive—reliable, economic and sustainable transformation

300+ Members Globally



Welcome!



- **Welcome to the first presentation of ESIG's Electromagnetic Transient Course (supported by CMEI – Thanks again)**
 - **Instructors for the week:**
 - Lukas Unruh – Engineering Manager – Electranix
 - Alex Shattuck – Director of Grid Transformation – ESIG
- **Logistics for the week:**
 - Training will run 9:00a – 5:00p on Tuesday and Wednesday
 - Tuesday lunch presentation by Mehdi Rezvani, ERCOT
 - Training will conclude at **2:30p on Thursday**
 - Happy Hour is Tuesday 6:00p – 8:00p at Meanwhile Brewing

Welcome!



Some questions to kick us off:

- 1. Poll of industry sector**
- 2. What topics are you hoping we cover this week?**
- 3. Poll of experience in industry**
- 4. Poll of experience in modeling**
- 5. Poll of experience in EMT modeling**

Key Takeaways From This Course



- **Align on modeling and study fundamentals**
- **Understanding of the use cases, benefits, and limitations of EMT**
- **Foundation for Model benchmarking, usability, and the right domain and model type**
- **Model quality testing and design evaluation**
- **When, how, and why to perform special studies (SSCI/SSO, Large Loads, Weak Grid, etc.)**

Acknowledgement of Multiple Software Tools



There are multiple commercially available Electromagnetic Transient (EMT) Software available currently

Wednesday and Thursday will include demonstrations in one EMT software but this is not an endorsement of this software, please use the software tool that best aligns with your needs

Throughout this week (and in general in public discussions) please refer to any EMT software tools as "EMT" or similar and try to refrain from using brand names in any discussions