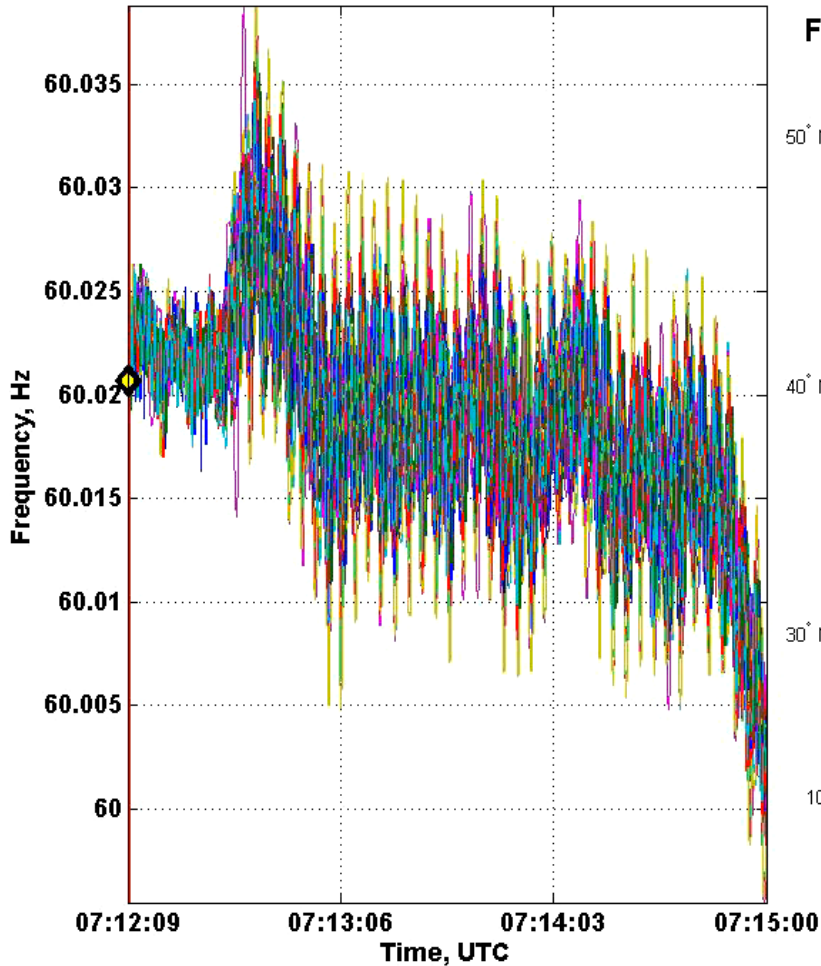
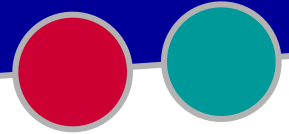


## Research Update

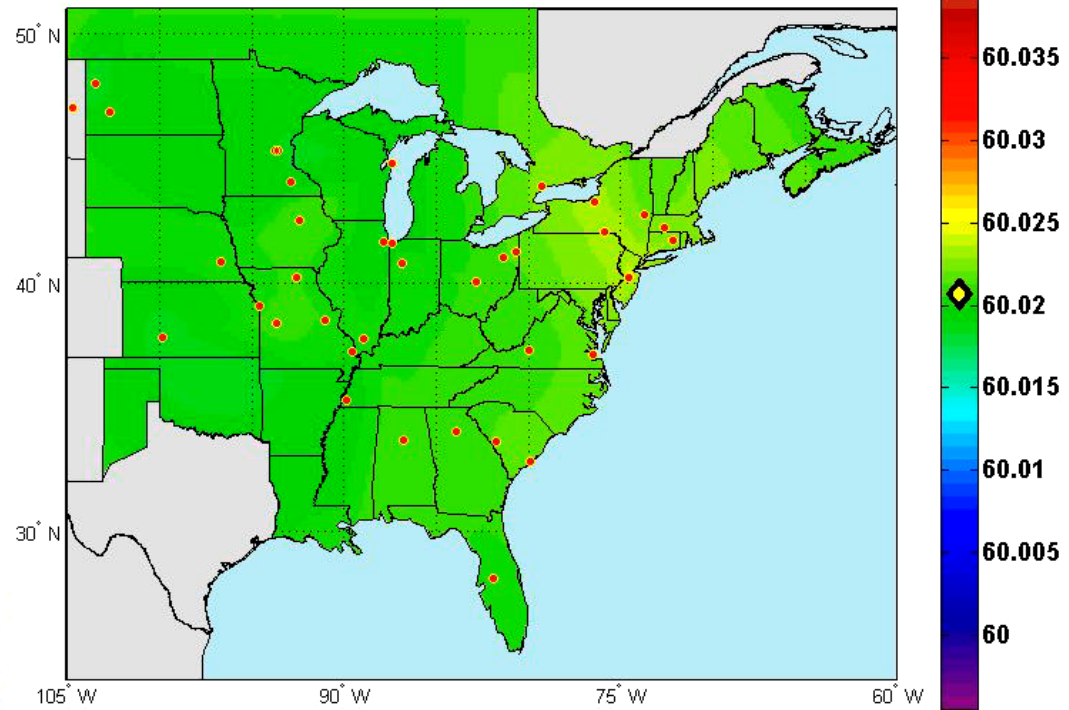
Mani V. Venkatasubramanian



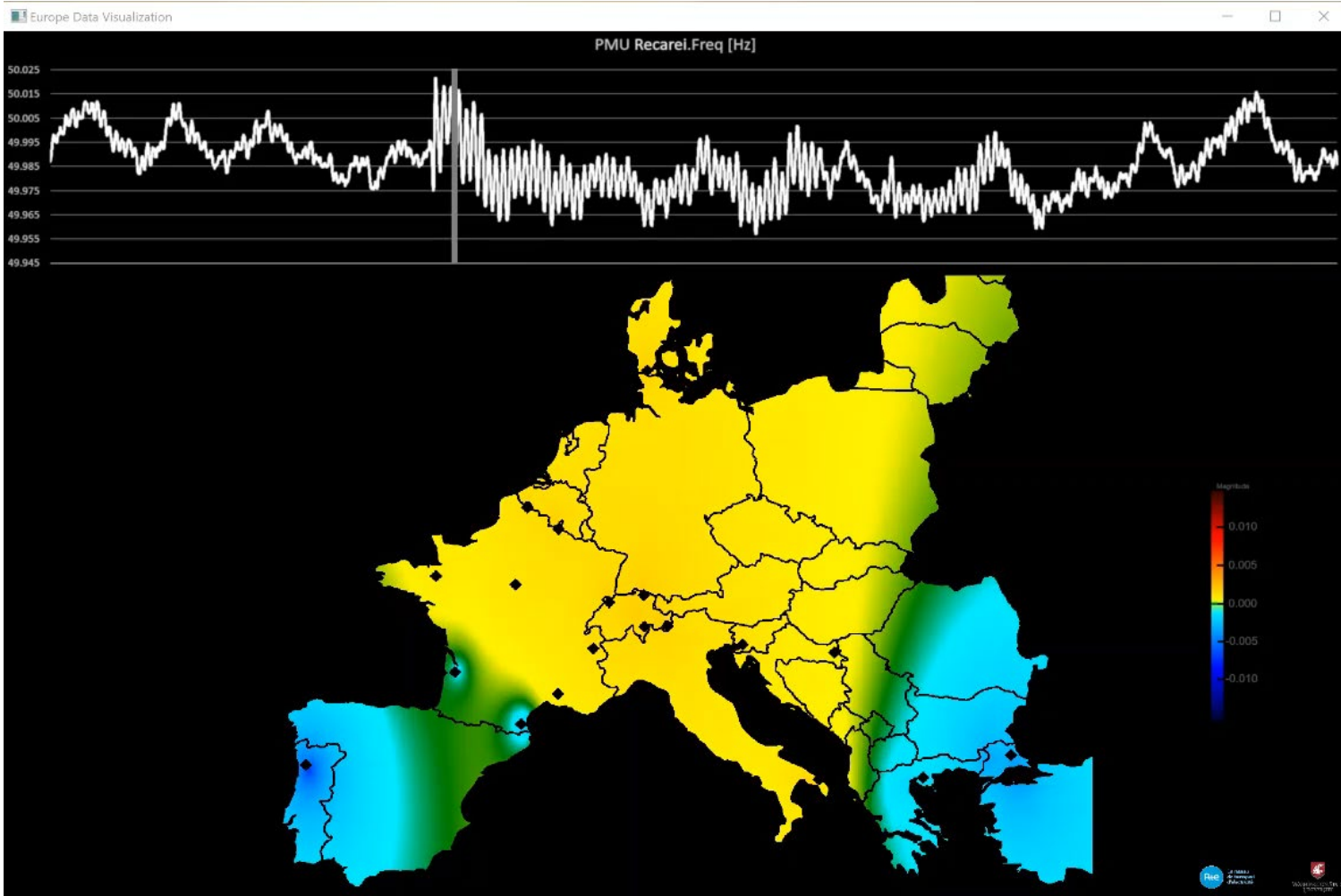
# 2016 Oscillation Event in the East

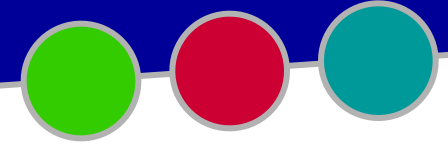


FNET Data Display [6/17/2016 Sustained Oscillation]  
Time: 7:12:9.9 UTC 60.0207 Hz



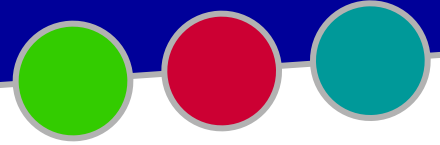
# 2019 Oscillation Event in Europe





- Variations in tie-line power-flows leading to lower damping levels of inter-area modes (0.1 Hz to 0.8 Hz)
- Forced oscillations interacting with inter-area modes causing interconnection-wide oscillations
- Subsynchronous oscillations (5 Hz to 20 Hz) related to power electronic controls of IBRs
- Operator tools for RTE, France, PSERC and RTE
- Source location, SEL, 2020-2022
- Visualization and source location, SDG&E, 2019-2022





- Line parameter estimation, Generator model validation, **SDG&E, 2019-2022**
- Power plant model validation, Renewable model impact, Online model estimation for adaptive control design, **RTE and PSERC, 2021-2023**

