OAK RIDGE National Laboratory



CRITICAL INFRASTRUCTURE MODELING

Modeling risk and resilience of people and places over time

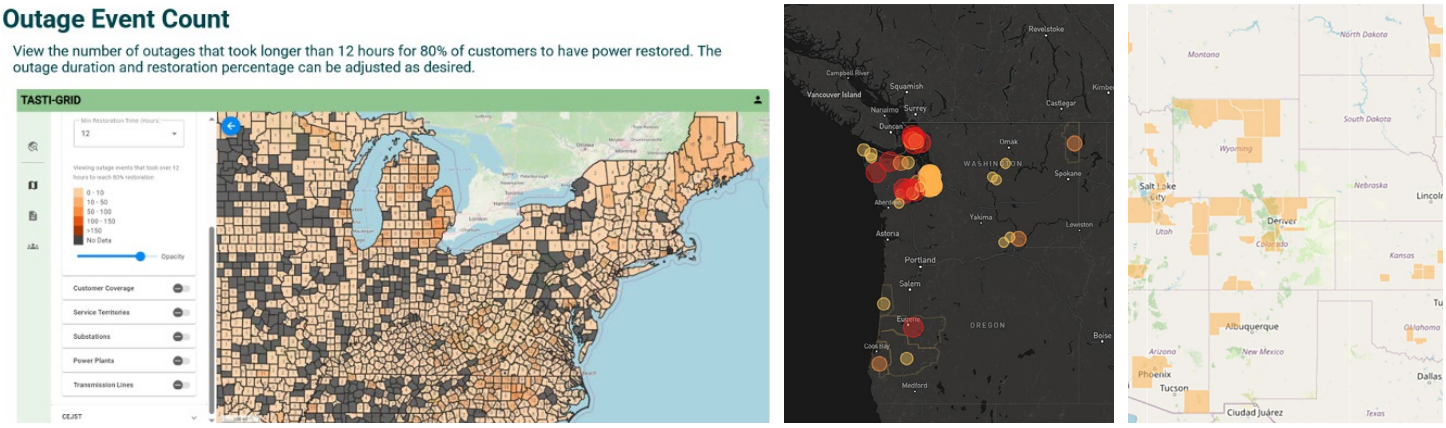
MISSION

We use geospatial science innovations to inform decision-makers on the risk of natural, built, and social systems to extreme events. Our work brings technical expertise to real-world impact, directly impacting disaster response, counterterrorism efforts, and global security planning.

The dynamic nature of human and natural systems can impact national security, which makes understanding the cause and effect of these changes critical. Innovative modeling techniques create datasets that intersect disparate information to allow decision-makers detailed views of people, places, events and environments to protect infrastructure and citizens.

IMPACT

- Support national and international security efforts across the energy–water–communications–transportation nexus
- Deliver fine-resolution insights into how urban areas function across space and time by harnessing spatially explicit points of interest, buildings, road networks, and neighborhood information
- Standardize utility outage data reporting through ORNL's Outage Data Initiative Nationwide (ODIN), with over 60 utilities reporting data, allowing utilities to see outages and deploy backup crews to the right locations.



ORNL KEY DIFFERENTIATORS

Cross-referencing data processing techniques and access to world-class technology

- ORNL critical infrastructure modeling teams help develop databases and digital platforms to curate and analyze geospatial data on U.S. critical infrastructure
- Data pipelines and conflation techniques create datasets from multiple sources, such as points of interest, building attributes, land use, and human mobility.
- Dynamic analysis capabilities apply data science, econometric modeling, network flow optimization and geocomputational methods to develop national security solutions.

Multidisciplinary teams answering questions about the Earth's surface faster and more completely than ever before

- The **Critical Infrastructure Resilience Group** has multi-disciplinary expertise ranging from risk geographic information science, spatiotemporal analytics, multi-scale modeling, econometrics modeling, logistics and network flow optimization, and geo-visualization
- The **Geospatial Data Modeling Group** skillsets span geospatial science, environmental informatics, remote sensing and data science. Additionally, researchers are proficient in geospatial and remote sensing techniques, application of machine learning on large spatial datasets, image classification, data engineering, data conflation, and geospatial intelligence.

Access to unparalleled national laboratory resources

- High performance computing
- Autonomous systems, artificial intelligence, and open-source as well as US government datasets
- Connections to multidisciplinary teams across a wide variety of science fields, including national security, cyber resilience, and nuclear nonproliferation.

CONTACT:

Supriya Chinthavali
Critical Infrastructure Resilience Group Leader
chinthavalis@ornl.gov

Nagendra Singh
Geospatial Data Modeling Group Leader
singhn@ornl.gov

One Bethel Valley Road
Oak Ridge, TN 37831

U.S. DEPARTMENT of ENERGY | Office of Science
OAK RIDGE National Laboratory

www.ornl.gov jobs.ornl.gov

Oak Ridge National Laboratory is managed by UT-Battelle LLC for the US Department of Energy