SRNL™
Savannah River National Laboratory
factsheets

CORE COMPETENCY

Computational Science & Modeling

Overview

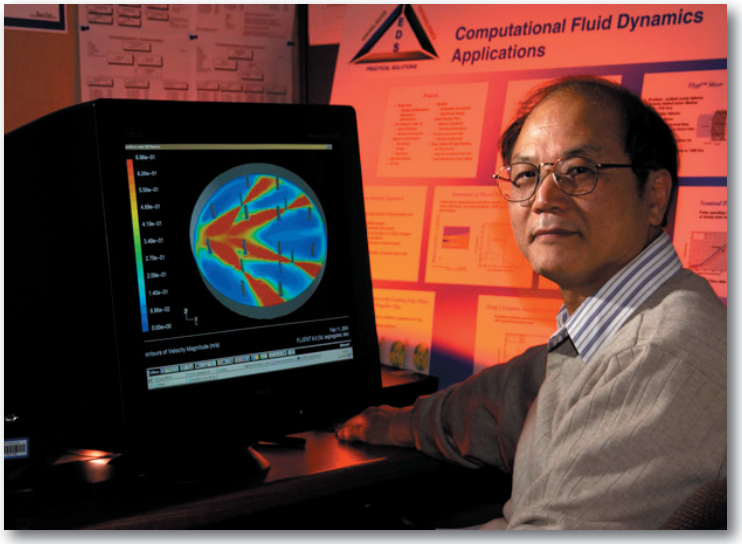
SRNL provides computational modeling capabilities as an integrated element of research, development, and delivery of technology solutions. Many major SRNL challenges of the future can only be addressed through advanced scientific computing. Others may be cost prohibitive or too big or too small to address in any other way. Computational modeling is often a cost-effective way to examine behavior of a physical process or system under a wide range of circumstances.

SRNL has significant expertise in applying state-of-the-art modeling tools, accessing a suite of commercially-available or custom-developed fundamental and general purpose modeling software. Services range from short-term consultation to in-depth analysis and development of specific user application and decision support tools.

Engineering Modeling and Simulation

SRNL provides essential cross-cutting, interdisciplinary computational modeling as a technology partner to facilitate the development of practical, effective solutions that provide maximum value for customers. SRNL has extensive experience in engineering modeling and simulation of a variety of complex systems or processing operations, both existing and proposed.

Engineering disciplines include heat transfer, physics, fluid dynamics, solid mechanics/structural analysis, chemical process modeling, molecular modeling, discrete event simulation, optimization, and non-traditional applications of Geographic Information Systems (GIS) tools.



Dr. Si Young Lee's sludge mixing and erosion modeling analyses play an important role in high-level tank waste removal operations at SRS. His technical experience includes nuclear accident modeling, reactor core modeling and analysis, nuclear criticality evaluation, and analysis for repository disposal of aluminum-based spent nuclear fuel.

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Computational Science & Modeling

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Advanced Atmospheric Modeling

SRNL performs and publishes research and development projects on atmospheric modeling problems that require flexible modeling capabilities and creative approaches. The tools used are often applied to local problems involving SRS, but may also be applied at any global location where meteorological data are available. Some of the tools used are:

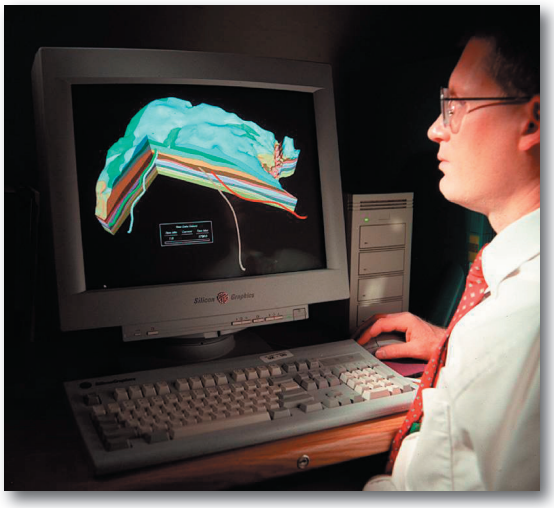
- Regional Atmospheric Modeling System (RAMS)
- Lagrangian Particle Dispersion Model (LPDM)
- Hazard Prediction and Assessment Capability (HPAC)
- Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT)
- Mesoeta model

Using state-of-the-art computational tools, the Atmospheric Technologies Center provides guidance to emergency response teams regarding transport and consequences of radiological and other toxic releases.

Subsurface and Porous Media Modeling

SRNL has strong capabilities in the subsurface and porous media modeling and simulation arena. Multi-disciplinary teams of hydrogeologists, geochemists, and engineers address challenging environmental problems using innovative methods to incorporate field data for input into modeling and simulation results. Areas of interest include:

- Geostatistical methodologies for incorporating subsurface heterogeneity
- Synthesis of different types of data at various scales for model input
- Alternative contaminant transport formulations such as dual-media
- Application of new approaches in porous media modeling to various disciplines
- Performance assessment modeling for waste disposal



Dr. Gregory Flach uses three-dimensional subsurface modeling and sophisticated computer graphics to better understand contaminant migration.

Statistical Decision Support

Statistical services are provided to a wide range of customers. These services include: experimental design, sampling plan development, statistical process control, data analysis, and application development.

CONTACT

Steve Wach
803-725-3020
steve.wach@srnl.doe.gov

Savannah River National Laboratory,
Bldg. 773-41A
Aiken, SC 29808

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