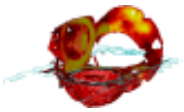
Making Science Count!

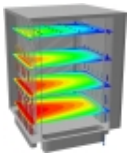
Learn more about the exciting research that is being carried out at Pacific Northwest National Laboratory!

Computational Science & Engineering
at Pacific Northwest National Laboratory

Applied Mathematics
Geometries and symmetries must be accurately modeled in order to solve complex problems. For example, our mathematicians provide solutions to environmental and health issues by working with interdisciplinary teams to properly describe temporal and spatial physics using combinatorial mathematics and multi-spatial-scale geometry.

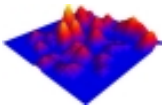


Atmospheric Science
One of the nation's top atmospheric science research centers, our experts conduct surface and airborne field campaigns that synthesize both meteorological and chemical kinetics of the atmosphere, investigate the interactions between trace gases and aerosols, and understand these processes using molecular-scale dynamic models.



Biology
We are developing the fundamental scientific basis for understanding the impact of natural and anthropogenic factors on human health. New tools are being developed for proteomic data analysis, modeling cell signaling pathways, protein-protein interactions, and organ modeling with a focus on the computational fluid dynamics of the lung.

Chemistry
To remediate legacy nuclear wastes in a timely fashion, we need a fundamental understanding of molecules and their interactions in isolation (gas phase), in liquids, on surfaces, at interfaces, and in condensed phases. Our research provides new insights into processes occurring at contaminated sites and technologies for cleaning them up.



Engineering
We provide comprehensive computational modeling in solid, thermal, and fluid mechanics and electrochemistry to design and improve manufacturing techniques. Significant advances have been made in the hydroforming of metals, a key technology needed for the design of new lightweight transportation systems.

Imaging Science
Our researchers are creating a new generation of scientific imaging theories, algorithms, information synthesis technologies, and three-dimensional visualization tools for rapid insight into measurement-based inquiries as well as higher productivity and accuracy in image analysis.

Information Visualization
We use data to create visualizations that include text, image data, sound, voice, video, and of course, numerical information. Our visual analysis systems also provide the tools to interact with the data so that users can subset the data, run queries, do time sequence studies, and create categories and correlations, all in real time.

Reactive Transport
In complex geological systems, discrete structures at multiple scales render simple concepts of continuum mechanics invalid. These effects are significant for groundwater remediation and protection problems. By taking these into account, we can more accurately model fluid dynamics of river flow and underground chemical plumes.

Scientific Computing Environments
To promote collaborations among scientists, our researchers are developing tools that exploit new communications technologies – shared computer displays, electronic notebooks, virtual reality collaboration spaces – and an integration of these technologies with current scientific practice and advanced information systems.

Ray Bair
Pacific Northwest National Laboratory
P.O. Box 999, MS K7-02
Richland, WA 99352

email: cse@emsl.pnl.gov
web: www.pnl.gov/cse

PNNL-SA-33298-7/01

Ray Bair
Computational Science & Engineering
Pacific Northwest National Laboratory
P.O. Box 999, MS K7-02
Richland, WA 99352

Making Science Count!

Learn more about the exciting research that is being carried out at Pacific Northwest National Laboratory!

Computational Science & Engineering

at Pacific Northwest National Laboratory

Operated by Battelle for the U.S. Department of Energy