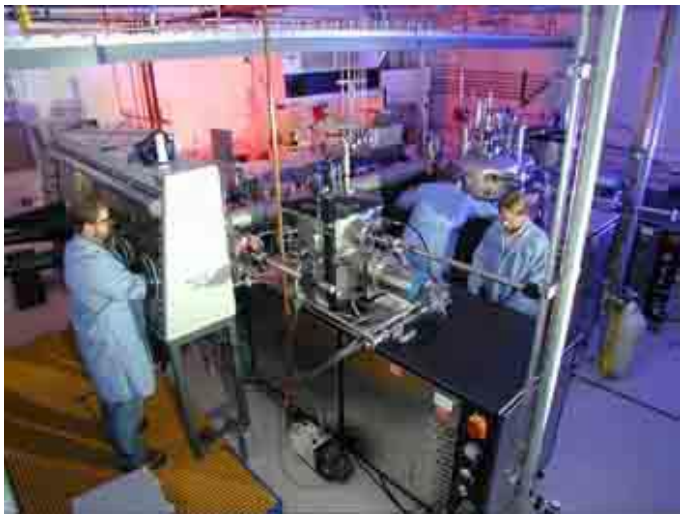
Other PNNL research highlights:

Fueling up on Mars, modeling climate change, replacing the ordinary light bulb

Leave for Mars without fuel to return? — Engineers at Pacific Northwest National Laboratory propose to make travel to Mars more feasible with microchannel process technology. Engineers are developing a light-weight micro-chemical processing plant about the size of a desktop personal computer. The processor would convert carbon dioxide from the Martian atmosphere into the propellant and oxygen needed for the return trip. Considering the cost of putting items into orbit can be as much as $20,000 per pound, packing fuel from Earth for a return trip would be incredibly expensive. Producing the fuel while on Mars would be much more practical.



At one of its state-of-the-art facilities, PNNL conducts organic thin-film research in the pursuit of revolutionary low- cost, efficient lighting.

Global warming could leave salmon high and dry — Changes in rain and snowpack patterns anticipated by global warming could significantly affect all who depend on water for survival, including fish. Under future climate scenarios, changes in stream temperatures may delay upstream migration of adult salmon, and an earlier spring snowmelt would compress the time for spawning, incubation and rearing of smolts. PNNL scientists have established a climate model for the Yakima River Basin, with three possible sscenarios based on predicted increases in global population, economic growth and energy production. This modeling tool will be a valuable resource for water-resource managers as they grapple with issues and decisions related to global warming.

Lighting the future — Solid-state lighting is an emerging technology that could change the way we light homes, offices and industrial facilities. Novel organic and inorganic thin films would replace conventional sources such as the light bulb. PNNL is assisting the Department of Energy's research and development of a key technology called Organic Light-Emitting Diodes. In its simplest form, an OLED consists of a layer of organic luminescent material sandwiched between two electrodes. Using organic light-emitting molecules, lighting sources could potentially be applied like wallpaper or even painted onto a surface.

What chemicals are in our air? — PNNL's Chemical Testing Chamber may play an important role in homeland security and other vital protections needed in today's world. The testing chamber can be used to identify harmful chemicals in the air and to test the performance of sensors used to detect weapons of mass destruction. The chamber is different from other chemical testing facilities in that it gives scientists the capability to work with very low concentrations that are characteristic of semi-volatile chemicals. Semi-volatile chemicals are used to produce pesticides and herbicides, but also can be used in chemical weapons. Scientists at PNNL recently began final performance testing of the Chemical Testing Chamber and expect to have it ready later this spring. ■