

**Research Participation Program
U.S. Environmental Protection Agency
Office of Research and Development
National Risk Management Research Laboratory
Cincinnati, Ohio**

EPA-ORD/NRMRL-STD-2009-01

A postdoctoral research project in the area of Chemical Process Sustainability Metrics is available at the U.S. Environmental Protection Agency's (EPA) National Risk Management Research Laboratory (NRMRL) in Cincinnati, Ohio.

Project Description:

In the initial stages of this work chemical process sustainability metrics have been developed to provide a description of the sustainability of a process in four indicator areas: environment, efficiency, energy and economics. While full scale processes can be described with metrics in these areas, the intention of this research is to develop a suite of indicators that can predict full scale sustainability performance based on bench-scale information. The idea is that the bench scale allows for process changes and research opportunities that are not available in most full scale processes, where many elements have been locked into place. Within the calculations for the sustainability metrics are steps involving data collection, engineering approximations and assumptions regarding process parameters. In the four areas described above, indicators will be developed for environmental friendliness, such as amounts released, global warming potential, toxicity, acidification, resource use, etc. Efficiency indicators will include conversion, atom economy, product selectivity, and others. Indicators for energy use can include amount, type, and cumulative exergy. Finally, economics of processes can be described by a number of indicators such as payback period, annualized profit, etc. The research will entail both using existing indicators and developing new or modified ones. A future result of this research will be a software tool that can aid laboratory researchers in developing more sustainable processes. The research participant will be mentored by Dr. Raymond Smith of NRMRL's Sustainable Technologies Division (STD).

Qualifications and Skills:

Applicants should have received a doctoral degree in chemical engineering or a related discipline within five years of the starting date, or completion of all requirements for the degree should be expected prior to the starting date.

The program is open to all qualified individuals without regard to race, sex, religion, color, age, physical or mental disability, national origin, or status as a Vietnam era or disabled veteran. U.S. citizenship or lawful permanent resident status is preferred (but can hold an appropriate visa status, however, an H1B visa is not appropriate).

The participant will be selected based on academic records, recommendations, research interests, compatibility of background and interests with research programs and projects at NRMRL, and the availability of funds, staff, programs, and equipment. The appointment is full time for one year and may be renewed upon recommendation of NRMRL and subject to availability of funds for up to two additional years. The participant will receive a monthly stipend up to \$5,853, depending on background and experience. The participant must show proof of health and medical insurance. The participant does not become an EPA employee.

Funding may be made available to reimburse the participant's travel expenses to present the results of his/her research at scientific conferences. No funding will be made available to cover travel costs for interviews, relocation costs, costs of tuition/school fees, or a participant's health insurance.

The Research Participation Program for EPA is administered by the Oak Ridge Institute for Science and Education. Please reference Project # EPA-ORD/NRMRL-STD-2009-01 when calling or writing for information. For additional information and application materials contact: Research Participation Program/NRMRL, Attn: Betty Bowling, Oak Ridge Institute for Science and Education, P.O. Box 117, Oak Ridge, Tennessee 37831-0117, Phone: (865) 576-8503 FAX: (865) 241-5219 e-mail: betty.bowling@ornl.gov.

An application can be found at www.ornl.gov/orise/edu/EPA/app-gugrgpd.pdf.