Paul E. Murray, Ph.D.

Email: pmurray@nnu.edu

Biography:

Dr. Paul Murray is a research engineer with 29 years of experience at the Idaho National Laboratory. His research includes computational mechanics and heat transfer, finite element analysis, nuclear reactor thermal-hydraulics, welding process modeling, and thermal-hydraulic analysis of irradiation experiments. He has published 15 peer-reviewed journal articles and more than 100 INL technical reports. Dr. Murray recently retired from the Idaho National Laboratory as a Distinguished Staff Engineer with the Advanced Test Reactor Analysis Department. He is currently a member of the Engineering faculty at Northwest Nazarene University in Nampa, Idaho.

Education:

Ph.D., Engineering Mechanics, University of Texas at Austin
M.S., Applied Mathematics, Rutgers University
B.A., Applied Mathematics, Rutgers University

Dissertation:

Finite element methods for flow and transport processes

Professional Activities:

Principal Reviewer, AWS Welding Journal
Technical Reviewer, ASME Heat Transfer and Fluids Engineering Divisions

Selected Publications:

P. E. Murray and M. K. Shelton, "Design and Analysis of the Zirconium Alloy Irradiation Growth Experiment in the ATR," INL/LTD-12-27393, January, 2013.

P. E. Murray, "Computational Fluid Dynamics Analysis of the RERTR-10 and RERTR-12 Experiments," INL/LTD-13-30325, January, 2013.

P. E. Murray, "Thermal Analysis of Irradiation Experiments in the ATR," *Test, Research, and Training Reactors Annual Conference*, INL/CON-12-26307, September, 2012.

P. E. Murray, "INL MAPLE 1 Reflector Three-Dimensional Flow Analysis," INL/EXT-08-13929, May, 2008.

D. M. McEligot, P. E. Murray, and G. W. Johnsen, "Convective Heat Transfer and Pressure Drop in Low-Prandtl-Number Gas Mixtures," INL/EXT-05-00779, September, 2005.

P. E. Murray, "Selecting Parameters for GMAW Using Dimensional Analysis," *Welding Journal*, 81(7), July, 2002.

P. Murray, "Stability of Droplets in Gas Metal Arc Welding," *Science and Technology of Welding and Joining*, 5(4), 2000.

P. E. Murray and A. Scotti, "Depth of Penetration in Gas Metal Arc Welding," *Science and Technology of Welding and Joining*, 4(2), 1999.

P. E. Murray, "A Model of Residual Stress in the Fabrication of Thin Glass Films," *ASME J. Eng. Mater. Tech.*, 118(2), April 1996.

P. E. Murray, "Numerical Simulation of Coalescence of Inviscid Drops at a Solid Surface," *Comm. Numer. Meth. Eng.*, 12, 1996.

P. Murray, "An Assessment of Advanced Numerical Methods for Two-Phase Fluid Flow," EGG-NRE-11262, April, 1994.

P. E. Murray and G. F. Carey, “Viscous Flow and Transport with Moving Free and Reactive Surfaces,” *Int. J. Numer. Meth. Eng.*, 30, 1990.

P. E. Murray and G. F. Carey, “Determination of Interfacial Stress During Thermal Oxidation of Silicon,” *J. Appl. Phys.*, 65(9), 1989.

P. E. Murray and G. F. Carey, “Finite Element Analysis of Mass Transport Through a Viscous Fluid with Reaction,” *Chem. Eng. Sci.*, 42(12), 1987.

Research Areas:

Finite element methods
Computational heat transfer and fluid dynamics
Nuclear reactor thermal-hydraulics
Modeling of welding processes
Thermal-hydraulic analysis of irradiation experiments
Thermal, fluid dynamics, and structural analyses using ABAQUS, FLUENT and RELAP5