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John Kirkpatrick is a member of the Modeling and Simulation Group in the Computational Sciences and Engineering Division at Oak Ridge National Laboratory. Dr. Kirkpatrick has over thirty-eight years experience in fluid dynamics, computational fluid dynamics, heat transfer, and diffusion problems. He is experienced both with numerical analysis of such problems and in practical engineering applications.

In research, Dr. Kirkpatrick has been a part of a very large variety of projects. He has done computational fluid dynamics (CFD) work on a rotating, stratified flow in air and other gases, and in buoyancy driven free convection in air and in liquid UF_6. He has been and is still extensively involved in the uranium centrifuge separation project. Kirkpatrick has done considerable work in conductive, convective, and radiant heat transfer. Problems he has studied include analysis of the effect of manufacturing defects on the heat transfer in High Flux Isotope Reactor (HFIR) fuel plates, and also modeling of the effect of exposure of the contents of reactor fuel shipping casks to a fire. He was responsible for a chapter of the Safety Analysis Report (SAR) for the HFIR and contributed to other portions. He was responsible for a chapter of the Safety Analysis Report for Packaging (SARP) for two different reactor fuel transport casks and contributed to other portions of those SARPs as well as to SARPS on other casks. He has done heat transfer work for the Atomic Vapor Laser Isotope Separation (AVLIS) project. He has done work in corrosion of uranium by hydrogen and water vapor, and in diffusion of hydrogen through an oxide surface layer on palladium. Kirkpatrick has modeled the time-dependent diffusion of dopant materials in liquid and refreezing semiconductors including the segregation of the dopants at the boundary between the liquid and solid. He has used a Monte Carlo numerical model to simulate growth and recrystallization of grains in steels. He has modeled fluid flow and heat transfer in a metal casting process. He has calculated theoretical infrared spectra and worked on methods to compare the results with data. He has done extensive work in transport of gases in vacuum and in corrosion processes in vacuum systems. He has modeled diffusion of impurities into inclusions in metals and the subsequent growth of the inclusions. Kirkpatrick has authored or co-authored 25 journal articles and more than 125 internal reports. He has B.A., M. S., and Ph. D. degrees from Rice University in Mechanical Engineering.