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## **Exceptional Service Medal**



**Bonnie J. McBride**

*For outstanding contributions to the field of computational thermodynamics and thermochemical calculations.*

Bonnie McBride is responsible for planning, coding, and documenting the extremely complex computer programs needed to calculate the thermodynamics and transport properties of advanced combustion systems. She also calculates and compiles the thermodynamic data and transport properties of individual chemical species for use in these codes. As better data become available and code users require extended temperature capabilities, she updates and extends the properties.

The computer programs she developed are used worldwide by the hundreds of universities, government agencies, industries, and technical organizations involved in determining propulsion system performance, analyzing combustion experiments, and conducting other studies that require knowledge of complex chemical equilibria. Two of the programs she developed—the Chemical Equilibrium and Transport (CET) and Properties and Coefficients (PAC)—are internationally recognized as standards for propulsion technology.

As the capabilities of large computers have advanced and more thermodynamic and thermochemical data have become available, Ms. McBride has supervised a team charged with updating and documenting the programs. Recently, the National Institute for Standards and Technology asked Ms. McBride to convert the JANAF (Joint Army, Navy, Air Force) Thermomechanical Tables to the standard coefficient form used in the PAC program. To meet this challenge, which will involve 1,600 chemical species, she will direct the work of an interagency group.

In addition to her exceptional initiative, innovation, and perseverance in developing a number of extremely complicated codes, she personally helps users solve specific problems. For example, she recently helped prepare specialized chemical equilibrium programs for use with computational fluid dynamic codes for reacting systems. And, she developed a program to calculate the thermodynamic properties of special fuels for a Lewis experimental program.

A recognized expert in the physics, mathematics, statistical mechanics, and thermodynamics required to compute properties of combustion species and multicomponent systems, Ms. McBride has authored or coauthored a number of comprehensive scientific papers in the area of thermodynamics.