

Michael J. Davis

Argonne National Laboratory
Chemical Sciences and Engineering Division
9700 South Cass Avenue, Building 200
Argonne, IL 60439-4837
phone: 630/252-4802, fax: 630/252-9292
e-mail: davis@tcg.anl.gov

Professional Experience

- **2006-present.** Senior Scientist, Chemical Sciences and Engineering Division, Argonne National Laboratory.
- **1982-2006.** Scientist, Chemistry Division, Argonne National Laboratory.
- **1981-1983.** Postdoctoral Appointment, University of Texas. (Advisor: Robert E. Wyatt)

Education

- Ph.D., Physical Chemistry, University of California, 1981. (Advisor: Eric J. Heller)
- B.S., Chemistry, Carnegie-Mellon University, 1975.

Career Activities & Highlights

- Areas of Research and Expertise
 - Research focuses on the study of multiple-time-scale kinetics, particularly kinetics which is nonlinear. This includes elementary gas phase kinetics, where master equations have been studied, complex chemical kinetics, and systems where there is an interaction between transport and reaction. The main approach to these areas is geometrical, relying on ideas and techniques common in the dynamical systems literature. There is a broader interest in geometric approaches to other types of multiple-scale problems, such as intramolecular energy flow and spectroscopy. The interest in multiple-scale problems includes spatial scales, also.
- Professional Organizations
 - American Physical Society
 - Combustion Institute
- Outside Collaborations
 - Tasso J. Kaper (Boston University)
 - Rex T. Skodje (University of Colorado, Boulder)
 - Alison S. Tomlin (University of Leeds)

- Antonios Zagaris (CWI, Netherlands)
- Joseph M. Powers (University of Notre Dame)

Publications

M. J. Davis and A. S. Tomlin, "Spatial Dynamics of Steady Flames. 1. Phase Space Structure and the Dynamics of Individual Trajectories," (preprint).

M. J. Davis and A. S. Tomlin, "Spatial Dynamics of Steady Flames. 2. Low-Dimensional Manifolds and the Role of Transport Processes," (preprint).

M. J. Davis , A. S. Tomlin, A. Zagaris, and T. J. Kaper, "Spatial Dynamics of Steady Systems with Reaction and Transport 1. Phase Space Dynamics and Low-Dimensional Manifolds," (in preparation).

S. Tomlin, M. J. Davis, U. Maas, "Model Reduction in Chemically Reacting Flows," *Progress in Energy and Combustion Science* (in preparation).

M. J. Davis, "Low-Dimensional Manifolds in Reaction-Diffusion Equations. 1. Fundamental Aspects," *The Journal of Physical Chemistry, A* 110 (16), 5235-5256 (2006).

M. J. Davis, "Low-Dimensional Manifolds in Reaction-Diffusion Equations. 2. Numerical Analysis and Method Development," *The Journal of Physical Chemistry, A* 110 (16), 5257-5272 (2006).