



Mechanical and Aeronautical Engineering Department
University of California Davis
Davis, California 95616-5294
mae.ucdavis.edu/SpaceED

2003-2004 Monthly Seminar Series on Space Research

16 October, 20 November, 15 January, 19 February, 15 April, 20 May
3rd Thursday 4:00-5:00 pm

An Alternative Computational Approach to Mass and Heat Transfer on Earth Reentry

Dr. Mark A. Havstad

Lawrence Livermore National Laboratory

Date: **15 January 2004_Thursday** Time: **4:10-5:00 pm** Location: **1065 Kemper**

Refreshments will be provided at 4:00 p.m.

ABSTRACT

Current analysis of the mass and heat transfer between reentering bodies and the surrounding fluid is most often based on transport theory and chemical relations developed in the mid 1960's. Although this work has served the aerospace field exceedingly well and will continue to do so into the foreseeable future, the use of film coefficients, driving potentials for mass transfer and integral boundary layer methods make this work less than ideally interfaced to current computational fluid dynamics. Further the vast growth in our knowledge and capabilities (both experimental and analytical) in the areas of surface chemical kinetics and combustion, particularly of carbon, make it possible to treat reentry at a more fundamental level. After describing the context of this work at the Livermore Laboratory and briefly reviewing some of the current work in the field, the talk will focus on our alternative formulation, its advantages and shortcomings and efforts to bring it to bear reliably on real reentries.

ABOUT THE SPEAKER

Mark Havstad received the Bachelor of Science degree from Yale University in Engineering and Applied Science and the Master of Science degree from Colorado State University in Mechanical Engineering. He received the Ph.D. degree in mechanical engineering from Stanford University in 1992 for studies of the optical constants and thermal radiative properties of atomically clean liquid metal surfaces. Mark has also worked in porous media fluid mechanics, pulsed laser ablation and steam reforming of methanol for portable power.

For more information about

SpaceED (Space Engineering Research and Graduate Program) or the seminars please contact

Professor Nesrin Sarigul-Klijn at (530)-752-0682 or nsarigulklijn@ucdavis.edu

Members of the campus community and visitors from the region are welcome to attend the seminar series.

Sign-in is required at the event. SpaceED seminar will replace MAE297 seminar on 3rd Thursdays.