

2004 Board of Trustees' Award for Outstanding Research and Creative Scholarship Recipient

Professor Nikolaos A. Gatsonis

Since coming to WPI in 1994, Nikolaos A. Gatsonis has established an international reputation as an aerospace engineer. His influential work explores plasma, rarefied gas, and fluid dynamics through an innovative combination of theory, computation, and experiment. "In a relatively short time," a scholar in the field notes, Professor Gatsonis has "established himself and WPI as world leaders in simulation in space propulsion and microfluidics."



Professor Gatsonis has compiled an extensive record of research. He has published some 70 articles and garnered more than \$1.9 million dollars in research funding from a number of sources, including the National Science Foundation and the National Aeronautics and Space Administration. A recognized team builder, his activities bring together colleagues across national boundaries and the sometimes even greater divisions between disciplines. A scientist at a major research university judges "Dr. Gatsonis... one of the most active researchers I have come across in Engineering or Mathematics."

At the core of Professor Gatsonis's research is the quest to understand the behavior of fluids and other materials in motion and to apply this understanding to a wide variety of real applications. These include Pulsed Plasma Thrusters for maneuvering spacecraft, material behavior in confined or nanodomains for nanomanufacturing applications, and the dynamic behavior of heterogeneous systems such as human blood. A unique aspect of his work is the combination of microscopic and macroscopic computational approaches in order to understand molecular behavior over large length scales with the goal of creating a computational world that can predict the behavior of real systems.

The results of this activity have been widely influential. Professor Gatsonis's three-dimensional simulations of plasma thrusters are becoming standard in the field. Both NASA and the Air Force, a prominent scholar notes, consider him the "go-to guy" for computational modeling. Thanks to his work, a field previously characterized by guesses and wide tolerances is increasingly dominated by serious and sophisticated engineering design. Another scientist considers Gatsonis's work on the computational modeling of plasma flows "among the most valuable of the recent decade."

Professor Gatsonis's teaching has been closely connected to his research. The former holder of the Morgan distinguished instructorship in Mechanical Engineering, he was instrumental in the creation of a new undergraduate degree in Aerospace Engineering.

He now directs the program, which allows undergraduate students to work closely with graduate students and with outside agencies.

In recognition of his many significant contributions to the field of Aerospace Engineering, it is with great pride that Nikolaos A. Gatsonis is named the recipient of the 2004 Board of Trustees' Award for Outstanding Research and Creative Scholarship.