

# AEROSPACE ENGINEERING AND MECHANICS

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## 1958 to 1992 - The Ascendancy of Mechanics

Dr. Lazan was a well-known researcher in the mechanics of materials whose orientation was toward engineering science. In the mid- 1950s, U. S. Deans of Engineering called for emphasis on engineering science and Lazan moved the department in that direction by means of the faculty he hired.

In the post-Sputnik era, research funds were re-directed to engineering science-oriented programs. During this time, the external funding base for the department changed from projects at RAL to projects on the main campus. The extensive facilities and personnel at RAL required large externally funded projects. Professor Rudolf Hermann, one of the world's leading experimental high speed aerodynamicists, was instrumental in obtaining the large grants and contracts necessary for the existence of RAL. When Hermann left the University in 1962 to join Werner von Braun's team in Huntsville Alabama, funding for RAL declined and eventually RAL closed its doors in the mid-1960s.

Professor Helmut Heinrich who was well known for his research in aerodynamic decelerators was one of the faculty members from the Aeronautical Department who continued in merged Department until his death in 1979. Professors Warner, Goodman, and Hsiao were from the Mechanics and Material Department and continued at the University of Minnesota until their retirements. Professor Goodman, however, later moved to Civil Engineering to become Head of that Department.

After the two Departments were merged, the engineering science fields of solid mechanics, fluid mechanics, and dynamics were the basis for improvements in the Department offerings in aerospace structures, aerodynamics, and new courses in satellite and spacecraft dynamics. The first computer-based structures course was offered in the early 1970s. The faculty was also augmented by new members. In 1960 Lazan hired Robert Plunkett from GE. Later Plunkett was elected to the National Academy of Engineering in 1974. Lazan also kept Thomas Lundgren, an Aeronautical Engineering B.S. and M.S. who had just earned his PhD in Fluid Mechanics under Prof. C. C. Chang of the Aeronautical Department. Lazan also hired Professor Daniel Joseph. Joseph was elected to the National Academy of Engineering in 1990, the National Academy of Sciences in 1991, and the American Academy of Arts and Sciences in 1992 and was the only member of the faculty at the University of Minnesota who was a member of all three Academies. Joseph was selected as Regents' Professor in 1994. Other new faculty hired in the early 1960s included Gordon Beavers, later to be Associate Dean of IT and Interim Dean, Theodore Wilson, and Abraham Berman.

Lazan's illness caused his resignation in the early 1960. Allan Blatherwick served as Interim Department Head until P. R. "Pat" Sethna, another Lazan hire, became head in 1966. Sethna had received his Ph.D. from the University of Michigan in Engineering Mechanics and joined the University of Minnesota in 1956. His specialty was non-linear systems. Sethna hired a number of faculty members including future Department Head William Garrard who was hired in 1967 to bolster the applied dynamics and controls area. In 1971, Sethna hired Philip Hodge (elected to the National Academy of Engineering in 1977) who was responsible for introducing computer-based course materials to the Department, especially in Aerospace Structures, Roger Fosdick who enhanced the Department's offerings in continuum mechanics and Jack Moran who initiated computational aerodynamics into the curriculum.

The large enrollments of the 1960s led the Department to use closed-circuit TV for teaching the three basic engineering mechanics courses for a number of years. This helped to prepare our participation in the UNITE TV program in Rochester in the 1970s. Also the 1970s found the first measurable appearance of women students in engineering classes; however, following national trends after five years the percentage has remained at about 15%.

In the early 1970s, the aerospace industry underwent a severe recession due to the end of the Vietnam War and the termination of the Apollo Program. Undergraduate enrollments plummeted. At the same time there was a substantial reallocation of funds from engineering, sciences, and liberal arts to the health sciences. Again there were proposals to merge the Aerospace Engineering department with Mechanical Engineering. This did not occur, but the department lost a number of faculty positions during this period and there were essentially no new faculty hires from the early 1970s to the early 1980s. During this period enrollments gradually increased but never reached the level of the late 1960s.

In 1972, the name of the Department was changed from Aeronautical Engineering to Aerospace Engineering and Mechanics. Up to that time courses had been designated Aero. or M&M (Mechanics and Materials) depending on whether they had been part of the old Aeronautical or Mechanics and Materials departments. The new course designator AEM (Aerospace Engineering and Mechanics) was adopted for all courses.

In the late 1970s expenditures in the aerospace field began to increase dramatically. This increase was driven primarily by increased defense spending. The demand for aerospace engineers rose sharply and enrollments in the Department grew. In 1989, enrollments peaked at about 600 undergraduates and the AEM Department had the largest undergraduate enrollment of any engineering department at the University of Minnesota. The number of faculty members also eventually increased to a maximum of 21.

In 1985, Sethna hired Richard James, whose work in new materials and their properties as well as nanotechnology has created a center of excellence in materials in the Department. Later James's adviser, Jerald Ericksen, joined the faculty with a joint appointment in Mathematics. A number of new, young faculty members were hired beginning in 1989, including the first two female faculty. These new hires included Gary Balas, future Head of the Department, Perry Leo, Yiyuan Zhao, Thomas Shield, and Ellen Longmire. These younger faculty members had, for the most part, a more applied orientation than did the more senior faculty members. This was to have important positive implications for the future. Nationwide, research funding priorities in engineering began to shift from theoretical to applied.

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