

The Department of Mechanical Engineering/College of Engineering and Applied
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**TOPICS IN MECHANICAL ENGINEERING
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Daniel J. Inman, Ph.D.
Department of Aerospace Engineering
The University of Michigan

Lecture Title: Avian Inspired Morphing UAVs

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Abstract

Morphing or shape changing structures for flight control is as old as the Wright Brothers who used wing warping actuated by cables for flight control. Because of the need for rigid wings to avoid flutter this type of flight control gave way to discrete control surfaces (flaps, rudder, aileron, elevator). Early flight attempts were based on avian inspiration. The research discussed here looks at the shapes birds take while gliding and uses the resulting information to examine morphing using smart materials applied to unmanned air vehicles (UAVs) with the hopes of improving their aerodynamic performance. In particular, we examine shape changing trailing edges for wings and rudderless flight control of UAVs.

Biography

Professor Inman is the Clarence “Kelly” Johnson Collegiate Professor and Department Chair of Aerospace Engineering at the University of Michigan. Prof. Dan Inman received his Ph.D. from Michigan State University in Mechanical Engineering in 1980. Since then, he has published eight books (on vibration, energy harvesting, control, statics, and dynamics), eight software manuals, 20 book chapters, over 350 journal papers and 600 proceedings papers, given 65 keynote or plenary lectures, graduated 62 Ph.D. students and supervised more than 75 MS degrees. He works in the area of applying smart structures to solve aerospace engineering problems including energy harvesting, structural health monitoring, vibration suppression and morphing aircraft. He is a Fellow of AIAA, ASME, IIAV, SEM and AAM. Formerly he was the Director of the Center for Intelligent Material Systems and Structures and the G.R. Goodson Professor in the Department of Mechanical Engineering at Virginia Tech and the Brunel Chair in Intelligent Materials and Structures at the University of Bristol, UK. A former Department Chair of the Department of Mechanical and Aerospace Engineering, State University of New York at Buffalo, he has held adjunct positions in the Division of Applied Math at Brown University and in math at the University of Southern California.