



Aerospace Engineering

By Distinguished Guest Professor Wei Shyy

We SHARE to inspire and ignite ideas!

WORKS BY Prof Wei Shyy

AERODYNAMIC INTERACTION OF FLAPPING WINGS

Journal Article

Dragonflies Utilize Flapping Wings Phasing and Spanwise Characteristics to Achieve Aerodynamic Performance

By **Wei Shyy**, Csaba Hefler, Qiu Huihe (2016)



Read about the detailed results of an experiment analyzing wing motion of a dragonfly. Wing phasing was observed, along with asymmetrical aerodynamic characteristics caused by a time-dependent distance between the leading edges of the forewings and hindwings.

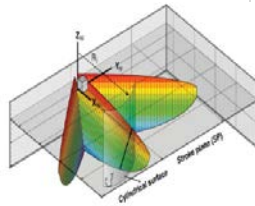
Source: [Cornell University Library](#)

AEROELASTIC MODELING

Journal Article

Approximate Aeroelastic Modeling of Flapping Wings in Hover

By **Wei Shyy**, Abhijit Gogulapati, Peretz P. Friedmann, Eugene Kheng, (2013)



Discover a non-linear aeroelastic model for flexible flapping wings. It was obtained through combining a non-linear structural dynamic model hinged upon finite element analysis software – MARC.

Source: [The American Institute of Aeronautics and Astronautics Journal](#)

AUTOMATED CONTROL OF SPACE VEHICLES

eBook

Automated Rendezvous and Docking of Spacecraft

By **Wei Shyy**, Michael J. Rycroft, Wigbert Fehse (2003)



This book provides insight into automated control of space vehicles through addressing a variety of technological matters. They include the manner by which the docking vehicle is made capable of accurately approaching the target spacecraft.

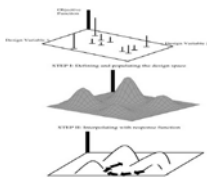
Source: [Cambridge University Press](#)

DESIGN OPTIMIZATION

Journal Article

Global design optimization for aerodynamics and rocket propulsion components

By **Wei Shyy**, Nilay Papila, Rajkumar Vaidyanathan, Kevin Tucker (2001)



Global optimization methods are advantageous for many reasons including capability of multi-criterion optimization and accomplishment of tasks in parallel. This article provides a review of this development.

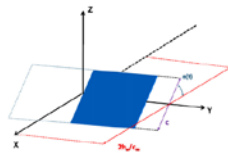
Source: [Progress in Aerospace Sciences](#)

FLAPPING WING AERODYNAMICS

Journal Article

Recent progress in flapping wing aerodynamics and aeroelasticity

By **Wei Shyy**, H. Aono, S.K. Chimakurthi, P. Trizila, C.-K. Kang, C.E.S. Cesnik, H. Liu (2010)



This article discusses the aerodynamic force production affected by the Reynolds number which varied both the leading edge vortex (LEV) and flow structures. Lift can be improved when tip vortices (TIVs) interact with the LEV.

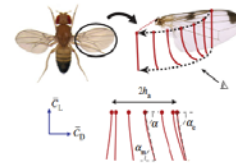
Source: [Progress in Aerospace Sciences](#)

INSECT FLIGHT

Journal Article

Scaling law and enhancement of lift generation of an insect-size hovering flexible wing

By **Wei Shyy** and Kang Chang-Kwon (2013)



Read about a detailed scaling law, along with new techniques for lift generation. A non-linear response in wing motion results in high lift. Also, the wing can deform, which further improves lift.

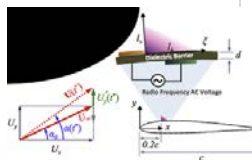
Source: [Journal of the Royal Society Interface](#)

LOW-REYNOLDS NUMBER AERODYNAMICS

Journal Article

Adaptive control of low-Reynolds number aerodynamics in uncertain environments: Part 1. Disturbance regimes and flow characteristics

By **Wei Shyy** and Young-Chang Cho (2013)



Read about minimal modelling and adaptive parameterization was employed to reduce fluctuations in aerodynamic forces.

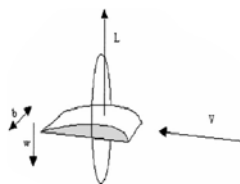
Source: [Computers and Fluids](#)

MICRO AIR VEHICLES

Journal Article

Flapping and flexible wings for biological and micro air vehicles

By **Wei Shyy** and Hao Liu (2007)



Scaling laws of birds and micro-air vehicles (MAVs) are discussed. The authors also talk about low Reynolds number flows and how to choose appropriate shapes for air foils.

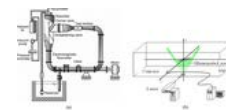
Source: [Progress in Aerospace Sciences](#)

SHEET/CLOUD CAVITATION

Journal Article

Combined experimental and computational investigation of unsteady structure of sheet/cloud cavitation

By **Wei Shyy**, Wang Guoyu, Biao Huang and Yin L. Wang (2013)

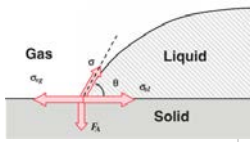


In this research, it was found that the production and collapse of sheet cavities occurred in a periodic manner. These, along with two types of torques, were important mechanisms for generation and alteration of vortices.

Source: [Journal of Fluids Engineering](#)

SPACECRAFT APPLICATIONS

VORTICE

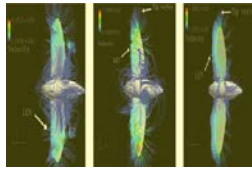


Interfacial flow computations using adaptive Eulerian-Lagrangian method for spacecraft applications

By **Wei Shyy** and Sim Jaeheon (2010)

In engineering, it is essential to comprehend the fluid physics associated with the operation of spacecraft. This led to the development of a 3-D adaptive Eulerian-Lagrangian technique, which is discussed in this article.

Source: [International Journal for Numerical Methods in Fluids](#)



Flapping wings and aerodynamic lift: The role of leading-edge vortices

By **Wei Shyy** and Hao Liu(2007)

In this research, it was found that the production and collapse of sheet cavities occurred in a periodic manner. These, along with two types of torques, were important mechanisms for generation and alteration of vortices.

Source: [Journal of Fluids Engineering](#)

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