

Wei Shyy

Professor Wei Shyy is the President of The Hong Kong University of Science and Technology. He first joined HKUST in August 2010 as Provost and Chair Professor of Mechanical and Aerospace Engineering. Prior to this, he was Clarence L. “Kelly” Johnson Collegiate Professor and Chairman of the Department of Aerospace Engineering of the University of Michigan. He was previously employed by the University of Florida and GE Research and Development Center in Schenectady, New York.

He is the author or a co-author of five books and numerous journal and conference articles dealing with computational and modeling techniques involving fluid flow, biological and low Reynolds number aerodynamics, combustion and propulsion, and a broad range of topics related to aerial and space flight vehicles. He was the Principal Investigator of several multi-institutional research projects, funded by the US Government and industries, on future space transport, bio-inspired flight, and computational aeronautical science. He is General Editor of the *Cambridge Aerospace Book Series* published by the Cambridge University Press, Co-Editor-in-Chief of *Encyclopedia of Aerospace Engineering*, a major reference work published by Wiley-Blackwell.

Since joining HKUST, he led and promoted numerous initiatives, including campus-wide clustered faculty recruitment in 2015 in five strategic areas to encourage interdisciplinary activities. Turning the campus into a living lab, a Sustainable Smart Campus scheme was announced in 2018; with substantial budget committed to support open projects between 2019 and 2022. A long-term strategic plan with dual emphasis on curiosity-driven and mission-encouraged pursuit was launched in 2021 to fuse disciplinary as well as cross-disciplinary programs to jointly address issues challenging the society and the humanity. Built on these conceptual foundations, HKUST, in partnership with the Guangzhou City and the Guangzhou University, is establishing HKUST(GZ) under a “Unified HKUST, Complementary Campuses” framework. During his presidency, HKUST has solicited an unprecedented amount of donations and Government matching grants which made possible key new campus-wide enhancements including academic and research buildings, dormitories, and other multi-purpose facilities, to support expanded academic programs, entrepreneurship and knowledge transfer activities.

Professor Shyy is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA) and the American Society of Mechanical Engineers (ASME). He has received awards for his research and professional contributions, including the AIAA 2003 Pendray Aerospace Literature Award, the ASME 2005 Heat Transfer Memorial Award, and The Engineers’ Council (Sherman Oaks, CA) 2009 Distinguished Educator Award. In 2021, the French Government made him an Officer of the Legion of Honor.

As an academic leader, Professor Shyy has consistently advocated broadening the educational scope and approach, advancing research and knowledge transfer to help address global challenges. He is committed to promoting university’s societal engagement and independent, entrepreneurial spirit. He has also led efforts in fostering diverse and inclusive campus cultures to better reflect and support the university’s overall mission.

Motivated by his appreciation of the intrinsic beauty of natural flyers, Professor Shyy is an avid bird photographer. Some of his photos are compiled in eBooks, entitled *Flight InSight* and *Flapping*.

CITIZENSHIP

U.S.A.

EDUCATION

B.S. (1977), Power Mechanical Engineering, National Tsing-Hua University, Taiwan.

M.S.E. (1981) / Ph.D. (1982), Aerospace Engineering, University of Michigan.

EMPLOYMENT

Employment History

| | | | |
|-----------|---|------------|--|
| July 1977 | - | June 1979: | Military Service (Taiwan) |
| Aug 1979 | - | May 1982: | Graduate Research Assistant, University of Michigan |
| May 1982 | - | Apr 1983: | Post-doctoral Research Scholar, University of Michigan, and Consultant to Ford Motor Company and General Electric Company |
| May 1983 | - | Aug 1988: | Research Scientist, General Electric Research and Development Center, Schenectady, NY |
| Jan 1987 | - | Jun 1987: | Visiting Professor of Aeronautics and Astronautics, National Cheng-Kung University, Taiwan |
| Aug 1988 | - | Jul 1992: | Associate Professor of Aerospace Engineering, Mechanics and Engineering Science, University of Florida |
| Jul 1992 | - | Jun 2002: | Professor of Aerospace Engineering, Mechanics and Engineering Science, University of Florida |
| Jan 1996 | - | Jun 2002: | Professor and Chairman of Aerospace Engineering, Mechanics and Engineering Science Department, University of Florida |
| Jul 2002 | - | Jun 2004: | Professor and Chairman of Mechanical and Aerospace Engineering Department (merged between Mechanical Engineering Department, and Aerospace Engineering, Mechanics and Engineering Science Department), University of Florida |
| Jul 2004 | - | Dec 2004: | Distinguished Professor and Chairman of Mechanical and Aerospace Engineering Department, University of Florida |
| Jan 2005 | - | Aug 2010: | Clarence L. "Kelly" Johnson Collegiate Professor and Chairman of Aerospace Engineering Department, University of Michigan |
| Fall 2010 | - | Aug 2013: | Provost, Hong Kong University of Science and Technology |
| Sep 2013 | - | Aug 2018: | Executive Vice-President & Provost, Hong Kong University of Science and Technology |
| Feb 2018 | - | Aug 2018: | Acting President, Hong Kong University of Science and Technology |
| Sep 2018 | - | Present: | President, Hong Kong University of Science and Technology |

Consulting Experiences

- BDM Federal
- Chung Shan Institute of Science and Technology (Taiwan)
- Dominion Engineering Works
- Ford Scientific Research Laboratory
- Ford Powertrain Division
- GE Research and Development Center
- GE Lighting
- GE Aircraft Engines
- Gould, Lewis & Proctor
- Industrial Technology Research Institute (Taiwan)
- Lockheed Martin / GE Aerospace
- NASA
- OSRAM Sylvania
- Pratt & Whitney
- National Science Foundation (Committee of Visitors)
- Prairie View A&M University
- ZONA Technology

Teaching Experiences

- Undergraduate: Engineering Analysis: Differential Equations II; Fluid Mechanics; Aerospace Propulsion
- Graduate: Numerical Methods; Fluid Mechanics; Turbulent Fluid Flow; Thermo-fluid Dynamics for Space Applications; Computational Fluid Dynamics; Viscous Flows

Ph.D. Students Advised as Chair or Co-chair (the year the student graduated)

1. S.-J. Liang (1993) A Study of Free and Moving Boundary Problems Involving Thin Crystal Growth
2. S. Thakur (1993) Treatment of Convection in Sequential Solvers for Navier-Stokes Equations
3. J.A. Wright (1993) A Pressure-Based Composite Grid Method for Complex Fluid Flows
4. E.L. Blosch (1994) Pressure-Based Methods on Single-Instruction Stream / Multiple-Data Stream Computers
5. H.S. Udaykumar (1994) A Mixed Eulerian-Lagrangian Approach for the Simulation of Interfacial Phenomena in Solidification Processing
6. R. Smith (1994) A Viscous Flow Based Membrane Wing Model
7. J. Liu (1996) Multiblock Computations and Turbulence Modeling for Turbomachinery Flows
8. H. Ouyang (1996) Multilevel Simulation and Modeling of Vertical Bridgman Growth of Single Crystals and Solidification of Binary Alloys
9. M. Rao (1996) Computational Modeling of Phase Change, Convective Heat Transfer and Free Surface Flow in Solidification Processing
10. V. Krishnamurty (1996) Effect of Compressibility on the Turbulence Structure and Its Modeling
11. J.K. Clutter (1997) Computation of High Speed Reacting Flows
12. H-C Kan (1997) Computational Study of Leukocyte Rheology Based on a Multilayer Model (co-chair)
13. A. Martin (1997) Multiscale Modeling of Heat Transfer Enhancement with Fiber Array Inserts (co-chair)
14. N. C. Prewitt (1999) Parallel Computing of Overset Grids for Aerodynamic Problems with Moving Objects
15. G. L. Abate (1999) Experimental Investigations of Shock Waves Undergoing Sudden Expansion in a Confined Chamber

16. N. Papila (2001) Neural Network and Polynomial-Based Response Surface Techniques for Supersonic Turbine Design Optimization
17. G. Chochua (2002) Computations of Gas Annular Damper Seal Flows
18. M. Francois (2002) Computations of Drop Dynamics with Heat Transfer
19. D. Yu (2002) Viscous Flow Computations with the Lattice-Boltzmann Equation Method (co-chair)
20. I. Senocak (2002) Computational Methodology for the Simulation of Turbulent Cavitating Flows.
21. N. N'dri (2002) Multi-Scale Computation in Hemodynamics (co-chair)
22. Y. Lian (2003) Membrane and Adaptively-Shaped Wings for Micro Air Vehicle
23. R. Vaidyanathan (2004) Investigation of Navier-Stokes Code Verification and Design Optimization
24. R. Kamakoti (2004) Computational Aeroelasticity Using a Pressure-Based Method
25. J. Wu (2005) Filter-Based Modeling for Turbulent Cavitating Flow Computations
26. Y. Utturkar (2005) Computational Modeling of Thermodynamic effects of Cryogenic Cavitation
27. M. Popescu (2005) A Finite-Volume, Cartesian Grid Method for Computational Aeroacoustics
28. B. Jayaraman (2006) Computational Modeling of Glow Discharge-Induced Fluid Dynamics
29. R.K. Singh (2006) Three-Dimensional Marker-Based Multiphase Flow Computation Using Adaptive Cartesian Grid Techniques
30. D. Viieru (2006) Flapping and Fixed Wing Aerodynamics of Low Reynolds Number Flight Vehicles
31. J. Chao (2006) Multi-Scale Computational Fluid Dynamics with Interfaces
32. E. Uzgoren (2006) Adaptive, Multi-Domain Techniques for Two-Phase Flow Computations
33. T. Goel (2007) Multiple Surrogates and Error Modeling in Optimization of Liquid Rocket Propulsion Components (co-chair)
34. Y. Mack (2007) CFD-Based Surrogate Modeling of Liquid Rocket Engine Components via Design Space Refinement and Sensitivity Assessment
35. X. Zhang (2009) Multiscale Modeling of Li-Ion Cells: Mechanics, Heat Generation and Electrochemical Kinetics (co-chair)
36. S. Chimakurthi (2009) A Computational Aeroelasticity Framework for Analyzing Flapping Wings (co-chair)
37. E. Sozer (2010) Modeling of Gaseous Reacting Flow and Thermal Environment of Liquid Rocket Injectors
38. C.-C. Tseng (2010) Modeling of Turbulent Cavitating Flows
39. J. Sim (2010) 3-D Adaptive Eulerian-Lagrangian Method for Multiphase Flows with Spacecraft Applications
40. Y.-C. Cho (2010) Low-Reynolds Number Adaptive Flow Control Using Dielectric Barrier Discharge Actuator
41. C.-K. Kang (2011) Aerodynamics, Scaling, and Performance of a Flexible Flapping Wing
42. P.C. Trizila (2011) Aerodynamics of Low Reynolds Number Rigid Flapping Wing Under Hover and Freestream Conditions
43. E. A. Hassan (2012) Multi-fluid Dynamics for Supersonic Jet-and-Crossflows and Liquid Plug Rupture
44. D. Yeo (2013) Aerodynamic Sensing for Autonomous Unmanned Aircraft Systems (co-chair)
45. W. Du (2013) Multi-Scale Modeling, Surrogate-Based Analysis, and Optimization of Lithium-Ion Batteries for Vehicle Applications
46. C-K Kuan (2013) Parallel processing of Eulerian-Lagrangian, Cell-Based Adaptive Method for Moving Boundary Problems
47. P. Tan (2016) Investigation of Non-Aqueous Lithium-Oxygen Batteries for Performance Improvement (co-chair)
48. J.-J. Fu (2017) Effects of Wing Morphology on Flapping-Wing Aerodynamics (co-chair)
49. C. Hefler (2019) Inherent Aspects of Root Flapping Tandem Wing Arrangements in Nature: Forewing – Hindwing Interactions in Dragonfly Flight (co-chair)

RESEARCH

Professor Shyy's research is centered on computational modeling techniques, which include continuum and lattice Boltzmann formulations. He has made substantial contributions to the formulations of the techniques needed for treating complex geometry, coupled multi-physics, moving and deformable boundaries, and fluid-fluid/fluid-structure interactions. A key feature is that his interest encompasses fundamental and application, including (i) development of original and novel numerical and modeling techniques for multidisciplinary problems related to thermo-fluid dynamics; (ii) computational and modeling techniques typically developed to a point that they have a comprehensive capability to tackle original physical issues; (iii) consistent emphasis on close collaboration between theory/computation and experiment; (iv) extension of scientific research to address engineering issues arising from optimization, assessment and design tool development.

Overall, he has made substantial contributions to air and space flight vehicle research and development, fluid machinery design optimization, and computational methods for complex unsteady flows. To name but a few, he

- demonstrated, by combined computational modeling and experiment, and in collaboration with students and colleagues, the importance of membrane wings and flexible structures for low-Reynolds-number flight; also offered new insight into issues such as tip vortices, downwash, and kinematics associated with flapping wing vehicles.
- developed, with the collaborators, and working jointly with NASA Marshall and Boeing-Rocketdyne, a multidisciplinary approach (combining numerical simulations, surrogate models, and optimization techniques) to improve the efficiency and design of turbines for reusable launch vehicles (RLVs), including supersonic turbines for NASA's second generation RLVs and Moon/Mars endeavors. The tools developed have been applied by researchers in many other fields.
- developed the CONCERT computer code, the first 3D numerical model used by GE Aircraft Engines in the 1990s for gas turbine combustor flow analysis.
- made original contributions to computational moving boundary problems arising from engineering and science, including multiphase flows and drop collision/impact dynamics, cavitation for rocket and underwater propulsion, fluid-structures interactions for aerial vehicles and sail dynamics, spacecraft thermal management, cellular and bio-mechanical processes, and advanced materials processing.
- developed, in collaboration with colleagues of the Hong Kong University of Science and Technology, University of Michigan and General Motors, advanced predictive capability of and physical insight into materials sciences, mechanics, thermo-transport and multi-scale modeling of modern battery technologies for vehicle development.
- pioneered development of three-dimensional Navier-Stokes-based computer tools for hydraulic turbine flow analyses, including distributors, runners and draft tubes. Supervised Ph.D. studies and developed original cavitation models needed for, e.g., liquid rocket engines, hydraulic turbines and underwater propulsion.
- analyzed hydrocarbon emissions in spark-ignition engines which impacted IC engine design and changed the standard picture of when, where, and how the emissions occur. While previous wisdom contended that these occurred in the quench layer, he proved that these occur in crevices and oil layers, which was a completely new idea, and was confirmed experimentally.
- contributed, in collaboration with colleagues of Pratt & Whitney and Dresser-Rand, to turbomachinery heat transfer, including those related to leading edge film cooling, cavity heat transfer, supersonic nozzle heat transfer, and modern seal operation.

- investigated high temperature (about 6,000 K) heat transfer for high pressure discharge lamp, based on a model accounting for combined radiation, convection and conduction in equilibrium plasma and neutral fluids. The research has contributed to product design of GE and other industrial entities.
- conducted extensive research in solidification processing, materials manufacturing, and crystal growth, at both macroscopic and microscopic (morphological) levels in the areas of materials sciences. Spanning the scales from surface tension, conduction to convection and overall crystal sizes, his research has elucidated the rich and complex thermal physics associated with various processing techniques (including continuous casting, Bridgman, float zone, electron beam melting, plasma coating).
- contributed to issues in biomechanics including deformation and recovery of cellular (leukocyte) dynamics through capillary scale geometries, cell-receptor dynamics associated with cell adhesion and movement, liquid plug propagation in airways, and fluid flow through stenosed artery and bypass graft in an anastomosis.
- analyzed, with collaborators of GE Aerospace (later became part of Lockheed-Martin) capillary-pumped loop thermal management for spacecraft, and conducted original research on fluid physics, materials processing, and multiphase fluid dynamics for micro-gravity space environments.

As part of his professional activities, in 2002, he led a group to establish the Institute for Future Space Transport, a seven-university consortium funded by NASA, under the University Research, Engineering and Technology Institutes program (now called the Constellation University Institutes Program, CUIP). In 2006, he served as the principal investigator to lead the establishment of the Michigan/AFRL/Boeing Collaborative Center in Aeronautical Sciences (MAB-CCAS), a five-year endeavor sponsored by the Air Force Research Laboratory. In 2007, he was the principal investigator of a Multidisciplinary University Research Initiative (MURI) project, sponsored by DoD, on Biologically-Inspired, Anisotropic Flexible Wing for Optimal Flapping Flight. The foundations of Alcoa, Ford, and TRW selected him as a recipient for their unrestricted research grants, with no string attached and no deliverables required.

AWARDS & HONORS

- Fellow of American Institute of Aeronautics and Astronautics (AIAA) & American Society of Mechanical Engineers (ASME)
- General Electric Research and Development Center: Publications Award (1986)
- Chinese Society of Mechanical Engineers (Taiwan): Research Paper Award (1987)
- AIAA: Service Citation (1993)
- NASA Kennedy Space Center: Certificate of Appreciation (1999) & Productivity Award (1999)
- AIAA Pendray Aerospace Literature Award (2003) with the citation "For significant contributions to research and publications in computation and modeling techniques for a broad range of aerospace applications."
- ASME Heat Transfer Memorial Award (2005), with the citation "For outstanding and archival contributions to the thermal sciences in a number of areas including modeling of phase-change and moving boundary heat transfer problems, convective flows in complicated domain, air-breathing and rocket combustion, materials thermal processing, and turbo-machinery flows."
- Listed in Who's Who in America (since 1993), Who's Who in Science and Technology (since 1993), Who's Who in the World (since 1994), International Directory of Distinguished Leadership (since 1988), etc.
- Distinguished Alumnus Award, Department of Power Mechanical Engineering, National Tsing-Hua University (2009).

- The Engineers' Council (Sherman Oaks, CA): 2009 Distinguished Educator Award, with the citation "In Recognition of Outstanding Contributions to the Engineering Profession as a Teacher, Researcher, Mentor to Students and Staff, and Leader in Working Together with Industry." <http://www.engineerscouncil.org/>
- The article entitled Effects of Nucleus on Leukocyte Recovery, published in *Annals of Biomedical Engineering*, Vol. 27, (1999), pp. 648-655, was featured as the Cover Article of the issue.
- The article entitled Evaluation of geometric conservation law using pressure-based fluid solver and moving grid technique published in *International Journal of Numerical Methods for Heat & Fluid Flow* (2004) was chosen as the Outstanding Paper Award Winner at the Literati Club Awards for Excellence 2005.
- The article entitled Multi-scale Thermo-fluid Transport in Porous Media, published in *International Journal of Numerical Methods for Heat & Fluid Flow* was chosen as a Highly Commended Award Winner at the Literati Network Awards for Excellence 2009.
- The article entitled Flow Structures of Gaseous Jets Injected into Water for Underwater Propulsion, published in *Acta Mechanica Sinica*, Vol. 27, (2011), pp.461-472, was featured as the Focused Paper of the issue.
- The article entitled Effects of Flexibility on the Aerodynamic Performance of Flapping Wings, published in *Journal of Fluid Mechanics*, Vol. 689, (2011), pp. 32-74, was featured as the Cover Article of the issue.
- Distinguished Alumnus Award, National Tsing-Hua University (2013).
- University of Michigan 2013 Alumni Merit Award for the Department of Aerospace Engineering.
- Officer of the Legion of Honor by the French government (2021).

OTHER PROFESSIONAL ACTIVITIES

Editorship

- *Cambridge University Press: Cambridge Aerospace Book Series*: General Editor (2000-present); Cambridge Elements (Aerospace Engineering) (2020-present)
- *ASME Applied Mechanics Reviews*: Associate Editor (2002-2010)
- *Computer Modeling in Engineering & Sciences*: Associate Editor (2002-2004)
- *Acta Mechanica Sinica*: Associate Editor (2004-2007); Co-Editor-in-Chief (2008-2018)
- *Encyclopedia of Aerospace Engineering*: Co-Editor-in-Chief (2007-present)
- *Communications in Computational Physics*: Associate Editor (2009-present)

Member of Editorial Boards

- *AIAA Journal*
- *Progress in Aerospace Sciences*
- *Numerical Heat Transfer: An International Journal of Computation and Methodology* (Part A: Applications, Part B: Fundamentals)
- *Progress in Computational Fluid Dynamics*: An International Journal
- *International Journal for Numerical Methods in Heat and Fluid Flow*
- *International Journal for Numerical Methods in Fluids*
- *Chinese Journal of Aeronautics*
- *Transactions of the Aeronautical and Astronautical Society of the Republic of China* (Taiwan)
- *Frontiers of Energy and Power Engineering in China*
- *International Journal of Fluid Machinery and Systems*
- *Journal of Computational Surgery*

Selected Summary of Professional and Public Services

- NASA Consortium of Computational Fluid Dynamics for Propulsion Design (1990-1994)
- ASME Heat Transfer Division, Aerospace Heat Transfer (K-12) Committee (1994-2000)
- National Science Foundation (Committee of Visitors, 1997)
- Director of NASA Florida Space Grant Consortium (1998-2000)
- University of Florida Presidential Search Advisory Committee (1999)
- APS Fluid Dynamics Prize Selection Committee (Vice Chair, 1999-2000; Chair, 2000-2001)
- AIAA Pendray Literature Award Selection Committee (2003-2008)
- Universities Space Research Association (USRA) International Working Group (2003-2004)
- Air Force Research Laboratory- Air Vehicles Directory Awards Selection Committee (2005)
- University of Michigan College of Engineering Dean's Search Advisory Committee (2005)
- Referee of the State Natural Science Award of the People's Republic of China (2006)
- Panelist of National Research Council's Space Studies Board: Committee on Meeting the Workforce Needs for the National Vision for Space Exploration (2006)
- University of Michigan Department of Mechanical Engineering Chair Search Advisory Committee (2007)
- External Advisory Committee of Department of Aeronautics and Astronautics, University of Washington (2007-present)
- Naval Research Laboratory External Review Panelist of Materials and Chemistry Technology S&T Program (2008)
- School of Aerospace Engineering, Technical University of Delft: International Peer Review Committee (2008)
- Department of Mechanical Engineering Academic Advisory Committee, Hong Kong University of Science and Technology (2009 - 2010)
- Department of Aerospace Engineering, Korea Advanced Institute of Science and Technology: Global Advisory Board (2011, 2016)
- Member of Higher Education Evaluation and Accreditation Council of Taiwan, for National Taiwan University (December 2011)
- Member of Board of Directors, Hong Kong Science and Technology Parks Corporation (July 2012 - 2018)
- Member of University Advisory Board, Coursera (2013-2016)
- Member of University Grants Committee (Hong Kong) (January 2014 – January 2018)
- Member of Board of Governors of Technion, Israel Institute of Technology (June 2015 - present)

Patent

Shyy, W., Francois, M., and Chung, J. N., 2003, U.S. Patent No. 6,598,409: Thermal Management Device.

PUBLICATIONS

Books Authored

1. Shyy, W. (author), *Computational Modeling for Fluid Flow and Interfacial Transport*, Elsevier, Amsterdam, The Netherlands, (1994, revised printing 1997); Dover, New York, (2006) xviii + 504 pages. {Reviews of this book: W.B.J. Zimmerman, *The Chemical Engineering Journal*, Vol. 55, (1994); P.L. Roe, *AIAA Journal*, Vol. 32, (1994); B. Huang, *Drying Technology*, Vol. 12, (1994); L.A. Bertram, *Applied Mechanics Reviews*, Vol. 48, (1995); A. Iserles, *Journal of Fluid Mechanics*, Vol 305, (1995); H. Muthsam, *Monatshefte fur Mathematik* (1996)}
2. Shyy, W., Udaykumar, H.S., Rao, M.M., and Smith, R.W. (authors), *Computational Fluid Dynamics with Moving Boundaries*, Taylor & Francis, Washington, DC, (1996, revised printing 1997, 1998 & 2001); Dover, New York, (2007), xviii + 285 pages {Reviews of this book: S. Bhaduri, *Applied Mechanics Reviews*, Vol. 50, (1997); D. Kothe, *AIAA Journal*, Vol. 36 (1998)}.
3. Shyy, W., Thakur, S.S., Ouyang, H., Liu, J., and Blosch, E. (authors), *Computational Techniques for Complex Transport Phenomena*, Cambridge University Press, New York, hardcover (1997), paperback (2005), xviii + 321 pages. {Review of this book : W.M. Worek, *Applied Mechanics Reviews*, Vol. 52, (1999); *Mathematics Abstract*, April (1999); *AICHe J.*}
4. Shyy, W., Lian, Y., Tang, J., Viieru, D., and Liu, H. (authors), *Aerodynamics of Low Reynolds Number Flyers*, Cambridge University Press, New York, (2008, 2009, 2011; paperback 2011). {Review of this book: M. Platzer, *AIAA Journal*, Vol. 47, (2009)}.
5. Shyy, W., Aono, H., Kang, C.-K., and Liu, H. (authors), *An Introduction to Flapping Wing Aerodynamics*, Cambridge University Press, New York (2013).
6. Hefler, C., Kang, C.-K., Qiu, H., and Shyy, W. (authors), *Distinct Aerodynamics of Insect-Scale Flight*, Cambridge University Press, New York (2021).

Edited Books/Proceedings/Special Issues

1. Chao, C. C., Orszag, S. A., and Shyy, W. (editors): *Recent Advances in Computational Fluid Dynamics*, Lecture Notes in Engineering, Vol. 43, Springer-Verlag, New York, (1989) vi + 529 pages.
2. Atreya, A., Gritzko, L., Saltiel, C., and Shyy, W. (editors): *Fire and Combustion System*, Volume 2 of the Proceedings of the Heat Transfer Division, 1995 ASME International Mechanical Engineering and Exposition, HTD-Vol. 317-2, New York, (1995), pp. 1-212.
3. Shyy, W., and Narayanan, R. (editors): *Fluid Dynamics at Interface*, Cambridge University Press, (1999), paperback (2010), xvi + 461 pages.
4. Shyy, W. (editor): *Applied Mechanics Reviews - Special Issue on Animal Locomotion in Fluids, and Its Mimicry*, July (2005).
5. Abate, G., Ol, M., and Shyy, W. (editors): Special Section on *Biologically Inspired Aerodynamics*, *AIAA Journal*, Vol. 46, (2008), pp. 2113-2190.
6. Blockley, R., and Shyy, W. (editors-in-chief): *Encyclopedia of Aerospace Engineering*, printed version published by Wiley-Blackwell in November 2010, 9 volumes, 5648 pages; online version updated annually.

Refereed Articles in Journals/Books

1. Shyy, W., and Adamson, T.C., Jr., "Analysis of Hydrocarbon Emissions from Conventional Spark-Ignition Engines," *Combustion Science and Technology*, Vol. 33, (1983), pp. 245-260.
2. Shyy, W., "Determination of Relaxation Factors for High Cell Peclet Number Flow Simulation," *Computer Methods in Applied Mechanics and Engineering*, Vol. 43, (1984), pp. 221-230.
3. Shyy, W., "A Study of Finite Difference Approximations to Steady-State, Convection-Dominated Flow Problems," *Journal of Computational Physics*, Vol. 57, (1985), pp. 415-438.
4. Shyy, W., Tong, S.S., and Correa, S.M., "Numerical Recirculating Flow Calculation Using a Body-fitted Coordinate System," *Numerical Heat Transfer*, Vol. 8, (1985), pp. 99-113.

5. Shyy, W., "A Numerical Study of Annular Dump Diffuser Flows," *Computer Methods in Applied Mechanics and Engineering*, Vol. 53, (1985), pp. 47-65.
6. Shyy, W., "Numerical Outflow Boundary Condition for Navier-Stokes Flow Calculations by a Line Iterative Method," *AIAA Journal*, Vol. 23, (1985), pp. 1847-1848.
7. Correa, S.M., Drake, M. C., Pitz, R. W., and Shyy, W., "Prediction and Measurement of Non-Equilibrium Turbulent Diffusion Flame," *Twentieth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, (1985), pp. 337-343.
8. Braaten, M. E., and Shyy, W., "A Study of Recirculating Flow Computation Using Body-fitted Coordinates: Consistency Aspects and Mesh Skewness," *Numerical Heat Transfer*, Vol. 9, (1986), pp. 559-574.
9. Braaten, M. E., and Shyy, W., "Comparison of Iterative and Direct Solution Methods for Viscous Flow Calculations in Body-fitted Coordinates," *International Journal for Numerical Methods in Fluids*, Vol. 6, (1986), pp. 325-349.
10. Drake, M. C., Pitz, R. W., and Shyy, W., "Conserved Scalar Probability Density Functions in a Turbulent Jet Diffusion Flame," *Journal of Fluid Mechanics*, Vol. 171, (1986), pp. 24-51.
11. Shyy, W., and Vu, T.C., "A Numerical Study of Incompressible Navier-Stokes Flow through Rectilinear and Radial Cascade of Turbine Blades," *Computational Mechanics*, Vol. 1, (1986), pp. 269-279.
12. Shyy, W., and Braaten, M. E., "Three-Dimensional Analysis of the Flow in a Hydraulic Turbine Draft Tube," *International Journal for Numerical Methods in Fluids*, Vol. 6, (1986), pp. 861-882.
13. Shyy, W., "A General Coordinate System Method for Computing Transport Phenomena," *Heat Transfer 1986*, (C. L. Tien, V. P. Carey and J. K. Ferrell (eds.)), Hemisphere, Washington, D.C., Vol.2, (1986), pp. 397-402.
14. Shyy, W., "An Adaptive Grid Method for Navier-Stokes Flow Computation," *Applied Mathematics and Computation*, Vol. 21, (1987), pp. 201-219.
15. Shyy, W., "An Adaptive Grid Method for Navier-Stokes Flow Computation II: Grid Addition," *Applied Numerical Mathematics*, Vol. 2, (1986), pp. 9-19.
16. Shyy, W., "Effects of Open Boundary on Incompressible Navier-Stokes Flow Computation: Numerical Experiments," *Numerical Heat Transfer*, Vol. 12, (1987), pp. 157-178.
17. Correa, S. M., and Shyy, W., "Computational Models and Methods for Continuous Gaseous Turbulent Combustion," *Progress in Energy and Combustion Science*, Vol. 13, (1987), pp. 249-292.
18. Drake, M. C., Correa, S. M., Pitz, R. W., Shyy, W., and Fenimore, C. P., "Superequilibrium and Thermal Nitric Oxide Formulation in Turbulent Diffusion Flames," *Combustion and Flame*, Vol. 69, (1987), pp. 347-365.
19. Shyy, W., Braaten, M. E., and Sober, J. S., "A Three-Dimensional Grid Generation, Procedure for Gas Turbine Combustor Flow Computations," *Journal of the CSME*, Vol. 8, (1987), pp. 1-9; also AIAA Paper No. 87-2024, *AIAA 25th Aerospace Sciences Meeting*, January 12-15, Reno, NV.
20. Braaten, M. E., and Shyy, W., "A Study of Pressure Correction Methods with Multigrid for Viscous Flow Calculations in Non-Orthogonal Curvilinear Coordinates," *Numerical Heat Transfer*, Vol. 11, (1987), pp. 417-442.
21. Shyy, W., "Adaptive Computation, Grid Smoothness and Numerical Boundary Treatment for Recirculating Navier-Stokes Flows," *Journal of the CSME*, Vol. 8, (1987), pp. 139-154.
22. Shyy, W., Tswei, Y-M., and Lee, D., "A Study of Lagrangian Models for Calculating Dilute Particle Flow, Part I: Basics," *Transactions of AARC*, Vol. 20, (1987), pp. 83-98.
23. Vu, T. C., and Shyy, W., "Navier-Stokes Computation of Radial Inflow Turbine Distributor," *ASME Journal of Fluids Engineering*, Vol. 110, (1988), pp. 29-32.
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