

Dr. Charles Hoke

Associate Teaching Professor

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Education

- 2013–2021 **Ph.D. in Aeronautical Engineering**, *University of New South Wales, Canberra, Canberra, Australian Capitol Territory, Australia*, Thesis: *Investigation of Flapping Foil Efficiency Using Active Deformation and in Near-Wall Effects*
Co-Advisors: Professor John Young and Professor Joseph Lai
- 2018–2019 **Graduate Certificate in University Learning and Teaching**, *University of New South Wales, Sydney, New South Wales, Australia*
- 2000–2001 **Master of Science in Aeronautics and Astronautics**, *Stanford University, Stanford, California, USA*
- 1995–2000 **Bachelor of Science in Mechanical Engineering**, *University of California, San Diego, La Jolla, California, USA*

Academic and Industry Employment History

- 2024–Present **Associate Teaching Professor**, *Ann and H.J. Smead Department of Aerospace Engineering Science, University of Colorado, Boulder, Colorado, USA*
- Awarded Engineering Excellence Fund (EEF) Grant to develop simulation resources for undergraduate aerospace engineering education
 - Undergraduate Curriculum Committee, ABET Accreditation Coordinator
 - Faculty Advisor, CU Aviation Club
- 2023–2024 **Deputy Head of School, Education**, *School of Engineering and Technology, University of New South Wales, Canberra, Australian Capitol Territory, Australia*
- Management of all UG and PG programs for the school, encompassing near 100 courses, 60+ faculty members, and over 300 undergraduate students and 250 postgraduate students.
 - Direct supervisor for 10 faculty, both undergraduate and postgraduate program coordinators.
 - Responsible for management of the following for the school:
 - Management of five Undergraduate programs (Aeronautical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, and Naval Architecture)
 - Management of five Postgraduate programs (Masters of Capability Management, Masters of Explosive Ordnance, Masters of Project Management, Masters of Space Engineering, Masters of Space Operations)
 - Academic staff workload and teaching allocation (60+ staff)
 - Management of all University program and course evaluations
 - Management of the accreditation of all programs.
 - Recruitment of teaching staff, including fractional EF and casual teaching support staff
 - Development and implementation of systems to ensure the quality of the school's education programs
 - Lead the school's representation at the Academic Program Committee and Academic Quality Committee
 - Lead and coordinate regular review of School's courses and programs and develop and monitor action plans for Faculty support list courses
 - Prepare submissions as required by the School within the DHoS(E) portfolio for internal/external reviews and Faculty requests.
 - Build and sustain excellent relationships with relevant external and internal stakeholders
 - Assist the Head of School in developing a strategic direction for the School's education programs
 - Act as Head of School when required

- 2022–2023 **Distinguished Visiting Professor**, *Department of Aeronautics, United States Air Force Academy, Colorado Springs, Colorado, USA*
- Developed and offered cadet independent research projects in the fields of hypersonic fluid-structure interaction.
 - Taught two upper-division advanced classes, Hypersonics and Advanced Aerodynamics
 - Reviewed content of departmental courses in the aerodynamics sequence and recommended revisions regarding pedagogy and modern engineering education practices.
 - Presented Scholarship of Learning and Teaching (SoTL) research presentation entitled "Identification of USAFA Core Class Grading System Framing Effects and Correlation with Final Grade Distributions." at the 2023 USAFA SoTL Forum.
 - Delivery of department seminar entitled "Research and Teaching at the Australian Defence Force Academy"
 - Awarded the "Dean of Engineering Teaching Certificate"
- 2012–2023 **Senior Lecturer**, *School of Engineering and Information Technology, University of New South Wales, Canberra, Australian Capitol Territory, Australia*
- Education Focussed Academic Position, Senior Lecturer, UNSW Canberra (2019-Present)
 - Head of Learning and Teaching, School of Engineering and IT Course Quality Assurance Coordinator, 2020 – 2022
 - Masters program coordinator, Capability Management Master's Degree (2014-2021).
 - Course Convener and Curriculum Developer, UNSW at ADFA Aircraft Design Sequence, 2012 – 2022
 - ZEIT 3504, Aircraft and Systems Design 1, ZEIT 4502, Aircraft and Systems Design 2
 - Major curriculum developments, including introduction of virtual flight testing, authentic assessment design
 - Introduced completely external-sponsored design projects from Australian Army, Navy, Air Force, government, and industry design partners. Course sequence culminates in external design review from all participating partners.
 - Lecturer and Course Convener, Postgraduate: ZEIT 8503 Aerospace Vehicle Technologies
 - Course Developer and Course Coordinator: RAAF Aeronautical Engineering Fundamentals Course (Online, Distance Asynchronous Delivery)
- 2008–2012 **Multi-Disciplined Engineer IV**, *Department of Aeronautics, Raytheon Missile Systems, Tucson, Arizona, USA*
- Lead Aerodynamicist, Aegis Ashore Standard Missile Program as well as support to multiple other missile programs
 - Developed aero modeling capability using rapid inviscid CFD code, drastically increasing conceptual design fidelity
 - Supported major wind tunnel test programs for Standard Missile Programs including data analyst and test engineer duties
 - Polysonic Wind Tunnel (PSWT) facility at Boeing, St. Louis, Missouri
 - Von Karman Facility (VKF) Tunnel B Supersonic Wind Tunnel at Arnold Air Force Base, Tennessee
- 2004-2008 **Assistant Professor**, *Department of Aeronautics, United States Air Force Academy, Colorado Springs, Colorado, USA, Captain*
- Instructor, US Air Force Test Pilot School, teaching compressible and supersonic aerodynamics to future test pilots
 - Instructor and Course Director, Aerodynamics Sequence (Fundamentals, Low-Speed, Computational, and Advanced Aero)
 - Selected to course direct entire aerodynamics sequence, improving and standardizing curriculum to improve learning
 - Recipient of USAFA Outstanding Academy Educator award for 2007 for outstanding teaching and professionalism
 - Served as American Institute of Aeronautics and Astronautics (AIAA) Region V Deputy Director for Education
 - Academic Advisor for 100+ Academy cadets – extensive mentorship and professional leadership experience

- 2001-2004 **Aeronautical Design Engineer**, *U.S. Air Force Research Laboratory*, Wright Patterson AFB, Ohio, USA, First Lieutenant
- Team lead / member on two research teams awarded the AFRL Team Technical Achievement Awards
 - Computational aerodynamic analysis in support of the NASA/Air Force X-43 Hypersonic Technology Demonstrator
 - Development of multi-disciplinary tools for analysis and design of hypersonic vehicles
 - Project Manager for joint Boeing/Air Force MDOPT program, “Multi-disciplinary Design Optimization” software
 - International Collaboration Experience on NATO Technical Cooperation Program examining NATO missile aerodynamics
 - Team Lead/Member, Space Countermeasures Hands-on Program (SCHOP), Kirtland AFB, NM

Teaching Experience

2024– Present **Associate Teaching Professor**, *Ann and H.J. Smead Department of Aerospace Engineering Science*, University of Colorado, Boulder, CO, USA

○ **Courses Taught:**

- Spring 2025 - ASEN 2704, Introduction to Aerospace Vehicle Design
- Spring 2025 - ASEN 4028, Senior Design Projects 2: Design Practicum
- Fall 2024 - ASEN 3802, Aerospace Laboratory II
- Fall 2024 - ASEN 4018, Senior Design Project 1: Design Synthesis

2023– Present **Senior Lecturer and Deputy Head of School Education**, *School of Engineering and Technology*, University of New South Wales, Canberra, Australia

○ **Courses Taught:**

- S2 2024 - AEFC - Aeronautical Engineering Fundamentals Course (Short Course)
- S2 2024 - ZEIT 4013 - Hypersonics and Advanced Propulsion
- S1 2024 - ZEIT 4502 - Aircraft and Systems Design II
- S1 2024 - AEFC - Aeronautical Engineering Fundamentals Course (Short Course)
- S2 2023 - ZEIT 8503 - Aerospace Vehicle Technologies
- S2 2023 - ZEIT 3501 - Aircraft and Systems Design I

2022–2023 **Distinguished Visiting Professor**, *Department of Aeronautics*, United States Air Force Academy, Colorado Springs, CO, USA

○ **Courses Taught:**

- Fall 2022 - Aero 442 - Advanced Aerodynamics
- Spring 2023 - Aero 472 - Advanced Computational Aerodynamics
- Spring 2023 - Aero 456 - Hypersonics

Teaching Experience (con't)

2012–2022 **Senior Lecturer**, *School of Engineering and Information Technology, University of New South Wales, Canberra, Australia*

○ Courses Taught:

- S1 2022 - ZEIT 4502 - Aircraft and Systems Design II
- S1 2022 - AEFC - Aeronautical Engineering Fundamentals Course (Short Course)
- S2 2021 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2021 - ZEIT 4503 - Applied Thermodynamics and Propulsion
- S2 2021 - ZEIT 8503 - Aerospace Vehicle Technologies
- S2 2021 - AEFC - Aeronautical Engineering Fundamentals Course (Short Course)
- S1 2021 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2020 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2019 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2019 - ZEIT 4501 - Engineering Project II
- S2 2019 - ZEIT 8503 - Aerospace Vehicle Technologies
- S1 2019 - ZEIT 4500 - Engineering Project I
- S1 2019 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2018 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2018 - ZEIT 4501 - Engineering Project II
- S2 2018 - ZEIT 8503 - Aerospace Vehicle Technologies
- S1 2018 - ZEIT 4500 - Engineering Project I
- S1 2018 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2017 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2017 - ZEIT 4501 - Engineering Project II
- S2 2017 - ZEIT 8503 - Aerospace Vehicle Technologies
- S1 2017 - ZEIT 4500 - Engineering Project I
- S1 2017 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2016 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2016 - ZEIT 4501 - Engineering Project II
- S2 2016 - ZEIT 8503 - Aerospace Vehicle Technologies
- S1 2016 - ZEIT 4500 - Engineering Project I
- S1 2016 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2015 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2015 - ZEIT 4501 - Engineering Project II
- S2 2015 - ZEIT 8503 - Aerospace Vehicle Technologies
- S1 2015 - ZEIT 4500 - Engineering Project I
- S1 2015 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2014 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2014 - ZEIT 4501 - Engineering Project II
- S2 2014 - ZEIT 8503 - Aerospace Vehicle Technologies
- S1 2014 - ZEIT 4500 - Engineering Project I
- S1 2014 - ZEIT 4502 - Aircraft and Systems Design II
- S2 2013 - ZEIT 8503 - Aerospace Vehicle Technologies
- S2 2013 - ZEIT 3701 - Heat Transfer and Refrigeration
- S1 2013 - ZEIT 3501 - Aircraft and Systems Design I
- S2 2012 - ZEIT 8503 - Aerospace Vehicle Technologies
- S2 2012 - ZEIT 4502 - Aircraft and Systems Design II

Teaching Experience (con't)

2004–2008 **Assistant Professor**, Department of Aeronautics, United States Air Force Academy, Colorado Springs, CO, USA

○ Courses Taught:

- Spring 2008 - Aero 315 - Fundamentals of Aeronautics
- Spring 2008 - Aero 442 - Advanced Aerodynamics (course director)
- Fall 2007 - Aero 315 - Fundamentals of Aeronautics
- Fall 2007 - Aero 342 - Computational Fluid Dynamics (course director)
- Spring 2007 - Aero 315 - Fundamentals of Aeronautics
- Spring 2007 - Aero 341 - Aerodynamics (course director)
- Fall 2006 - Aero 315 - Fundamentals of Aeronautics (course director)
- Fall 2006 - Aero 442 - Advanced Aerodynamics
- Summer 2006 - Aero 315 - Fundamentals of Aeronautics (course director)
- Spring 2006 - Aero 342 - Computational Fluid Dynamics
- Spring 2006 - Aero 315 - Fundamentals of Aeronautics
- Fall 2005 - Aero 315 - Fundamentals of Aeronautics
- Fall 2005 - Aero 341 - Aerodynamics
- Spring 2005 - Aero 315 - Fundamentals of Aeronautics
- Fall 2004 - Aero 315 - Fundamentals of Aeronautics

Journal Articles

- Stanton, S.C., Hoke, C. M., Choi, S. J., & Decker, R.K. (2023). Nonlinear shock-structure interaction in a hypersonic flow. *Nonlinear Dynamics*, 111(19), 17617-17637.
- Hoke, C. M., Young, J., & Lai, J. C. (2023). Enhancing the power-extraction efficiency of a flapping foil by active morphing. *AIAA Journal*, 61(9), 4056-4069.
- Hoke, C. M., Young, J., Lai, J. C. S., Karakas, F., Zaloglu, B., & Fenercioglu, I. (2017). Investigation of oscillating-foil power generation in constrained flow. *Procedia Engineering*, 199, 3450-3455.
- Hoke, C. M., Young, J., & Lai, J. C. S. (2015). Effects of time-varying camber deformation on flapping foil propulsion and power extraction. *Journal of Fluids and Structures*, 56, 152-176.
- Moorhouse, D., Hoke, C., & Prendergast, J. (2002). Thermal analysis of hypersonic inlet flow with exergy-based design methods. *International Journal of Thermodynamics*, 5(4), 161-168.

Selected Professional Presentations

- Kirkpatrick, D., Dooner, D. D., Neely, A., Hoke, C., Wild, G., & Pollock, L. (2024). Characterization of Conformal Heaters for Measurement of High-Speed Fluid-Thermal-Structural Interactions. In *AIAA Aviation Forum and Ascend 2024* (p. 4112).
- Hoke, C. M. and Leonard, D. Identification of USAFA Core Class Grading System Framing Effects and Correlation with Final Grade Distributions. *2023 Scholarship of Learning and Teaching Forum*, United States Air Force Academy,
- Stout, N. J., Lorber, M. T., & Hoke, C. M. (2023). Investigation of a Hypersonic Shock Wave Boundary Layer Interaction on a Flexible Plate. In *2023 Regional Student Conferences* (p. 71934).
- Hoke, M., Smith, W. F., & Wilson, K. F. (2018, January). Effectiveness of first year mentoring program on increasing student sense of belonging and correlation with motivation. In *29th Australasian Association for Engineering Education Conference* (p. 325).
- Karakas, F., Zaloglu, B., Fenercioglu, I., Hoke, C., Young, J., Lai, J., & Platzer, M. F. (2016). On optimal oscillating-foil power generation in free and constrained flow. In *54th AIAA Aerospace Sciences Meeting* (p.2070).
- Hoke, C. M., Young, J., & Lai, J. (2014). Time-varying flexible shape effects on flapping airfoil power extraction. In *32nd ASME Wind Energy Symposium*, p. 1217. 2014
- Hoke, C., Decker, R., Cummings, R., McDaniel, D., & Morton, S. (2009). Comparison of overset grid and grid deformation techniques applied to 2-dimensional naca airfoils. In *19th AIAA Computational Fluid Dynamics* (p. 3537)
- Hoke, C., Burnley, V., & Schwabacher, G. (2004, August). Aerodynamic analysis of complex missile configurations using AVUS (air vehicles unstructured solver). In *22nd AIAA Applied Aerodynamics Conference and Exhibit* (p. 5452).