

Xuanhong An

Princeton University, Princeton, NJ 08544

Email: xuanhong@princeton.edu

RESEARCH INTERESTS

- Modeling, optimization and control of dynamic systems
- Unsteady fluid dynamics
- Bio-inspired fluid dynamic systems
- Model reduction for high dimensional data sets
- Experimental fluid dynamics
- Computational fluid dynamics
- Active flow control

CURRENT POSITION

Princeton University

Post-doctoral Research Associate in Mechanical and Aerospace Engineering,
Advisor: Professor Clarence W. Rowley, Ph.D.

Princeton, NJ

Started from May 2019

EDUCATION

Illinois Institute of Technology, Armour College of Engineering

Doctor of Philosophy in Mechanical and Aerospace Engineering,
Thesis: Low-order Modeling of Unsteady Aerodynamic Forces
Advisor: Professor David Williams, Ph.D.

Chicago, IL

July 2018

Illinois Institute of Technology, Armour College of Engineering

Master of Science in Mechanical and Aerospace Engineering
Thesis: Linear and Nonlinear Behavior of Transient Lift Response to Pulse-actuation
Advisor: Professor David Williams, Ph.D.

Chicago, IL

June 2014

Hebei Normal University, College of Physics and Information Engineering

Bachelor of Science in Physics, with honors
Advisor: Professor Shiping Yang, Ph.D.

Shijiazhuang, Hebei, China

July 2011

PUBLICATIONS

In Preparation

- X. An, D. Floryan, C. W. Rowley. "Optimal Gaits of Fish-like Swimming "
- X. An, D. R. Williams. "The Mechanism of Lift and Pitching Moment Reversal"
- X. An, D. R. Williams. "Separated Flow Response to Actuator Bursts over an Airfoil "

Published

X. An, D. Floryan, C. W. Rowley. "Optimal Gaits of Fish-like Swimming, " AIAA SciTech 2021

X. An, D. R. Williams, J. D. Eldredge, T. Colonius. "Lift Coefficient Estimation for Rapidly Pitching Airfoil, " Experiments in Fluids 62, 11 (2021)

X. An, D. R. Williams, M. S. Hemati. "A Hybrid Model for Lift Response to Dynamic Actuation on A Stalled Airfoil, " Energies, 13 (4), [855] (invited)

X. He, X. An, M. Provost, and D R. Williams. "Pressure Feedback Active Flow Control of Unsteady Roll Moment on a UCAS Delta Wing, " AIAA SciTech 2019, At San Diego, California

X. He, M. Provost, X. An, D. R. Williams. "Unsteady Roll Moment Control using Active Flow Control on a Delta Wing, " Active Flow and Combustion Control 2018, Berlin, Germany (invited)

X. An, D. R. Williams, A. Silva, T. Colonius, J. D. Eldredge. "Response of the Separated Flow over an Airfoil to a Short-Time Actuator Burst," AIAA Aviation 2017, At Denver, Colorado

A. Medina, M. Ol, D. R. Williams, **X. An**, M. S. Hemati. "Modeling of Conventional Flaps at High Deflection-Rate," AIAA SciTech 2017, At Grapevine, Texas

X. An, D. R. Williams, J. D. Eldredge, T. Colonius. "Modeling Dynamic Lift Response to Actuation," AIAA SciTech 2016, At San Diego, California

D. R. Williams, **X. An**, S. Iliev, R. King, F. Reißner. "Dynamic Hysteresis Control of Lift on a Pitching Wing," Experiments in Fluids 56 (5), 1-12 (invited)

X. An, L. Grimaud, and D. R. Williams. "Feedforward Control of Lift Hysteresis during Periodic and Random Pitching Maneuvers," Active Flow and Combustion Control 2014, Berlin, Germany (invited)

CONFERENCE PRESENTATIONS

X. An, D. Floryan, C. W. Rowley. "Optimal Gaits of Fish-like Swimming," AIAA SciTech 2021

X. An, D. R. Williams. "A Hybrid Low-order Model of Dynamic Lift Response to Time-varying Actuation," APS-DFD 2019, Seattle, Washington

D. Floryan, **X. An**, C. W. Rowley. "Efficient optimization of swimming gaits," APS-DFD 2019, Seattle, Washington

X. An, D. R. Williams. "From flowfield measurement to low-order modeling of pulsed actuation over separated flow," AIAA Aviation 2018, Atlanta, Georgia (**Invited**)

X. An, D. R. Williams, A. Silva, T. Colonius, J. D. Eldredge. "Response of the Separated Flow over an Airfoil to a Short-Time Actuator Burst," AIAA Aviation 2017, Denver, Colorado

A. Medina, M. Ol, D. R. Williams, **X. An**, M. S. Hemati. "Modeling of Conventional Flaps at High Deflection-Rate," AIAA SciTech 2017, Grapevine, Texas

J. D. Eldredge, **X. An**, D. Darakananda. "Mathematical modeling of flipping flaps and flinging fins in fluids," APS-DFD 2016, Seattle, Washington

X. An, D. R. Williams, J. D. Eldredge, T. Colonius. "Modeling Dynamic Lift Response to Actuation," AIAA SciTech 2016, San Diego, California

J. D. Eldredge (PI) and D. Darakananda, T. Colonius and A. Silva. D. R. Williams and **X. An**. "Dynamic response and estimation of separated flows over airfoils," Air Force Review Meeting 2015

D. R. Williams **X. An** and L. Grimaud. "Feedforward Control of Lift Hysteresis during Periodic and Randomized Pitching Maneuvers. Conference," Active Flow and Combustion Control 2014" Berlin Germany

OTHER INVITED TALKS

X. An. "Unsteady Flow Separation and Fluid System Optimization", EPFL, 9 Nov 2020

D. Williams, **X. An**, and L. Grimaud. "Reduced Order Modeling of Separated Flows over Wings," Princeton University, 17 May 2014

X. An, and D. Williams. "Understanding, Modeling and Estimating the Transient Behavior for the Burst Type Actuation," University of Notre Dame, 17 Nov 2017

PUBLICATION REVIEWER

AIAA Journal

Advances in Aerospace Science and Technology

Frontiers of Information Technology & Electronic Engineering

Aerospace

International Journal of Aeroacoustics

Journal of Flow Control, Measurement & Visualization

AIAA SciTech

HONORS & SOCIETIES

Best Research Assistant Nominee, IIT	2017
Graduate Scholarship, IIT	2012-2018
Outstanding Thesis Award (the first place of 185 candidates), Hebei Normal University	2011
Individual scholarships, Hebei Normal University	2008, 2010
AIAA, APS, ASME	

ADVISING

Spring 2021: Leonardo Espinoza Zuniga (undergraduate student), Princeton University
Summer 2015: Diego Soares Gonçalves (visiting undergraduate student), IIT
Summer 2013: Leroy Okoro (undergraduate student), IIT

RESEARCH EXPERIENCE

- Post-doctoral Research Associate** *May 2019-*
Optimizing fluid dynamic systems using numerical simulation sponsored by Office of Naval Research
- Graduate Research Assistant** *Oct 2012-Apr 2019*
- Conducting research on active flow control, lift response of single, multiple pulse actuation and dynamic separation control at high angle of attack, Sponsored by Air Force Office of Scientific Research
 - Conducting research on optimal glide trajectory in an urban area for UAVs, Sponsored by Air Force of Scientific Research
 - Conducting Unsteady aerodynamic research for a wing in the unsteady flow, Sponsored by Air Force Office of Scientific Research
- Undergraduate Research Assistant** *Aug 2010-May 2011*
- Modeling discontinuous time-space background and analyzed particles (force) interaction within this system
 - Project leader of modification of a wave number measuring experiment sponsored by the university

TEACHING EXPERIENCE

- Teaching Assistant** *Aug 2017-Dec 2017*
- **Aircraft Design I**
Introductory aircraft design and flight dynamic course
 - **Aerodynamics of Aerospace Vehicles**
Introductory aerodynamic course

LIST OF REFERENCES

Professor Clarence W. Rowley, MAE Department, Princeton University, Email: cwrowley@princeton.edu, Phone: (609) 258-7321

Professor Jeff D. Eldredge, Mechanical and Aerospace Engineering Department, University of California, Los Angeles, Email: jdeldre@g.ucla.edu, Phone: (310) 206-5094

Professor David R. Williams, Mechanical and Aerospace Engineering Department, Illinois Institute of Technology, Email: williamsd@iit.edu, Phone: (312) 567-3192

Assistant Professor Maziar Hemati, Department of Aerospace Engineering and Mechanics, University of Minnesota, Email: mhemati@umn.edu, Phone: (612) 625-6857

Assistant Professor Scott T. M. Dawson, Mechanical and Aerospace Engineering Department, Illinois Institute of Technology, Email: sdawson5@iit.edu, Phone: (312) 567-3554