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Engineering & Scientific Consulting


# Diana Chin, Ph.D., P.E.

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## Professional Profile

Dr. Chin specializes in mechanical design and analysis, mechanical testing, data acquisition, and fluid mechanics. She is also familiar with experimental and computational methods for structural analysis as well as digital image processing techniques.

Dr. Chin has extensive experience designing and building custom mechanical test setups for measuring properties of materials, high frequency forces in complex mechanical systems, and other multiphysics phenomena. She uses her expertise to assist clients across a wide range of industries with mechanical design review, custom mechanical testing, and root-cause analyses.

Dr. Chin received her Ph.D. in mechanical engineering from Stanford University, where her research focused on designing, fabricating, and validating an experimental setup capable of resolving aerodynamic forces generated by freely flying birds and small aerial robots. This work involved designing and assembling custom fixtures with tight tolerances using a range of composite materials, as well as performing vibrational simulation, testing, and data analysis. Her research in aerodynamics and 3D kinematics of perch-to-perch flights is used to inform the design of more effective strategies for bimodal robots to transition to and from the air and perform aerial maneuvers. While at Stanford, Dr. Chin also completed autonomous robot and machine learning projects and served as a teaching assistant for the “Aerial Robot Design” graduate-level course.

Prior to joining Exponent, Dr. Chin completed two internships at Schlumberger, where she performed fatigue analysis in subsea landing strings and optimized structural elements through analytical and computational methods. Additionally, she conducted research in automatic control systems and computational fluid dynamics while completing her Bachelor’s degree in mechanical and aerospace engineering at Princeton University. In addition to her Bachelor’s degree, she also earned certificates in “Applications of Computing” and “Robotics and Intelligent Systems” from Princeton.

## Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Stanford University, 2019

M.S., Mechanical Engineering, Stanford University, 2016

B.S.E., Mechanical and Aerospace Engineering, Princeton University, 2014

National Defense Science and Engineering Graduate Fellowship, 2016

National Science Foundation Graduate Research Fellowship, 2016

 

Brit and Alex d'Arbeloff Stanford Graduate Fellowship in Science and Engineering, 2014

Princeton University Sau Hai Lam '58 Prize, 2014

Shapiro Prize for Academic Excellence, Princeton University, 2012

Honor Societies: Phi Beta Kappa (2014), Sigma Xi (2014), Tau Beta Pi (2013, 2014)

## Licenses and Certifications

Professional Engineer Mechanical, California, #40923

## Publications

Chin, D. D. and Lentink, D. (2020). Fluid moment and force measurement based on control surface integration. Exp. Fluids. 61, 18.

Deetjen M.E., Chin D. D., and Lentink, D. (2020). The aerodynamic force platform as an ergometer. J Exp Biol. 223, 10.

Chin, D. D. and Lentink, D. (2019). Birds repurpose the role of drag and lift to take off and land. Nat. Commun. 10, 5354.

Roderick, W. R. T.‡, Chin, D. D.‡, Cutkosky, M. R., Lentink, D. (2019). Birds land reliably on complex surfaces by adapting their foot-surface interactions upon contact. eLife. 8:e46415.

Hightower, B. J., Ingersoll, R., Chin, D. D., Lawhon, C., Haselsteiner, A. F., and Lentink, D. (2017). Design and Analysis of Aerodynamic Force Platforms for Free Flight Studies. Bioinsp. Biomim. 12: 064001.

Chin, D. D. ‡, Matloff, L. Y. ‡, Stowers, A. K. ‡, Tucci, E. R. ‡, and Lentink, D. (2017). Inspiration for Wing Design: How Forelimb Specialization Enables Active Flight in Modern Vertebrates. J. R. Soc. Interface. 14: 20170240.

Chin, D. D. and Lentink, D. (2017). How birds direct impulse to minimize the energetic cost of foraging flight. Sci. Adv. 3: e1603041.

Gutierrez, E., Quinn, D. B., Chin, D. D., and Lentink, D. (2016) Lift calculations based on accepted wake models for animal flight are inconsistent and sensitive to vortex dynamics. Bioinsp. Biomim. 12: 016004.

Chin, D. D. and Lentink, D. (2016). Flapping wing aerodynamics: from insects to vertebrates. J. Exp. Biol. 219, 920-932.

**Presentations**

Chin DD and Lentink D. Avian locomotion strategies during arboreal foraging. Society for Integrative and Comparative Biology, Tampa, FL. 2019. (Oral)

Roderick WRT‡, Chin DD‡, Cutkosky MR, Lentink D. Preparing for takeoff and sticking the landing: Bird behavior and biomechanics at the interface of flight and surface locomotion. Society for Integrative and Comparative Biology, Tampa, FL. 2019. (Poster)

Chin DD and Lentink D. How birds direct impulse to minimize the energetic cost of foraging flight. World

Congress of Biomechanics, Dublin, Ireland. 2018. (Poster).

Chin DD and Lentink D. Avian locomotion strategies during arboreal foraging. Society for Integrative and Comparative Biology, Tampa, FL. 2019. (Oral)

Chin DD‡, Roderick WRT‡, Yang YW, Cutkosky MR, Lentink D. Preparing for takeoff and sticking the landing: At the interface of flight and surface locomotion. Society for Integrative and Comparative Biology, San Francisco, CA. 2018. (Oral)

Chin, DD and Lentink D. How birds direct impulse to minimize the energetic cost of foraging flight. American Physical Society Division of Fluid Dynamics. Denver, CO. 2017. (Oral)

Chin DD‡, Roderick WRT‡, Yang YW, Cutkosky MR, Lentink D. Preparing for takeoff and sticking the landing: At the interface of flight and surface locomotion. Mechanical Engineering Conference, Stanford, CA. 2017. (Winner of best poster award)

Chin DD and Lentink D. How birds direct impulse to minimize the energetic cost of foraging flight. Society for Integrative and Comparative Biology, New Orleans, LO. 2017. (Oral, Honorable mention for the Mimi A. R. Koehl and Steven Wainwright Student Presentation Award)

Chin D. and Rowley CW. Active control for a riderless bicycle. Princeton, NJ. 2014. (Poster)

Chin D. and Stone, HA. Characterizing flow in T-junctions of varying aspect ratios. Princeton, NJ. 2013. (Poster)

Chin D. Taylor, P. Chiu, Y., and Gmachl, C. Mode filtering of a 14 micron QC laser via single and multi-mode fibers. MIRTHE workshop. Princeton, NJ. 2011. (Poster).

## Peer Reviews

Scientific Reports

Royal Society Open Science

Nature Ecology and Evolution

Communications Biology