

Hasso Plattner Design Thinking Research Program

COMMUNITY
BUILDING
WORKSHOP
PROGRAM

February 5-7, 2017
Stanford Faculty Club
439 Lagunita Drive
Stanford, CA 94305



SUNDAY, FEBRUARY 5

6:00pm **Welcome Dinner** (On campus - Building 550, room 200)

MONDAY, FEBRUARY 6

Stanford Faculty Club: Red Lounge

8:30am Arrival and Breakfast

9:00am **Welcome and Opening Remarks** Larry Leifer & Christoph Meinel

9:30am **Introduction & Warm Up Activity** Crystal Pennywell, Rebecca Currano, & Neeraj Sonalkar

10:30am **Workshop Session IA – Project Specific Focus**

Present Challenges and Collect Feedback Project Teams

Preparation: (1) Create a 3-minute project overview video & (2) Bring a list of 3 challenges or questions you would like to receive feedback on.

11:30am *Break (15 min)*

11:45am **Workshop Session IB – Project Specific Focus**

Define Actionable Changes based on Feedback Project Teams

1:00pm *Lunch Break (1 hr)*

2:15pm *Walk to Gates Building (15-30 min)*

2:30pm **Lab Tours**

Prof. Michael Bernstein's Lab (2:30 – 3pm)
Gates 104, Gates Computer Science Building
353 Serra Mall, Stanford

Prof. James Landay's Lab (3:15 – 4:15pm)
Gates B23, Gates Computer Science Building
353 Serra Mall, Stanford

4:30pm *Break (1 hr)*

5:30 – 7:30pm **Dinner Event at Vino Locale**
431 Kipling St, Palo Alto, CA 94301
<http://www.vinolocale.com>



TUESDAY, FEBRUARY 7

Stanford Faculty Club: Red Lounge

8:30am	Arrival and Breakfast	
9:30 am	Keynote Speaker Talk title: "Avian Inspiration Design"	Prof. David Lentink
10:30am	<i>Break (15 min)</i>	
10:45am	Day 2 Warm Up Activity	Rebecca Currano & Neeraj Sonalkar
11:15am	Workshop Sessions IIA – Focused Project Interaction	
	5 Project Teams (to sign up) 11:15AM – 12:15PM	Project Teams
12:15pm	<i>Lunch (1 hr)</i>	
1:15pm	Workshop Session IIB - Focused Project Interaction	
	5 Project Teams (to sign up) 1:15 PM – 2:15 PM	Project Teams
2:15pm	<i>Break (15 min)</i>	
2:30pm	Workshop Session IIC - Focused Project Interaction	
	4 Project Teams (to sign up) 2:30 – 3:30 PM	Project Teams
3:30pm	Group Photo	
4:00pm	Closing Feedback Session	
5:00pm	<i>Adjourn</i>	

Note: Surveys will be distributed via email to provide additional "I wish, I like" feedback.



Workshop Keynote Speaker: Professor David Lentink

Talk Title: “Avian Inspiration Design”

Abstract

Many organisms fly in order to survive and reproduce. I am fascinated by the mechanics of flying birds, bats, insects, and autorotating seeds. Their development as an individual and their evolution as a species are shaped by the physical interaction between organism and surrounding air. It is critical that the organism’s architecture is tuned for propelling itself and controlling its motion. Flying macroscopic animals and plants maximize performance by generating and manipulating vortices. These vortices are created close to the body as it is driven by the action of muscles or gravity, then are ‘shed’ to form a wake (a trackway left behind in the fluid). I study how the organism’s architecture is tuned to utilize the fluid dynamics of vortices. Here I link the aerodynamics of insect wings to that of bat, maple seed and bird wings. The methods used to study all these flows range from robot fly models to maple seeds flying in a vertical wind tunnel and freeze dried swift wings tested in a low turbulence wind tunnel to freely flying birds in wind tunnels, flight arena’s and a novel aerodynamic force platform. The study reveals that animals and plants have converged upon the same solution for generating high lift: a leading edge vortex that runs parallel to the leading edge of the wing, which it sucks upward. Why this vortex remains stably attached to flapping animal and spinning plant wings is elucidated and linked to kinematics and wing morphology. While wing morphology is quite rigid in insects and maple seeds, it is extremely fluid in birds. Here I show how such ‘wing morphing’ significantly expands the performance envelope of birds during both gliding and flapping flight. Finally, I will show how these findings have inspired the design of new flapping and morphing micro air vehicles.

Speaker Biography

Professor Lentink's multidisciplinary lab studies biological flight, in particular bird flight, as an inspiration for engineering design. <http://lentinklab.stanford.edu> He has a BS and MS in Aerospace Engineering (Aerodynamics, Delft University of Technology) and a PhD in Experimental Zoology cum laude (Wageningen University). During his PhD he visited the California institute of Technology for 9 months to study insect flight. His postdoctoral training at Harvard was focused on studying birds. Publications range from technical journals to cover publications in Nature and Science. He is an alumnus of the Young Academy of the Royal Netherlands Academy of Arts and Sciences, recipient of the Dutch Academic Year Prize, the NSF CAREER award and he has been recognized in 2013 as one of 40 scientists under 40 by the World Economic Forum.