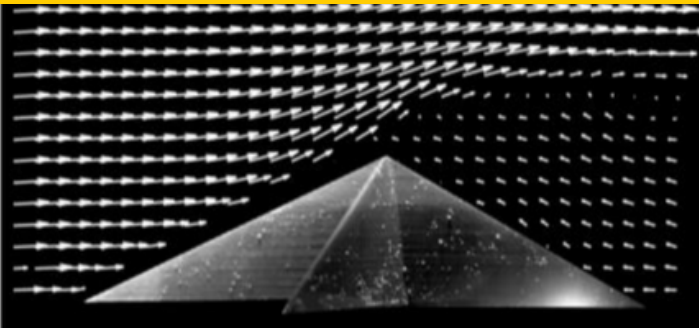
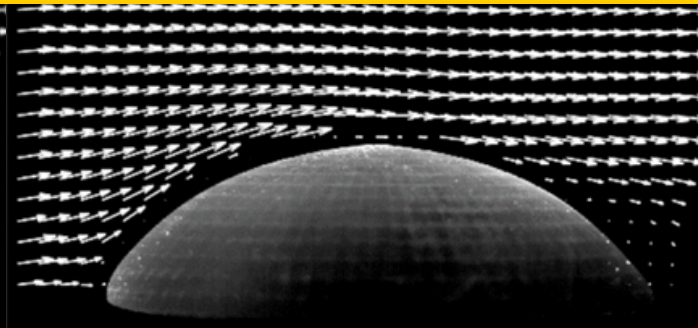


EXPERIMENTS

USC Viterbi



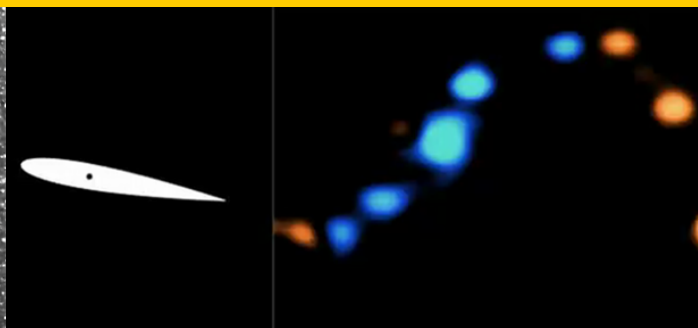
Flow around sea star model (Hermes 2021)



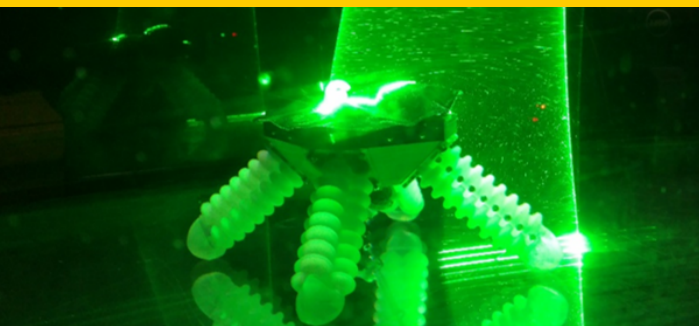
Flow around hemispherical dome (Hermes 2021)



Particle image velocimetry (PIV) for flapping foil (Jones 2022)



PIV vorticity measurement in foil wake (Jones 2022)



Shape morphing submersible robot (Ishida 2019)



Turbulent boundary layer setup (Eizenberg 2023)



Imaging long wave propagation (Chu 2023)

CONTACT



**Department of Aerospace and
Mechanical Engineering**

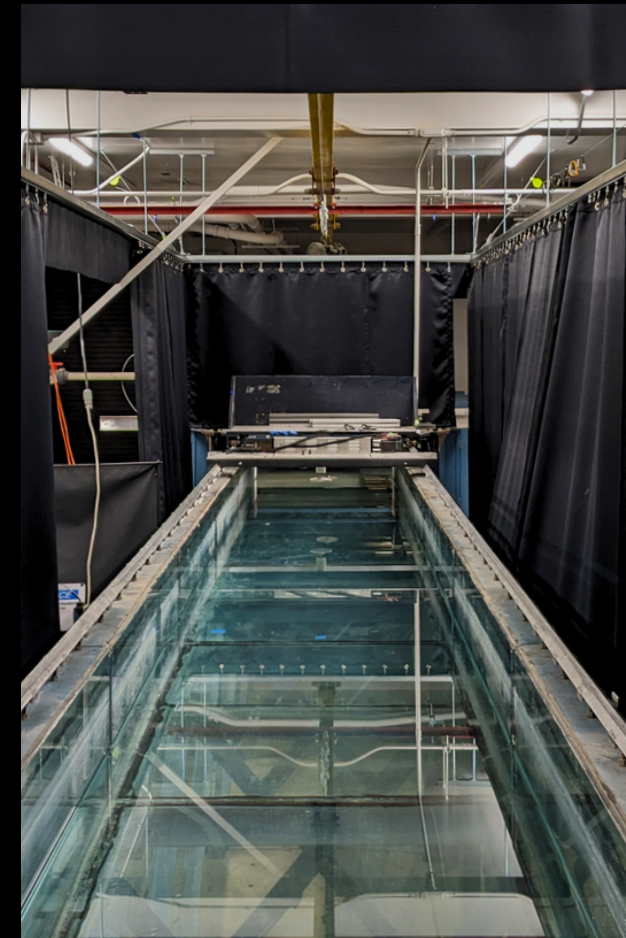
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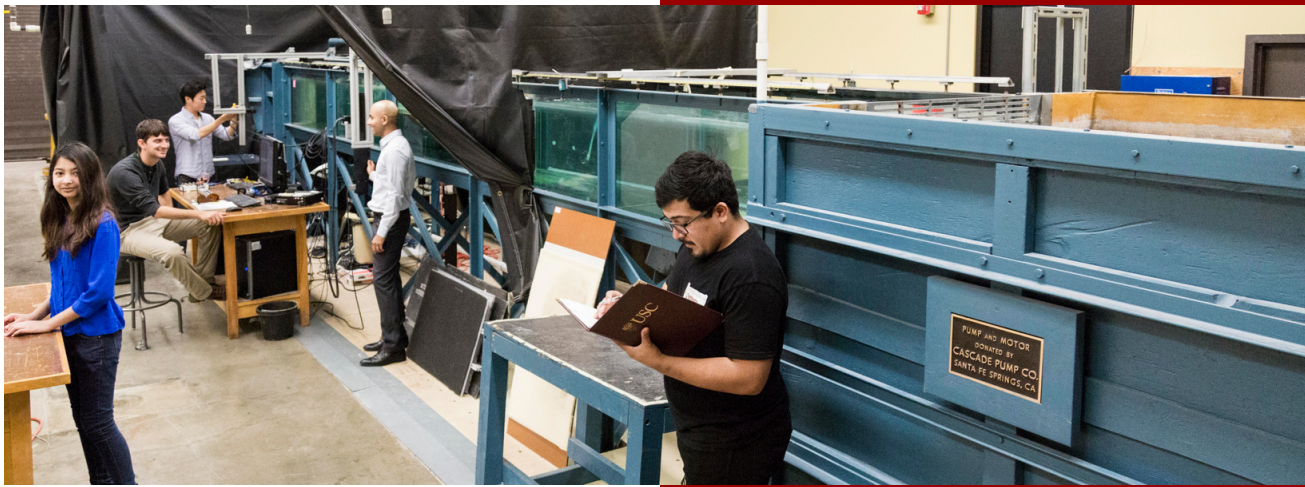
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BLUE WATER CHANNEL

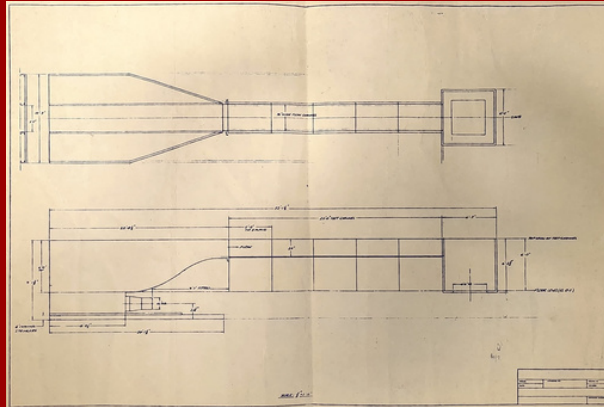


Rapp Engineering Building (RRB)
854 Downey Way
Los Angeles, CA 90089
sites.usc.edu/fsi



ABOUT

The water channel — fondly termed the Blue Water Channel (BWC) — was designed in-house at USC by Professors Richard Kaplan and Ron Blackwelder and graduate student Bob Amen. The BWC was constructed in 1987, as the south side of the Rapp Research Building was built around it. It has been in continuous operation since then, supporting hydrodynamic experiments for funded research, undergraduate students, and senior design projects.



Water channel schematic (c. 1986)

The BWC can hold over 40,000 liters of water — enough to fill 140 bathtubs!

SIGNIFICANCE

Numerous well-known experiments on boundary layer transition, and particularly the development and characterisation of turbulent spots, have been hosted here. The BWC has been used to determine self-propelled points for submerged bodies, and to show for the first time, certain peculiar aspects of flow around wings at moderate Reynolds number. It was also the facility used to develop the technology for the Kelly Slater Wave project. The BWC currently supports research on bio-inspired soft robots and propulsors, sensor fusion for flow reconstruction, and the evaluation of designer-configured porous and patterned surfaces for passive flow control.

CAPABILITIES

The BWC has a large test section (7.6m x 0.9m x 0.6m) and low turbulence levels for a water channel (less than 1%). It can act as a companion facility to the DWT since it can also focus on natural or forced transition mechanisms in transitional boundary layers.

INSTRUMENTATION

Velocity measurements can be made in the BWC using several existing systems, including:

- 2D laser doppler velocimeter (LDV) with a 500 mm standoff distance (MSE miniLDV).
- Submersible fiber-film hot wire boundary layer probes (Dantec miniCTA).
- 2D-2C particle image velocimetry (PIV) system consisting of a 5W CW laser and a 1 MP high-speed camera (Phantom VEO 410-L) capable of generating velocity measurements at 5200 Hz.
- 2D-2C PIV system comprising a double-pulsed Nd:YAG laser (Litron Nano-L PIV; 50 mJ/pulse) and a 4 MP CMOS camera (Dalsa Falcon2) capable of generating high-resolution velocity measurements at 50 Hz.

The test section is also fitted with a 6 DoF load cell (ATI Gamma) capable of generating high-resolution force and torque measurements for hydrodynamic models.