



SINGLE-PIXEL PIV FOR HIGH-RE TURBULENT PIPE FLOW

Thursday, April 28, 2022 | 2 pm

DeWalt Seminar Room
2164 Glenn L. Martin Hall

Speaker

JERRY WESTERWEEL

Prof.dr.ir.

Fluid Mechanics Chair

TU Delft, Netherlands



ABSTRACT

Conventional PIV is limited in spatial resolution, and spatially fully-resolved measurements at high Re turbulent flow either require specialised flow facilities or highly adapted measurement methods. Here we apply PIV with single-pixel resolution to an industrial-style pipe flow. With this approach we reach an order of magnitude higher spatial resolution in comparison to conventional PIV. Originally single-pixel PIV was developed to measure only the mean flow, but we are able to also extract second-order flow statistics, such as normal and Reynolds stresses. A novel development is the measurement of the spatial correlation by reconstructing the 2-point probability function for the velocity fluctuations. Using the single-pixel approach makes it possible to measure the velocity statistics over the full pipe diameter, while resolving down to buffer layer for a Reynolds number of 700×10^3 .

BIO

Prof.dr.ir. J. Westerweel is the Fluid Mechanics Chair at TU Delft, Netherlands and is also an Editor for Experiments in Fluids.

