

5. Tim Persoons



Research expertise and background

Dr. Tim Persoons is a thermal fluids mechanical engineer whose research centres on multi-scale convective heat transfer. My team's work is underpinned by analytical, experimental, and computational fluid dynamics, and mostly applied to thermal management of electronics systems. This focus is inspired by the rapidly growing energy use of electronics systems and data centres, and the need to better integrate these with our energy system through waste heat recuperation. The analogies between heat, mass and momentum transfer means that my work has also overlapped with active flow control methods, mass transfer in pharmaceutical applications as well as heat transfer and particle-fluid flow in biological systems. I received my PhD from KU Leuven, spent several years as postdoctoral fellow in Trinity College Dublin, KU Leuven and Purdue University before building my Trinity research team.

Current research interests / themes

- Experimental fluid mechanics measurement techniques
- Computational heat transfer and fluid dynamics
- Reduced order modelling of thermal fluids systems
- Analytical and theoretical modelling
- Multiphase (particle/droplet/bubble laden flows) transport phenomena

Potential areas for fellowship projects

Fellowship projects could focus on experimental or computational modelling of fluid flow and convective heat transfer around swimming fish models or more generic oscillating bodies in crossflow. Reduced order modelling could be used (e.g., physics informed neural networks or equivalent), in combination with high resolution experimental measurements (e.g., particle image velocimetry, laser Doppler velocimetry, time-resolved heat flux measurements) and CFD. Exploring overlaps with mechanical engineering applications could be particularly interesting, including drag reduction for bodies in crossflow, high lift devices for aviation, active flow control for electronics cooling.

Research profile / webpage

Trinity profile: <https://people.tcd.ie/Profile?Username=persoont>

Another relevant research webpage (if applicable): <https://timpersoons.org/>