Thomas LEWEKE

Senior Researcher | CNRS – IRPHÉ, Marseille

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PROFILE

Experimental researcher in fluid mechanics, specializing in vortex dynamics, wake stability and fluid-structure interactions. Expertise in flows around rotors (helicopters, wind turbines). Author of more than 90 publications, including two articles in the *Annual Review of Fluid Mechanics*. Co-inventor of three international patents. Collaborations with Monash University, RWTH Aachen, Cornell, DTU, KTH, ONERA and DLR.

PROFESSIONAL EXPERIENCE

2014 – present **Senior Researcher (*Directeur de Recherche*), 1st Class – CNRS**
IRPHÉ UMR 7342, CNRS/Aix-Marseille Université/Centrale Méditerranée · Teams: Aerodynamics, Fluid-Structure-Elasticity, Fluids & Solids

2007 – 2014 Senior Researcher (*Directeur de Recherche*), 2nd Class – CNRS
IRPHÉ, Aerodynamics team

1997 – 2007 Researcher (*Chargé de Recherche*), 1st Class – CNRS
IRPHÉ, Teams: Instabilities, Vortex Dynamics, Wakes, Aerodynamics

1995 – 1997 Postdoctoral researcher – Cornell University (USA), then IRPHÉ, Marseille
Group of C.H.K. Williamson, Sibley School of Mechanical and Aerospace Engineering

EDUCATION

2006 *Habilitation à Diriger des Recherches* (HDR) – Université de Provence, Marseille
Dissertation: "Vortices and wakes"

1994 **PhD in Fluid Mechanics – Université de Provence Aix-Marseille I**
Thesis: "Experimental study and modelling of the wake of a torus at low Reynolds number"

1991 *Diplom* in Physics (Fluid Mechanics) – RWTH Aachen

1988 *Maîtrise* in Physics – Université de Provence, Marseille

RESEARCH THEMES

Dynamics & stability of helical vortices · Rotor wakes (helicopters, wind turbines, drones) · Fluid-structure interactions · Bluff bodies near a wall · Vortices and gas-liquid interfaces

SELECTED PUBLICATIONS & PATENTS

- Leweke, Le Dizès, Williamson: Dynamics and instabilities of vortex pairs. *Annu. Rev. Fluid Mech.* **48**, 507 (2016)
- Thompson, Leweke, Hourigan: Bluff bodies and wake-wall interactions. *Annu. Rev. Fluid Mech.* **53**, 347 (2021)
- Quaranta, Brynjell-Rahkola, Leweke, Henningson: Local and global pairing instabilities of two interlaced helical vortices. *J. Fluid Mech.* **863**, 927 (2019)
- Xu, Thompson, Le Dizès, Leweke: Short-wave displacement instability of a helical vortex. *J. Fluid Mech.* **1041**, A23 (2026)
- Abraham, Castillo-Castellanos, Leweke: Simplified model for helical vortex dynamics in the wake of an asymmetric rotor. *Flow* **3**, E5 (2023)
- Eldemerdash, Leweke: Fluid-structure interaction of a flexible rotor in water. *J. Fluids Struct.* **103**, 103259 (2021)
- Leweke, Sørensen: Patent EP 4229293 / WO 2022/07883 / US 12,037,976. Wind turbine wake control using an asymmetric rotor (2024)
- Quaranta, Leweke: Patent EP 3406520 / US 10,843,810. Early detection of the Vortex Ring State (2019/20)

RESEARCH PROJECTS (since 2016)

2025–2029 ANR VFIN – Vortex and Fluid Interface (participant, WP Manager)

2022–2024 A*Midex RapiDO – High-frequency optical diagnostics (scientific lead)

2021–2023 SATT Sud-Est – Technology maturation "Asymmetric wind turbine" (lead)

2018–2021 ANR-DFG TWIN-HELIX – Dynamics and instabilities of helical vortex pairs (coordinator)

2015–2023 3 Australian Research Council Discovery Projects, with Monash University – rotating and rolling bluff bodies (partner)

2014–2017 Airbus Helicopters contract (lead)

2013–2016 ANR HELIX – Dynamics of helical vortices (coordinator)

SUPERVISION & TEACHING (since 2016)

PhD students	3 theses (2017, 2023, ongoing) + 6 international co-supervisions (Germany, Spain, Sweden, Australia, China)
Postdocs	2 postdoctoral researchers (2019–2023)
Interns	10 internships (Bachelor's, Master's, Grandes Écoles)
Master 2	Head of the “Fluid Mechanics & Nonlinear Physics” specialization, AMU/Centrale Méditerranée, 2007–2018

RESPONSIBILITIES & ACADEMIC SERVICE (since 2016)

Editorial	Associate Editor: *Journal of Fluids and Structures* (2006–23) · *Journal of Visualization* (2009–23)
Organization	Chairman BBVIV-7 (Marseille, 2018, 100 participants) · Chairman EFDC4 (Marseille, 2029, ~1000 participants)
Scientific committees	6 Wake Conferences 2017–2027 · IUTAM Vorticity & Vortices 2017 · Wind Energy Science Conference 2017
Reviewing	96 article reviews · 14 PhD thesis reports · 10 project reviews · 15 PhD committees · 2 HDR committees
Management	Head of the “Fluids & Solids” team, IRPHÉ (since 2024) · IRPHÉ Scientific Council (2018–23)
Outreach	MécaPixel CNRS Audience Award 2022 · Article in The Conversation · IRPHÉ FlashLab 2024/25/26

MAJOR INTERNATIONAL COLLABORATIONS

Monash University (Melbourne, 14 months as visiting researcher, 53 joint publications) · RWTH Aachen (ILR) · DTU Copenhagen · KTH Stockholm · Cornell University · University of Málaga · Shanghai Jiao Tong University · Airbus Helicopters · ONERA · DLR