

**Nicolas DIETRICH, Ph.D.**

**Full Professor in Chemical Engineering and Environmental Sciences**

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**Date of Birth:** June 12, 1980 | **Nationality:** French | **Age:** 44

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## CURRENT AND PAST POSITION

**2023–Present – Full Professor**, INSA Toulouse, Department of Chemical Engineering & Environment, affiliated with the Toulouse Biotechnology Institute (TBI), Toulouse, France.

**2009–2023 – Associate Professor**, INSA Toulouse, Department of Chemical Engineering & Environment, Toulouse Biotechnology Institute (TBI), Toulouse, France.

**2008–2009 – Assistant Professor**, École Nationale Supérieure des Industries Chimiques (ENSIC), Nancy, France.

**2005–2008 – Ph.D. Candidate**, Laboratoire des Sciences du Génie Chimique (LSGC), Nancy, France. Funded by the French Ministry of Higher Education and Research.

## EDUCATION AND QUALIFICATIONS

**2018 – Habilitation à Diriger des Recherches (HDR)** in Science, Institut National Polytechnique de Toulouse (INPT), France.

**Title:** “*Study of hydrodynamics and mass transfer at gas–liquid interfaces: optical visualization tools for process engineering modeling*”.

**2008 – Ph.D.** in Chemical Engineering, Institut National Polytechnique de Lorraine (INPL), Nancy, France.

**Title:** “*Étude locale et expérimentale des phénomènes interfaciaux*” (Local and Experimental Study of Interfacial Phenomena).

Conducted at the Laboratoire des Sciences du Génie Chimique (LSGC), under the supervision of Prof. Huai-Zhi Li and Dr. Souhila Poncin.

**2005 – Engineering Degree** in Chemical Industries (*Ingénieur des Industries Chimiques*), École Nationale Supérieure des Industries Chimiques (ENSIC), INPL, Nancy, France.

**2005 – Master’s Degree** in Chemical Engineering and Product Design, Institut National Polytechnique de Lorraine (INPL), Nancy, France.

## PEDAGOGICAL RESPONSIBILITIES

**2024–present – Director** of the Department of Chemical Engineering, Water, Energy and Environment (GP3E) at INSA Toulouse. The department trains approximately 50 students per year in a two-year engineering curriculum focused on sustainability, process optimization, and energy transition.

**2015–present – Head** of the Master's degree in *Complex Systems Engineering* (University of Toulouse, INSA Toulouse, INP Toulouse, IMT Mines Albi). This two-year interdisciplinary program (600 ECTS credits total) welcomes around 50 students annually across the Toulouse and Albi campuses.

**2013–present – Co-director** of the international Master’s program *Fluid Engineering for Industrial Processes* (INSA Toulouse and INP Toulouse). This two-year English-taught program (120 ECTS credits) hosts approximately 30 students per year, with a strong focus on transport phenomena and multiphase flows.

**2021–2023 – Pedagogical advisor** for the INSA Group (7 engineering schools) in the deployment of *Challenge-Based Learning* approaches, promoting active learning and interdisciplinary collaboration.

**2015–2022 – Academic coordinator** for the 4th-year engineering curriculum within the Process and Environmental Engineering Department at INSA Toulouse (60 ECTS credits, ~50 students/year), ensuring curricular coherence and alignment with industrial needs.

**2012–2017 – Coordinator** of the “Transition Semester” in Chemical Engineering for international students enrolled in the *n+i* network program at INSA Toulouse (26 ECTS credits, ~25 students/year), facilitating academic and cultural integration into the French engineering education system.

## TEACHINGS

My teaching activities focus on transport phenomena, fluid mechanics, unit operations for process engineering (distillation, extraction, absorption, etc.), industrial process design, as well as economic and societal approaches in process engineering. Over the past five years, I have delivered an average of approximately 270 hours/year (equivalent tutorials):

- **3rd to 5th year of the INSA Toulouse engineering program:** 20 hours of lectures, 50 hours of tutorials, 60 hours of lab work, and 40 hours of project supervision
- **M1/M2 Master of Science program (taught in English):** 20 hours of lectures, 20 hours of project supervision, and 34 hours of academic coordination

**Innovative teaching methods:** 10 articles published in international education journals (topics include gamification, distance learning, use of augmented reality, hybrid and online teaching, science communication), 5 conference presentations, and several expert evaluations of educational projects.

## RESEARCH ACTIVITIES

Since completing my PhD in Chemical Engineering in 2008, I have developed strong expertise and tools in fluid mechanics, mass transfer, applied mathematics, and chemistry to investigate hydrodynamics and mass transfer in bubbly flows across multiple scales. Initially applied to environmental processes, my research has progressively shifted—since 2016—towards biological fluids, with the goal of applying my multidisciplinary approach to biotechnological applications.

- ➔ **Research topics:** Sustainable process engineering, hydrodynamics and mass transfer in bioreactors for biogas production and wastewater/air treatment.
  - Development of original and innovative visualization techniques in these areas
  - Currently supervising 5 PhD students (15 theses co-supervised or completed, 36 MSc students, 7 engineers and postdoctoral researchers)
  - Actively involved in building multidisciplinary teams and establishing international collaborations (Germany, Morocco, China, Scotland, Thailand, Canada, USA, Portugal, South Korea)
- ➔ **Scientific output:**
  - 183 scientific contributions, including 73 peer-reviewed international journal articles, 7 publications in French journals, and 7 patents
  - 84 conference papers, including 23 invited or keynote lectures
  - Bibliometrics (Google Scholar, Jan. 2025): 2,900 citations, H-index: 30
  - Full-text Open Access rate: 100% (HAL, Jan. 2025)
- ➔ **Recognition:**
  - Holder of the French Excellence Bonuses: PES (2013–2017) and PEDR (2017–2021, 2021–2025)
  - Listed among the World's Top 2% Scientists ([Stanford Ranking 2021-2024](#), 2021–2024)

**FELLOWSHIPS and GRANTS : Total funding awarded: €12 million, including over €6 million as Principal or co-Principal Investigator over the past 5 years.**

Since 2009, I have secured or contributed to over 30 funded research and innovation projects at national, European, and industrial levels. Recent highlights include the participation in the PIA4 TIRIS project (*Science and Society program committee chair*, €4M, 2023–2028), the ANR PRC ODYSSEUS project (€560k, PI, 2023–2028), and the Horizon 2020 *CitizenArenas* project (€140k, co-coordinator, 2023). I coordinate or co-coordinate several projects with industrial partners (e.g., *Roche*, *SUEZ*, *Eneapharm*, *Overlab*, *Total*), and lead initiatives on science-society interfaces and participatory research (e.g., *Grande Expérience Participative*, €10k, 2023).

I have led or contributed to several ANR-funded projects (*MaMOTHS*, JCJC, €205k PI, 2017–2021; *O2STAR*, €600k, partner, 2010–2012), ADEME programs (*EPUROGAZ*, €500k, partner, 2015–2020), and European grants (*SMART-ER*, Horizon 2020 SwafS, €1.5M, task leader; *UNLOCK*, Erasmus+). In total, my role has ranged from project coordinator to task leader and scientific contributor, with significant involvement in doctoral and postdoctoral supervision (e.g., *Chinese Scholarship Council* PhD grants totaling €150k, as PI).

Funding sources also include the CNRS (*Post-doctoral fellowships*, 2014, 2018, 2020 – €120k, co-PI), the University of Toulouse (*MEGALITE*, €100k, PI), INSA Toulouse (*Ashpurogas*, €135k, PI), 3BCAR (*RayCell*, €35k, contributor), and the Toulouse Tech Interlabs initiative (*TTIL*, €30k, PI). These grants supported projects in sustainable process engineering, fluid mechanics, and transdisciplinary innovation.

## SCIENTIFIC RESPONSIBILITIES

**2020–2024** — Co-leader of the research team “*Transfer–Interface–Mixing*” at Toulouse Biotechnology Institute (TBI, INSA/CNRS UMR 5504, INSA/INRAE UMR 792), involving 15 researchers and faculty members, 2 technical staff (research engineer and assistant engineer), and around 15 PhD students and interns — Toulouse, France.

**2018–2024** — Co-leader of the research theme “*Multiphase Flows*” within the FERMAT research federation (FR3089), bringing together 50 researchers and 30 PhD students across 7 laboratories — Toulouse, France.

## COMMITTEE MEMBERSHIPS

**2024–present** — Chair of the Department Council for "Chemical and Environmental Engineering" at INSA Toulouse (6 to 8 meetings/year); responsibilities include budget approval, strategic planning, voting on departmental directions, and involvement in recruitment (e.g., temporary teaching staff).

**2024–present** — Member of the Laboratory Council of Toulouse Biotechnology Institute (TBI) — 5 to 6 meetings/year.

**2020–2024** — Member of the Scientific Council of TBI — 5 to 6 meetings/year.

**2022–2023** — Elected member of the Education Council of INSA Toulouse — 5 meetings/year.

**2018–2022** — Elected member of the Scientific Council (5 meetings/year) and Restricted Scientific Council (6 meetings/year) of INSA Toulouse.

**2014–2018** — Elected member of the Board of Directors of INSA Toulouse (5 meetings/year) and its Restricted Board (10 meetings/year); member of the Disciplinary Committee for students; member of the Budget Committee and the Procurement Committee.

**2012–2018** — Elected member of the Department Council for "Process and Environmental Engineering" at INSA Toulouse — 6 to 8 meetings/year; budget approval, strategic planning, recruitment, etc.

## SCIENCE-SOCIETY & OPEN SCIENCE RESPONSIBILITIES

**2023–present** — Chair of the *Science-Society* Program Committee within the TIRIS project (Winner of the “Excellence in All Its Forms” call under the 4th French Investments for the Future Program – PIA4). Responsibilities include the creation and coordination of a *Co-Research* call for projects involving civil society, a Science Shop, and the REH Science-Society Observatory).

**2023–present** — Member of the Steering Committee for *Science with and for Society* at the University of Toulouse.

**2023–present** — *Science-to-Society Outreach (OSS)* Advisor at INSA Toulouse.

**2020–present** — *Open Science* Representative of INSA Toulouse within the network of France Universités (formerly CPU – Conférence des Présidents d’Université).

**2021–2022** — Coordinator of a working group between the Scientific Council and the Board of Directors at INSA Toulouse to develop a roadmap for Open Science (2023–2026), officially adopted by the Board in 2022.

## COMMISSIONS OF TRUST & EXPERTISE

Since 2017, I have been involved in numerous national and international scientific evaluation activities. I have reviewed projects for several funding agencies, including the DFG (Germany, 2024), the French National Research Agency (ANR, 2022–2023), the ANRT (2024), the Israel Science Foundation (2021–2022), the National Science Center of Poland (2021), MITACS in Canada (2017, 2019, 2020, 2023), and the National Center of Science and Technology Evaluation in Azerbaijan (2020). I also evaluated a European educational project under the Erasmus+ UNLOCK initiative (<http://www.un-lock.eu>), as well as internal funding programs such as the APR doctoral fellowship and the TTIL interdisciplinary project program at the University of Toulouse in 2019. At the institutional level, I regularly provide expert advice to the FERMAT research federation and to the scientific council of INSA Toulouse for project development, mobility grants, and doctoral fellowships. My academic responsibilities also include serving on PhD juries as a reviewer (Germany) and examiner, participating in 12 PhD follow-up committees outside my institution, contributing to a University Research Diploma jury, and taking part in two hiring committees for Associate Professor positions. Additionally, I sat on doctoral school selection panels at GAIA Montpellier in 2023 and 2024. As a peer reviewer, I evaluate around 10 manuscripts per year for leading journals such as *Chemical Engineering Science*, *Chemical Engineering Journal*, *AIChE Journal*, *Heat and Mass Transfer Journal*, and *Journal of Chemical Education*. Since 2021, I have also served as Associate Editor for the journal *Processes*, managing approximately five articles annually.