

**Talib DBOUK** (Professor - Full)  
**Computational Physics & Applied Sciences**

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## ● World Ranking of Top 2% Scientists

**It is with a great honor that my name appeared in the World Ranking of Top 2% Scientists in the consecutive years 2021, 2022, 2023, 2024 and 2025 by Stanford University Rankings in Mechanical Engineering-Fluids Mechanics.** DOI: <https://doi.org/10.17632/btchxktzyw.8>

## ● SKILLS

### ● Techniques

- Physics, Mechanics of Fluids and Complex Materials, Heat and Mass Transfer, Biofluids, Turbulence, Rheology, Adsorption and Tribology.
- Numerical Analysis, Numerical Modeling, Topology Optimization, Fluid/Structure Interaction, CFD, Numerical Methods, IBM, The Finite Volume Method, ODE, PDE, Non-linear Programming, Convex Analysis, Adjoint Methods, Development of computational codes in CFD, User-Machine Interfaces.
- Artificial Intelligence, Deep and Machine Learning
- Microscopy, Rheometry, Normal Stresses, Suspensions of Particles, and Migration.

### ● Communications

- Coordination and management of R&D projects
- National and International scientific collaborations
- Bibliographical Research
- Writing of advanced technical and progress reports
- Interaction with academia and industry
- International Conferences and scientific publications in high-impact journals (see next page)
- Referee in peer-review journals (i.e. Physics of Fluids, Journal of Fluid Mechanics, IJHMT, ICHMT, CEJ, CES, etc)

### ● Informatics

- Linux®.
- C++®, C®, Fortran®, Python®.
- OpenFOAM®, StarCCM+®, gmsh®.
- FreeCAD®, Blender®.
- TensorFlow®, Keras®.

### ● Languages

- Arabic-Lebanese (*Native*)
- English (fluent)
- French (fluent)
- Scientific English (fluent)

## ● PROFESSIONAL EXPERIENCE

Oct. 2022 – Present  
 Rouen, France

**Professor (Full):** [University of Rouen-Normandy](#) [CORIA](#) [IUT](#)  
**Professor, Computational Physics & Applied Sciences**  
**Energy, Chemical & Process Engineering, Optimization**

Sep. 2021 – Sep. 2022  
 Lille, France

**Associate Professor (HDR):** [IMT Nord Europe](#)  
**Associate Professor, Computational Physics & Applied Sciences**

April 2020 – Sep. 2021  
 Nicosia, Cyprus

[University of Nicosia](#)  
**Defence and Security Research Institute (DSRI)**  
**Senior Researcher, Research Director of DSRI, Medical School (Joint-Position)**

- Sept. 2014 – Mar. 2020  
Lille-Douai, France     **Associate Professor (HDR):** [IMT Nord Europe](#)  
**Topology Optimization in CFD, Fluid Mechanics and Heat Transfer.**
- Sept. 2013 – Aug. 2014  
St-Paul-Lez-Durance     **PostDoc:** [IRSN - Saint Paul Lez Durance](#)  
**Rheology of immersed granular materials in presence of Hydrodynamic interactions.**
- Jan. 2012 – June 2013  
Sophia Antipolis     **PostDoc:** [CEMEF - Mines ParisTech](#) ↔ [Arcelormittal](#)  
**Study and Development of scientific calculation codes (Fast-Models) for industrial strip rolling processes with lubrication.**
- Oct. 2008 – Dec. 2011  
Nice, France     **PhD thesis :** [LPMC UMR - CNRS 7336](#)  
**Rheology of concentrated suspensions and shear-induced particles migration.**
- Mar. 2008 – Sept. 2008  
Nantes, France     **Master II R&D :** [LTN - Ecole Polytechnique de Nantes](#)  
**Liquid-Liquid Dispersion and Chaotic Advection in Heat Exchangers.**
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## ● DIPLOMAS

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- Nov. 2019 :**     **HDR (Habilitation à Diriger des Recherches)**  
Topology Optimization of complex thermofluid flows and systems:  
multiphysics, multiscale, modeling and design.  
[University of Polytechnique Hauts-de-France](#)  
<https://tel.archives-ouvertes.fr/tel-02493044>
- Dec. 2011 :**     **PhD in Physics**  
Rheology of concentrated suspensions and shear-induced migration  
University of Nice Sophia Antipolis, France. [Cote d'Azur University](#) member.  
Laboratory of Physics of Condensed Matter (LPMC), Physics Institute of Nice, UMR CNRS 7336.  
<https://tel.archives-ouvertes.fr/tel-00673964>
- Oct. 2008 :**     **Masters-II Research in Heat-Energy**  
University of Nantes, École centrale de Nantes, École Polytechnique de Nantes, France.  
LteN Polytech Nantes - UMR CNRS 6607.
- Nov. 2008 :**     **Diploma in Mechanical Engineering**  
Lebanese University, Faculty of Engineering (III), Hadath, Beirut, Lebanon.
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## ● PEER-REVIEW: SCIENTIFIC PUBLICATIONS & CONFERENCE PROCEEDINGS

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### Scientific Articles in peer-reviewed journals

- M.N. NADAMANI, M. SAFDARI SHADLOO, O. K. MATAR, **T. DBOUK**, An Advanced CFD Model with Porous Based Immersed Boundary Method For Adsorption Kinematics at a Particle's Scale, **Chemical Engineering Journal**, accepted March (2026).
- É. WIEL, H. MENU, F. ROGER, **T. DBOUK**, The vital role of distal end location of endotracheal tubes in human trachea, **Anaesthesia Critical Care & Pain Medicine**, accepted January (2026).
- S. ALI, D. HOUALLA, R. TAHER, H. ZHANG, C. YANG, G. WANG, J. FARAJ, M. KHALED, **T. DBOUK**, On the robustness of adjoint shape optimization method when applied to the optimal design of vortex generators: The impact of the Reynolds number, **International Communications in Heat and Mass Transfer**, 175, (2026).

M.N. NADAMANI, M. SAFDARI SHADLOO, T. DBOUK, A Computational Fluid Dynamics MacroModel for the Design of Bed Adsorbers, **Physics of Fluids**, accepted, March (2026).

T. DBOUK, N. VISEZ, P. ROY, A. DJAMA, E. VAREA, R. CHAMPION, A. GEFFROY, B. PATTE-ROULAND, AND J. REVEILLON, Flow and Plants: On the Dispersion of Wind-Induced Tree Pollen. **Physics of Fluids**, accepted 22 January (2026).

M.N. NADAMANI, M. SAFDARI SHADLOO, T. DBOUK, A Review on Theoretical and Computational Fluid Dynamics Modeling of Coupled Heat and Mass Transfer in Fixed Beds of Adsorbing Porous Media. *Energies*, 18(24):6418.

DOI: <https://doi.org/10.3390/en18246418>

M.N. NADAMANI, M. SAFDARI SHADLOO, T. DBOUK, Advancing three dimensional modeling of adsorption physics in porous media for gas separation towards a new design of fixed bed adsorbers. *Physics*, arXiv:2509.25062.

DOI: <https://doi.org/10.48550/arXiv.2509.25062>

C. YANG, D. WANG, S. ALI, Y. LI, G. WANG, M. KHALED, T. DBOUK, Topology optimization of heat sinks for an enhanced cooling of solar photovoltaic panels, **International Communications in Heat and Mass Transfer**, 167, 109382, (2025). DOI : <https://doi.org/10.1016/j.icheatmasstransfer.2025.109382>

C. YANG, D. WANG, F. ROGER, G. WANG, T. DBOUK, Geothermal Heating of Domestic Water: A new Generation of Geothermal Energy Units by Topology Optimization. **Journal of Energy Resources Technology. Part A.**, 1(6): 061302 (2025).

DOI : <https://doi.org/10.1115/1.4069185>

T. DBOUK, O. MOURAD, A Review on Thermal Management and Heat Dissipation Strategies for 5G and 6G Base Stations: Challenges and Solutions. **Energies** 18 (6), 1355, (2025). DOI : <https://doi.org/10.3390/en18061355>

C. YANG, D. WANG, S. ALI, G. WANG, T. DBOUK, Topology optimization of rectangular parallel plate heat exchanger unit. **International Journal of Thermal Sciences** 208, 109503, (2025). DOI : <https://doi.org/10.1016/j.ijthermalsci.2024.109503>

M. NADAMANI, T. DBOUK, B. OBEID, F. MURZYN, J.-L. HARIION, CFD Analysis of Fine Clay Particles Dispersion from a Truck Operating on Unpaved Roads, **Atmospheric Pollution Research**, 16, 3, 102408 (2025). DOI : <https://doi.org/10.1016/j.apr.2025.102408>

D. WANG, C. YANG, G. WANG, Y. LI, T. DBOUK, Innovative Designs of 3D Heat Sinks by Topology Optimization, **Journal of Mechanical Design**, 147 (8), (2025), 081705. DOI: <https://doi.org/10.1115/1.4067870>

T. DBOUK and D. DRIKAKIS, Flow and Plants, **Physics of Fluids**, 36(11), (2024), 110402.

DOI : <https://doi.org/10.1063/5.0244727>

S. ALI, C. NOHRA, J. FARAJ, T. DBOUK, M. KHALED, Thermo-hydraulic performance of concentric tube heat exchangers with turbulent flow: Predictive correlations and iterative methods for pumping power and heat transfer. **International Journal of Thermofluids**, 24, (2024), 100898. DOI : <https://doi.org/10.1016/j.ijft.2024.100898>

U.S. MAHABALESHWAR, K.M. NIHAAL, D. ZEIDAN, T. DBOUK, D. LAROZE, Computational and artificial neural network study on ternary nanofluid flow with heat and mass transfer with magnetohydrodynamics and mass transpiration, **Neural Computing and Applications** (2024). <https://doi.org/10.1007/s00521-024-10325-9>

H. KARKABA, T. DBOUK, C. HABCHI, S. RUSSEIL, T. LEMENAND, D. BOUGEARD, "Multiobjective Optimization of Vortex Generators for Heat Transfer Enhancement in Turbulent Flows", **International Journal of Thermofluids**, 22, 100633, (2024). <https://doi.org/10.1016/j.ijft.2024.100633>

K. POULINAKIS, D. DRIKAKIS, I.W. KOKKINAKIS, S.M. SPOTTSWOOD, T. DBOUK, "LSTM Reconstruction of Turbulent Pressure Fluctuation Signals", **Computations**, 12 (1), 4 (2024). DOI : <https://doi.org/10.3390/computation12010004>

S. ALI, T. DBOUK, M. KHALED, J. FARAJ, D. DRIKAKIS, "Morphing optimization of flow and heat transfer in concentric tube heat exchangers", **Physics of Fluids** 35 (9), 095127, (2023). DOI : <https://doi.org/10.1063/5.0159144>

T. DBOUK, F. ROGER, D. DRIKAKIS, S. ALI, H. MENU, E. WIEL, "The impact of endotracheal intubation on oxygen delivery, trachea pressure and wall deformation", **Computers in Biology and Medicine**, 107325, (2023). DOI : <https://doi.org/10.1016/j.combiomed.2023.107325>

- G. WANG, D. WANG, A. LIU, **T. DBOUK**, X. PENG, A. ALI, "Design and performance enhancement of thermal-fluid system based on topology optimization", **Applied Mathematical Modelling** 116, 168-186 (2023). DOI: <https://doi.org/10.1016/j.apm.2022.11.031>
- S. ALI, **T. DBOUK**, G. WANG, D. WANG, D. DRIKAKIS, "Advancing thermal performance through vortex generators morphing". **Nature**, Sci. Rep., 13(368), (2023). DOI: <https://doi.org/10.1038/s41598-022-25516>
- T. DBOUK**, N. VISEZ, S. ALI, I. SAHROUR, D. DRIKAKIS, "Risk assessment of pollen allergy in urban environments". **Nature**, Sci. Rep., 12 (21076), (2022). DOI: <https://doi.org/10.1038/s41598-022-24819>
- D. DRIKAKIS, **T. DBOUK**, "Flow and acoustics of unmanned vehicles". **Physics of Fluids**, 34 (10), 100402 (2022). DOI: <https://doi.org/10.1063/5.0129577>
- G. WANG, D. WANG, A. LIU, **T. DBOUK**, X. PENG, A. ALI, "Design and performance enhancement of thermal-fluid system based on topology optimization". **Applied Mathematical Modelling** 116, 168-186 (2022). DOI: <https://doi.org/10.1016/j.apm.2022.11.031>
- T. DBOUK**, D. DRIKAKIS, "The Role of Computational Science in Wind and Solar Energy: A Critical Review". **Energies**, 15(24), (2022). DOI: <https://doi.org/10.3390/en15249609>
- T. DBOUK**, D. DRIKAKIS, "Natural Ventilation and Aerosol Particles Dispersion Indoors". **Energies**, 15(14), 5101 (2022). <https://doi.org/10.3390/en15145101>
- T. DBOUK**, C. HABCHI, J.-L. HARION, D. DRIKAKIS, "Enhancement of Heat Transfer and Fluid Flow by a Poiseuille-Taylor-Couette Flow between Two Rotating Elliptically-deformed Annular Tubes". **International Journal of Heat and Fluid Flow**, 96, 109011 (2022). <https://doi.org/10.1016/j.ijheatfluidflow.2022.109011>
- T. DBOUK**, D. DRIKAKIS, "Computational Aeroacoustics of Quadcopter Drones", **Applied Acoustics**, 192, 108738 (2022). <https://dx.doi.org/10.1016/j.apacoust.2022.108738>
- T. DBOUK**, D. DRIKAKIS, "The computational fluid dynamics-based epidemic model and the pandemic scenarios", **Physics of Fluids**, 34, 027104 (2022). <https://dx.doi.org/10.1063/5.0082090>
- G. WANG, A. LIU, **T. DBOUK**, D. WANG, X. PENG, A. ALI, "Optimal shape design and performance investigation of helically coiled tube heat exchanger applying MO-SHERPA", **International Journal of Heat and Mass Transfer**, 184, 122256, (2022). <https://doi.org/10.1016/j.ijheatmasstransfer.2021.122256>
- T. DBOUK**, F. ROGER, D. DRIKAKIS, "Reducing Indoor Virus Transmission using Air Purifiers", **Physics of Fluids**, 33, 103301 (2021). <https://dx.doi.org/10.1063/5.0064115>
- T. DBOUK**, S. ARANDA-GARCÍA, R. BARCALA-FURELOS, A. RODRÍGUEZ-NÚÑEZ, D. DRIKAKIS, "Airborne infection risk during open air cardiopulmonary resuscitation". **Emergency Medicine Journal (BMJ)**, 38, 673-678, (2021). <https://dx.doi.org/10.1136/emered-2021-211209>
- T. DBOUK**, D. DRIKAKIS, "Correcting pandemic data analysis through environmental fluid dynamics". **Physics of Fluids**, 33, 067116, (2021). <https://dx.doi.org/10.1063/5.0055299>
- T. DBOUK**, D. DRIKAKIS, "On Pollen and Airborne Virus Transmission". **Physics of Fluids**, 33, 063313, (2021). <https://dx.doi.org/10.1063/5.0055845>
- T. DBOUK**, D. DRIKAKIS, "Endotracheal Tubes Design : The role of tube bending". **Symmetry**, 13, 8, (2021). <https://dx.doi.org/10.3390/sym13081503>
- T. DBOUK**, D. DRIKAKIS, "Quadcopter Drones Swarm Aeroacoustics". **Physics of Fluids**, 33, 057112, (2021). <https://dx.doi.org/10.1063/5.0052505>
- T. DBOUK**, D. DRIKAKIS, "Fluid Dynamics and Epidemiology : Seasonality and Transmission Dynamics". **Physics of Fluids**, 33, (2021). <https://dx.doi.org/10.1063/5.0037640>
- T. DBOUK**, D. DRIKAKIS, "On Airborne Virus Transmission in Elevators and Confined Spaces". **Physics of Fluids**, 33, 011905, (2021). <https://dx.doi.org/10.1063/5.0038180>

- T. DBOUK, D. DRIKAKIS, "Weather impact on airborne coronavirus survival". **Physics of Fluids**, 32, 093312, (2020). <https://dx.doi.org/10.1063/5.0024272>
- T. DBOUK, D. DRIKAKIS, "On respiratory droplets and face masks". **Physics of Fluids**, 32, 063303, (2020). <https://dx.doi.org/10.1063/5.0015044>
- T. DBOUK, D. DRIKAKIS, "On coughing and airborne droplet transmission to humans". **Physics of Fluids**, 32, 053310, (2020). <https://dx.doi.org/10.1063/5.0011960>
- T. DBOUK, S.A. BAHRANI, "Modeling of buoyancy-driven thermal convection in immersed granular beds". **International Journal of Multiphase Flows**, 134, 103471, (2020). <https://dx.doi.org/10.1016/j.ijmultiphaseflow.2020.103471>
- G. WANG, T. DBOUK, D. WANG, Y. PEI, X. PENG, H. YUAN, S. XIANG, "Experimental and numerical investigation on hydraulic and thermal performance in the tube-side of helically coiled-twisted trilobal tube heat exchanger", **International Journal of Thermal Sciences**, 153, 106328, (2020). <https://dx.doi.org/10.1016/j.ijthermalsci.2020.106328>
- H. KARKABA, T. DBOUK, C. HABCHI, S. RUSSEIL, T. LEMENAND, D. BOUGEARD, "Multi objective optimization of vortex generators for heat transfer enhancement using large design space exploration". **Chemical Engineering and Processing - Process Intensification**, 154, 107982, (2020). <https://dx.doi.org/10.1016/j.cep.2020.107982>
- C. OCTAU, T. DBOUK, M. WATREMEZ, D. MERESSE, M. LIPPERT, J. SCHIFFLER, L. KEIRSBULCK, L. DUBAR, "Liquid-solid two-phase jet in a turbulent cross-flow : Experiments and simulations". **Chemical Engineering Research & Design**, 155, 156-171, (2020). <https://dx.doi.org/10.1016/j.cherd.2020.01.004>
- H. BELKHOUB, S. RUSSEIL, T. DBOUK, M. MOBTIL, D. BOUGEARD, N.-Y. FRANCOIS, "Large Eddy Simulation of boundary layer transition over an isolated ramp-type micro roughness element". **International Journal of Heat and Fluid Flow**, 80, 108492, (2019). <https://dx.doi.org/10.1016/j.ijheatfluidflow.2019.108492>
- V. SUBRAMANIAM, T. DBOUK, J.-L. Harion, "Topology optimization of conjugate heat transfer systems : A competition between heat transfer enhancement and pressure drop reduction". **International Journal of Heat and Fluid Flow**, 75, 165-184, (2019). <https://dx.doi.org/10.1016/j.ijheatfluidflow.2019.01.002>
- T. DBOUK, "A new technology for CPU chip cooling by concentrated suspension flow of non-colloidal particles". **Applied Thermal Engineering**, 146, 664-673, (2019). <https://dx.doi.org/10.1016/j.applthermaleng.2018.10.044>
- T. DBOUK, C. HABCHI, "On the mixing enhancement in concentrated non-colloidal neutrally buoyant suspensions of rigid particles using helical coiled and chaotic twisted pipes : A numerical investigation". **Chemical Engineering and Processing - Process Intensification**, 141, (2019). <https://dx.doi.org/10.1016/j.cep.2019.107540>
- T. DBOUK, "A computational framework with an Adaptive Mesh Refinement technique for concentrated suspension flows". **Particulate Science and Technology**, 1-10, (2019). <https://dx.doi.org/10.1080/02726351.2019.1624663>
- T. DBOUK, "Heat transfer and shear-induced migration in dense non-Brownian suspension flows : Modelling and simulation". **Journal of Fluid Mechanics**, 840, (2018). <https://dx.doi.org/10.1017/jfm.2018.72>
- V. SUBRAMANIAM, T. DBOUK, J.-L. HARION, "Topology optimization of conductive heat transfer devices : An experimental investigation", **Applied Thermal Engineering**, 131, 390-411, (2018). <https://dx.doi.org/10.1016/j.applthermaleng.2017.12.026>
- R. GAUTIER, T. DBOUK, M.A. CAMPESI, L. HAMON, J.-L. HARION and P. PRÉ, "Pressure-swing-adsorption of gaseous mixture in isotropic porous medium : Transient 3D modeling and validation". **Chemical Engineering Journal**, 348, 1049-1062, (2018). <https://dx.doi.org/10.1016/j.cej.2017.05.145>
- R. GAUTIER, T. DBOUK, J.-L. HARION, L. HAMON and P. PRÉ, "Pressure-Swing-Adsorption of gaseous mixture in isotropic porous medium : Numerical sensitivity analysis in CFD". **Chemical Engineering Research and Design**, 129, 314-326, (2018). <https://dx.doi.org/10.1016/j.cherd.2017.11.007>
- T. DBOUK, "A review about the engineering design of optimal heat transfer systems using topology optimization". **Applied Thermal Engineering**, 112, 841-854, (2017). <https://dx.doi.org/10.1016/j.applthermaleng.2016.10.134>
- T. DBOUK "A Suspension Balance Direct-Forcing Immersed Boundary Model for wet granular flows including obstacles". **Journal of Non-Newtonian fluid Mechanics**, 230, 68-79 (2016). <https://dx.doi.org/10.1016/j.jnnfm.2016.01.003>

**T. DBOUK**, F. PERALES, F. BABIK and R. MOZUL "A DF-IBM/NSCD coupling framework to simulate immersed particle interactions". *Comput. Methods Appl. Mech. Engrg.*, 309, 610–624, (2016). <https://dx.doi.org/10.1016/j.cma.2016.05.041>

**T. DBOUK** and J.-L. HARION "Performance of Optimization Algorithms Applied to Large Nonlinear Constrained Problems". *American Journal of Algorithms and Computing*, 2 (1) 32-56, (2015).

**T. DBOUK**, P. MONTMITONNET, N. SUZUKI, Y. TAKAHAMA, N. LEGRAND, T. NGO and H. MATSUMOTO "Advanced roll bite models for cold and temper rolling processes". *La Metallurgia Italiana*, 4, (2015).

**T. DBOUK**, P. MONTMITONNET, N. LEGRAND "Two-dimensional Roll Bite Model with lubrication for Cold Strip Rolling". *Advanced Materials Research* Vols. 966-967, 48-62, (2014). <https://dx.doi.org/10.4028/www.scientific.net/AMR.966-967.48>

**T. DBOUK**, L. LOBRY, E. LEMAIRE, and F. MOUKALLED, "Shear-induced Particles Migration : Predictions from Experimental Determination of The Particle Stress Tensor". *Journal of Non-Newtonian Fluid Mechanics*, 198, 78-95, (2013). <https://dx.doi.org/10.1016/j.jnnfm.2013.03.006>

**T. DBOUK**, L. LOBRY, E. LEMAIRE, "Normal stresses in concentrated non-Brownian suspensions". *Journal of Fluid Mechanics*, 715, 239-272, (2013). <https://dx.doi.org/10.1017/jfm.2012.516>

### Scientific Articles in peer-review conference proceedings

O. RAHAL, E. VAREA, J. FARAJ, H. EL HAGE, B. PATTE-ROULAND, M. KHALED, T. DBOUK, Outdoor Measurements of Airborne Pollutants Dispersion in Presence of Green Trees.

M. NADAMANI, T. DBOUK, B. OBEID, F. MURZYN, J.-L. HARION, "Simulations numériques de la dispersion de particules due au trafic de camions sur des pistes de chantiers de construction", 26ème Congrès Français de Mécanique, Metz, France, 25-29 August (2025).

S.A. BAHRANI, **T. DBOUK**, J.F. MORRIS, "Déstabilisation en mode séquentiel d'un lit granulaire immergé par une source thermique". Proceeding of XIVE Colloque International Franco-Québécois : Énergies Durables, CIFQ2019, Québec, Canada, 18 June (2019).

H. BELKHOUCHE, S. RUSSEIL, **T. DBOUK**, M. MOBTIL, D. BOUGEARD, N. FRANCOIS, "Influence of surface roughness elements on heat transfer in transitional flows : a cfd investigation". Proceeding of the XI International Conference on Computational Heat, Mass and Momentum Transfer, Cracow, Poland, May 21-24 (2018).

C. OCTAU, M. LIPPERT, **T. DBOUK**, A. FRAZIANI, M. WATREMEZ, L. KEIRSBULCK and L. DUBAR, "Particles transport in railway braking systems : an experimental and numerical investigation". Proceeding of the ASME 2017 Fluids Engineering Division Summer Meeting, Waikoloa, Hawaii, USA, 31-July–3-August (2017).

R. GAUTIER, **T. DBOUK**, L. HAMON, P. PRÉ, D. BOUGEARD, "Intensification d'un procédé de séparation de gaz par adsorption : étude numérique par simulations CFD 3D et influence de la géométrie du lit adsorbant". Proceeding 16ème Congrès de la Société Française de Génie des Procédés, Nancy, du 11 au 13 Juillet (2017).

V. SUBRAMANIAM, **T. DBOUK**, J.-L. HARION, "Optimisation topologique decomposantsconducteurs de chaleur : étude expérimentale". 25ème Congrès Français de Thermique, Subramaniam-SFT-2017, Marseille, du 30 Mai au 2 Juin (2017).

M.-A. CAMPESI, R. FAUTIER, **T. DBOUK**, O. MOUSSA, L. HAMON, F.-X. BLANCHET, Y. GOURIOU, J.-L. HARION, P. PRÉ, "Study of a novel heat exchanger adsorber concept for CO2 capture". Physical and Chemical Phenomena in Heat Exchangers and Multifunctional Reactors for Sustainable Technology : Eurotherm Seminar 106, Paris, France, 10-11 Octobre (2016).

F. PERALES, F. DUBOIS, Y. MONERIE, R. MOZUL, F. BABIK, **T. DBOUK**, R. MONOD, "Xper : une plateforme pour la simulation numérique distribuée d'interactions multiphysiques entre corps", CSMA2015 proceedings, 12e Colloque National en Calcul des Structures, Presqu'île de Giens, Var, France, 18-22 Mai (2015).

**T. DBOUK**, P. MONTMITONNET, H. MATSUMOTO, N. SUZUKI, Y. YAKAHAMA, N. LEGRAND, and T. NGO, "Advanced Roll Bite Models for Cold and Temper Rolling Processes". Proceeding of 9th International & 6th European Rolling Conference, Venice, Italy, June (2013).

## HDR and PhD Manuscripts

T. DBOUK "Topology Optimization of Complex Thermofluid Flows and Systems: MultiPhysics Multiscale Modeling and Design", Habilitation Degree - **HDR (November 2019)**, **University of Polytechnique Hauts-de-France**, Valenciennes, France. <https://tel.archives-ouvertes.fr/tel-02493044>

T. DBOUK "Rheology of concentrated suspensions and shear-induced particles migration", **PhD in Physics (December 2011)**, **University of Nice-Sophia Antipolis**, LPMC UMR - CNRS 7336, Nice, France. <https://tel.archives-ouvertes.fr/tel-00673964v1>

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### ● INTERNATIONAL SCIENTIFIC EDITORIAL BOARD – PEER-REVIEW SCIENTIFIC JOURNALS

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1- **Guest Editor**, Journal : **Energies** (MDPI). Special Issue "Fluid Dynamics Challenges in Energy Systems: High-Efficiency Design and Control" Submission Deadline: **24 April, 2026**. [https://www.mdpi.com/journal/energies/special\\_issues/O7XTZP9LLZ](https://www.mdpi.com/journal/energies/special_issues/O7XTZP9LLZ)

2- **Guest Editor**, Journal : **Physics of Fluids** (American Institute of Physics- AIP). Special Issue "**Flow and Plants**" Submission Deadline: **December, 2023**.

3- **Guest Editor**, Journal : **Frontiers in Mechanical Engineering**. Special Issue "Heat and mass transfer in multifunctional heat exchangers/reactors : Measurements, Multisdisciplinary design and optimization ". Submission Deadline : **June, 2022**.

4- **Guest Editor**, Journal : **Physics of Fluids** (American Institute of Physics- AIP). Special Issue "**Flow and Acoustics of Unmanned Vehicles**" Submission Deadline: **December 31, 2021**. <https://publishing.aip.org/publications/journals/special-topics/phf/flow-and-acoustics-of-unmanned-vehicles/>

5- **Guest Editor**, Journal : **Applied Sciences** (MDPI). Special Issue "**Artificial Intelligence and Emerging Technologies**" [https://www.mdpi.com/journal/applsci/special\\_issues/AI\\_Technologies](https://www.mdpi.com/journal/applsci/special_issues/AI_Technologies)

A special issue of *Applied Sciences* (ISSN 2076-3417). This special issue belongs to the section "[Computing and Artificial Intelligence](#)". Deadline for manuscript submissions: **20 September 2021**.

6- **Guest Editor**, Journal : **Inventions** (MDPI). Special Issue "**Innovative Technologies for Cardiovascular and Respiratory Diseases**" [https://www.mdpi.com/journal/inventions/special\\_issues/cardiovascular\\_respiratory](https://www.mdpi.com/journal/inventions/special_issues/cardiovascular_respiratory)

A special issue of *Inventions* (ISSN 2411-5134). This special issue belongs to the section "[Inventions and Innovation in Applied Chemistry and Physics](#)". Deadline for manuscript submissions: **31 August 2021**.

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### ● SCIENTIFIC COMMUNICATIONS (Keynote, Oral, Poster)

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- 19-12 December **2025**, The 15th International Conference on Mechanical Engineering (TSME 2025), Bangkok, Thailand. "3D CFD Modeling and Simulation of Adsorption Columns". (**Oral**)
- 05-06 December **2025**, International Conference on Energy, Environment, Ecosystems and Sustainable Development (ICEEESD-25), Porto, Portugal. "Outdoor Measurements of Airborne Pollutants Dispersion in Presence of Green Trees". (**Oral**)
- 16-22 September **2025**, the 23rd International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 2025), Heraklion, Crete, Greece. "TOPOSTEP: An Innovative Algorithm for Solving Large Scale Nonlinear Topology Optimization Problems with an Inequality Constraints". (**Oral**)
- 16-22 September **2025**, the 23rd International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 2025), Heraklion, Crete, Greece. "New Aerodynamics and Heat Transfer Correlations for Irregular Shape Particles at Low Reynolds Numbers". (**Oral**)
- 25 July **2025**, 6th Edition of Mechanical and Aerospace Engineering Virtual (V-MechAero2025), "Exploring the Complexities of Airborne Virus Transmission: Insights and Innovations". (**KeyNote Speaker Invitation**)
- 25-29 August **2025**, Metz, France. 26ème Congrès Français de Mécanique. "Simulations numériques de la dispersion de particules due au trafic de camions sur des pistes de chantiers de construction" (**Oral**)

- 12-13 June **2025**, London, UK. Kick-off of *International Research Lab ABEL* (Ayrton-Blériot Engineering Lab), between CNRS Engineering and Imperial College London. "An Overview of the different Research Activities at CORIA Lab" (**Poster**)
- 2 December **2024**, CFD2SSC-2024, Lille, France, First International Workshop Contribution of Computational Fluid Dynamics (CFD) to Sustainable and Smart Cities, "On Computational Fluid Dynamics of Airborne Particles and Smart Cities". (**KeyNote Speaker Invitation**)
- 15-17 October **2024**, SFGP2024, Deauville, France. "Modélisation et Simulation Numériques Tridimensionnelles des Colonnes d'Adsorption". (**Poster**)
- 28 July **2024**, International Summer School, ZhengZhou, China. "Modeling and Simulation of Multiphase Fluid Flows Using Euler and Euler-Lagrange Methods: A focus on liquid-solid and gas-solid flows". (**Oral**)
- 17 May **2022**, IFPEN, Lyon, France. 5<sup>th</sup> French/Belgian OpenFOAM® Users Conference, "Airborne Virus Transmission Modeling, Simulation and Forecasting". (**Oral**)
- 18 June **2021**, OpenFOAM® Workshop - TU Delft Institute for Computational Science and Engineering, "Airborne Virus Transmission Modeling, Simulation and Forecasting". **Oral** (Invited Speaker - online).
- 17 April **2021**, European Consortium for Mathematics in Industry (ECMI), "Present and Future of Modelling and Simulation of Airborne Virus Transmission". **Oral** (Invited Speaker - online).
- 05-06 October **2020**, V-Applied-2020-International Webinar on Applied Science "Advanced Modeling and Simulation Platform for COVID-19 Airborne Transmission". **Oral** (Invited Speaker - online).
- 16-19 June **2019**, CIFQ, CANADA (**2019**) "Déstabilisation en mode séquentiel d'un lit granulaire immergé par une source thermique" (**Oral**)
- 12-13 June **2019**, 4th French OpenFOAM® users conference, Marseille, France. "Buoyancy-driven instability of immersed granular bed of micro-particles". (**Oral**)
- 11 June **2018**, ECCOMAS, ECCM 6, ECFD7, Glasgow, UK. Multiobjective topology optimization applied to conjugate heat transfer problem. (**Oral**)
- 23-24 May **2018**, 3<sup>rd</sup> French OpenFOAM® users conference, Valenciennes, France. "Research and development activities using OpenFOAM at the Energy Engineering Department of IMT Lille Douai". (**Oral**)
- 21-24 May **2018**, XI-th International Conference on Computational Heat, Mass and Momentum Transfer (ICCHMT), Cracow, Poland. "Influence of surface roughness elements on heat transfer in transitional flows: a cfd numerical investigation". (**Poster**)
- 16 May **2018**, Journée thématique (*Thermique dans les écoulements de fluides complexes*), Société Française de thermique (SFT), "Heat transfer and shear-induced migration in dense non-Brownian suspension flows: Modelling and Simulation". **Oral** (Invited Speaker).
- 07 November **2017**, Journée Jeunes Chercheurs 2017 (JJC'17) – GEPROC UgéPE, Douai, France. "Infrared Thermal Measurements in Conductive Heat Transfer Tree-Like Structures Obtained by Topology Optimization". (**Poster**)
- 07 November **2017**, Journée Jeunes Chercheurs 2017 (JJC'17) – GEPROC UgéPE, Douai, France. "Optimisation de forme d'un adsorbent échangeur de chaleur". (**Poster**)
- 07 November **2017**, Journée Jeunes Chercheurs 2017 (JJC'17) – GEPROC UgéPE, Douai, France. "Intensification du transfert de chaleur dans les échangeurs embarqués par structurations de surface". (**Poster**)
- 30 May - 02 June **2017**, 25<sup>ème</sup> Congrès Français de Thermique, Marseille, France. "Optimisation topologique des composants conducteurs de chaleur: étude expérimentale". (**Oral + Poster**)
- 03 May **2017**, Invited Speaker, Scientific Seminar, Notre Dame University, Zok Mosbeh, Beirut, Lebanon. "Gas separation in packed bed of adsorbing porous medium: Modeling and Simulation". (**Oral**)
- 28 April **2017**, IMT National Conference, Colloque « L'énergie en révolution numérique », Paris, France. "Numerical optimization platform developments for designing optimal heat exchangers". (**Poster**)
- 24 April **2017**, IMT Research Seminar, University of Lille, Villeneuve d'ascq, France. "Numerical optimization platform developments for designing optimal heat exchangers". (**Poster**)

- 21-22 March **2017**, 2ndes journées françaises des utilisateurs de OpenFOAM, Nevers, France. "TOPOF: Topology Optimization Platform in OpenFOAM". **(Oral)**
- 30-31 January **2017**, 6èmes Journées de l' Association Française de l' Adsorption, Paris, France. "Simulations numériques 3D d'un procédé de séparation de gaz par adsorption (PSA)". **(Oral)**
- 10-11 November **2016**, Invited Speaker, Annual Meeting on Rheology, Alicante, Spain. "Dynamic-Scale Modeling of non Brownian suspensions including suspension/structure interactions". **(Oral)**
- 10-11 October **2016**, Eurotherm Seminar 106, Paris, France. Physical and Chemical Phenomena in Heat Exchangers and Multifunctional Reactors for Sustainable Technology, "Study of a novel heat exchanger adsorber concept for CO<sub>2</sub> capture". **(Oral)**
- 06 October **2016**, Journée Jeunes Chercheurs 2016 (JJC'16) – GEPROC UGÉPE, Louvain, Belgium. "Topology optimization of conductive heat transfer devices: An experimental investigation". **(Poster)**
- 30 June **2016**, Journée des Doctorants 2016 (JDD'16), Douai France. "Topology optimization of conductive heat transfer devices:  
An experimental investigation". **(Poster)\*** (\* : Best Poster Award)
- 19-23 June **2016**, 5th International Conference on Engineering Optimization, Iguassu Falls, Brazil. "Topology optimization of 2D and 3D heat conduction structures". **(Oral)**
- 31 May - 03 June **2016**, Congrès Français de Thermique, Toulouse, France. "Optimisation topologique 3D des systèmes de conduction de la chaleur". **(Poster)**
- 18 May **2016**, Journée des utilisateurs OpenFOAM, Rouen, Normandie, France. "Dynamic-Multi-Scale Modeling and Simulation of Immersed Granular Flows over Obstacles". **(Oral)**
- 15-17 July **2015**, International conference: 17th British-French-German Conference on Optimization, BFG 2015, Imperial College, London, UK. "An optimization algorithm of high performance for inequality-constrained bounded nonlinear optimization problems". **Oral**
- 18-22 May **2015**, International conference: 12e Colloque National en Calcul des Structures, CSMA 2015, Presqu'île de Giens (Var), France. "Xper : une plateforme pour la simulation numérique distribuée d'interactions multiphysiques entre corps". **Poster**
- 09-11 July **2014**, International conference: Modeling Granular Media Across Scales 2014, Montpellier, France. 'Numerical Modeling of the Dynamics of Immersed Granular Materials'. **Oral**
- 22-24 June **2014**, The 6th International Conference on Tribology in Manufacturing Processes & Joining by Plastic Deformation, Darmstadt, Germany: 'Advanced Roll Bite Models for Cold and Temper Rolling Processes'. **Oral**
- 5-6 Nov **2013**, Workshop on Numerical Modelling of Grains/Fluid Flows, ENS, Lyon, France: 'A Suspension Balance Model for the flows of non-Brownian Suspensions of hard spheres'. **Oral**
- 10-12 June **2013**, The 9th International Rolling Conference and the 6th European Rolling Conference, Venice, Italy: 'Advanced Roll Bite Models for Cold and Temper Rolling Processes'. **Oral**
- 05-10 August **2012**, The 16th International Congress on Rheology, Lisbon, Portugal: 'Normal Stresses in non-Brownian suspension'. **Poster**
- 23 January **2012**, Les Rencontres Niçoises de Mécanique des Fluides, Laboratoire Jean-Alexandre Dieudonné, Nice, France: 'Rheology of concentrated suspensions and Shear-induced migration'. **Oral**
- 9-13 October **2011**, 83rd Annual Meeting of the Society of Rheology, Cleveland, Ohio, USA: 'Normal stresses in concentrated non-colloidal suspensions (Experiments and Simulations)'. **Poster**
- 13-16 June **2011**, 6th OpenFOAM Workshop, Penn state, USA: 'An Incompressible Multi Phase Solver'. **Oral**
- 18-19 Nov **2010**, GISEC 2010, Nice, France: '[Normal stress measurements in non-Brownian Suspensions](#)'. **Oral**

- 7-9 April **2010**, 6th Annual European Rheology Conference (AERC), Göteborg, Sweden: ‘Normal stresses in sheared non-Brownian suspensions’. **Oral**
- 27 Novembre **2009**, le Groupe Français de Rhéologie (GDR MePhy), Paris, France: ‘Measurements of Normal Stresses in sheared Stokesian suspensions’. **Oral**
- 15-17 April **2009**, 5th Annual European Rheology Conference (AERC), Cardiff, United Kingdom: ‘Particle migration in suspensions flowing between rotating parallel-plates: The role of the secondary flow’. **Poster**

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## ● PROJECTS: Research, Development and Innovation

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**Project no.1** (January 2012 – June 2013) - *[role: Scientific Collaborator]*

**Host Institution:** CEMEF, Mines-ParisTech, Sophia-Antipolis, France

**Research Topic:** Advanced Solver development for simulating the rolling loads in a cold strip rolling process (with lubrication)

**Partners:** Dr. Nicolas Legrand (Acelor-Mittal Research, France), Prof. Pierre Montmitonnet (CEMEF, Mines-ParisTech)

**Funding:** ≈90000 euros, Arcelor-Mittal (France)

**Project no.2** (September 2013 – September 2014) - *[role: Scientific Collaborator]*

**Host Institution:** CEA-Cadarache, France (IRSN)

**Research Topic:** Immersed Boundary Methods for nuclear safety applications

**Partners:** Prof. Frédéric Perales (IRSN, Cadarache, France)

**Funding:** ≈50000 euros, IRSN, France

**Project no.3** (April 2015 – April 2016) - *[role: PI, Coordinator]\**

**Host Institution:** IMT Lille-Douai, France

**Research Topic:** Pressure-swing adsorption of gaseous mixture in isotropic porous medium: Transient 3D Modeling and Validation

**Partners:** Prof. Jean-Luc Harion (IMT Lille-Douai), Prof. Pascaline Pré (IMT Atlantique, Nantes)

**Funding:** ≈104000 euros, Institut Mines-Télécom (France)

**Project no.4** (January 2016 – December 2018) - *[role: PI, Coordinator]\**

**Host Institution:** IMT Lille-Douai, France

**Research Topic:** Topology optimization of conjugated heat transfer devices: experimental and numerical investigation

**Partners:** Prof. Jean-Luc HARION (IMT Lille-Douai)

**Funding:** ≈50000 euros IMT Lille-Douai (ARMINES contract)

**Project no.5** (January 2017 – January 2020) - *[role: Scientific Partner]\*\**

**Host Institution:** IMT Lille-Douai, Douai, France – Valeo Group, Paris, France

**Research Topic:** Optimization and Design of innovative heat exchangers

**Partners:** N.-Y. François (VALEO R, Paris)

**Funding:** >250000 euros, VALEO R Group Thermal Systems (inside a 6 years Industrial chair NEO (Numerical and Experimental Optimization platform for efficient design of automotive heat exchangers))

**Project no.6** (January 2016 – September 2019) - *[role: Scientific Collaborator]*

**Host Institutions :** ALSTOM Research group and LAMIH, University of Valenciennes, France

**Research Topic:** Particles transport emitted during railway braking systems: experimental and numerical investigations

**Partners:** Prof. Laurent. Keirsbulck (LAMIH, University of Haut-de-France)

**Funding:** 250000 euros ALSTOM Research Group (France)

**Project no. 7** (September 2019 – April 2020) - *[role: Scientific Partner]\*\**

**Host Institutions :** IMT Lille Douai, France – University of Zhengzhou, China

**Research Topic:** Optimization and Design of innovative heat exchangers

**Partners:** Prof. Dingbiao Wang, Dr. Guanghui Wang (University of Zhengzhou, China)

**Funding:** ≈20000 euros (Chinese Academy of Sciences)

**Project no. 8** (April 2016 – December 2017) - *[role: PI, Coordinator]\**

**Host Institution:** IMT Lille-Douai, Boet-Stopson Research, Lille, France

**Research Topic:** CFD 3D modeling and simulation of isothermal turbulent fluid flows in industrial silencers: uncertainty and quantification of pressure drop

**Partners:** Florian DELABRE (Boet-Stopson Research Group)

**Funding:** ≈60000 euros, Boet-Stopson R – Lille, France

**Project no.9** (September 2018 – December 2020) - *[role: PI, Coordinator]\**

**Host Institutions:** Lebanese International University (LIU)-Lebanon

**Research Topic:** Design space exploration to find optimal designs of vortex generators for heat transfer enhancement

**Partners:** C. Habchi (NDU University, Lebanon) and T. Lemenand (Angers University, France)

**Funding:** ≈50000 euros, LIU University - Lebanon (50%) and IMT Lille-Douai - France (50%)

**Project no.10** (June 2018 – June 2019) - *[role: Scientific Partner]*

**Host Institutions:** IMT Lille-Douai, France, EcoTech-Ceram startup (Rivesaltes, France)

**Research Topic:** Optimization and Design of "plug and play" waste heat storage system (Eco-Stock®)

**Partners:** Guilhem Dejean (Ecotech-Ceram R&D)

**Funding:** ≈50000 euros, BPI Bank, France

**Project no.11** (June 2023 – June 2024) – BQRI2023 - *[role: PI, Coordinator]\**

**Host Institutions:** CORIA, CNRS UMR 6614 (Saint-Etienne-du-Rouvray, France)

**Research Topic:** Airborne pollutant particles dispersion

**Partners:** Mahmoud KHALED (BIU, LIU, Beirut, Lebanon)

**Funding:** ≈18000 euros, UROUEN, France

**Project no.12** (September 2023 – September 2026) – OMAC - *[role: PI, Coordinator]\**

**Host Institutions:** CORIA, CNRS UMR 6614 (Saint-Etienne-du-Rouvray, France)

**Research Topic:** Optimization of Multicomponent Adsorption Columns for enhanced carbon capture and hydrogen production

**Partners:** Mostafa SHADLOU (INSA Rouen)

**Funding:** ≈60000 euros, Normandy University, France

**Project no.13** (January 2024 – January 2027) – DISPERSE - *[role: PI, Coordinator]\**

**Host Institutions:** CORIA, CNRS UMR 6614 (Saint-Etienne-du-Rouvray, France) – BIU, Beirut, Lebanon

**Research Topic:** Airborne pollutant particles dispersion close to an emitting source in an urban environment: Modeling and Simulations

**Partners:** Mahmoud KHALED (BIU, LIU, Beirut, Lebanon)

**Funding:** ≈60000 euros, BIU-Normandy Region (50 %-50%), Lebanon-France

**Project no.14** (September 2024 – September 2027) – REMOVE - *[role: PI, Coordinator]\**

**Host Institutions:** CORIA, CNRS UMR 6614 (Saint-Etienne-du-Rouvray, France) – BIU, Beirut, Lebanon

**Research Topic:** Innovative Technologies for Airborne Pollutant Particles Removal from Urban Environment

**Partners:** Mahmoud KHALED (BIU, LIU, Beirut, Lebanon)

**Funding:** ≈60000 euros, (BIU-Beirut, Normandy Region, 50%-50%), Lebanon-France

**Project no.15** (September 2024 – September 2026) – HÉLIOS - *[role: Scientific Partner]\*\**

**Host Institutions:** University of Rouen Normandy

**Research Topic:** De la caractérisation spatiale, sanitaire et sociales des îlots de chaleurs urbains et des risques de submersion et de débordement de cours d'eau à l'exploration et l'évaluation de solutions d'adaptations fondées sur la nature dans l'estuaire de la Seine : Le Havre Seine Métropole, Caux Seine Agglo et la Métropole Rouen Normandie comme territoires d'expérimentation

**Partners:** 9 Research Labs. (University of Rouen-Normandy)

**Funding:** ≈400000 euros, Multi : ANR, Métropole Rouen Normandie, Pays de la Loire Region, Cergy Region(Paris).

**Project no.16** (July 2025 – Dec 2025) – BQRI2025 - *[role: PI, Coordinator]\**

**Host Institutions:** CORIA, CNRS UMR 6614, University of Rouen Normandy

**Research Topic:** Airborne pollutant particles dispersion

**Partners:** Emilien VAREA (CORIA), Mahmoud KHALED (BIU, LIU, Beirut, Lebanon)

**Funding:** ≈8500 euros, UROUEN, France

**Project no.17** (November 2025 – November 2028) – ANR – PAPA *[role: PI, Coordinator]\**

**Host Institutions:** CORIA, CNRS UMR 6614, University of Rouen Normandy

**Research Topic:** Prediction and Risk Assessment of Pollen Allergy (PAPA)

**Partners:** Institut T.URN, Région Normandie

**Funding:** ≈239000 euros - Agence

*\*[PI, Coordinator]: Writing/Coordination of the Totality of the Research Project, including the definition of the research objectives, the scientific Work-Packages and all the Tasks, the Methodology, the Deliverables, the Required Resources and the Gantt diagram of the Project-Timeline Execution Plan. (PI: Principal Investigator)*

*\*\*[Scientific Partner]: Writing/contributing to scientific Work-Packages in a Research Project Proposal of another PI.*

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## ● SCIENTIFIC PRIZES & WORLDWIDE RECOGNITION

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**World Ranking of Top 2% Scientists: It is with a great honor that my name appeared in the World Ranking of Top 2% Scientists in the consecutive years 2021, 2022, 2023 and 2024 by Stanford University Rankings in Mechanical Engineering: Fluids Mechanics. DOI: <https://doi.org/10.17632/btchxktzyw.6>**

**Winner of best article award "Proceeding of 3<sup>rd</sup> International Conference on Experimental and Numerical Flow and Heat Transfer" (ENFHT'18), 12-14 April, 2018, Budapest, Hungary.**

**Winner of the prize "Best French-PhD developed within an Open-source CFD code: OpenFOAM®" Association Foam-U, second annual meeting, 21-22 Mars 2017, Nevers, France. <http://www.foam-u.fr/>**

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## ● ENVELOPPES SOLEAU (INNOVATION - FRANCE)

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**Year 2017:** 3 Enveloppes Soleau, [INPI](#)

**Year 2018:** 4 Enveloppes Soleau, [INPI](#)

**Year 2023:** 2 Enveloppes Soleau, [INPI](#)

**Year 2024:** 1 Enveloppe Soleau, [INPI](#)

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## ● DEVELOPED NUMERICAL SOLVERS FOR R&D PURPOSES

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2010/2011: 3D Solver development for immersed granular flows (suspensions of rigid particles immersed in a fluid).

Solver Name: **SbmFoam** (for simple shear flows)

Hyper link: <https://openfoamwiki.net/index.php/Contrib/SbmFoam>

Integration Library: OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.

2011/2012: 3D Solver development for immersed granular flows (suspensions of rigid particles immersed in a fluid).

Solver Name: **SbmGeneralFoam** (for general flows)

Hyper link: <http://dx.doi.org/10.1016/j.jnnfm.2013.03.006>

Integration Library: OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.

2012/2013: Advanced 2D Solver development for simulating the rolling loads in a cold strip rolling process (with lubrication).

Solver Name: **RollGap®**

Integration Library: Fortran90®.

2013/2014: 3D solver for fluid/structure interactions (wet granular flows) using the immersed boundary method coupled to a non-smooth contacts dynamics method.

Solver Name: **PELICANS\_IBM\_LMGC**

Hyper link: [https://csmma2015.ec-nantes.fr/resumes/r\\_FJFO3RX6.pdf](https://csmma2015.ec-nantes.fr/resumes/r_FJFO3RX6.pdf)

Integration Library: Xper: IRSN-LMGC90 research laboratories open source C++/Fortran developed library.

2012/2015: 3D solver for suspension/structure interactions (suspension flows over obstacles) using the immersed boundary method coupled to a suspension balance model.

Solver Name: **SbIBMFoam**

Hyper link:	<a href="http://dx.doi.org/10.1016/j.jnnfm.2016.01.003">http://dx.doi.org/10.1016/j.jnnfm.2016.01.003</a>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2014/2015:	Topology optimization 3D solver for designing optimum heat conduction systems.
Solver Name:	<b>TopOptHCFoam</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2017/2018:	3D Solver for quasi-compressible immersed granular flows (suspensions of rigid particles immersed in a fluid) including heat transfer, shear-induced migration and buoyancy effects.
Solver Name:	<b>SBMHTFoam</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2015/2018:	3D Topology Optimization Solver for Multi-Objective Conjugate Heat Transfer Problems (steady laminar flows).
Solver Name:	<b>MOadjOptChtFoamMMA®</b>
Optimization Algorithm :	MMA, GCMMA (Svanberg, 1987; Svanberg, 2002)
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2017/2019:	3D Solver for multicomponent adsorption and reactive flows with heat transfer (Macro-Scale).
Solver Name:	<b>AdsorpReactingFoam®</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2020:	3D Solver for droplet-mixture impacting a porous surface including multi-type physics interaction.
Solver Name:	<b>DroplectImpactReactingParcelFoam®</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2021:	3D Solver for the Aeoaoustics Predictions of Multicopter Drones and Unmanned Vehicles.
Solver Name:	<b>AeroacousticFoam®</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2023/2024:	3D Solver for the Coupling of UVC Fields and Fluid Flows
Solver Name:	<b>UVCreatingParcelFoam®</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.
2024/2025:	3D Solver for multicomponent adsorption and reactive flows with heat transfer (Meso-Scale).
Solver Name:	<b>AdsorpPorousReactingFoam®</b>
Integration Library:	OpenFOAM® Library (C++) - under the GNU (GPL) General Public Licence.

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## ● SOME EXTERNAL SCIENTIFIC COLLABORATIONS (INSTITUTIONS)

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- University of Nicosia, Nicosia, Cyprus
  - University of Campania Luigi Vanvitelli, Italy
  - University of Cote d'Azur, France
  - City College of New York, USA
  - Manhattan College, New York, USA
  - Zhengzhou University, Zhengzhou, China
  - American University of Beirut (AUB), Beirut, Lebanon
  - Lebanese University, Beirut, Lebanon
  - NDU University, Zouk Mosbeh, Lebanon
  - LIU University, Beirut, Lebanon
  - The International University of Beirut (BIU), Beirut, Lebanon
  - Université Saint Esprit de Kaslik, Jounieh, Mount Lebanon, Lebanon
  - IMT Atlantique, Nantes, France
  - Nantes Université, Nantes, France
  - University of Polytechnique Hauts-de-France, Valenciennes, France
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## ● ORGANIZATION OF INTERNATIONAL SCIENTIFIC EVENTS

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- **Eurotherm Seminar 106**, Physical and chemical phenomena in heat exchanger and multifunctional reactor for sustainable technology, 10-11 October 2016, Paris, France.  
<https://eurotherm106.sciencesconf.org/>

- **9ème Journée des Jeunes Chercheurs**, GEPROC et l'UgéPE, 07 November 2017, Douai, France.  
[http://conference.mines-douai.fr/GEPROC\\_UGEPE\\_2017/](http://conference.mines-douai.fr/GEPROC_UGEPE_2017/)

- **3rd French OpenFOAM® users conference** (Joint Franco/Belgian OpenFOAM users conference), 23-24 May 2018, Valenciennes, France.  
<http://foam-u.fr>

- **5th French-Belgian OpenFOAM® users conference**, 17-18 May 2022, Lyon, France.  
<http://foam-u.fr>

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## ● KNOWLEDGE TRANSFER EXPERIENCE

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**Label of course no.1:** Fluid Mechanics  
**Level:** Graduate – Masters of Science

**Label of course no.2:** Heat Transfer I  
**Level:** undergraduate – 1<sup>st</sup> cycle engineering

**Label of course no.3:** Industrial Thermodynamics  
**Level:** Graduate – Masters of Science

**Label of course no.4:** Thermodynamics II  
**Level:** undergraduate – 2<sup>nd</sup> cycle engineering

**Label of course no.5:** PINCH Analysis & Process Integration.  
**Level:** Graduate – Masters of Science

**Label of course no.6:** Fluid Flow Networks  
**Level:** undergraduate – 2<sup>nd</sup> cycle engineering

**Label of course no.7:** Crystallization and Evaporation Process  
**Level:** undergraduate – 3<sup>rd</sup> cycle engineering

**Experimental Labs:** Viscosity, rotational rheometer (rheology), Pressure drop, conductive heat transfer, convective heat transfer, fluidized beds, distillation columns, heat pumps, solar PV cells, fluid flow in porous media, grain size distribution

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## ● HDR, PostDoc, PhD, MSc and R-Engineers - Team Members

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### HDR-director (Habilitation à Diriger des Recherches)

**HDR no.1:** Samer ALI

**Topic:** Towards Enhanced and Sustainable Energy Systems: Advanced Modeling, Optimization, and Hybrid Energy Recovery

**University of Lille, France**

**Defense :** 20 October 2025

### Postdocs

**Postdoc no.1:** Rémi GAUTIER

**Topic:** Adsorption phenomena modeling and simulation in CFD for gas separation processes

**Funded by:** IMT Nord Europe, University of Lille, France

**Period :** (April 2015 – April 2016)

### PhD Students

**PhD Student no.1:** Vignaesh SUBRAMANIAM

**Topic:** Topology Optimization of Conjugated Heat Transfer Devices: Experimental and Numerical Investigation

**Funded by:** IMT Nord Europe, University of Lille, France

**Defended :** 07 December 2018

**PhD Student no.2:** Hatim BELKHOU

**Topic:** Optimization of Heat Exchangers for Automotive applications (CFD and experiments)

**Funded by:** VALEO® - Thermal Systems®

**Defended : 13 December 2019**

**PhD Student no.3:** C. OCTAU

**Topic:** Particles transport in a railway braking system (modeling, simulations and experiments)

**Funded by:** ALSTOM®

**Defended : 15 November 2019**

**PhD Student no.4:** Hassan KARKABA

**Topic:** Large design space exploration for designing optimal vortex generators for heat transfer enhancement

**Funded by:** LIU University (Lebanon), IMT Nord Europe, University of Lille (France)

**Defended : Q1 of 2021**

**PhD Student no.5:** Guanghui WANG

**Topic:** Topology optimization and design of thermofluid systems

**Funded by:** Chinese Academy of Sciences (University of Zhengzhou)

**Defended : Q4 of 2021**

**PhD Student no.6:** Chongrui YANG

**Topic:** Topology optimization and design of thermofluid systems in renewable energy applications

**Funded by:** Chinese Academy of Sciences (University of Zhengzhou)

**Expected date of defense : May-June 2026**

**PhD Student no.7:** Mohamad-Najib NADAMANI

**Topic:** Optimization of Adsorption Columns

**Funded by:** University of Rouen Normandy, CORIA, CNRS UMR 6614

**Expected date of defense : October 2026**

**PhD Student no.8:** Omar RAHAL

**Topic:** Innovative Technologies for Airborne Pollutant Particles Removal from Urban Environment

**Funded by:** (BIU-Beirut, Normandy Region, 50%-50%), Lebanon-France

**Expected date of defense : January 2027**

**PhD Student no.9:** Omar HAMAD

**Topic:** Airborne pollutant particles dispersion close to an emitting source in an urban environment: Modeling and Simulations

**Funded by:** (BIU-Beirut, Normandy Region, 50%-50%), Lebanon-France

**Expected date of defense : January 2027**

**PhD Student no.10:** Matheus DE ARAÚJO SIQUEIRA

**Topic:** Airborne pollutant particles dispersion in industrial sites with stock piles: Modeling and Simulations

**Funded by:** Universidade Federal do Espírito Santo, UFES, Brasil

**Expected date of defense : End 2026**

**PhD Student no.11:** Nageen FATIMA

**Topic:** On the Application of Artificial Intelligence in Computational Fluid Dynamics

**Funded by:** University of Campania Luigi Vanvitelli, Italy

**Expected date of defense : End 2027**

### **Research Engineers**

**Research Engineer no.1:** Mahdi REZAEI

**Topic:** Modeling and simulation of pressure drop and noise reduction in industrial silencers

**Funded by:** Boët-Stopson®, Lille, France

**Period :** April 2017 – January 2018

### **MSc Students**

**MSc no.1:** T.C. NGUYEN

**Topic:** Spatial Filters in Topology Optimization

**Defended : September 2017**

**MSc no.2:** Amine KASSOU

**Topic:** Modeling and simulation of pollutants in air in an indoor environment

**Defended : November 2018**

**MSc no.3:** Mohamad Najib NADAMANI

**Topic:** Simulation numérique de l'écoulement se développant dans le sillage des véhicules de chantier

**Defended :** September 2023

**MSc no.4:** Georges MAROUN

**Topic:** Modélisation et simulation numériques de la dispersion des particules dans un milieu urbain

**Defended :** August 2023

**MSc no.5:** Fermín CATALÁN

**Topic:** Numerical modelling and simulation of the dispersion of pollutants in an urban environment

**Defended :** October 2023

**MSc no.6:** Yaél AUBÉ

**Topic:** CFD modeling and simulation of pollutants dispersion in urban environment

**Defended :** July 2025

**MSc no.7:** Ahcene SADI

**Topic:** CFD modeling and simulation of outdoor microclimate in urban environment

**Defended :** July 2025

**MSc no.8:** Abdkarim DJAMA

**Topic:** Digital Twin of the Rouen Normandy Metropolis: Physical Models Enrichment

**Defended :** July 2025

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## ● NATIONAL AND INTERNATIONAL SCIENTIFIC JURY MEMBER – PhD Degree

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1- **Reporter (Evaluator):** PhD defence of Cyprien BERTHELEMY. *Modélisation et élaboration d'un dispositif médical innovant pour le test de médicaments anti-cancer*. Université de Lorraine (France), Institut Jean Lamour et LRGP, Nancy, France, **12 December 2025**.

2- **President of Jury (Evaluator):** PhD defence of Dr. Mosbah KIWAN. *Experimental study for in-line mixer for non-Newtonian fluids*. Nantes Université, Nantes, France, **15 October 2025**.

3- **President of Jury (Reporter):** PhD defence of Dr. Shriram SANKURANTRIPATI. *High-Fidelity Numerical Modeling of UV-Based Mitigation Strategies for Airborne Virus transmissions in Enclosed Spaces*. Université de Toulouse (France), l'Institut National Polytechnique de Toulouse, France, **22 July 2025**.

4- **President of Jury (Evaluator):** PhD defence of Dr. Charles GUAQUIERE. *Modélisation de la diffusion de particules issues du freinage ferroviaire – Application au réseau souterrain*. Université Polytechnique Hauts-de-France et l'INSA Hauts-de-France, Valenciennes, France, **12 December 2024**.

5- **Reporter (Evaluator) and Jury Member:** PhD defence of Dr. Aymane OUIRDANI. *Développement d'une nouvelle approche de la gestion thermique d'habitable personnalisée dans les véhicules PSA Groupe (actuellement STELLANTIS) par une modélisation numérique embarquée de l'être humain et par une connaissance et/ou caractérisation du ou des occupants*. MINES ParisTech, Université de recherche Paris Sciences et Lettres, PSL Research University, Paris, France, **8 November 2024**.

6- **Reporter (Evaluator) and Jury Member:** PhD defence of Dr. Obeida FARHAT. *Étude expérimentale de systèmes de récupération de chaleur avancés/hybrides appliqués aux appareils industriels*. Nantes Université, Nantes, France, **12 September 2024**.

7- **Reporter (Evaluator) and Jury Member:** PhD defence of Dr. Wassim ABDEI NOUR. *Topology Optimization of High Efficiency Heat Exchangers using the Level Set Method and Anisotropic Mesh Adaptation*. Université PSL, Paris-France, **23 November 2023**.

8- **Reporter (Evaluator) and Jury Member:** PhD defence of Dr. Rima ARIDI. *Récupération de chaleur par intégration de générateur de vorticit , hybridation avec des g n rateurs thermo lectriques, utilisation d' nergies renouvelables et analyse du cycle de vie*. University of Angers, Angers, France, **08 September 2023**.

9- **Reporter (Evaluator) and Jury Member: PhD defence of Dr. Moeen EL BAST.** *Etudes Numériques et Expérimentales pour la Conception d'un Réacteur de Liquéfaction Hydrothermale.* IMT Atlantique, Nantes, France, **15 December 2022.**

10- **Reporter (Evaluator) and Jury Member: PhD defence of Dr. Quentin HOLKA.** *Optimisation topologique des échangeurs de chaleur en régime turbulent avec la méthode des porosités.* MINES ParisTech, Université de recherche Paris Sciences et Lettres, PSL Research University, Paris, France, **27 April 2022.**

11- **Reporter (Evaluator) and Jury Member: PhD defence of Dr. Cléante LANGRÉE.** *CFD simulation of deflagrations in open congested environment for industrial accident application.* **University of Rouen-Normandie,** Rouen, France, **08 December 2021.**

12- **Jury Member: PhD defence of Dr. Omran ABUSHAMMALA.** *Optimal Helical Tube Design for Intensified Heat / Mass Exchangers.* **University of Lorraine,** Nancy, France, **18 Sep. 2020.**

13- **Jury Member: PhD defence of Dr. Walid ABOU HWEIJ.** *Numerical simulation of wall-bounded flows through screen-type static mixers.* **American University of Beirut,** Beirut, Lebanon, **27 Apr. 2020.**

14- **Jury Member: PhD defence of Dr. Florian DUGAST.** *Optimisation topologique en convection thermique avec la méthode de Lattice Boltzmann.* **University of Nantes,** Nantes, France, **15 Oct. 2018.**

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## ● INTERESTS AND HOBBIES

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**Sports:** Running, reading, swimming, soccer, ping-pong and cycling. Completed two marathons (nice-cannes marathon 2009, and Paris marathon 2014) and more than 10 half-marathons and tens of 10k.

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## ● PROFESSIONAL REFERENCES

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**Professor Fadi Moukalled,** American University of Beirut, [fmukalled@aub.edu.lb](mailto:fmukalled@aub.edu.lb)

**Professor Jean-Luc Harion,** Unievrstity of Lille, [jean-luc.harion@imt-nord-europe.fr](mailto:jean-luc.harion@imt-nord-europe.fr)

**Professor Dimitris Drikakis,** University of Nicosia, [drikakis.d@unic.ac.cy](mailto:drikakis.d@unic.ac.cy)

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