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CNRS Researcher &
Lecturer at École polytechnique
Physical hydrodynamics

Date of birth : 10-23-1979
Nationality : French

EDUCATION

2021 — ***HDR : Hydrodynamics, Capillarity & Phase change***
Institut ∂'Alembert, Sorbonne Université, Paris
Defended May 5, 2021

2003–2006 — ***Ph.D. in Physical Hydrodynamics***
F.A.S.T. Laboratory, Université Pierre et Marie Curie, Paris
Defended Sept. 27, 2006

2002–2003 — ***DEA*** *(Master 2)* ***Physics of Liquids***
Université Pierre et Marie Curie, Paris

2002 — ***Maîtrise*** *(Bachelor Degree)* ***in Physics***
Université Joseph Fourrier, Grenoble

RESEARCH **(Keywords : Multiphase flows, Capillarity, Heat transfer, Mixing)**

From 2010 — ***Institut Jean Le Rond d'Alembert (Paris, France)***
Capillary hydrodynamics (bubble, jet, drop...) and phase change (solidification, evaporation...)

2010(Jun-Sep) — ***Institut de Recherche sur les Phenomenes Hors Équilibre (Marseille, France)***
Experimental study of a Helmholtz resonator in a rotor-stator cavity
Collaborator : P. Le Gal

2008-2010 — ***Department of Mathematics, University of B.C. (Vancouver, Canada)***
Experimental and analytical study of the dynamics of a gravity current in a mean flow
Collaborator : I.A. Frigaard

2006-2007 — ***Departamento de Física, Universidad de Chile (Santiago, Chile)***
Experimental study of the interaction of nonpropagating hydrodynamic solitons
Collaborator : N. Mujica

2005(Apr-Jul) — ***Department of Applied Maths & Theoretical Physics (Cambridge, UK)***
Numerical study of the stability of a viscous shear flow in a tilted tube
Advisor : E.J. Hinch

2003-2006 — ***Fluides, Automatique & Systèmes Thermiques Laboratory (Orsay, France)***
Title : *From Turbulent Mixing to Gravity Currents in Confined Geometry*
Experimental study of buoyant mixing of miscible fluids in vertical and tilted tubes
Advisors : J.-P. Hulin and B. Perrin
Jury : B. Castaing (reviewer), A.-M. Cazabat, J.-M. Chomaz (reviewer),
E.J. Hinch, J.-P. Hulin, C. Misbah

2002(Mar-Jul) — ***Laboratoire Interdisciplinaire de Physique (Grenoble, France)***
Numerical study of steady to unsteady dynamics of a vesicle in a shear flow (using the Green functions formalism)
Advisor : C. Misbah

PUBLICATIONS & COMMUNICATIONS

Book

- *Les Lois d'échelle: La Physique du petit et du grand*
  T. Séon
  Odile Jacob, 256 p., Oct, 2018

Publications in peer reviewed journals

(31) *How size and speed of jet drops are robust to initial conditions*
A. Berny, L. Deike, S. Popinet and T. Séon
Subm. to ***Phys. Rev. Fluids***, (2021)

(30) *Statistics of jet drop production*
A. Berny, S. Popinet, T. Séon and L. Deike
Geophys. Res. Lett. **48**, 10 (2021)

(29) *Solidification of a rivulet : shape and temperature fields*
A. Monier, A. Huerre, T. Séon and C. Josserand
J. Fluid Mech. **914**, A32 (2021)

(28) *Freezing-damped impact of a water drop*
V. Thiévenaz, T. Séon and C. Josserand
Europhys. Lett. **132**, (2) 24002 (2020)

(27) *Freezing a rivulet*
A. Monier, A. Huerre, C. Josserand and T. Séon
Phys. Rev. Fluids **5**, 062301 (2020)

(26) *Retraction and freezing of a water film on ice*
V. Thiévenaz, C. Josserand and T. Séon
Phys. Rev. Fluids **5**, 041601 (2020)

(25) *Role of all jet drops in mass transfer from bursting bubbles*
A. Berny, L. Deike, T. Séon and S. Popinet
Phys. Rev. Fluids **5**, 033605 (2020)

(24) *Solidification dynamics of an impacted drop*
V. Thiévenaz, T. Séon and C. Josserand
J. Fluid Mech. **874**, 756-773 (2019)

(23) *Ejecta, Corolla, and Splashes from Drop Impacts on Viscous Fluids*
F. Marcotte, G.-J. Michon, T. Séon and C. Josserand
Phys. Rev. Lett. **122**, 014501 (2019)

(22) *Dynamics of jets produced by bursting bubbles*
L. Deike, E. Ghabache, G. Liger-Belair, A. K. Das, S. Zaleski, S. Popinet and T. Séon
Phys. Rev. Fluids **3**, 013603 (2018)

(21) *Jet dynamics post drop impact on a deep pool*
G.-J. Michon, C. Josserand and T. Séon
Phys. Rev. Fluids **2**, 023601 (2017)

(20) *Effervescence in champagne and sparkling wines : From bubble bursting to droplet evaporation*
T. Séon and G. Liger-Belair
Eur. Phys. J. Special Topics **226**, 117-156 (2017)

(19) *Size of the top jet drop produced by bubble bursting*
É. Ghabache and T. Séon
Phys. Rev. Fluids **1**, 051901 (2016)

(18) *Frozen Impacted Drop : From Fragmentation to Hierarchical Crack Patterns*
É. Ghabache, C. Josserand and T. Séon
Phys. Rev. Lett. **117**, 074501 (2016)

(17) *Evaporation of droplets in a Champagne wine aerosol*
É. Ghabache, G. Liger-Belair, A. Antkowiak and T. Séon
Sci. Rep. **6**, 25148 (2016)

(16) *On the physics of fizziness : How bubble bursting controls droplets ejection*
É. Ghabache, A. Antkowiak, C. Josserand and T. Séon
Phys. Fluids **26**, 121701 (2014)

(15) *Liquid jet eruption from hollow relaxation*
É. Ghabache, T. Séon and A. Antkowiak
J. Fluid Mech. **761**, 206-219 (2014)

(14) *Large bubble rupture sparks fast liquid jet*
T. Séon and A. Antkowiak
Phys. Rev. Lett. **109**, 014501 (2012)

(13) *Collection of collapsing-bubble-driven phenomena found in champagne glasses*
G. Liger-Belair, T. Séon and A. Antkowiak
Journal of Bubble Science, Engineering and Technology **4**, 21–34 (2012)

(12) *Miscible displacement flows in near-horizontal ducts at low Atwood number*
S.M. Taghavi, K. Alba, T. Séon, K. Wielage-Burchard, D.M. Martinez and I.A. Frigaard
J. Fluid Mech. **696**, 175-214 (2012)

(11) *Jets in viscous bubbles*
T. Séon and A. Antkowiak
Phys. Fluids **23**, 091103 (2011)

(10) *Stationary residual layers in buoyant Newtonian displacement flows*
S.M. Taghavi, T. Séon, K. Wielage-Burchard, D.M. Martinez and I.A. Frigaard
Phys. Fluids **23**, 044105 (2011)

(9) *Influence of an imposed flow on the stability of a gravity current in a nearly horizontal duct*
S.M. Taghavi, T. Séon, D.M. Martinez and I.A. Frigaard
Phys. Fluids **22**, 031702 (2010)

(8) *Buoyancy-dominated displacement flows in horizontal channels : the viscous limit*
S.M. Taghavi, T. Séon, D.M. Martinez and I.A. Frigaard
J. Fluid Mech. **639**, 1-35 (2009)

(7) *Front dynamics and macroscopic diffusion in buoyant mixing in a tilted tube*
T. Séon, J. Znaien, J.-P. Hulin, D. Salin, B. Perrin and E.J. Hinch
Phys. Fluids **19**, 125105 (2007)

(6) *Transient buoyancy-driven front dynamics in nearly horizontal tubes*
T. Séon, J. Znaien, J.-P. Hulin, D. Salin, B. Perrin and E.J. Hinch
Phys. Fluids **19**, 123603 (2007)

(5) *LIF measurements of buoyancy driven mixing in tilted tubes*
T. Séon, J.-P. Hulin, D. Salin, B. Perrin and E.J. Hinch
Phys. Fluids **18**, 041701 (2006)

(4) *From turbulent mixing to gravity currents in tilted tubes*
T. Séon, J.-P. Hulin, D. Salin, B. Perrin and E.J. Hinch
Phys. Fluids **18**, 091103 (2006)

(3) *Buoyancy driven miscible front dynamics in tilted tubes*
T. Séon, J.-P. Hulin, D. Salin, B. Perrin and E.J. Hinch
Phys. Fluids **17**, 031702 (2005)

(2) *Buoyant mixing of miscible fluids in tilted tubes*
T. Séon, J.-P. Hulin, D. Salin, B. Perrin and E.J. Hinch
Phys. Fluids **16**, L103-L106 (2004)

(1) *Steady to unsteady dynamics of a vesicle in a flow*
J. Beaucourt, F. Rioual, T. Séon, T. Biben and C. Misbah
Phys. Rev. E **69**, 011906 (2004)

Invited conferences in congress and workshop

- *On the physics of effervescence : From bubble bursting to sea spray distribution*
  T. Séon, E. Ghabache, A. Berny, L. Deike and S. Popinet
  8th International Conference on Nonlinear Science and Complexity, Marseille, May, 24-27, 2021
- *On the physics of effervescence*
  T. Séon, S. Popinet ,E. Ghabache, A. Berny and G. Liger-Belair
  Journée des oenologues de France, VITeff, Hall Millésium, Epernay, Oct. 18, 2019
- *Story of a freezing drop impact*
  T. Séon, V. Thiévenaz and C. Josserand
  Trends in spatiotemporal complexity symposium, Université de Lille, July. 3-4, 2018
- *The physics of effervescence*
  T. Séon, E. Ghabache, C. Josserand and G. Liger-Belair
  Drops and Bubbles Workshop, Jiaotong University, Xi'an, China, Dec. 4, 2018
- *Frozen Impacted Drops*
  T. Séon, V. Thiévenaz and C. Josserand
  Worshop Givrage, Toulouse, France, Mai 30- Jun 1, 2018
- *Patterns of Frozen Impacted Drops*
  T. Séon, E. Ghabache, V. Thiévenaz and C. Josserand
  Taiwan-France Workshop on Drop Dynamics, Taipei, Taiwan, Dec. 11, 2017

- *Buoyancy driven mixing in confined geometries*
  T. Séon, Y. Tanino, J. Znaien, F. Moisy, J.-P. Hulin, D. Salin
  XII Meeting of Fluids and their Applications, Buenos-Aires, Argentina, Nov 5-7, 2012
  Published in ***Anales AFA 23, n∘3*** (2012)

Communications with peer reviewed proceedings

- *Dispensing improvements with drop on demand technology*
  E. Cadalen, T. Seon, C. Josserand, D. Manteigas
  22nd European Microelectronics and Packaging Conference and Exhibition, Pisa, Italy, Sept. 16-19, 2019
  Paper 8951793 in the **peer reviewed proceedings** of the conference
- *Size and velocity of jet drops following bursting bubbles*
  T. Séon, L. Deike, E. Ghabache, S. Popinet and S. Zaleski
  24th International Congress of Theoretical and Applied Mechanics, Montreal, Canada, Aug. 21-26, 2016
  Paper FM06-2.03 in the **peer reviewed proceedings** of the conference
- *Coalescence de bulles dans des fluides visqueux et génération de bulles satellites*
  Q. Magdelaine, J. Philippi, A. Antkowiak, T. Séon et F. Pigeonneau
  22ème Congrès Français de Mécanique - Lyon, 24 - 28 août 2015
  Paper in the **peer reviewed proceedings** of the conference
- *Relaxation d'interface et jet gravitaire*
  É. Ghabache, T. Séon, A. Antkowiak
  21ème Congrès Français de Mécanique - Bordeaux, 26 - 30 août 2013
  Paper in the **peer reviewed proceedings** of the conference
- *Large hollow relaxation sparks liquid projection*
  T. Séon, É. Ghabache, A. Antkowiak
  8th International Conference on Multiphase Flow, Jeju, Korea, May 26-31, 2013
  Paper ICMF2013-547 in the **peer reviewed proceedings** of the conference
- *Large bubble rupture sparks fast liquid jet*
  T. Séon, A. Antkowiak
  23rd International Congress of Theoretical and Applied Mechanics, Beijing, China, Aug. 19-24, 2012
  Paper FM06-043 in the **peer reviewed proceedings** of the conference
- *Résonances d'une cavité rotor/stator au voisinage du point critique du SF6*
  G. Verhille, T. Séon et P. Le Gal
  20ème Congrès Français de Mécanique - Besançon, 28 août – 2 septembre 2011
  Paper 310 in the **peer reviewed proceedings** of the conference
- *Buoyancy induced mixing of miscible fluids in vertical and inclined tubes*
  T. Séon, J.-P. Hulin, D. Salin, B. Perrin
  21st International Congress of Theoretical and Applied Mechanics, Warsaw, Poland, August 15-21, 2004
  Paper FM20-12092 in the **peer reviewed proceedings** of the conference

General public articles

- *Le champagne, comment le déguster scientifiquement*
  G. Liger-Belair and T. Séon
  Alliage **77**, 97–106 (2016)
- *Le Crime Imparfait : La morphoanalyse des traces de sang au secours des enquêteurs*
  G. Boudarham, C. Josserand, T. Séon and L. Rhin
  Citrus **2**, 52–59 (2014)
- *La dégustation du champagne :*
  Quelques éléments de réflexion sur l'impact de la forme du verre et de la taille des bulles
  G. Liger-Belair, C. Cilindre, G. Polidori, H. Pron, T. Séon, E. Ghabache, A. Antkowiak, P. Jamesse, H. Fort
  Revue des oenologues et des techniques vitivinicoles et oenologiques **40**, 149, 43–46 (2013)

Confidential industrial report

- *Banc d'essai d'un système d'équilibrage axial de turbo-pompe dans du SF6*
  T. Séon et P. Le Gal.
  Rapport SNECMA, Sept, 2010

International communications without peer reviewed proceedings

- *Retraction and freezing of a water film on ice*
  T. Séon, V. Thiévenaz and C. Josserand
  72nd Meeting of the APS Division of Fluid Dynamics, Seattle (WA), Nov 23-26, 2019
- *Story of a freezing drop impact*
  T. Séon, V. Thiévenaz and C. Josserand
  10th International Conference on Multiphase Flow - ICMF 2019, Rio de Janeiro, Brazil, May 19-24, 2019
- *Frozen Impacted Drops*
  T. Séon, V. Thiévenaz and C. Josserand
  71st Meeting of the APS Division of Fluid Dynamics, Atlanta (GA), Nov 18-20, 2018
- *Breakfast patterns of frozen impacted drops*
  T. Séon, V. Thiévenaz and C. Josserand
  70th Meeting of the APS Division of Fluid Dynamics, Denver (CO), Nov 19-21, 2017
- *Frozen impacted drop : From fragmentation to hierarchical crack patterns*
  T. Séon, É. Ghabache and C. Josserand
  69th Meeting of the APS Division of Fluid Dynamics, Portland (OR), Nov 20-22, 2016
- *Evaporation of droplets in a Champagne wine aerosol*
  T. Séon, É. Ghabache, A. Antkowiak, C. Josserand
  11th European Fluid Mechanics Conference, Sevilla, Spain, Sept 12-16, 2016
- *On the physics of effervescence, from Bubble Bursting to Drop ejection*
  T. Séon, É. Ghabache, A. Antkowiak, C. Josserand
  9th International Conference on Multiphase Flow, Florence, Italy, May 22-27, 2016
- *From bubble bursting to droplet evaporation in the context of champagne aerosols*
  T. Séon, É. Ghabache, A. Antkowiak, G. Liger-Belair
  68th Meeting of the APS Division of Fluid Dynamics, Boston (MA), Nov 22-24, 2015
- *On the physics of fizziness : How does bubble bursting control droplets ejection ?*
  T. Séon, É. Ghabache, A. Antkowiak, C. Josserand
  67th Meeting of the APS Division of Fluid Dynamics, San Fransisco (CA), Nov 23-25, 2014
- *Large bubble rupture sparks fast liquid jet*
  T. Séon, A. Antkowiak
  65th Meeting of the APS Division of Fluid Dynamics, San Diego (CA), Nov 18-20, 2012
- *Singular jets in the formation of bubbles in viscous fluids*
  T. Séon, V. Duclaux, S. Popinet, A. Antkowiak
  63nd Meeting of the APS Division of Fluid Dynamics, Long Beach (CA), Nov 21-23, 2010
- *Influence of an imposed flow on a gravity current in a near horizontal duct*
  T. Séon, S.M. Taghavi, D.M. Martinez, I.A. Frigaard
  62nd Meeting of the APS Division of Fluid Dynamics, Minneapolis (MN), Nov 22-24, 2009
- *Front dynamics and macroscopic diffusion in buoyant mixing in a tilted tube*
  T. Séon, J. Znaien, J.-P. Hulin, D. Salin, B. Perrin, E.J. Hinch
  60th Meeting of the APS Division of Fluid Dynamics, Salt Lake City (UT), Nov 18-20, 2007
- *Inertial and viscous gravity currents in a confined geometry : Stationary and transient regimes*
  T. Séon, J. Znaien, J.-P. Hulin, D. Salin, B. Perrin, E.J. Hinch
  59th Meeting of the APS Division of Fluid Dynamics, Tampa Bay (FL), Nov 19-21, 2006
- *Concentration distribution in gravity driven mixing of two fluids in a tilted tube*
  T. Séon, J.-P. Hulin, D. Salin, B. Perrin, E.J. Hinch
  58th Meeting of the APS Division of Fluid Dynamics, Chicago (IL), Nov 20-22, 2005
- *Buoyancy driven miscible front dynamics in tilted tubes*
  T. Séon, J.-P. Hulin, D. Salin, B. Perrin, E.J. Hinch
  57th Meeting of the APS Fluid Dynamics Division, Seattle (WA), Nov 21-23, 2004

Invited seminars

(31) Les lois d'échelle ou comment esquisser le monde qui nous entoure...
Laboratoire de Physique des Solides (Orsay, France), Jul. 6, 2021

(30) Story of a freezing drop impact
Conférences de l'IPR (Rennes, France), Oct. 13, 2020

(29) Comment de simples lois physiques ont-elles dessiné la nature ?
Université du temps libre (Verrières le Buisson, France), Mar. 9, 2020

(28) Bubble bursting in Champagne
Centre de recherche de Moët&Chandon (Épernay, France), Apr 2, 2019

(27) Frozen impacted drops
Laboratoire de Synthèse et Fonctionnalisation des Céramiques (LSFC) (Cavaillon, France), Jan. 17, 2019

(26) On the physics of effervescence, from Bubble Bursting to Drop evaporation
Laboratoire de Physique des Solides (LPS) (Orsay, France), Mai 04, 2018

(25) On the physics of effervescence, from Bubble Bursting to Drop evaporation
Laboratoire Matière et Systèmes Complexes (MSC) (Paris, France), Fev. 05, 2018

(24) Champagne ! La valse des bulles...
Les conférences expérimentales de l'ESPCI (Paris, France), Jan. 15, 2018
`https://www.espgg.org/Champagne-La-valse-des-bulles`

(23) On the physics of effervescence, from Bubble Bursting to Drop evaporation
Institut Universitaire des Systèmes Thermiques Industriels (IUSTI) (Marseille, France), Fev. 10, 2017

(22) On the physics of effervescence, from Bubble Bursting to Drop evaporation
Laboratoire Magmas et Volcans (Clermont-Ferrand, France), Jan. 24, 2017

(21) On the physics of effervescence, from Bubble Bursting to Drop evaporation
Laboratoire FAST (Orsay, France), June 2, 2016

(20) From bubble bursting to drop evaporation : On the Fizzics of Champagne ...
Centre de recherche de Moët&Chandon (Épernay, France), June 22, 2015

(19) On the Physics of Fizziness : How does bubble bursting control droplets ejection ?
Scripps Institution of Oceanography, UC San Diego (USA), Nov. 21, 2014

(18) On the physics of fizziness : Universal behaviors
ENS Ulm (Paris, France), Feb. 25, 2014

(17) When large hollow relaxation sparks liquid projection ...
Institut de Recherche sur les Phénomènes Hors Equilibre (Marseille, France), Dec. 14, 2012

(16) Jets, projections et grandes bulles visqueuses
Saint-Gobain Recherche (Aubervilliers, France), May 24, 2012

(15) Jet & Bubble : large bubble rupture sparks fast liquid jet
Laboratoire de Planétologie et Géodynamique de Nantes (Nantes, France), Feb. 16, 2012

(14) Jets, projections et grandes bulles visqueuses
Institut de Physique du Globe de Paris (Paris, France), Jan. 24, 2012

(13) Dynamique d'un courant de gravité dans un écoulement moyen
Institut Jean Le Rond d'Alembert (Paris, France), Jan. 18, 2011

(12) Some nice and pretty experiments in fluid dynamics
Mech. Eng. Department, University of British Columbia (Vancouver, Canada), Dec. 3, 2010

(11) Dynamique d'un courant de gravité dans un écoulement moyen
Laboratoire FAST (Orsay, France), Nov. 4, 2010

(10) Dynamique d'un courant de gravité dans un écoulement moyen
Laboratoire PMMH - ESPCI (Paris, France), Apr. 23, 2010

(9) Influence of an imposed flow on a buoyant flow in a near horizontal duct : physics of the 3 flow regimes
Schlumberger seminar (Montrouge, France), Apr. 13, 2010

(8) Buoyant mixing and displacement of two miscible fluids in tilted tubes
Paul Linden's group, University of California - San Diego (USA), Jul. 28, 2009

(7) Buoyant mixing and displacement of two miscible fluids in tilted tubes
Schlumberger seminar (Vancouver, Canada), May 15, 2009

(6) Displacement and Mixing in a Pipe
Trican Well Service Ltd. seminar (Calgary, Canada), Jun. 16, 2008

(5) Buoyant mixing of two miscible fluids in tilted tubes
Civil Eng. Department, University of British Columbia (Vancouver, Canada), Feb. 8, 2008

(4) Buoyant mixing of two miscible fluids in tilted tubes
Chem. Eng. Department, University of British Columbia (Vancouver, Canada), Feb. 6, 2008

(3) From turbulent mixing to gravity currents in confined geometry
Departamento de física, Universidad de Chile (Santiago, Chile), Dec. 19, 2006

(2) From turbulent mixing to gravity currents in confined geometry
Schlumberger seminar (Montrouge, France), Oct. 10, 2006

(1) Du mélange turbulent aux courants de gravité en géométrie confinée
Laboratoire LEMTA (Nancy, France), Oct. 5, 2006

Ph.D. STUDENTS

From 2020 ***Simon Brient***
PhD Title : *Freezing a flowing film*

From 2020 ***Rodolphe Grivet***, co-supervised with C. Josserand
PhD Title : *Wetting of water on ice*

From 2020 ***Hamed Vaziri***, co-supervised with S. Popinet
PhD Title : *Bursting bubble film drops*

From 2018 ***Antoine Monier***
PhD Title : *Freezing a rivulet*

2017-2020 ***Alexis Berny***, co-supervised with S. Popinet
PhD Title : *Droplets production and evaporation by bubble bursting*

2016-2019 ***Virgile Thiévenaz***, co-supervised with C. Josserand
PhD Title : *Drop impact and solidification*

2012-2015 ***Elisabeth Ghabache***, co-supervised with C. Josserand and A. Antkowiak
PhD Title : *Free surface deformation : from cavity collapse to stretched jet*

TEACHING

From 2019 ***Part-time Lecturer at École polytechnique, Palaiseau, France***
Lab class in environmental flows (60h) for graduates students (M1)
Lab class in complexe fluids flows (40h) for graduates students (M2)

From 2014 ***Sorbonne Université - UPMC, Paris, France***
5 years of tutorial class in Fluid Mechanics (14h/y) for undergraduates students (L3)

2017–2019 ***École polytechnique, Palaiseau, France***
Lab class in Granular Flows (50h) for graduates students (M1)

2011–2019 ***Sorbonne Université - UPMC, Paris, France***
8 years of tutorial class in Fluid Mechanics (14h/y) for graduates students (M1)
5 years tutorial class in Solid Mechanics (26h/y) for undergraduates students (L3)
2 years of lecture and tutorial class in Physics of Liquid (15h/y) for graduates students (M1)
1 year of lab class in Fluid Mechanics (12h/y) for undergraduates students (L3)

2011–2018 ***ENSTA, Paris, France***
6 years of tutorial class in Fluid Mechanics (14h/y) for graduates students (M1)

2008–2009 ***University of British Columbia, Vancouver, Canada***
Lecture on Mathematics (80h) for undergraduates students (in English)

2007 ***Universidad de Chile, Santiago, Chile***
Lecture on Hydrodynamics (20h) for graduates students (in Spanish)

2003–2006 ***Université Paris*** XI***, Orsay & ENSTA, Paris, France***
Various Labs in Fluid Mechanics and Aerodynamics (250h) for undergraduates students