

Frédéric MOISY

Professor at Université Paris-Sud

PERSONAL DETAILS

Born November 28, 1974, in Paris (France)
Address Laboratoire FAST – Bâtiment 530
Université Paris-Saclay, 91 405 Orsay, France
33 1 69 15 80 37 – moisy@fast.u-psud.fr
www.fast.u-psud.fr/~moisy

EDUCATION AND POSITIONS

2012 - ... **Professor at Université Paris-Sud**, Laboratoire Fluides, Automatique et Systèmes Thermiques (FAST, UMR 7608).
2017 **Invited professor**, Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge (7 months)
2012-17 **Junior fellow of Institut Universitaire de France**
2010 **Habilitation à Diriger des Recherches, Université Paris-Sud**
2000-12 **Maître de Conférences (assistant professor) at Université Paris-Sud**, Laboratoire Fluides, Automatique et Systèmes Thermiques (FAST, UMR 7608).
2000 **PhD thesis** of Université Pierre et Marie Curie, at Laboratoire de Physique Statistique, Ecole Normale Supérieure. Supervisor: P. Tabeling.
1997 **D.E.A. (Master's degree) Champs, Particules, Matières**, Université Pierre et Marie Curie.

RESEARCH PROJECTS

since 2017 Hydrodynamics of swimming microorganisms. Collaborations with H. Auradou (FAST), P. Mergaert (I2BC), R. Goldstein (DAMTP Cambridge).
since 2012 Surface waves and capillary-gravity wakes. Collaborations with M. Rabaud (FAST), Wietze Herreman (LIMSI), Michael Benzaquen (LadHyX)
2009-2018 Linear and nonlinear inertial waves. Collaborations with P.P. Cortet (FAST), T. Dauxois (ENS Lyon), L. Maas (NIOZ, Univ. Utrecht), D. Cébron (ETH Zurich), B. Voisin (LEGI Grenoble)
since 2007 Optical methods for free-surface deformations, application to capillary parametric waves. Collaboration with M. Rabaud (FAST), Y. Couder (MSC, Univ. Paris Diderot).
2007-2014 Turbulent mixing in miscible fluids. Collaboration with J.P. Hulin (FAST) and J. Magnaudet (IMFT Toulouse).
2004-2017 Rotating turbulence. Collaborations with P.P. Cortet (FAST), J. Sommeria (LEGI Grenoble) and B. Gallet (CEA Saclay)
2000-2005 Instabilities in rotating flows. Collaborations with O. Daube (LME, Université d'Evry) and C. Nore (LIMSI, Univ. Paris-Sud).
2000-2003 Geometry of intense structures in isotropic turbulence. Collaboration with J. Jiménez, (Univ. Politecnica, Madrid).
1997-2000 Turbulence and mixing in low-temperature helium gas (PhD thesis at Laboratoire de Physique Statistique, Ecole Normale Supérieure, with P. Tabeling). Collaboration with E. Bodenschatz (Cornell University).

TEACHING

Lectures

- Hydrodynamics, at Ecole Normale Supérieure (3rd year of Licence de Physique Inter-Universitaire, since 2017-2018)
- Fluid Mechanics for Master 1 of fundamental physics (2010-2017)
- Turbulence for Master 2 Dynamique des Fluides et Energetique
- Experimental methods in Fluid Mechanics for Master 2 Dynamique des Fluides et Energetique
- Lagrangian Mechanics for Licence 3 of mechanics

Total teaching hours: 192 h / year, except during the IUF junior fellowship (64 h/yr) in 2012-2017.

Teaching responsibilities

- Since 2008, I am coordinator with C.T. Pham of the Master's programme « Dynamique des Fluides et Energétique » (coordination shared with G. Labrosse during 2008-2010, and with C. Dang-Vu during 2010-2012).
- Since 2017, I supervise a group of students participating in the "French Physicists' Tournament"

SCIENTIFIC PRODUCTION

- 46 papers (+ 2 submitted), including 15 Phys. Fluids, 6 J. Fluid Mech., 5 Phys. Rev. Lett., 5 Phys. Rev. Fluids, 4 Phys. Rev. E, 2 Exp. in Fluids, 2 EPL
- 32 conference proceedings, including 13 invited talks / keynote lectures.
- 6 large audience papers
- 32 invited laboratory seminars
- Bibliometry: 1220 citations, h = 19 (Web of Science); 2050 citations, h = 24 (Google Scholar)

RESEARCH GRANTS

- PI of project LABEX LASIPS "OVA", with LadHyX (2018-19): 60 k€
- Second investigator of ANR project "ViscousWindWave" (PI : M. Rabaud), with IMFT
- PI of project LABEX LASIPS "Empreintes", with LadHyX (2017-18): 60 k€
- Second investigator of ANR project "Diset" (PI : P. Cortet), with ENS Lyon and LMFA Grenoble
- Second investigator of project LABEX PALM « Waveturb », with LadHyX (2015-2016): 60 k€
- PI of project ANR blanc « ONLITUR », with ENS Lyon (2011-2014): 298 k€.
- PI of project RTRA Triangle de la Physique « Rotating platform » (2008-2010): 70 k€
- PI of project ANR blanc « HiSpeed PIV », with laboratories LIMSI, IAS, IJLRA, LadHyX and ENSTA (2006-2010): 500 k€.
- PI of project BQR Univ. Paris-Sud « Particle Image Velocimetry » (2002): 23 k€.
- PI of project Action Spécifique UPMC « Particle Image Velocimetry » (2002): 30 k€.

DISTINCTIONS

- PRF Editor's suggestion for "Wind-sustained viscous solitons", **4**, 084003 (2019).
- EPL Highlight for "Counter-rotation in an orbitally shaken glass of beer", **22**, 34002 (2018).
- PRE Editor's suggestion for "Mach-like capillary-gravity waves", **90**, 023009 (2014).
- PRL Editor's suggestion for « Ship wakes: Kelvin or Mach angle? », **110**, 214503 (2013).
- Phys. Fluids Research Highlights for "Crosswaves induced by the vertical oscillation of a fully immersed vertical plate", **24**, 022110 (2012).
- « Focus on Fluids » by S. Dalziel, J. Fluid Mech **666** (2011).
- Prize "Gallery of Fluid Motion", APS DFD (2002)
- Prize of 9^{ème} colloque Alain Bouyssi, Université Paris-Sud (2001).

THESIS SUPERVISION: 7

- Cyprien Morize, co-supervised with Marc Rabaud (Université Paris Diderot, defended september 29, 2006) – currently maître de conférences at Université Paris-Sud.
- Jemil Znaien, co-supervised with J.P. Hulin (University Paris-Sud, defended October 2, 2009), currently engineer at DAF Trucks, Netherlands.
- Cyril Lamriben, co-supervised with P.-P. Cortet (University Paris-Sud, defended July 12, 2012), currently professeur agrégé at Université Paris Ouest.
- Antoine Campagne, co-supervised with P.-P. Cortet (University Paris-Sud, defended July 9, 2015), currently postdoc at LEGI, Université de Grenoble.
- Anna Paquier, co-supervised with M. Rabaud (University Paris-Sud, defended July 11, 2016), currently engineer at Saint-Gobain.

In progress

- Julien Bouvard, co-supervised with H. Auradou (University Paris-Sud), start. Oct 2018
- Marine Aulnette, co-supervised with M. Rabaud (University Paris-Sud), start. Oct 2018

DEFENSE COMMITTEES: 45

- Reviewer for 20 PhD thesis: M. Mercier (ENS Lyon, 2010), N. Grisouard (Univ Joseph Fourier Grenoble, 2010), S. Davoust (ONERA, 2011), P. Augier (Ecole Polytechnique, 2011), C. Jause-Labert (Ecole Centrale Lyon, sept. 2012), D. Duri (Univ Joseph Fourier Grenoble, 2012), A. Sauret (Univ. Aix-Marseille, 2013), A. Benusiglio (Ecole Polytechnique, 2013), M. Landeau (Institut de Physique du Globe de Paris, 2013), J. Hérault (Ecole Normale Supérieure, 2013), G. Gomit (Institut PPrime, 2013), Rafael Gomes Fernandes (Imperial College, 2014), N. Machicoane (ENS Lyon, 2014), A. Ranjan (Cambridge, 2015), R. Courtier (ONERA, 2015), J.M. Perez-Gracia (Madrid, 2016), Q. Aubourg (LEGI, Grenoble, 2016), R. Hassaini (Univ Grenoble, 2018), Yang Wen (Sorbonne Université, 2018), E. Leivadarou (Univ Cambridge, 2019), R. Schuster (INRIA Rennes, 2019), M. Chitt (CEA Cadarache, 2019)
- Referee for 13 PhD thesis: F. Ravelet (CEA Saclay, 2005), R.P.J. Kunnen (TU/e Eindhoven, 2008), W. Mouhali (Observatoire de Paris – Meudon, 2009), J. Basley (Univ. Paris-Sud, 2012), S. Miralles (Ecole Normale Supérieure de Lyon, 2013), Simon Thalabard (CEA Saclay, 2013), Hugo Chauvet (IPGP / Univ Paris Diderot, 2014), N. Schneider (CEA, 2015), L. Hadid (LPP, Ecole Polytechnique, Univ Paris Sud, 2016), D. Kuzzay (CEA Saclay, 2016), Leo-Paul Euvé (Université de Poitiers, 2017), Lucie Domino (Université Paris-Diderot, 2018), Jean-Philippe Boucher (Ecole Polytechnique, 2018), C. Nobili (Univ Aix-Marseille, 2019), V. Ageorges (Le Havre, 2019).
- Reviewer for 2 Habilitation thesis: S. Poncet (Univ Aix-Marseille, 2014), R. Monchaux (ENSTA / Univ. Paris-Sud, 2015), L. Chatelier (PPRIME Poitiers, 2019)
- Referee for 4 Habilitation thesis: O. Doaré (ENSTA /Univ. Paris-Sud, 2012), D. Lo Jacono (IMFT Toulouse, 2015), L. Leffshatz (Ecole Polytechnique, 2018), A. Naso (Ec Centrale Lyon, 2019).

ADMINISTRATIVE SERVICES

- Co-organizer of the workshop “Sillages et Ondes de surface” (2014, 2016, 2018, 2020)
- Organizer of a workshop ERCOFTAC/SIG35 (april 13-14 2011, Paris)
- Member of the scientific board of Labex PALM (since 2011)
- Member of the scientific board of GDR « Turbulence » (2008-2019)
- Member of the board of the physics department at University Paris-Sud (2010-2014).
- Member of the HCERES evaluation committee of Laboratory PPRIME, Poitiers (December 2016)
- Member of the board « CES n°5: energie » of Agence Nationale de la Recherche (july 2014).
- Member of the evaluation committee of Department DAFE (ONERA, march 2014).
- Coordinator of the group “Instabilities, Waves and Turbulence” at Laboratory FAST
- Coordinator of seminars of the Master’s degree in fundamental physics (2011-2016).

- Reviewer for J. Fluid. Mech (23 papers), Phys. Fluids (15), Exp. Fluids (10), Phys. Rev. Fluids (5), J. Turbulence (3), Physica D (3), Eur. J. Mech (3), etc.
- Reviewer for ANR projects (2008 and 2012); Labex PALM (several projects since 2012); Israel Science Foundation (2012); incubateur Agoranov (2005).

JOURNAL PAPERS: 48

48. C. Nove-Josserand, S. Perrard, A. Lozano Duran, M. Rabaud, M. Benzaquen, F. Moisy, Effect of current on wind-waves generation, *subm. to Phys. Rev. Fluids* (2019)
47. H. De Maleprade, F. Moisy, T. Ishikawa, R.E. Goldstein, Motility and Phototaxis of *Gonium*, the Simplest Differentiated Colonial Alga, *subm. to Phys Rev. E* (2019)
46. M. Aulnette, M. Rabaud, F. Moisy, Wind-sustained viscous solitons, *Phys. Rev. Fluids* **4**, 084003 (2019) - **Editor's suggestion**
45. S. Perrard, A. Lozano Duran, M. Rabaud, M. Benzaquen, F. Moisy, Turbulent windprint on a liquid surface, *J. Fluid Mech.* **873**, 1020-1054 (2019).
44. F. Moisy, J. Bouvard, W. Herreman, Counter-rotation in an orbitally shaken glass of beer, *EPL* **122**, 34002 (2018) – **Highlight 2018**
43. N. Machicoane, V. Labarre, B. Voisin, F. Moisy, P.-P. Cortet, Wake of inertial waves of a horizontal cylinder in horizontal translation, *Phys. Rev. Fluids* **3**, 034801 (2018)
42. J. Bouvard, W. Herreman and F. Moisy, Mean mass transport in an orbitally shaken cylindrical container, *Phys. Rev. Fluids* **2**, 084801 (2017)
41. A. Paquier, F. Moisy and M. Rabaud, Viscosity effects in wind wave generation, *Phys. Rev. Fluids* **1**, 083901 (2016)
40. N. Machicoane, F. Moisy and P.-P. Cortet, Two-dimensionalization of the flow driven by a slowly rotating impeller in a rapidly rotating fluid, *Phys. Rev. Fluids* **1**, 073701 (2016)
39. A. Campagne, N. Machicoane, B. Gallet, P.-P. Cortet and F. Moisy, Turbulent drag in a rotating frame, *J. Fluid Mech.* **794**, R5 (2016)
38. A. Paquier, F. Moisy, and M. Rabaud, Surface deformations and wave generation by wind above a viscous liquid, *Phys. Fluids* **27**, 122103 (2015)
37. N. Machicoane, P.-P. Cortet, B. Voisin, and F. Moisy, Influence of the multipole order of the source on the decay of an inertial wave beam in a rotating fluid, *Phys. Fluids* **27**, 066602 (2015)
36. A. Campagne, B. Gallet, F. Moisy and P.-P. Cortet, Disentangling inertial waves from eddy turbulence in a forced rotating turbulence experiment, *Phys. Rev. E* **91**, 043016 (2015)
35. F.S. Godefert and F. Moisy, Structure and dynamics of rotating turbulence: a review of recent experimental and numerical results, *Applied Mechanics Reviews* **67**, 030802 (2015)
34. Y. Tanino, F. Moisy, J.-P. Hulin. Lock-exchange flows in inclined pipes: the relevance of the Prandtl mixing length model. *J. Turbulence* **16** (5), 484-502 (2015)
33. A. Campagne, B. Gallet, F. Moisy and P.-P. Cortet, Direct and inverse energy cascades in a forced rotating turbulence experiment, *Phys. Fluids* **26**, 125112 (2014)
32. M. Rabaud and F. Moisy, Narrow ship wakes and wave drag for planing hulls, *Ocean Eng.* **90**, 34 (2014).
31. F. Moisy, M. Rabaud, Mach-like capillary-gravity wakes, *Phys. Rev. E* **90**, 023009 (2014) - **Editor's suggestion**
30. F. Moisy, M. Rabaud, Scaling of far-field wake angle of non-axisymmetric pressure disturbance, *Phys. Rev. E* **89**, 063004 (2014).
29. B. Gallet, A. Campagne, P.-P. Cortet, F. Moisy. Scale-dependent cyclone-anticyclone asymmetry in a forced rotating turbulence experiment, *Phys. Fluids* **26**, 035108 (2014).
28. M. Rabaud, F. Moisy. Ship wakes: Kelvin or Mach angle?, *Phys. Rev. Lett.* **110**, 214503 (2013) - **Editor's suggestion**
27. J. Boisson, C. Lamriben, L.R.M. Maas, P.-P. Cortet, F. Moisy. Inertial waves and modes excited by the libration of a rotating cube, *Phys. Fluids* **24**, 076602 (2012).
26. J. Boisson, D. Cébron, F. Moisy, P.P. Cortet, Earth rotation prevents the solid-body rotation of fluids in the laboratory *EPL* **98**, 59002 (2012).
25. Y. Tanino, F. Moisy, J.P. Hulin, Laminar-turbulent cycles in inclined lock-exchange flows, *Phys. Rev. E* **85**, 066308 (2012).
24. F. Moisy, G.J. Michon, M. Rabaud, E. Sultan, Crosswaves induced by the vertical oscillation of a fully immersed vertical plate, *Phys. Fluids* **24**, 022110 (2012) - **Research Highlight**

23. G. Bordes, F. Moisy, T. Dauxois, P.-P. Cortet, Experimental evidence of a triadic resonance of plane inertial waves in a rotating fluid, *Phys Fluids* **24**, 014105 (2012).
22. C. Lamriben, P.P. Cortet, F. Moisy, Direct measurements of anisotropic energy transfers in a rotating turbulence experiment, *Phys. Rev. Lett.* **107**, 024503 (2011).
21. J. Znaïen, F. Moisy, J.P. Hulin, Flow structure and momentum transport for buoyancy driven mixing flows in long tubes at different tilt angles, *Phys. Fluids* **23**, 035105 (2011).
20. C. Lamriben, P.P. Cortet, F. Moisy, L. Maas, Excitation of inertial modes in a closed grid turbulence experiment under rotation, *Phys. Fluids* **23**, 015102 (2011).
19. F. Moisy, C. Morize, M. Rabaud, J. Sommeria, Decay laws, anisotropy and cyclone-anticyclone asymmetry in decaying rotating turbulence, *J. Fluid Mech* **666**, 5-35 (2011) – **Focus on Fluid**
18. P.P. Cortet, C. Lamriben, F. Moisy, Viscous spreading of an inertial wave beam in a rotating fluid, *Phys. Fluids* **22**, 086603 (2010).
17. J. Znaïen, Y. Hallez, F. Moisy, J. Magnaudet, J.P. Hulin, D. Salin and E. J. Hinch: Experimental and numerical investigation of flow structure and momentum transport in a turbulent buoyancy-driven flow inside a tilted tube, *Phys. Fluids* **21**, 115102 (2009).
16. A. Eddi, E. Fort, F. Moisy, Y. Couder: Unpredictable tunneling of a classical wave-particle association, *Phys. Rev. Lett.* **102**, 240401 (2009).
15. F. Moisy, M. Rabaud, K. Salsac: A Synthetic Schlieren method for the measurement of the topography of a liquid interface, *Exp. in Fluids* **46** (6), 1021-1036 (2009).
14. J. Seiwert, C. Morize, M. Rabaud, F. Moisy: Scaling of longitudinal structure functions in grid-generated decaying rotating turbulence, *Phys. Fluids* **20**, 071702 (2008).
13. L. Messio, C. Morize, M. Rabaud, F. Moisy: Experimental observation using particle image velocimetry of inertial waves in a rotating fluid, *Exp. in Fluids* **44**, 519-528 (2008).
12. C. Morize, F. Moisy: Energy decay of rotating turbulence with confinement effects, *Phys. Fluids* **18**, 065107 (2006).
11. C. Morize, F. Moisy, M. Rabaud: Decaying grid-generated turbulence in a rotating frame, *Phys. Fluids* **17**, 095105 (2005)
10. C. Nore, F. Moisy, L. Quartier: Experimental observation of near-heteroclinic cycles in the von Karman swirling flow, *Phys. Fluids* **17**, 064103 (2005).
9. F. Moisy and J. Jimenez: Geometry and clustering of intense structures in isotropic turbulence, *J. Fluid Mech* **513**, 111-133 (2004).
8. F. Moisy, O. Doaré, T. Pasutto, O. Daube, M. Rabaud: Experimental and numerical study of the shear layer instability between two counter-rotating disks, *J. Fluid Mech* **507**, 175-202 (2004).
7. F. Moisy: Supercritical bifurcation of a spinning hoop, *Am. J. Phys.* **71**, 999-1004 (2003).
6. F. Moisy, T. Pasutto, M. Rabaud, Instability patterns in the flow between counter-rotating disks, *Nonlinear Processes in Geophysics* **10** (3), 281-288 (2003).
5. G. Gauthier, P. Gondret, F. Moisy, M. Rabaud: Instabilities in the flow between co and counter-rotating disks, *J. Fluid Mech* **473**, 1-21 (2002).
4. F. Moisy, H. Willaime, J.S. Andersen, P. Tabeling: Passive scalar intermittency in low temperature helium flows, *Phys. Rev. Lett.* **86** (21), 4827-4830 (2001).
3. La Porta, G.A. Voth, F. Moisy, E. Bodenschatz: Using cavitation to measure statistics of low-pressure events in large-Reynolds-number turbulence, *Phys. Fluid* **12** (6), 1485-1496 (2000).
2. H. Willaime, J. Maurer, F. Moisy, P. Tabeling: Turbulence over arrays of obstacles in low temperature helium gas, *Eur. Phys J.B* **18**, 363-369 (2000).
1. F. Moisy, P. Tabeling, H. Willaime: Kolmogorov Equation in fully developed turbulence, *Phys. Rev. Lett.* **82**, 3994-3997 (1999).

GENERAL PUBLIC

6. M. Rabaud, F. Moisy: Du neuf dans les sillages, *Reflets de la Physique* **39**, 10-13 (2014).
5. J. Boisson, D. Cébron, F. Moisy, P.-P. Cortet: Un pendule de Foucault fluide, *Reflets de la Physique* **31**, 22-23 (2012).
4. F. Moisy, C. Lamriben, P.P. Cortet, M. Rabaud: Et pourtant elle tourne... *Plein Sud spécial Recherche* 2010-2011.
3. F. Moisy, T. Pasutto, G. Gauthier, P. Gondret et M. Rabaud: Spiral patterns in swirling flows, *Europhysics News* **34** (3), 104-107 (2003).

2. G. Gauthier, P. Gondret, F. Moisy, M. Rabaud: Patterns between two rotating disks, Phys. Fluids 14 (9), S7 (2002). [Gallery of Fluid Motion]
1. F. Moisy, T. Pasutto, G. Gauthier, P. Gondret et M. Rabaud: Instabilités spirales entre disques tournants, Bull. S.F.P. 135, 4-8 (2002).

INVITED CONFERENCES / KEYNOTE LECTURES: 13

1. Workshop "Structures and Waves in Anisotropic Turbulence", Isaac Newton Institute for Mathematical Sciences, Univ. Warwick, UK, 2-7 november 2008
2. Winter School "New Challenges in Turbulence Research", Les Houches, 21-26 february 2010.
3. Colloquium Euromech 519 "Mixing and Dispersion in Flows Dominated by Rotation and Buoyancy", Rolduc, Netherlands, 20-23 june 2010.
4. Workshop "Classical and Quantum Turbulence", Abu Dhabi, 2-5 may 2011.
5. Colloquium Euromech 525 "Instabilities and transition in three-dimensional flows with rotation", Lyon, 21-23 june 2011.
6. Summer School « Morphology and dynamics of anisotropic flows », Cargèse, 18-31 july 2011.
7. Winter School "Wave Turbulence", Les Houches, 26-30 march 2012.
8. Colloquium Euromech 542 « Progress in statistical theory and pseudo-spectral DNS », Lyon, 15-18 january 2013
9. Conference "Statistical Mechanics and Nonlinear Physics", Lille 12-15 november 2013
10. Workshop "ISTROF - Instabilities and Turbulence in Stratified Rotational Flows", Le Havre, 23-26 june 2014
11. 19th International Couette-Taylor Workshop, Cottbus, Germany, 22-24 june 2015
12. Euromech-Ercoftac Workshop "Turbulence cascades", Lille, 2-4 december 2015.
13. Euromech-Ercoftac Workshop "Turbulence cascades II", Lyon, 5-7 december 2017.

RESEARCH HIGHLIGHTS

1. Pourquoi la mousse tourne-t-elle en sens inverse du liquide dans un verre de bière ?, L'Obs (4 oct 2018).
2. La surprenante rotation de la mousse dans un verre de bière, CNRS-INSIS Actualités (17 sept 2018).
3. Counter-Rotation Inside a Glass of Beer Shaken Stirringly, Improbable Research (August 7th, 2018).
4. Bière qui roule amasse la mousse à l'envers, Le Monde (7 aout 2018).
5. Quand la mousse de la bière tourne à contre-courant, Pour la Science (26 juillet 2018).
6. Wake up, Nature Physics News and Views 9, 390 (July 2013).
7. Vague à lame, Paris-Sud Magazine 84, 35 (juin 2013).
8. Blick auf Bugwellen mit Google Earth, Pro-Physik (30 May 2013).
9. Physicists rethink celebrated Kelvin wake pattern for ships, Physics World (30 May 2013).
10. Le sillage fait des vagues, Pour la Science 429, 7 (2013).
11. Lord Kelvin Wipes Out on Speed Boat Wakes?, Science Now (9 may 2013).
12. A liquid Foucault pendulum, CNRS international magazine, 27 (octobre 2012).
13. Un pendule de Foucault version liquide, CNRS Le journal, 268 (septembre-octobre 2012).

FREEWARES

The following Matlab toolboxes are distributed under BSD (Berkeley Software Distribution) license:

1. PIVMat - A PIV post-processing and data analysis toolbox for Matlab
<http://www.fast.u-psud.fr/pivmat>
2. EzyFit - A free curve fitting toolbox for Matlab
<http://www.fast.u-psud.fr/ezyfit>