

MOLIN Bernard
Born: 23-7-1952
Nationality: French

PROFESSIONAL ADDRESSES

- Ecole Centrale Marseille
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- Institut de Recherche sur les Phénomènes Hors Equilibre (IRPHE UMR 6594)
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EDUCATION

Graduate from Ecole Polytechnique of Paris (1974)
Master of Science in Naval Architecture (U.C. Berkeley, 1975)
Doctor of Engineering (ENSM Nantes, 1981)
'Habilité à Diriger les Recherches' (Aix-Marseille II, 1996)

SYNOPSIS OF PROFESSIONAL EXPERIENCE

1975-1981: Research Engineer within the Marine Engineering Division of 'Institut Français du Pétrole' (IFP)
1981-1982: Sabbatical leave at the Ship Research Institute of Japan (Tokyo)
1982-1994: Project Manager of IFP project 'Hydrodynamics of Structures at Sea'
1991-1994: Scientific Adviser at Bassin d'Essais des Carènes in Val de Reuil.
1994-2004: Professor at the Ocean Engineering Department of 'Ecole Supérieure d'Ingénieurs de Marseille' (ESIM).
2004- on: Professor at 'Ecole Centrale de Marseille'.
1994- on: Scientific Adviser at Principia R.D.

Research activities have been mainly concerned with nonlinear hydrodynamics (drift forces, slow drift motion, high frequency loads and response), and development of computer models for the French offshore industry. Recent involvement has included hydrodynamics of perforated structures, Vortex Induced Vibrations, slamming, moon-pool resonances, hydroelastic responses, run-up effects.

MISCELLANEOUS

22nd Georg Weinblum Memorial Lecturer (1999-2000).
In charge of 'Groupe de compétences Hydrodynamique' of CLAROM (1998-on).
Co-chief editor of Applied Ocean Research (2009-on).
In charge of the 'Comité de pilotage' of GIS-HYDRO (2000-on).
Member of the (*Comitato Di Valutazione Della Attivita Scientifica*) of INSEAN (2006-on).

PUBLICATIONS

Book

'*Hydrodynamique des structures offshore*', Editions Technip, 2002 (in French).

Journals

1. 'Second-Order Diffraction Loads Upon Three-Dimensional Bodies', Applied Ocean Research, vol. 1, n^o 4, 1979.
2. 'Effect of Wave Directionality on Second-Order Loads Induced by the Set-Down', Applied Ocean Research, vol. 6, n^o 2, 1984 (with V. Fauveau).
3. 'Comportements non-linéaires des structures flottantes dans la houle', la Houille Blanche, n^o 4-5, 1986 (with C. Berhault).
4. 'Hydrodynamique des plates-formes semi-submersibles', Revue de l'Institut Français du Pétrole, vol. 43, n^o2, 1988 (with C. Berhault).
5. 'Un point sur la recherche française en hydrodynamique navale, à l'occasion des Deuxièmes Journées de l'Hydrodynamique', Revue Scientifique et Technique de la Défense, 1989 (with C. Berhault, R. Cointe, G. Delhommeau, G. Fernandez and P. Sulmont).
6. 'A potential flow model for the drag of shrouded cylinders', J. Fluids and Structures, Vol. 7, pp 29-38, 1993.
7. 'An heuristic approach to wave drift damping', Applied Ocean Research, Vol. 15, N^o1, 1993 (with P. Clark and Š. Malenica).
8. 'Second-order hydrodynamics applied to moored structures. A state-of-the-art survey', Ship Technology Research (Schiffstechnik), vol 41, N^o2.
9. 'Third-harmonic wave diffraction by a vertical cylinder', J. Fluid Mechanics, vol 302, pp 203-229, 1995 (with Š. Malenica).
10. 'Wave and current forces on a vertical cylinder free to surge and sway', Applied Ocean Research, Vol 17, pp 79-90, 1995 (with Š. Malenica and P.J. Clark).
11. 'Nonlinear wave loads and runup on a vertical cylinder', chapter in *Nonlinear Water Wave Interaction*, Advances in Fluid Mechanics, WIT Press, Computational Mechanics Publications, 1999 (with P. Ferrant and Š. Malenica).
12. 'Numerical and physical wavetanks. Making them fit', 22nd Memorial George Weinblum Lecture, Hamburg, 1999 (published in Ship Technology Research, Vol. 48, No.1, 2-22, 2001).
13. 'On viscous forces on non-circular cylinders in low KC oscillatory flows', European J. Mechanics-B/Fluids, Vol. 19, 453-457, 2000 (with S. Etienne).
14. 'On the added mass and damping of periodic arrays of fully or partially porous disks', J. Fluids and Structures, Vol. 15, 275-290, 2001.
15. 'On the piston and sloshing modes in moonpools', J. Fluid Mechanics, Vol. 430, 27-50, 2001.
16. 'Experimental and theoretical analysis of the wave decay along a long array of vertical cylinders', J. Fluid Mechanics, Vol. 456, 113-135, 2002 (with H. Kagemoto, M. Murai, M. Saito & Š. Malenica).
17. 'Experimental study of the wave propagation and decay in a channel through a rigid ice sheet', Applied Ocean Research, Vol. 24, 247-260, 2002 (with F. Remy, O. Kimmoun & Y. Stassen).
18. 'On the frictional damping in roll of ship sections', International Shipbuilding Progress, Vol. 51, no 1, 57-83, 2004.
19. 'On energy arguments applied to the hydrodynamic impact force', Journal of En-

- gineering Mathematics, **48**, Nos.3-4, 305-319, 2004 (with R. Cointe, E. Fontaine & Y-M. Scolan).
20. 'The role of tertiary wave interactions in wave-body problems', *J. Fluid Mech.*, Vol. 528, 323-354 (with F. Remy, O. Kimmoun & E. Jamois).
21. 'Les effets non-linéaires en interaction houle-structure et leur modélisation', *Mécanique et Industries*, **7**, 169–177, 2006.
22. 'Nonlinear wave amplification in front of reflective structures', *Eur. J. Mech. B-Fluids*, **25**, 565–573, 2006 (with E. Jamois, F. Remy & O. Kimmoun).
23. 'A numerical study of nonlinear wave runup on a vertical plate', *Coastal Eng.*, **53**, 929–945, 2006 (with E. Jamois, D. Fuhrman & H. Bingham).
24. 'Second-order wave interaction with a vertical plate', *J. Nicholas Newman Honorary Volume* (also in *J. Eng. Math.*, **58**, 109–119, 2006) (with F. Remy & O. Kimmoun).
25. 'Spacing effects on hydrodynamics of heave plates on offshore structures', *J. Fluids & Structures*, **23**, 1119–1136, 2007 (with L. Tao, Y.-M. Scolan & K. Thiagarajan).
26. 'A coupling method between extended Boussinesq equations and the integral equation method with application to a two-dimensional numerical wave-tank', *Ocean Engineering*, in press (with M. Hamidou, M. Kadri, O. Kimmoun & A. Tahakourt).

Conferences

1. 'Computations of Wave Drift Forces', OTC paper 3627, 1979.
2. 'Second-Order Drift Forces upon Large Bodies in Regular Waves', BOSS'79, London, 1979.
3. 'A Simulation Model for the Dynamic Behavior of Tankers Moored to Single Point Moorings', SSPA Symposium, Goteborg, 1980 (with G. Bureau).
4. 'On the Generation of Long-Period Second-Order Free-Waves Due to Changes in the Bottom Profile', paper n^o 68 of the Ship Research Institute of Japan, 1982.
5. 'Three-Year Experience in the Numerical Prediction of the Slow-Drift Motion of Moored Tankers', OTC paper n^o 4533, 1983.
6. 'On Second-Order Motion and Vertical Drift Forces for Three-Dimensional Bodies in Regular Waves', Int. Workshop on Ship and Platform Motions, Berkeley, 1983 (with J-P. Hairault).
7. 'Second-Order Double Frequency Loads and Motions for 3D Bodies', Proc. of the First International Workshop on Water Waves and Floating Bodies, MIT, 1986.
8. 'Second-Order Loads and Motions for Floating Bodies in Regular Waves', OMAE, 1986 (with A. Marion).
9. 'Alternative Methods for the Numerical Analysis of the Linear Response of Semi-Submersible Platforms in Waves', OMAE, 1987 (with C. Berhault et al).
10. 'Calcul des efforts de premier ordre sur les plates-formes semi-submersibles: choix d'une méthode', Premières Journées de l'Hydrodynamique, Nantes, 1987 (with C. Berhault).
11. 'Quelques réflexions sur la résolution du problème de diffraction au deuxième ordre', Premières Journées de l'Hydrodynamique, Nantes, 1987.
12. 'Nonlinear Impulsive Problems', Proc. of the Second International Workshop on Water Waves and Floating Bodies, University of Bristol, 1987 (with R. Cointe and A. Jami).
13. 'Second-Order Deformation of the Free-Surface Elevation around a Vertical Cylin-

- der', Proc. of the Third International Workshop on Water Waves and Floating Bodies, Woods Hole, 1988 (with L. Boudet).
14. 'Impact of Ice Bergy Bits on a Concrete Semi-Submersible', Polartech'88, Trondheim, 1988 (with C. Putot and C. Valenchon).
 15. 'Nonlinear and Second-Order Transient Waves in a Rectangular Tank', BOSS'88, Trondheim, 1988 (with R. Cointe and P. Nays).
 16. 'Low Frequency Heave Damping of Semi-Submersible Platforms: some Experimental Results', BOSS'88, Trondheim, 1988 (with E. Le Marchand and C. Berhault).
 17. 'Comportements non linéaires des plates-formes semi-submersibles', Deuxièmes Journées de l'Hydrodynamique, Nantes, 1989 (with C. Berhault and E. Le Marchand).
 18. 'Second-Order Deformation of the Free-Surface around a Vertical Cylinder. Part II', Proc. of the Fourth International Workshop on Water Waves and Floating Bodies, Oystese, 1989 (with Y-M. Scolan).
 19. 'On the Added Mass and Damping of Porous or Slotted Cylinders', Proc. of the Fourth International Workshop on Water Waves and Floating Bodies, Oystese, 1989.
 20. 'Numerical Prediction of Semi-Submersible Non-Linear Motions in Irregular Waves', Proc. of the 5th Intern. Conf. on Num. Ship Hydrodynamics, Hiroshima, 1989 (with Chen Xiao-Bo).
 21. 'Hydrodynamic Modeling of the ROSEAU Tower Stabilizer', E&P Forum Workshop on Wave and Current Kinematics and Loading, Rueil-Malmaison, 1989, and Proc. of the 9th OMAE Conference, Houston, 1990 (with J-L. Legras).
 22. 'High frequency interactions between TLP legs', Proc. of the Fifth International Workshop on Water Waves and Floating Bodies, Manchester, 1990 (with X.B. Chen).
 23. 'On the added mass and damping of porous cylinders. Non harmonic motion', Proc. of the Fifth International Workshop on Water Waves and Floating Bodies, Manchester, 1990.
 24. 'Nonlinear and linear motions of a rectangular barge in a perfect fluid', Proc. of the 18th Symposium on Naval Hydrodynamics, Ann Arbor, 1990 (with R. Cointe, P. Geyer, B. King and M-P. Tramoni).
 25. 'Cylindre de section elliptique monté sur appuis élastiques dans un courant', Actes des Troisièmes Journées de l'Hydrodynamique, Grenoble, 1991 (with C. Berhault).
 26. 'Etude hydrodynamique de structures circulaires à porosité surfacique', Actes des Troisièmes Journées de l'Hydrodynamique, Grenoble, 1991.
 27. 'Calcul des efforts de deuxième ordre à très haute fréquence sur des plates-formes à lignes tendues', Actes des Troisièmes Journées de l'Hydrodynamique, Grenoble, 1991 (with X.B. Chen).
 28. 'Nonlinear propagation of bichromatic wave trains', Proc. Sixth Int. Workshop on Water Waves and Floating Bodies, Woods Hole, 1991 (with L. Boudet and R. Cointe).
 29. 'Stabilizers for compliant towers: numerical and experimental studies', Brasil Off-shore'91 (with G. Damy).
- 'Faster evaluation of resonant exciting loads on tension leg platforms', Brasil Off-shore'91 (with X.B. Chen and F. Petitjean).
30. 'A new small semi concept for marginal fields', OTC paper N⁰7050, 1992.
 31. 'Numerical modeling of progressive wave absorbers', Proc. Seventh Int. Workshop on Water Waves and Floating Bodies, Val de Reuil, 1992 (with J-M. Fourest).
 32. 'Motion damping by slotted structures', MARIN Jubilee Meeting, Wageningen, May 1992.
 33. 'Low frequency vertical forces acting on a submerged body: a comparison between

- theory and experiments', Proc. Sixth Int. BOSS Conference, 1992 (with L. Boudet and R. Cointe).
34. 'Atténuation de la houle par une dalle horizontale immergée et perforée', Quatrièmes Journées de l'Hydrodynamique, Nantes, 1993 (with P. Bétous).
 35. 'Steady forces due to onset flow and waves on wall-sided bodies in finite depth water', Proc. 12th OMAE Conf., Glasgow, 1993 (with P. Clark and Š. Malenica).
 36. 'Slow-drift viscous damping of TLP pontoons', Proc. 13th OMAE Conf., Houston, 1994 (with D. Martigny and Y-M. Scolan).
 37. 'Slow-drift motion: practical estimation of mooring line damping', Proc. 13th OMAE Conf., Houston, 1994 (with X. Bompais, M. Le Boulluec, F. Dekindt and S. Marin).
 38. 'Third order triple frequency wave forces on fixed vertical cylinders', Proc. 9th Int. Workshop on Water Waves and Floating Bodies, Kuju, Japan, 1994.
 39. 'Recent advances on the slow-drift damping of offshore structures', Proc. 7th BOSS Conference, Boston, 1994 (with M. Le Boulluec, Ph. Le Buhan, X-B. Chen, G. Deleuil, L. Foulhoux and F. Villeger).
 40. 'Analyse numérique et expérimentale du groupage des vagues', Cinquièmes Journées de l'Hydrodynamique, 1995 (avec L. Boudet).
 41. 'Effet des défauts de planéité de parois sur la propagation de la houle dans un bassin de grande longueur', Cinquièmes Journées de l'Hydrodynamique, 1995 (avec R. Cointe).
 42. 'On energy arguments applied to the slamming force', 11th Int. Workshop on Water Waves and Floating Bodies, Hamburg, 1996 (with E. Fontaine and R. Cointe).
 43. 'Experimental and numerical modeling of the high frequency resonant motion of a vertical cylinder in irregular waves', OMAE, 1996 (with Y-M. Scolan, G. Deleuil and D. Martigny).
 44. 'Modélisation instationnaire de poches de cavitation par la méthode potentielle et par la méthode VOF', Sixièmes Journées de l'Hydrodynamique, Nantes, 1997 (avec L. Diéval, R. Marcer et M. Arnaud).
 45. 'Some results from numerical and experimental investigations on the high frequency responses of offshore structures', BOSS, 1997 (with Y-M. Scolan, M. le Boulluec, X-B. Chen, G. Deleuil, P. Ferrant and Š. Malenica).
 46. 'A procedure to remove secularity in third-order numerical wave tanks', 13th Int. Workshop on Water Waves and Floating Bodies, 1998 (with Y. Stassen).
 47. 'A high order boundary element model for 2D wave tank simulation', ISOPE, 1998 (with Y. Stassen and M. le Boulluec).
 48. 'Numerical study of complex flow around an array of circular cylinders in various arrangements', 2nd Int. Conf. on Hydroelasticity in Marine Technology, Fukuoka, 1998 (with S. Etienne and Y-M. Scolan).
 49. 'Etude théorique et expérimentale des seiches parasites générées dans les bassins d'essais', Septièmes Journées de l'Hydrodynamique, Marseille, 1999 (avec Y. Stassen et S. Marin).
 50. 'Etude théorique et expérimentale des efforts hydrodynamiques sur une embase plane à l'approche du fond marin', Septièmes Journées de l'Hydrodynamique, Marseille, 1999 (avec P. Guérin, D. Martigny et Ph. Weber).
 51. 'On the piston mode in moonpools', 14th Int. Workshop on Water Waves and Floating Bodies, Port Huron, 1999.
 52. 'Numerical study of flow around an array of circular cylinders at high Reynolds

- number', Proc. 7th Int. Conf. on Numerical Ship Hydrodynamics, Nantes, 1999 (with S. Etienne and Y-M. Scolan).
53. 'On the sloshing modes in moonpools, or the dispersion equation for progressive waves in a channel through the ice sheet', 15th Int. Workshop on Water Waves and Floating Bodies, Caesarea, Israel, 2000.
54. 'Etude au deuxième ordre d'approximation de l'interaction d'une houle régulière avec une plaque poreuse verticale', Huitièmes Journées de l'Hydrodynamique, Nantes, Mars 2001 (avec O. Kimmoun et W. Moubayed).
55. 'Simulation bidimensionnelle des écoulements dans une baie de forage. Etude des modes de résonance et des amortissements', Huitièmes Journées de l'Hydrodynamique, Nantes, Mars 2001 (avec C. Maisondieu, O. Kimmoun & L. Gentaz).
56. 'Water entry of a perforated wedge', 16th Int. Workshop on Water Waves and Floating Bodies, Hiroshima, 2001 (with A.A. Korobkin).
57. 'LNG-FPSO's: frequency domain, coupled analysis of support and liquid cargo motions', Proc. IMAM 2002 (with F. Remy, S. Rigaud & Ch. de Jouette).
58. 'Approximations of the low-frequency second-order wave loads: Newman versus Rainey', Proc. 17th Int. Workshop on Water Waves and Floating Bodies, Cambridge, 2002 (with X.B. Chen).
59. 'Interaction fluide/structure dans un faisceau de risers verticaux soumis à un courant uniforme : effets de masquage et vibrations induites', Neuvièmes Journées de l'Hydrodynamique, Poitiers, 2003 (avec Y. Stassen, J-P. Morel, M. Répecaud, E. Fontaine et E. de Langre).
60. 'Etude numérique et expérimentale de la réponse à la houle d'un ensemble flotteurs + cuves partiellement remplies', Neuvièmes Journées de l'Hydrodynamique, Poitiers, 2003 (avec F. Remy, Th. Coudray, S. Rigaud & C. Mary).
61. 'Réponse à la houle d'une barge élastique', Neuvièmes Journées de l'Hydrodynamique, Poitiers, 2003 (avec Š. Malenica, F. Remy & I. Senjanovic).
62. 'Third-order interactions and wave run-up', 18th Int. Workshop on Water Waves and Floating Bodies, le Croisic, 2003 (with F. Remy, O. Kimmoun & P. Ferrant).
63. 'Numerical and experimental study of the wave-induced free surface boundary layer current in a canal', 18th Int. Workshop on Water Waves and Floating Bodies, le Croisic, 2003 (with M. Baklouti, O. Kimmoun, L. Gentaz & B. Alessandrini).
64. 'VIV on risers with top-tensioning buoyancy-cans. Part 1: numerical modeling and simplified analysis', ISOPE 2003 (with E. Fontaine, J-P. Morel, G. Damy, M. Repecaud, Y. Stassen & E. de Langre).
65. 'VIV on risers with top-tensioning buoyancy-cans. Part 2: experimental modeling', ISOPE 2003 (with E. Fontaine, J-P. Morel, G. Damy, M. Repecaud, Y. Stassen & E. de Langre).
66. 'Multi-modal VIV excitations: measurements and predictions', OMAE 2003 (with C. le Cunff & P. Guérin)
67. 'Hydroelastic response of a barge to impulsive and non-impulsive wave loads', 3rd Int. Conf. on Hydroelasticity in Marine Technology, 2003 (with Š. Malenica, F. Remy & I. Senjanovic).
68. 'VIV and mask effects testing in risers array: lessons learned from experimental and analyses work', DOT conference, Marseille, 2003 (with Y. Stassen, J-P. Morel, M. Repecaud, E. Fontaine, Ph. Di Constanzo & E. de Langre).
69. 'Heave added mass and damping of a perforated disk below the free surface', 19th Int. Workshop on Water Waves and Floating Bodies, Cortona, 2004 (with

F.G. Nielsen).

70. 'Experimental study of the non-linear wave interaction with a vertical plate', ISOPE Conference, Toulon, 2004 (with F. Remy & O. Kimmoun).

71. 'Nonlinear interactions and wave run-up near a gravity base structure', Proc. ICCE Conf., Vol. 4, 3979-3991, Lisbonne (with E. Jamois, O. Kimmoun & Y. Stassen).

72. 'Enhanced wave effects on the weather side of reflective structures', Rogue Waves 2004, Brest (with F. Remy, O. Kimmoun & E. Jamois).

73. 'Run-up sur une plaque verticale. Effet de l'incidence de la houle', Dixièmes Journées de l'Hydrodynamique, Nantes, 2005 (avec E. Jamois, F. Remy & O. Kimmoun).

74. 'Experimental study of the wave response of a two-dimensional rectangular barge in very shallow water', 20th Int. Workshop on Water Waves and Floating Bodies, Longyearbyen, 2005 (with O. Kimmoun & E. Fontaine).

75. 'Oblique wave interaction with reflective structures by a high-order velocity potential Boussinesq-type model', 20th Int. Workshop on Water Waves and Floating Bodies, Longyearbyen, 2005 (with E. Jamois, D. Fuhrman, H. Bingham & F. Remy).

76. 'Non-linear wave interaction with a square cylinder', 20th Int. Workshop on Water Waves and Floating Bodies, Longyearbyen, 2005 (with E. Jamois, C.H. Lee & J.N. Newman).

77. 'A Lagally formulation of the wave drift force', 21st Int. Workshop Water Waves & Floating Bodies, Loughborough, 2006 (with A. Ledoux, G. Delhommeau & F. Remy).

78. 'Experimental and numerical study of the wave response of a flexible barge', 4th International Conference on Hydroelasticity in Marine Technology, Wuxi 2006 (with F. Remy & A. Ledoux).

79. 'Non-linear wave interaction with a long vertical breakwater', 7th Int. Conf. Hydrodynamics, Ischia, 2006 (keynote lecture) (with O. Kimmoun, F. Remy & E. Jamois).

80. 'A Lagally formulation of the second-order slowly varying drift forces', Onzièmes Journées de l'Hydrodynamique, Brest, 2007 (with M.-C. Rouaults & A. Ledoux).

81. 'Non-linear standing wave effects on the weather side of a wall with a narrow gap', 22nd Int. Workshop Water Waves & Floating Bodies, Plitvice, 2007 (with O. Kimmoun & F. Remy).

82. 'Experimental study of the heave added mass and damping of solid and perforated disks close to the free surface', IMAM 2007 (with F. Remy & T. Rippol).

83. 'Nonlinear phenomena in wave-body interaction: description and theoretical modeling', International Workshop on Coupled Methods in Numerical Dynamics, Dubrovnik, 2007.

84. 'Tapping wave energy through Longuet-Higgins microseism effect', 23rd Int. Workshop Water Waves & Floating Bodies, Plitvice 2008 (with D. Lajoie, N. Jarry & G. Rousseaux).

85. 'Effect of roof impacts on coupling between wave response and sloshing in tanks of LNG-carriers', 27th OMAE Conference, Estoril, 2008 (with F. Remy, A. Ledoux & N. Ruiz).

86. 'Third-order effects in wave-body interaction', XXII ICTAM Conference, Adelaide, 2008 (with O. Kimmoun & F. Remy).

87. 'Hydrodynamic modeling of partial dikes', 24th Int. Workshop Water Waves & Floating Bodies, Zelegonorsk, 2009 (with B. Lécuyer & F. Remy).

88. 'Experimental and numerical study of the gap resonances in-between two rectangular barges', 13th Congress Intl. Maritime Assoc. of Mediterranean IMAM 2009,

Istanbul, 2009 (with F. Remy, A. Camhi & A. Ledoux).