Sébastien Michelin

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Education

2013 **Habilitation à Diriger des Recherches**, *Université Pierre et Marie Curie*, Paris, France, *Fluid-solid interactions : locomotion, instabilities and energy transfers*.

2009 **PhD in Aerospace Engineering**, *University of California, San Diego*, La Jolla, CA, USA, *Falling, flapping, flying, swimming... : high-Re fluid-solid interactions with vortex shedding*.

2007 **M.Sc. in Aerospace Engineering**, *University of California, San Diego*, La Jolla, CA, USA.

2005 **Ingénieur du Corps des Mines**, *Ecole des Mines de Paris*, Paris, France.

2002 **Diplôme d'Ingénieur**, *Ecole Polytechnique*, Palaiseau, France.

Academic Employment & Positions

2014–present **Professor**, *LadHyX, Département de Mécanique – Ecole Polytechnique*, Palaiseau, France.

Jan-Sept 2017 **Visiting Academics**, *Department of Applied Mathematics and Theoretical Physics (DAMTP)*, University of Cambridge, UK.

2010–2014 **Assistant Professor**, *LadHyX, Département de Mécanique – Ecole Polytechnique*, Palaiseau, France.

2009 **Post-doctoral Researcher**, *Mechanical and Aerospace Engineering – University of California, San Diego*, La Jolla, CA, USA.

2005–2009 **Graduate Student Researcher**, *Mechanical and Aerospace Engineering – University of California, San Diego*, La Jolla, CA, USA.

2003–2004 **Visiting Scientist**, *Scripps Institution of Oceanography*, La Jolla, CA, USA.

Administrative Responsibilities

2022–present **Head of the Mechanical & Energy Engineering Scientific Field**, IP Paris Doctoral School, France.

2020–present **Executive council member**, LadHyX, Ecole Polytechnique, France.

2013–present **Executive Committee member**, Mechanics Department, Ecole Polytechnique, France.

2013–2019 **Deputy Director of LadHyX**, LadHyX, Ecole Polytechnique, France.

Editorial Responsibilities & Service

2023 **Selection Committee Member**, *François Frenkiel Award for Fluid Mechanics*, Division of Fluid Dynamics of the American Physical Society.

2015–present **Associate Editor**, *Journal of Fluids and Structures*.

2021–present **Member of the General Assembly**, *French National Comittee of Mechanics (CNFM)*.

2021–present **Selection Committee Member**, *Andreas Acrivos Dissertation Award in Fluid Dynamics*, Division of Fluid Dynamics of the American Physical Society.

2022 **Guest Editor**, *Proceedings of the National Academy of Sciences, USA*.

2020 **Editor**, *Special Issue on Fluid & Elasticity 2019*, Journal of Fluids and Structures.

Conference organisation

June 2024 **Conference co-organizer**, *Fluid & Elasticity 2024*, Arcachon, France.

Nov. 2021 **Focus Session co-chair**, *Interfacial Active Matter*, 74^{th} Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Phoenix, AZ, USA.

Aug. 2021 **Thematic session co-chair**, *Low-Re flows and suspensions*, International Congress on Theoretical and Applied Mechanics, ICTAM 2020+1, Milano, Italy.

June 2019 **Conference co-organizer**, *Fluid & Elasticity 2019*, Malaga, Spain.

Fellowships, Awards and Honors

2022 **François Frenkiel Award**, *Division of Fluid Dynamics*, American Physical Society.
Jul-Sept 2017 **Visiting Fellow Commonership**, *Trinity College*, University of Cambridge, UK.
Jan-Jun 2017 **French Governement Fellowship**, *Churchill College*, University of Cambridge, UK.
2009 **Summer Graduate Student Teaching Fellowship**, University of California, San Diego, USA.
2009 **MAE Dissertation Fellowship**, University of California, San Diego, USA.
2008 **MAE Outstanding Graduate Student Award**, University of California, San Diego, USA.
2005–2007 **Jacobs School of Engineering Graduate Fellowship**, University of California, San Diego, USA.
2002–2005 **Corps des Mines Fellowship**, Ecole des Mines de Paris, France.
2002 **Prix L. E. Rivot**, *French Academy of Sciences*.

Grants

2017–2022 **ERC Starting Grant**, *PI : S. Michelin*, 1,497,698€.
2015–2016 **CNRS PEPS Grant**, *PI : S. Michelin*, 10,000€.
2014–2015 **DGA Grant**, *PI : S. Michelin*, 18,500€.
2013–2016 **ANR Young Investigator Grant (ANR JCJC)**, *PI : S. Michelin*, 228,000€.
2012–2013 **LASIPS Grant**, *PI : O. Doaré*, 57,000€.
2011–2014 **Marie-Curie International Reintegration Grant**, *PI : S. Michelin*, 75,000€.

Teaching Experience

2024– **MEC432 – Fluid Mechanics**, *Lectures, class coordinator*, Ecole Polytechnique, France.
2020–present **PHY306 – Fluid Mechanics**, *Lectures*, Bachelor, Ecole Polytechnique, France.
2019–present **MEC664 – Microhydrodynamics**, *Lectures*, Masters MFFA, Ecole Polytechnique, France.
2013–present **MEC432 – Fluid Mechanics**, *Petites Classes*, Ecole Polytechnique, France.
2013–2019 **MEC657 – Animal Locomotion**, *Lectures*, Masters MFFA, Ecole Polytechnique, France.
2013–2016 **MEC560 – Propulsions**, *Petites Classes*, Ecole Polytechnique, France.
2010–2014 **MEC431 – Continuum Mechanics I**, *Petites Classes*, Ecole Polytechnique, France.
2010–2013 **MEC581 – Projects in Mechanics**, Ecole Polytechnique, France.
2010–2012 **MEC561 – Fluid-Structure Interactions**, *Petites Classes*, Ecole Polytechnique, France.
2012 **MS206 – Fluid-Structure Interactions**, *Petites Classes*, ENSTA ParisTech, France.
2009 **MAE107 – Computational Methods in Engineering**, *Instructor*, UCSD, CA, USA.
2006 **MAE210A – Fluid Mechanics**, *Teaching Assistant*, UCSD, CA, USA.

Refereed Publications

72. P. Vinze & **S. Michelin**, 2023 : Self-organisation of active suspensions in shear flows (under review)
71. **S. Michelin**, 2023 : Self-propulsion of chemically-active droplets, *Ann. Rev. Fluid Mech.*, **55**
70. N. Desai & **S. Michelin**, 2022 : Steady state propulsion of isotropic active colloids along a wall, *Phys. Rev. Fluids*, Special Collection on *Interfacial Active Matter*, **7**, 100501
69. T. Traverso & **S. Michelin**, 2022 : Collective dynamics and rheology of confined phoretic suspensions, *J. Fluid Mech.*, **943**, A21
68. F. Picella & **S. Michelin**, 2022 : Confined self-propulsion of isotropic active colloids, *J. Fluid Mech.*, **933**, A27
67. N. Desai & **S. Michelin**, 2021 : Instability and self-propulsion of active droplets along a wall,*Phys. Rev. Fluids*, **6**, 114103
    This publication was awarded the 2022 François Frenkiel Award of the Division of Fluid Dynamics of the American Physical Society
66. A. Choudhary, K. V. S. Chaithanya, **S. Michelin** & S. Pushpavanam, 2021 : Self-propulsion in 2D confinement : phoretic and hydrodynamic interactions, *Eur. Phys. J. E*, **44**, 97

65. F. Rojas-Pérez, B. Delmotte & **S. Michelin**, 2021 : Hydrochemical interactions of phoretic particles : a regularized multipole framework, *J. Fluid Mech.*, **919**, A22

64. K. Lippera, M. Benzaquen & **S. Michelin**, 2021 : Alignment and scattering of colliding active droplets, *Soft Matter*, **17**, 365–375

63. T. Traverso & **S. Michelin**, 2020 : Hydro-chemical interactions in dilute phoretic suspensions : from individual particle properties to collective organization, *Phys. Rev. Fluids*, **5**, 104203

62. A. Saint-Sardos, S. Sart, K. Lippera, E. Brient-Litzler, **S. Michelin**, G. Amselem & C. N. Baroud, 2020 : High-throughput measurements of intra-cellular and secreted cytokine from single spheroids using anchored microfluidic droplets, *Small*, **16**, 2002303

61. P. Katsamba, **S. Michelin** & T. D. Montenegro-Johnson, 2020 : Slender Phoretic Theory of chemically-active filaments *J. Fluid Mech.*, **898**, A24

60. F. Nadal & **S. Michelin**, 2020 : Acoustic propulsion of a small bottom-heavy sphere, *J. Fluid Mech.*, **898**, A10

59. J. Mougel & **S. Michelin**, 2020 : Flutter and resonances of a flag near a free surface, *J. Fluids Struct.*, **96**, 103046

58. K. Lippera, M. Benzaquen & **S. Michelin**, 2020 : Bouncing, chasing or pausing : asymmetric collisions of active droplets, *Phys. Rev. Fluids*, **5**, 032201

57. **S. Michelin**, S. Game, E. Lauga, E. Keaveny & D. Papageorgiou, 2020 : Spontaneous onset of convection in a uniform phoretic channel, *Soft Matter*, **16**, 1259–1269

56. K. Lippera, M. Morozov, M. Benzaquen & **S. Michelin**, 2020 : Collisions and rebounds of chemically-active droplets, *J. Fluid Mech.*, **886**, A17

55. A. Varma & **S. Michelin**, 2019 : Modeling chemo-hydrodynamic interactions of phoretic particles : a unified framework, *Phys. Rev. Fluids*, **4**, 124204

54. M. Morozov & **S. Michelin**, 2019 : Orientational instability and spontaneous rotation of active nematic droplets, *Soft Matter*, **15**, 7814–7822

53. **S. Michelin** & E. Lauga, 2019 : Universal optimal geometry of minimal phoretic pumps, *Sci. Rep.*, **9**, 10788

52. C. de Blois, M. Reyssat, **S. Michelin** & O. Dauchot, 2019 : The flow field around a confined active droplet, *Phys. Rev. Fluids*, **4**, 054001

51. K. Lippera, O. Dauchot, **S. Michelin** & M. Benzaquen, 2019 : No net motion of oscillating near-spheres at low Re, *J. Fluid Mech.*, **866**, R1

50. M. Morozov & **S. Michelin**, 2019 : Nonlinear dynamics of a chemically active drop : from steady to chaotic self-propulsion, *J. Chem. Phys.*, **150**, 044110

49. E. Kanso & **S. Michelin**, 2019 : Phoretic & hydrodynamic interactions of weakly-confined autophoretic particles, *J. Chem. Phys.*, **150**, 044902

48. M. Morozov & **S. Michelin**, 2019 : Self-propulsion near the onset of Marangoni instability of deformable active droplets, *J. Fluid Mech.*, **860**, 711–738

47. **S. Michelin**, G. Gallino, F. Gallaire & E. Lauga, 2019 : Viscous growth and rebound of a bubble near a rigid surface, *J. Fluid Mech.*, **860**, 172–199

46. A. Varma, T. D. Montenegro-Johnson & **S. Michelin**, 2018 : Clustering-induced self-propulsion of isotropic autophoretic particles, *Soft Matter*, **14**, 7155-7173

45. G. Gallino, F. Gallaire, E. Lauga & **S. Michelin**, 2018 : Physics of bubble-propelled microrockets, *Adv. Funct. Mat.*, **28**, 1800686

44. **S. Michelin**, E. Guérin & E. Lauga, 2018 : Collective dissolution of microbubbles, *Phys. Rev. Fluids*, **3**, 043601

43. J. Kim, **S. Michelin**, M. Hilbers , L. Martinelli , E. Chaudan , G. Amselem , E. Fradet , J.P. Boilot , A. Brouwer , C.N. Baroud , J. Peretti & T. Gacoin, 2017 : Monitoring the orientation of rare-earth doped nanorods for flow shear tomography, *Nat. Nanotechnol.*, **12**, 914–919

42. Y. Xia, O. Doaré & **S. Michelin**, 2017 : Fluid-solid-electric energy transport along piezoelectric flags, *Eur. J. Comp. Mech.*, Special Issue on "Fluid Flows with Interactive Boundaries", **26**, 154–171

41. **S. Michelin** & E. Lauga, 2017 : Geometric tuning of self-propulsion for Janus catalytic particles, *Sci. Rep.*, **7**, 42664

40. G. O. Antoine, E. de Langre & **S. Michelin**, 2016 : Optimal energy harvesting from Vortex-Induced Vibrations of cables, *Proc. Roy. Soc. A*, **472**, 20160583

39. G. Amselem, C. Guermonprez, B. Drogue, **S. Michelin** & C. Baroud, 2016 : Universal microfluidic platform for bioassays in anchored droplets, *Lab Chip*, **16**, 4200–4211

38. E. Lauga & **S. Michelin**, 2016 : The stresslet induced by active swimmers, *Phys. Rev. Lett.*, **117**, 148001

37. J. Mougel, O. Doaré & **S. Michelin**, 2016 : Synchronized flutter of two slender flags, *J. Fluid Mech.*, **801**, 652–669

36. Y. Xia, O. Doaré & **S. Michelin**, 2016 : Electro-hydrodynamic synchronization of piezoelectric flags, *J. Fluids Struct.*, **65**, 398–410

35. M. Lisicki, **S. Michelin** & E. Lauga, 2016 : Phoretic flow induced by asymmetric confinement, *J. Fluid Mech.*, **799**, R5

34. M. Piñeirua, **S. Michelin**, D. Vasic & O. Doaré, 2016 : Synchronized switch harvesting applied to piezoelectric flags, *Smart Mater. Struct.*, **25**, 085004

33. Y. Xia, **S. Michelin** & O. Doaré, 2015 : Resonance-induced enhancement of the energy harvesting performance of piezoelectric flags, *Appl. Phys. Lett.*, **107**, 263901

32. T. D. Montenegro-Johnson, **S. Michelin** & E. Lauga, 2015 : A regularised singularity approach to phoretic problems, *Eur. Phys. J. E*, **38**, 139

31. **S. Michelin** and E. Lauga, 2015 : A reciprocal theorem for boundary-driven channel flows, *Phys. Fluids*, **27**, 111701

30. C. Guermonprez, **S. Michelin** and C. N. Baroud, 2015 : Tailoring concentration gradients through advection-diffusion control in microfluidic networks, *Biomicrofluidics*, **9**, 054119

29. **S. Michelin**, T. D. Montenegro-Johnson, G. De Canio, N. Lobato-Dauzier and E. Lauga, 2015 : Geometric pumping in autophoretic channels, *Soft Matter*, **11**, 5804–5811

28. M. Piñeirua, O. Doaré and **S. Michelin**, 2015 : Influence and optimization of the electrodes position in a piezoelectric energy harvesting flag, *J. Sound Vib.*, **346**, 200–215

27. E. Yariv and **S. Michelin**, 2015 : Phoretic self-propulsion at large Péclet numbers, *J. Fluid Mech.*, **768**, R1

26. **S. Michelin** and E. Lauga, 2015 : Autophoretic locomotion from geometric asymmetry, *Eur. Phys. J. E*, **38**, 7–22

25. Y. Xia, **S. Michelin** and O. Doaré, 2015 : Fluid-solid-electric lock-in of energy harvesting pieozelectric flags, *Phys. Rev. Applied*, **3**, 014009

24. D. Lopez, E. de Langre and **S. Michelin**, 2015 : A space-averaged model of branched structures, *Comput. Struct.*, **146**, 12–19

23. Z. Izri, M. N. van der Linden, **S. Michelin** and O. Dauchot, 2014 : Self-propulsion of pure water droplets by spontaneous Marangoni stress driven motion, *Phys. Rev. Lett.*, **113**, 248302

22. D. Lopez, C. Eloy, **S. Michelin** and E. de Langre, 2014 : Drag reduction, from bending to pruning, *Europhys. Lett.*, **108**, 48002

21. C. Grouthier, **S. Michelin**, R. Bourguet, Y. Modarres-Sadeghi and E. de Langre, 2014 : On the efficiency of energy harvesting using vortex-induced vibrations of cables, *J. Fluids Struct.*, **49**, 427–440

20. **S. Michelin** and E. Lauga, 2014 : Phoretic self-propulsion at finite Péclet numbers, *J. Fluid Mech.*, **747**, 572–604

19. X. Amandolese, **S. Michelin** and M. Choquel, 2013 : Low speed flutter and limit-cycle oscillations of a two-degree-of-freedom flat plate in a wind tunnel, *J. Fluids Struct.*, **43**, 244–255

18. **S. Michelin**, E. Lauga and D. Bartolo, 2013 : Spontaneous autophoretic motion of isotropic particles, *Phys. Fluids*, **25**, 061701

17. C. Grouthier, **S. Michelin**, Y. Modarres-Sadeghi and E. de Langre, 2013 : Self-similar vortex-induced vibrations of a hanging string, *J. Fluid Mech.*, **724**, R2

16. **S. Michelin** and E. Lauga, 2013 : Unsteady feeding and optimal strokes of model ciliates, *J. Fluid Mech.*, **715**, 1–31

15. **S. Michelin** and O. Doaré, 2013 : Energy harvesting efficiency of piezoelectric flags in axial flows, *J. Fluid Mech.*, **714**, 489–504

14. K. Singh, **S. Michelin** and E. de Langre, 2012 : Effect of damping on flutter in axial flow and energy-harvesting strategies, *Proc. Roy. Soc. A*, **468**, 3620–3635

13. K. Singh, **S. Michelin** and E. de Langre, 2012 : Energy harvesting from fluid-elastic instabilities of a cylinder, *J. Fluids Struct.*, **30**, 159–172

12. **S. Michelin** and E. Lauga, 2011 : Optimal feeding is optimal swimming for all Péclet numbers, *Phys. Fluids*, **23** (10), 101901

11. D. Lopez, **S. Michelin** and E. de Langre, 2011 : Flow-induced pruning of branched systems and brittle reconfiguration, *J. Theor. Biol.*, **284**, 117–124

10. O. Doaré and **S. Michelin**, 2011 : Piezoelectric energy harvesting from flutter instability : local/global linear stability and efficiency, *J. Fluids Struct.*, **27**, 1357–1375

9. **S. Michelin** and E. Lauga, 2010 : Efficiency optimization and symmetry-breaking in a model of ciliary locomotion, *Phys. Fluids*, **22** (11), 111901

8. **S. Michelin** and E. Lauga, 2010 : The long-time dynamics of two-hydrodynamically coupled swimming cells, *Bull. Math. Biol.*, **72**, 973–1005

7. **S. Michelin** and S. G. Llewellyn Smith, 2010 : Falling cards and flapping flags : understanding fluid-solid interactions using an unsteady point vortex model, *Theor. Comp. Fluid Dyn.*, **24**, 195–200

6. **S. Michelin** and S. G. Llewellyn Smith, 2009 : Linear stability analysis of coupled parallel flexible plates in an axial flow, *J. Fluids Struct.*, **25**, 1136–1157

5. **S. Michelin** and S. G. Llewellyn Smith, 2009 : Resonance and propulsion performance of a heaving flexible wing, *Phys. Fluids*, **21** (7), 071902

4. **S. Michelin** and S. G. Llewellyn Smith, 2009 : An unsteady point vortex method for coupled fluid-solid problems, *Theor. Comp. Fluid Dyn.*, **23**, 127–153

3. **S. Michelin**, S. G. Llewellyn Smith and B. J. Glover, 2008 : Vortex shedding model of a flapping flag, *J. Fluid Mech.*, **617**, 1–10

2. S. G. Llewellyn Smith, **S. Michelin** and D. G. Crowdy, 2008 : The dipolar field of rotating bodies in two dimensions *J. Fluid Mech.*, **607**, 109–118

1. D. Sipp, D. Fabre, **S. Michelin** and L. Jacquin, 2005 : Stability of a vortex with a heavy core, *J. Fluid Mech.*, **526**, 67–76

Conference proceedings

12. G. O. Antoine, **S. Michelin** & E. de Langre : Optimal energy harvesting from vortex-induced vibrations of cables, *Proceedings of the ASME 2016 35th International Conference on Ocean, Offshore and Arctic Engineering OMAE2016*, Busan, South Korea, June 2016

11. Y. Xia, **S. Michelin**, O. Doaré : Numerical and experimental study on energy-harvesting piezoelectric flags, *Proceedings of the ASME 2015 34th International Conference on Ocean, Offshore and Arctic Engineering OMAE2015*, St. John's, Newfoundland, Canada, June 2015

10. **S. Michelin**, Y. Xia, O. Doaré : Fluid-solid-electric couplings in piezoelectric energy harvesting flags, *Proceedings of the 17th U.S. National Congress on Theoretical and Applied Mechanics, East Lansing*, MI, USA, June 2014

9. O. Doaré, **S. Michelin**, Y. Xia and M. Pineirua : Flow energy harvesting with piezoelectric flags, *Proceedings of the ASME 2014 33rd International Conference on Ocean, Offshore and Arctic Engineering OMAE2014*, San Francisco, CA, USA, June 2014

8. Y. Xia, **S. Michelin** and O. Doaré : Effets inductifs sur la récupération d'énergie par drapeau piézoélectrique, *21ème Congrès Français de Mécanique*, Bordeaux, France, September 2013

7. M. Pineirua, O. Doar ? and **S. Michelin** : Modèle d'impédance non-linéaire d'une plaque piézoélectrique dans un écoulement, *21ème Congrès Français de Mécanique*, Bordeaux, France, September 2013

6. C. Grouthier, **S. Michelin** and E. de Langre : Energy harvesting by vortex-induced vibrations in slender structures, *Proceedings of the ASME 2013 32nd International Conference on Ocean, Offshore and Arctic Engineering OMAE2013*, Nantes, France, June 2013

5. K. Singh, **S. Michelin** and E. de Langre : Energy harvesting from axial flow-induced instabilities in slender structures. *Proceedings of the 10th International Conference on Flow-Induced Vibrations (and Flow-Induced Noise) – FIV 2012*, Dublin, Ireland, July 2012

4. C. Grouthier, **S. Michelin** and E. de Langre : Optimal energy harvesting by Vortex-Induced Vibrations in Cables. *Proceedings of the 10th International Conference on Flow-Induced Vibrations (and Flow-Induced Noise) – FIV 2012*, Dublin, Ireland, July 2012

3. **S. Michelin** and O. Doaré : Flow energy harvesting from piezoelectric flags. *Proceedings of the 10th International Conference on Flow-Induced Vibrations (and Flow-Induced Noise) – FIV 2012*, Dublin, Ireland, July 2012

2. X. Amandolese, **S. Michelin** and M. Choquel : Low-speed flutter and limit-cycle oscillations of a flat plate section in a wind tunnel. *Proceedings of the 10th International Conference on Flow-Induced Vibrations (and Flow-Induced Noise) – FIV 2012*, Dublin, Ireland, July 2012

1. **S. Michelin**, K. Singh and E. de Langre : Flow energy harvesting by fluttering slender bodies in axial currents. *Proceedings of the ASME 2011 30th International Conference on Ocean, Offshore and Arctic Engineering OMAE2011*, Rotterdam, The Netherlands, June 2011

Invited conference presentations

- N. Desai & **S. Michelin** : Chemically-active droplets swimming near a wall, *François Frenkiel Award for Fluid Mechanics*, *75th Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Indianapolis, IN, USA November 2022
- **S. Michelin** : Chemically-active particles & droplets, *Active Matter & Complex Media* Summerschool, Cargèse, France, October 2022
- **S. Michelin** : Propulsion & interactions of chemically-active droplets, GDR *Interfacial Soft Matter*, online, September 2022
- **S. Michelin** : Individual & collective dynamics of chemically-active droplets, *World Congress of Biomechanics*, Taipeh (hybrid), Taiwan, July 2022
- **S. Michelin** : Individual and collective dynamics of chemically-active droplets, *APS March Meeting 2021*, online, March 2021
- **S. Michelin** : Chemical and hydrodynamic coupling in the self-propulsion of phoretic particles and active droplets, *"Frontiers in Computational Methods for Active Matter", CECAM Workshop*, Lausanne, Switzerland, February 2020
- **S. Michelin**, A. Varma & T. J. Montenegro-Johnson : Clustering-induced self-propulsion of isotropic catalytic swimmers, *Journées de la Matière Condensée 2018*, Grenoble, France, August 2018
- **S. Michelin** : Energy harvesting using Vortex-Induced Vibrations of flexible cables, *7th conference on Bluff-Body Wakes and Vortex-Induced Vibrations (BBVIV)*, Carry le Rouet, France, July 2018
- **S. Michelin** : Self-propulsion of autophoretic particles, *Living Liquids 2017*, Institut Henri Poincaré, Paris, October 2017
- **S. Michelin** : Geometric tuning of self-propulsion of catalytic particles, *"Microswimmers, Self-Propelled Particles and Active Matter", CECAM Workshop*, EPFL, Lausanne, Switzerland, March 2017
- **S. Michelin** : Symmetry-breaking and self-propulsion of autophoretic particles, *Workshop "Soft Matter at interfaces 2016"*, Ringberg Castle, Germany, February 2016
- **S. Michelin** : Intéractions fluide-structures et récupération d'énergie, *2ème Forum de la R&D EDF*, Palaiseau, October 2015
- **S. Michelin** : Self-propulsion at low-Re : the art of breaking symmetry..., *"Active Liquids"*, Leiden, The Netherlands, September 2015
- **S. Michelin** : Introduction to Flow-Induced Vibrations & Energy harvesting, *Helix 2015 : Fluid-Structure Interactions and Vortex Dynamics in Aerodynamics*, Porquerolles, France, July 2015
- **S. Michelin** & E. Lauga : Symmetry-breaking and self-propulsion of autophoretic particles, *Microswimmers - From bulk to interfaces*, Bordeaux, France, April 2015
- **S. Michelin** : From ciliates to phoretic particles : self-propulsion of model micro swimmers, *Mathematical Aspects of Fluid-Structure Interactions*, Institut Henri Poincaré, Paris, France, November 2013
- **S. Michelin** : Propulsion ciliée des micro-organismes : modélisation et optimisation. *Journées thématiques de l'IMFT*, Toulouse, France, June 2013
- **S. Michelin** and E. Lauga : Propulsion ciliée à bas Reynolds : Efficacité, optimisation et brisure de symétrie. *Self-propelled motions in fluids : Modeling, Analysis and Control*, Nancy, France, October 2010

Other conference presentations

- N. Desai & **S. Michelin** : Chemically-active droplets swimming near a wall, *Active Matter at Surfaces and in Complex Environments*, Dresden, Germany, 2023
- F. Picella & **S. Michelin** : Confined self-propulsion of chemically-active droplets, *75th Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Indianapolis, IN, USA November 2022
- F. Picella & **S. Michelin** : Confined self-propulsion of chemically-active droplets, *14th European Fluid Mechanics Conference – EFMC14*, Athens, Greece, September 2022
- F. Picella, N. Desai & **S. Michelin** : Self-propulsion of confined swimming droplets, *Biological Fluids*

& Flows, A Conference to celebrate the 80th birthday of Prof. Tim Pedley, Cambridge, UK, March 2022
- K. Lippera, M. Benzaquen & **S. Michelin** : Alignment and scattering of swimming droplets, *74th Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Phoenix, AZ, USA November 2021
- K. Lippera, M. Morozov, M. Benzaquen & **S. Michelin** : Interactions and collisions of chemically-active droplets, *25th International Congress on Theoretical and Applied Mechanics ICTAM 2020+1*, online, August 2021
- K. Lippera, M. Benzaquen & **S. Michelin** : Interactions and collisions of chemically-active droplets, *Microswimmers 2020*, online, October 2020
- **S. Michelin**, S. Game, E. Lauga, E. Keaveny & D. Papageorgiou : Spontaneous phoretic flows in chemically-active channels, *73rd Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, online, November 2020
- **S. Michelin**, G. Gallino, F. Gallaire & E. Lauga : Viscous growth and rebound of viscous gas droplets, *72nd Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Seattle, WA, November 2019
- **S. Michelin** & A. Varma : Modelling chemo-hydrodynamic interactions in phoretic suspensions, *Stokes^{200} Symposium*, Cambridge, UK, September 2019
- **S. Michelin**, S. Game, E. Lauga, E. Keaveny & D. Papageorgiou : Spontaneous phoretic flows in chemically-active channels, *Bifurcations and Instabilities in Fluid Dynamics, BIFD 2019*, Limerick, Ireland, July 2019
- **S. Michelin**, A. Varma & T. J. Montenegro-Johnson : Clustering-induced self-propulsion of isotropic catalytic swimmers, *Self-organization in active matter : from colloids to cells*, Erice, Italy, October 2018
- **S. Michelin** & E. Lauga : Collective dissolution of microscopic bubbles, *12th European Fluid Mechanics Conference – EFMC12*, Vienna, Austria, September 2018
- **S. Michelin** & E. Lauga : Collective dissolution of microscopic bubbles, *70th Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Denver, CO, November 2017
- A. Varma, T. J. Montenegro-Johnson & **S. Michelin** : Clustering-induced self-propulsion of isotropic catalytic swimmers, *70th Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Denver, CO, November 2017
- **S. Michelin** & E. Lauga : The stresslet of active swimmers, *69th Annual Meeting of the American Physical Society - Division of Fluid Dynamics*, Portland, OR, November 2016
- **S. Michelin** & E. Lauga : The role of geometry in autophoretic propulsion, *Microswimmers – From single particle motion to collective behaviour*, Bonn, Germany, October 2016
- **S. Michelin**, T. J. Montenegro–Johnson & E. Lauga : Geometric pumping in autophoretic channels, *11th European Fluid Mechanics Conference, EFMC 11*, Sevilla, Spain, September 2016
- M. Piñeirua, O. Doaré & **S. Michelin** : Optimization of piezoelectric flags, *11th European Fluid Mechanics Conference, EFMC 11*, Sevilla, Spain, September 2016
- Y. Xia, O. Doaré & **S. Michelin** : Fluid-solid-electric couplings in piezoelectric flags, *24th International Congress on Theoretical and Applied Mechanics ICTAM 2016*, Montreal, Canada, August 2016
- **S. Michelin**, T. Montenegro-Johnson, G. De Canio, N. Lobato-Dozier & E. Lauga : Geometric pumping in autophoretic channels, *68th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, Boston, MA, November 2015
- **S. Michelin** & E. Lauga : Symmetry-breaking and self-propulsion of autophoretic particles, *Bifurcations and Instabilities in Fluid Dynamics BIFD 2015*, Paris, France, July 2015
- **S. Michelin**, C. Grouthier, G. Antoine & E. de Langre : Energy harvesting efficiency of cables in Vortex-Induced Vibrations, *Fluid & Elasticity 2015*, Biarritz, France, June 2015
- **S. Michelin** & E. Lauga : Autophoretic self-propulsion of homogeneous particles, *67th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, San Francisco, CA, November 2014
- Y. Xia, **S. Michelin** & O. Doaré : Fluid-solid-electric couplings and efficiency of piezoelectric flags, *67th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, San Francisco, CA, November 2014
- **S. Michelin**, E. Lauga & D. Bartolo : Self-propulsion of autophoretic particles at finite Péclet number, *10th European Fluid Mechanics Conference, EFMC 10*, DTU, Copenhagen, September 2014
- **S. Michelin** : The effect of advection on autophoretic particles, *Fluides actifs – Rencontres 2014 du GDR MePhy*, April 2014
- **S. Michelin**, D. Bartolo & E. Lauga : Advective effects on the propulsion of phoretic micro-swimmers. *65th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, San Diego, CA, November 2012

- **S. Michelin**, K. Singh and E. de Langre : Energy harvesting using flapping flags in axial flows. *Fluid & Elasticity 2012*, La Jolla, CA, November 2012
- **S. Michelin** and E. Lauga : Swimming and feeding : optimal strokes of model ciliates. *Biological Flow : A Conference to Celebrate the 70th birthday of T. J. Pedley*, Cambridge, UK, April 2012
- **S. Michelin** and E. Lauga : Optimal feeding vs. optimal swimming of model ciliates. *64th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, Baltimore, MD, November 2011
- **S. Michelin** and E. Lauga : Optimal swimming of model ciliates. *63rd Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, Long Beach, CA, November 2010
- **S. Michelin** and E. Lauga : Efficiency optimization and symmetry-breaking in an envelope model of ciliary locomotion. *Individual and Collective Fluid Mechanics of Swimming Microorganisms*, Glasgow, Scotland, July 2010
- **S. Michelin** and S.G. Llewellyn Smith : Thrust production and vortex wake generated by flapping flexible wings. *BBVIV 6*, Capri, Italy, June 2010
- **S. Michelin** and S.G. Llewellyn Smith : Flapping of flexible sheets in high-Re flows and applications to locomotion. *Fluid & Elasticity 2009*, Carry-le-Rouet, France, June 2009.
- **S. Michelin** and S.G. Llewellyn Smith : Propulsive performance of a heaving flexible membrane. 3^{rd} *Southern California Symposium on Flow Physics*, La Jolla, CA, April 2009.
- **S. Michelin** and S.G. Llewellyn Smith : A vortex shedding model of a flapping membrane. *61st Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, San Antonio, TX, November 2008.
- **S. Michelin** and S.G. Llewellyn Smith : Falling, flapping, flying, swimming,... : understanding fluid-solid interactions using an unsteady point vortex model. *IUTAM Symposium : 150 years of vortex dynamics*, Copenhagen, Denmark, October 2008
- **S. Michelin** and S.G. Llewellyn Smith : High-Re flows past flexible flapping profiles. 2^{nd} *Southern California Symposium on Flow Physics*, Santa Monica, CA, April 2008.
- **S. Michelin** and S.G. Llewellyn Smith : Flying, swimming, falling,... : fluid-solid interactions with vortex shedding. *60th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, Salt Lake City, UT, November 2007.
- **S. Michelin** and S.G. Llewellyn Smith : Application of point vortices model to Maxwell's problem. *Third European SCAT Workshop and Summerschool, "Vortices and Vortex Sheets : theorics, numerics and applications"*., Porquerolles, France, June 2007.
- **S. Michelin** and S.G. Llewellyn Smith : Application of a vortex shedding model to Maxwell's problem. *Southern California Symposium on Flow Physics*, Pasadena, CA, April 2007.
- **S. Michelin**, and S.G. Llewellyn Smith : Vortex Shedding and Maxwell's problem. *59th Annual Meeting of the American Physical Society – Division of Fluid Dynamics*, Tampa, FL, November 2006.

Seminars

2023 Physics of Fluids group, University of Twente, Netherlands

2022 School of Physics, University of Edinburgh, Scotland
University of Princeton, USA
Laboratoire Matière et Systèmes Complexes, Paris, France

2021 Institut de Recherche sur les Phénomènes Hors-Equilibre (IRPHE), Marseille, France

2019 Laboratoire Interdisciplinaire de Physique (LiPhy), Grenoble, France

2018 Laboratoire d'Ondes et Matière d'Aquitaine (LOMA), Bordeaux, France

2017 Institut Lumière et Matière, Lyon (ILM), France
Biological Fluids Seminar, DAMTP, University of Cambridge, UK
BP Institute, University of Cambridge, UK
School of Mathematics, University of Birmingham, UK
Department of Engineering, University of Cambridge, UK
Department of Mathematics, Imperial College, UK
Department of Mathematics, University of Manchester, UK
Department of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, UK

2016 Biological Physics and Soft Matter, University of Oxford, UK

2015 Safran R&D, France
Ecole Polytechnique Fédérale de Lausanne, Switzerland
DAMTP, University of Cambridge, UK
Condensed Matter Physics, Brown University, RI
Physics Department, Cornell University, NY

2014 BP Institute, University of Cambridge, UK
Gulliver, ESPCI, Paris, France
DAFE, ONERA, Meudon, France
AME, University of Southern California, Los Angeles, CA, USA

2013 PCT Gulliver, ESPCI, Paris, France

2012 Institut Jean le Rond d'Alembert, UPMC, Paris, France
FLOW Center, KTH, Stockholm, Sweden

2011 PMMH, ESPCI, Paris, France

2010 LIMSI, Orsay, France

2008 LadHyX, Ecole Polytechnique, Palaiseau, France
IMFT, Toulouse, France
IRPHE, Marseille, France
PMMH, ESPCI, Paris, France

2007 DAFE, ONERA, Meudon, France
Scripps Institution of Oceanography, La Jolla, CA, USA

2005 DAFE, ONERA Meudon, France

2004 Scripps Institution of Oceanography, La Jolla, CA, USA

Students and postdocs

Postdocs

Kiran Singh	Postdoc, LadHyX (2010 – 2012)
Miguel Pineirua	UME ENSTA ParisTech (2012 – 2013)
Gordon Taub	Postdoc, LadHyX (2013 – 2014)
Jerome Mougel	Postdoc, LadHyX (2014 – 2015)
Guillaume Antoine	Postdoc, LadHyX (2014 – 2016)
Zhanle Yu	Postdoc, LadHyX (2016 – 2017)
Matvey Morozov	Postdoc, LadHyX (2017 – 2019)
Francesco Picella	Postdoc, LadHyX (2019 – 2021)
Nikhil Desai	Postdoc, LadHyX (2020 – 2022)

PhD students

Diego Lopez	co-advised with E. de Langre (2009 – 2012) Title : *Modeling reconfiguration strategies in plants submitted to flow*
Clement Grouthier	co-advised with E. de Langre (2010 – 2013) Title :*Energy harvesting and Vortex-Induced Vibrations of slender structures*
Yifan Xia	co-advised with O. Doare (2012–2015) Title : *Energy harvesting by piezoelectric flags*
Cyprien Guermonprez	co-advised with C. Baroud (2013 – 2016) Title : *Droplet-based microfluidic platform for Quantitative Biology*
Akhil Varma	(2016 – 2019) Title : *Active fluids : Interactions and collective dynamics in phoretic suspensions*
Kevin Lippera	co-advised with M. Benzaquen (2017 – 2020) Title : *Self-propelled active droplets : a story of interactions*
Tullio Traverso	(2018 – 2021) Title : *Suspensions of active microparticles : collective dynamics and effective rheology*
Francisco Rojas Perez	co-advised with B. Delmotte (2019 – present) Title : *Collective motion in reactive suspensions*
Prathmesh Vinze	(2021 – present)
Yassine Mimoh	(2023 – present)

Masters students

Witold Krasny	EPFL (2011–2012)
Yifan Xia	Ecole Centrale de Lyon (2012)

Charudatt Kaushik	MFFA Master program (2014)
Johann Moulin	EPFL / EC Paris (2015)
Francisco Rojas	Sorbonne Universite (2019)
William Antolin	Sorbonne Universite (2020)
Max Warburton	ENS Paris Saclay (2021)
Ray Zhang	University of California, San Diego (2021)
Arnav Deshmukh	University of California, San Diego (2022)
Yassine Mimoh	Sorbonne Universite (2023)

Undergraduate interns/projects

Maxime Choquel	Universite Technologique de Belfort-Montbeliard, co-advised with X. Amandolese (2010–2011)
Pierre Pinta	Ecole Polytechnique, co-advised with C. Baroud (2010–2011)
Juan Ruiz Ruiz	Ecole Polytechnique, co-advised with C. Clanet (2012–2013)
Nicolas Lobatto-Dauzier	Ecole Polytechnique (2014–2015)
Augustin Guibaud	Ecole Polytechnique (2014–2015)
You Gu	ENSTA ParisTech (2015)
Nicolas Li	Ecole Polytechnique (2015–2016)
Ke Wang	Ecole Polytechnique (2017–2018)
Quentin Rakotamalala	Ecole Polytechnique (2017–2018)
Ramprakash Ravichandran	IIT Madras (2019)
Marco Vona	University of Cambridge (2022)
Louan Press	Ecole Polytechnique (2022-2023)

Service

Reviewer

Journal of Fluid Mechanics
Journal of Fluids and Structures
Physics of Fluids
Physical Review Letters
Physical Review Applied
Physical Review E
Physical Review X
Physical Review Fluids
Soft Matter
Journal of the Royal Society – Interface
New Journal of Physics
Langmuir
Nature Communications
Science Advances
Nature Physics Review
Proceedings of the Royal Society A
Proceedings of the National Academy of Sciences USA
Theoretical and Computational Fluid Dynamics
Europhysics Letters
Journal of Computational Physics
European Physical Journal E
Fluid Dynamics Research
Engineering Structures
Experimental Mechanics
Journal of Sound and Vibrations
European Journal of Mechanics / B Fluids
Journal of Physics : Condensed Matter
Smart Materials and Structures
Journal of Chemical Physcis
Journal of Applied Physics
European Journal of Applied Mathematics
ACS Applied Materials and Interfaces
ACS Central Science
International Journal of Non-Linear Mechanics

International Journal of Heat Transfer
Archive of Applied Mechanics
Applied Mathematical Modelling
Applied Ocean Research
Journal of Vibration and Control
Transport in Porous Media
Zeitschrift für Angewandte Mathematik und Physik
IMA Journal of Applied Mathematics
Bioinspiration & Biomimetics
Journal of Visualized Experiments
Nonlinear Mechanics

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Agence Nationale pour la Recherche (ANR)
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Ville de Paris
Leading Fellows Postdoc Programme (Marie Curie COFUND programme))
Deutsche Forschungsgemeinschaft (DFG)
UNIT Fundation
Austrian Science Fund (FWF)
Dutch Research Council (NWO)

Memberships

American Physical Society, Euromech

PhD and HDR Examination Committees

2014	Gregory Germain	HDR, examiner, Universite du Havre
	Ziane Izri	PhD, examiner, Universite Paris-Diderot
2015	Fabien Candelier	HDR, referee, Aix-Marseille Universite
2016	Aurelien Babarit	HDR, referee, Ecole Centrale de Nantes
	Zhanle Yu	PhD, referee, Ecole Centrale Marseille
	Astrid Deporte	PhD, referee, Universite de Bretagne Occidentale (UBO)
	Adrian Zambrano Ramirez	PhD, examiner, Universite Pierre et Marie Curie (UPMC)
2017	Yi Man	PhD, external referee, University of Cambridge
2018	Giacomo Gallino	PhD, referee, EPFL
2019	Patricia Vega Martinez	PhD, external referee, Universidad Carlos III de Madrid
2020	Antoine Lagarde	PhD, referee, Sorbonne Universite
	Dolachai Boniface	PhD, examiner, Universite Claude Bernard (Lyon I)
2021	Binglin Zheng	PhD, external referee, University of Twente
2022	Georges Chabouh	PhD, referee, Universite Grenoble Alpes
2023	Yibo Chen	PhD, external referee, University of Twente