

MICHAEL MACDONALD

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Education

- 2013 – 2017** PhD (Mechanical Engineering)
University of Melbourne, Australia
Thesis: Numerical simulation of turbulent flows over rough surfaces
- 2010 – 2012** Bachelor of Engineering (Engineering Science) with First Class Honours
University of Auckland, New Zealand
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Employment

- 2018 – Present** Caltech Postdoctoral Scholar (Atmospheric Physics and Weather Group)
Caltech/NASA Jet Propulsion Laboratory, Pasadena CA, USA
- 2017** Postdoctoral Research Assistant (Fluid Mechanics Research Group)
University of Melbourne, Australia
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Peer-Reviewed Journal Articles (see also my Google Scholar profile)

1. **MACDONALD, M.**, OOI, A., GARCÍA-MAYORAL, R., HUTCHINS, N. & CHUNG, D. 2018 Direct numerical simulation of high aspect ratio spanwise-aligned bars *J. Fluid Mech.* **843**, 126–155
2. **MACDONALD, M.**, CHUNG, D., HUTCHINS, N., CHAN, L., OOI, A. & GARCÍA-MAYORAL, R. 2017 The minimal-span channel for rough-wall turbulent flows. *J. Fluid Mech.* **816**, 5–42
3. **MACDONALD, M.**, CHAN, L., CHUNG, D., HUTCHINS, N. & OOI, A. 2016 Turbulent flow over transitionally rough surfaces with varying roughness densities. *J. Fluid Mech.* **804**, 130–161
4. CHUNG, D., CHAN, L., **MACDONALD, M.**, HUTCHINS, N. & OOI, A. 2015 A fast and direct numerical simulation method for characterising hydraulic roughness. *J. Fluid Mech.* **773**, 418–431
5. CHAN, L., **MACDONALD, M.**, CHUNG, D., HUTCHINS, N. & OOI, A. 2015 A systematic investigation of roughness height and wavelength in turbulent pipe flow in the transitionally rough regime. *J. Fluid Mech.* **771**, 743–777
6. CLARKE, R. J., FINN, M. D. & **MACDONALD, M.** 2013 Hydrodynamic persistence within very dilute two-dimensional suspensions of squirmers. *Proc. Roy. Soc. A - Math. Phys.* **470** (2167), 20130508

Articles ‘In Press’ or ‘Under Review’

1. CHAN, L., MACDONALD, M., CHUNG, D., HUTCHINS, N. & OOI, A. 2018 Secondary motion in turbulent pipe flow with three-dimensional roughness *J. Fluid Mech.* Under review.
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Peer-Reviewed Conference Proceedings

1. MACDONALD, M., OOI, A., HUTCHINS, N. & CHUNG, D. 2017 Direct numerical simulation of high aspect ratio spanwise-aligned bars. In *Proc. 10th Int. Symp. on Turbulence and Shear Flow*, 9A-5, Chicago, USA
 2. CHAN, L., MACDONALD, M., CHUNG, D., HUTCHINS, N. & OOI, A. 2016 Analysis of the coherent and turbulent stresses of a numerically simulated rough wall pipe. In *Proc. 15th Asian Congress of Fluid Mech., J. Phys.: Conf. Ser.* **822**, 012011, Kuching, Malaysia
 3. MACDONALD, M., CHUNG, D., HUTCHINS, N., CHAN, L., OOI, A. & GARCÍA-MAYORAL, R. 2016 The minimal channel: a fast and direct method for characterising roughness. In *Proc. 2nd Multiflow Summer School on Turbulence, J. Phys.: Conf. Ser.* **708**, 012010, Madrid, Spain
 4. CHUNG, D., MACDONALD, M., CHAN, L., HUTCHINS, N. & OOI, A. 2015 A fast and direct method for characterizing hydraulic roughness. In *Proc. 9th Int. Symp. on Turbulence and Shear Flow*, 2A-1, Melbourne, Australia
 5. CHAN, L., MACDONALD, M., CHUNG, D., HUTCHINS, N. & OOI, A. 2015 Investigation of a turbulent flow from the transitionally rough regime to the fully rough regime. In *Proc. 9th Int. Symp. on Turbulence and Shear Flow*, 2A-3, Melbourne, Australia
 6. CHAN, L., MACDONALD, M., CHUNG, D., HUTCHINS, N. & OOI, A. 2014 Numerical Simulation of a Rough-Wall Pipe from the Transitionally Rough Regime to the Fully Rough Regime. In *Proc. 19th Australasian Fluid Mech. Conf.*, 319, Melbourne, Australia
 7. MACDONALD, M., CHUNG, D., HUTCHINS, N., CHAN, L., OOI, A., PARK, G. I. & PIERCE, B. 2014 A comprehensive DNS database to investigate measures of roughness and LES wall models. In *Proc. 15th CTR Summer Program*, 445-455, Stanford University, USA
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Conference Papers ‘In Press’ or ‘Under Review’

1. GÓMEZ-DE-SEGURA, G., FAIRHALL, C. T., MACDONALD, M., CHUNG, D. & GARCÍA-MAYORAL, R. 2018 Manipulation of near-wall turbulence by surface slip and permeability. In *Proc. 1st Coturb Summer School on Turbulence*, Madrid, Spain. Under Review.
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Conference Papers and Abstracts

1. MACDONALD, M., HUTCHINS, N. & CHUNG, D. 2017 DNS of turbulent heat transfer in a rough-wall minimal-span channel. *10th Australasian Natural Convection Workshop*, 7–8, Auckland, New Zealand

2. **MACDONALD, M.**, CHUNG, D., HUTCHINS, N., OOI, A. & GARCÍA-MAYORAL, R. 2017 Predicting the performance of riblets in a minimal channel. *European Drag Reduction and Flow Control Meeting*, 4.2-F, Rome, Italy
 3. **MACDONALD, M.**, CHAN, L., CHUNG, D., HUTCHINS, N. & OOI, A. 2015 Direct numerical simulations of the dense regime of roughness. *68th Annual Meeting of the APS Division of Fluid Mechanics*, Boston, USA
 4. CHAN, L., **MACDONALD, M.**, CHUNG, D., HUTCHINS, N. & OOI, A. 2014 Direct numerical simulation of a turbulent pipe with systematically varied three-dimensional roughness. *67th Annual Meeting of the APS Division of Fluid Mechanics*, San Francisco, USA
 5. OOI, A., CHAN, L., **MACDONALD, M.**, HUTCHINS, N. & CHUNG, D. 2013 Direct numerical simulation of a turbulent rough-walled pipe. *66th Annual Meeting of the APS Division of Fluid Mechanics*, Pittsburgh, USA
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Journal Referee

- Journal of Fluid Mechanics, Cambridge University Press
 - Physics of Fluids, AIP Publishing
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Presentations, Workshops and Seminars

1. 10th Australasian Natural Convection Workshop, Auckland, NZ, 30 Nov – 1 Dec 2017
 2. Invited Seminar, NASA Jet Propulsion Laboratory, Pasadena, USA, 2 Nov 2017
 3. 10th International Symposium on Turbulence and Shear Flow, Chicago, USA, 6 – 9 Jul 2017
 4. PhD Completion Seminar, University of Melbourne, 10 Feb 2017
 5. Student Seminar, Fluid Mechanics Research Group, University of Melbourne, 16 Aug 2016
 6. 4th Fluids in New Zealand Workshop, Auckland, New Zealand, 26 – 27 Jan 2016
 7. 68th Annual Meeting, APS Division of Fluid Mechanics, Boston, USA, 22 – 24 Nov 2015
 8. 2nd Multiflow Summer Workshop, Madrid, Spain, 25 May – 26 Jun 2015
 9. 19th Australasian Fluid Mechanics Conference, Melbourne, Australia, 8 – 11 Dec 2014
 10. 15th Center for Turbulence Research Summer Program, Stanford, USA, 6 Jul – 1 Aug 2014
 11. PhD Confirmation Seminar, University of Melbourne, 6 Mar 2014
 12. 2nd Fluids in New Zealand Workshop, Auckland, New Zealand, 29 – 31 Jan 2014
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Awards and Scholarships

2013, 2016	AIMES Education Award, North Harbour Club, Auckland
2013	Australian Postgraduate Award, University of Melbourne
2011, 2012	Engineering Dean's Honours List, University of Auckland
2010	Engineering Science Senior Prize, University of Auckland
2009	New Zealand Outstanding Scholar Award, NZQA

Teaching and Tutoring

Below is a list of the subjects that I have been involved in as a tutor. The responsibilities of a tutor include:

- Organising and running tutorials, developing tutorial material
- Marking assignments and exams
- Running laboratory demonstrations
- Other tasks as required by the subject coordinator

Year	Subject	Code
University of Melbourne, Australia		
2016 SM1	Advanced Fluid Dynamics	MCEN90018
2015 SM2	Fluid Dynamics	MCEN90008
2015 SM1	Advanced Fluid Dynamics	MCEN90018
2015 SM1	Computational Fluid Dynamics	ENGR90024
2014 SM2	Fluid Dynamics	MCEN90008
2014 SM1	Mechanics and Materials	MCEN30017
2014 SM1	Computational Fluid Dynamics	ENGR90024
2013 SM2	Fluid Dynamics	MCEN90008
University of Auckland, New Zealand		
2012 SM2	Engineering Science Design 2	ENGSCI363
2012 SM1	Mathematical Modelling 2	ENGSCI211
2012 SM1	Advanced Mechanics and Mathematical Modelling	ENGGEN150

Note: University of Melbourne subjects with a 900XX code are graduate-level subjects.