

## Roland Bouffanais

Assistant Professor, Singapore University of Technology and Design (SUTD)

Pillar of Engineering & Product Development      tel: +65 6303 6667  
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### EARNED DEGREES

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<i>Degree</i>	<i>Year</i>	<i>University</i>	<i>Field</i>
Ph.D.	2007	Swiss Federal Institute of Technology Lausanne (EPFL)	Mechanical Engineering
M.Sc.	1999	École Normale Supérieure (ENS) Lyon	Fundamental Physics
M.Sc.	1999	UPMC – Paris Sorbonne University	Hydrodynamics
‘Agrégation’	1998	French higher teaching certificate	Physics

### POSITIONS HELD

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<i>Title</i>	<i>Organization</i>	<i>Years</i>
<i>Assistant Professor</i>	Singapore University of Technology and Design Pillar of Engineering Product Development	2011–present
<i>Research Associate</i>	Massachusetts Institute of Technology (MIT) Department of Mechanical Engineering	2010–present
<i>Visiting Academician</i>	Changi General Hospital Office of Innovation	2017–present
<i>Research Fellow</i>	University of Geneva (UNIGE) Department of Computer Science (CUI), SPC group	2010–2011
<i>Visiting Scholar</i>	Swiss Federal Institute of Technology Lausanne (EPFL) Department of Mechanical Engineering, LFMI group	2010–2011
<i>Visiting Lecturer</i>	Swiss Federal Institute of Technology Lausanne (EPFL) Department of Mechanical Engineering	Fall 2010
<i>Postdoctoral Fellow</i>	Massachusetts Institute of Technology (MIT) Department of Mechanical Engineering, VFRL group	2008–2010
<i>Research Scientist</i>	Swiss Federal Institute of Technology Lausanne (EPFL) School of Engineering	2007
<i>Visiting Scholar</i>	Johns Hopkins University School of Engineering, Department of Civil Engineering	Summer 2006
<i>Research Assistant</i>	Swiss Federal Institute of Technology Lausanne (EPFL) School of Engineering	2003–2007
<i>Physics Instructor</i>	National University of Singapore NUS double degree program (concurrently manager)	2001–2003
<i>Physics Instructor</i>	Preparatory Classes for Grandes Écoles (2nd Year) French Ministry of Education	2001–2003

### HONORS AND AWARDS

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2015	Visiting Scholar Invitation – CPU Cluster of Excellence, University of Bordeaux
2011	Member of the Editorial Board of <i>Computers &amp; Fluids</i> (Published by Elsevier)
2009	IMACS 2008 Most Successful Papers Award, in <i>App. Num. Math.</i>
2008	IBM Research Prize in Computational Sciences: “Exceptional quality in Doctoral thesis work”
2008	Finalist EPFL Doctorate Award
2007	ERCOFTAC Da Vinci Award: “Best European Doctoral thesis on Flow, Turbulence and Combustion”: Silver medal
2007	Swiss National Science Foundation, Prospective Researcher Fellowship
2003	Swiss Federal Institute of Technology Lausanne, Doctoral School Merit Scholarship (1 Year)
1999	École Normale Supérieure de Lyon, Teaching and Research Scholarship (4 Years)

## TEACHING

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### Singapore University of Technology and Design (SUTD) – Undergraduate & Graduate Courses

- Ph.D. Course Course Lead: 30.504 – Computational Science & Engineering (Springs 2015–2017)
- UG Term 5 Course Lead: 30.103 – Fluid Mechanics (Springs 2014–2017)
- UG Term 3 Cohort Instructor: 10.008 – Engineering in the Physical World (Spring 2014)
- UG Term 3 Course Lead: 10.008 – Engineering in the Physical World (Spring 2013)
- UG Term 1 Instructor: 10.002 – Physics 1 (Summer 2012)
- Term 0 Instructor: Integrated Learning Program 2 – Physics 2

### Swiss Federal Institute of Technology Lausanne (EPFL) – Graduate & Doctoral Schools

- Fall 2010 Lecturer: Instability and Turbulence (jointly taught with Prof. François Gallaire)

### Swiss Federal Institute of Technology Lausanne (EPFL) – Undergraduate Courses

- Falls 2003–2006 Teaching Assistant: Incompressible Fluid Mechanics
- Springs 2005–2006 Teaching Assistant: Continuum Mechanics
- Springs 2004–2006 Teaching Assistant: Hydrodynamics

### National University of Singapore (NUS)

- Falls 2001–2002 Instructor: Physics—bachelor level, double degree program with French “Grandes Écoles”
- Springs 2001–2003 Instructor: Physics applied to Engineering—Faculty of Engineering and Science

### Preparatory Classes for Engineering Schools

- 1999–2001 Instructor: Complete Physics curriculum (Sophomore level)

## PROFESSIONAL MEMBERSHIPS AND EDITORSHIPS

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- Editorial Board Member for *Computers & Fluids* (Published by Elsevier)
- IEEE Control Systems Society & Robotics and Automation Society: Member #93827907
- Marine Technology Society: Chairman of the Singapore Chapter – Member # 1-19789
- IMACS: Invited Member
- Complex Systems Society (CSS): Member
- American Association for the Advancement of Science (AAAS): Member # 40748994
- American Physical Society: Member #61018767 – Units: DBIO, DFD, GSNP
- Biophysical Society (BPS): Member #61791

## PATENTS AND TECHNOLOGY DISCLOSURES

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- U.S. Provisional Patent No. 62/151,530  
“Device and Method for Analyzing Cell Motility” (filed 23 Apr 2015)
- PCT Patent No. PCT/SG2016/05091  
“Device and Method for Analyzing Cell Motility” (filed 22 Apr 2016)
- Technology Disclosure: “Method for the characterization and differentiation of material surfaces using compound responses for mechanically driven cells” (SUTD-MIT International Design Center)

## SCHOLARLY ACCOMPLISHMENTS

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### Books

- [B1] **Design and Control of Swarm Dynamics** web, doi  
R. Bouffanais, Springer, Complexity Series ISBN 978-9812877505, 118 pages, 2016.
- [B2] **Thermodynamics** pdf  
R. Bouffanais, Prepamath Edition (In French), ISBN 2-910350-30-4, 192 pages, 1999.

### Book Chapters

- [C3] **Complex Systems: Theory and Applications** pdf, doi  
D. Mateo & R. Bouffanais, Chapter 18: Excess of social activity reduces the responsiveness of swarms (Eds. G. Rzesveski and C.A. Brebbia), WIT Press, Pages 172–180, Print ISBN: 978-1-78466-235-6, eBook ISBN: 978-1-78466-236-3, 2017.
- [C4] **Graphene Science Handbook Nanostructure and Atomic Arrangement** pdf, doi  
M. B. Belonenko, N. N. Konobeeva, A. V. Zhukov & R. Bouffanais, Chapter 22: Tunneling current of the contact of the curved graphene nanoribbon with metal and quantum dots (Eds. M. Aliofkhazraei, N. Ali, W. I. Milne, C. S. Ozkan, S. Mitura, and J. L. Gervasoni), CRC Press, Pages 327339, Print ISBN: 978-1-4665-9137-0, eBook ISBN: 978-1-4665-9138-7, 2016.
- [C5] **High-Performance Computing of Industrial Flows** pdf, doi  
R. Bouffanais, N. Fiétier, J. Lätt, M. O. Deville, Chapter 7: High performance computing with spectral element methods. In VKI Lecture Series (Eds. J.-M. Buchlin, P. Rambaud, Ph. Planquart), ISBN 978-2-930389-93-1, von Kármán Institute for Fluid Dynamics, 2009.

### Refereed Journal Articles and Highly Refereed Conference Proceedings (by theme)

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#### Theme A: Complexity Science & Engineering of Complex Systems

- [A6] **Experience Replay Using Transition Sequences** pdf  
T. G. Karimpanal & R. Bouffanais, *Autonomous Agents and Multi-Agent Systems*, Under Review [arXiv:1705.10834], 2017.
- [A7] **Consensus in networked multiagent systems under communication constraints and dynamically changing topologies** pdf  
M. Komareji, Y. Shang & R. Bouffanais, *Nonlinear Dyn.*, Under Review, 2017.
- [A8] **Anomalous slowing down of individual human activity due to successive decision-making processes** pdf  
A. V. Zhukov, R. Bouffanais & S. Fedotov, *Eur. J. Phys. B*, Under Review [arXiv:1705.04319] 2017.
- [A9] **Distributed System of Autonomous Buoys for Scalable Deployment and Monitoring of Large Waterbodies** pdf  
B. M. Zoss, D. Mateo, Y. K. Kuan, G. Tokić, M. Chamanbaz, L. Goh, F. Vallegra, R. Bouffanais, & Dick K. P. Yue, *Autonomous Robots*, Accepted for Publication, 2017.
- [A10] **A Distributed Ellipsoid Algorithm for Uncertain Convex Problems: A Randomized Approach** pdf  
M. Chamanbaz, G. Notarstefano & R. Bouffanais, *IEEE Conf. Decision Control (CDC 2017)*, Accepted for Publication, 2017.
- [A11] **Effect of Correlations in Swarms on Collective Response** pdf, doi  
D. Mateo, Y. K. Kuan & R. Bouffanais, *Scientific Reports*, (7), 10388 2017.
- [A12] **Randomized Constraints Consensus for Distributed Robust Linear Programming** pdf, doi  
M. Chamanbaz, G. Notarstefano & R. Bouffanais, *IFAC 2017 PapersOnLine*, (50), 4973–4978, 2017.
- [A13] **Swarm-enabling technology for multi-robot systems** pdf, doi  
M. Chamanbaz, D. Mateo, B. M. Zoss, G. Tokić, E. Wilhelm, R. Bouffanais & Dick K. P. Yue, *Frontiers in Robotics and AI* (Multi-Robot Systems Section) (4), 0012, 2017.
- [A14] **Interplay between signaling network design and swarm dynamics** pdf, doi  
A. Sekunda, M. Komareji & R. Bouffanais, *Network Science* (4), 244–265, 2016.
- [A15] **Consensus reaching in swarms ruled by a hybrid metric-topological distance** pdf, doi  
Y. Shang & R. Bouffanais, *Eur. Phys. J. B* (87), 294 2014.

- [A16] **Influence of the number of topologically interacting neighbors on swarm dynamics** pdf, doi  
Y. Shang & R. Bouffanais, *Scientific Reports* (4), 04184, 2014.
- [A17] **Resilience and controllability of dynamic collective behaviors** pdf, doi  
M. Komareji & R. Bouffanais, *PLoS one* (8), e82578, 2013.

### Theme B: Complexity in Biological Systems – Mechanotactic Cellular Control

- [A18] **Interplay between motility and cell-substratum adhesion in amoeboid cells** pdf, doi  
X. Zhu, R. Bouffanais & D. K. P. Yue, *Biomicrofluidics* (9), 054112, 2015.
- [A19] **Persistent cellular motion control and trapping using mechanotactic signaling** pdf, doi  
X. Zhu, R. Bouffanais & D. K. P. Yue, *PLoS one* (9), e105406, 2014.
- [A20] **Physical limits on cellular directional mechanosensing** pdf, doi  
R. Bouffanais, J. Sun & D. K. P. Yue, *Phys. Rev. E* (87), 052716, 2013.
- [A21] **Hydrodynamics of cell-cell mechanical signaling in the initial stages of aggregation** pdf, doi  
R. Bouffanais & D. K. P. Yue, *Phys. Rev. E* (81), 041920, 2010. Also selected to appear in:  
*Virtual Journal of Biological Physics Research*, (19), Issue 9, May 2010. <http://www.vjbio.org>  
*Virtual Journal of Nanoscale Science and Technology*, (21), Issue 19, May 2010. <http://www.vjnano.org>

### Theme C: Complex Fluid Flows

- [A22] **A space-time integral minimization method for reconstructing velocity fields from scalar fields** pdf  
J. J. J. Gillissen, R. Bouffanais & D. K. P. Yue, Under Review, 2017.
- [A23] **Growth mechanisms of perturbations in boundary layers over a compliant wall** pdf  
M. Malik, M. Skote & R. Bouffanais, *Phys. Rev. Fluids*, Provisionally Accepted, 2017.
- [A24] **Computational Fluid Dynamics for Architectural Design** pdf, doi  
S. Kaijima, R. Bouffanais, S. Naidu & K. Willcox, *Architectural Design* (83), Issue 2, 118–123, 2013.
- [A25] **Hydrodynamic object recognition using pressure sensing** pdf, doi  
R. Bouffanais, G. D. Weymouth & D. K. P. Yue, *Proc. Roy. Soc. A* (467), 19–38, 2011.
- [A26] **Time-scale joint representation of DNS and LES numerical data** pdf, doi  
G. Courbebaisse, R. Bouffanais, L. Navarro, E. Leriche & M. O. Deville, *Computers & Fluids* (43), 38–45, 2011.
- [A27] **Computational performance of a parallelized three-dimensional high-order spectral element toolbox** pdf, doi  
C. Bosshard, R. Bouffanais, M. O. Deville, R. Gruber & J. Lätt, *Computers & Fluids* (44), 1–8, 2011.
- [A28] **Advances and challenges of applied large-eddy simulation** pdf, doi  
R. Bouffanais, *Computers & Fluids* (39), 735–738, 2010.
- [A29] **Unsteady transitional swirling flow in the presence of a moving free surface** pdf, doi  
R. Bouffanais & D. Lo Jacono, *Phys. Fluids* (21), Art. 064107, 2009.
- [A30] **Transitional cylindrical swirling flow in presence of a flat free surface** pdf, doi  
R. Bouffanais & D. Lo Jacono, *Computers & Fluids* (38), 1651–1673, 2009.
- [A31] **Solution of moving boundary problems by the spectral element method** pdf, doi  
N. Bodard, R. Bouffanais & M. O. Deville, *App. Num. Math.* (58), 968–984, 2008.
- [A32] **A coupled approximate deconvolution and dynamic mixed scale model for large-eddy simulation** pdf, doi  
M. A. Habisreutinger, R. Bouffanais, E. Leriche & M. O. Deville, *J. Comput. Phys.* (224), 241–266, 2007.
- [A33] **Large-eddy simulation of the flow in a lid-driven cubical cavity** pdf, doi  
R. Bouffanais, M. O. Deville & E. Leriche, *Phys. Fluids*. (19), Art. 055108, 2007.
- [A34] **Mesh update techniques for free-surface flow solvers using spectral element method** pdf, doi  
R. Bouffanais & M. O. Deville, *J. Sci. Comput.* (27), 137–149, 2006.
- [A35] **Large-eddy simulation of the lid-driven cubic cavity flow by the spectral element method** pdf, doi  
R. Bouffanais, M. O. Deville, P. F. Fischer, E. Leriche & D. Weill, *J. Sci. Comput.* (27), 151–162, 2006.

#### Theme D: Complex Nonlinear Electronic Systems

- [A36] **Nonequilibrium dielectric noise in solids in the presence of modulation of electrical permittivity and spectral symmetry breaking under feedback** pdf, doi  
D. Sinha, [R. Bouffanais](#) & S. Huang, *New J. Phys.* (**19**), 113050, 2017.
- [A37] **Three-dimensional light bullets in a Bragg medium with carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), M. B. Belonenko, I. S. Dvuzhilov & Y. V. Nevzorova, *Appl. Phys. B*, (**123**), 196, 2017.
- [A38] **Influence of the order parameter on the dynamics of ultrashort pulses in an environment with carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), N. N. Konobeeva & M. B. Belonenko, *J. Appl. Phys.* (**121**), 084301, 2017.
- [A39] **Three-dimensional ultrashort optical Airy beams in an inhomogeneous medium with carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), M. B. Belonenko & I. S. Dvuzhilov, *Phys. Lett. A* (**381**), 931, 2017.
- [A40] **Collisions of three-dimensional bipolar optical solitons in an array of carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), B. A. Malomed, H. Leblond, D. Mihalache, E. G. Fedorov, N. N. Rosanov & M. B. Belonenko, *Phys. Rev. A* (**94**), 053823, 2016.
- [A41] **Opto-acoustics effects in an array of carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), N. N. Konobeeva & M. B. Belonenko, *J. Appl. Phys.* (**120**), 134307, 2016.
- [A42] **Peculiarities of the propagation of multidimensional extremely short optical pulses in germanene** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), N. N. Konobeeva & M. B. Belonenko, *Phys. Lett. A* (**380**), 3117–3120, 2016.
- [A43] **Interaction of a two-dimensional electromagnetic pulse with an electron inhomogeneity in an array of carbon nanotubes in the presence of field inhomogeneity** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), H. Leblond, D. Mihalache, E. G. Fedorov & M. B. Belonenko, *Eur. Phys. J. D* (**69**), 242, 2015.
- [A44] **Two-dimensional extremely short electromagnetic pulses in a Bragg medium with carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), M. B. Belonenko, N. N. Konobeeva, Y. V. Nevzorova & T. F. George, *Eur. Phys. J. D* (**69**), 129, 2015.
- [A45] **Interaction of a two-dimensional electromagnetic breather with an electron inhomogeneity in an array of carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), E. G. Fedorov & M. B. Belonenko, *J. Appl. Phys.* (**115**), 203109, 2014.
- [A46] **Influence of multi-level impurities on the dynamics of ultrashort electromagnetic pulses in carbon nanotubes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), N. N. Konobeeva, M. B. Belonenko & T. F. George, *Europhys. Lett.* (**106**), 37005, 2014.
- [A47] **Few-cycle optical pulses in a thin film of a topological insulator** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), M. B. Belonenko, N. N. Konobeeva & T. F. George, *Opt. Commun.* (**329**), 151–153, 2014.
- [A48] **Three-dimensional electromagnetic breathers in carbon nanotubes with the field inhomogeneity along their axes** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), E. G. Fedorov & M. B. Belonenko, *J. Appl. Phys.* (**114**), 143106, 2013.
- [A49] **On the electronic spectrum in curved graphene nanoribbons** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), N. N. Konobeeva & M. B. Belonenko, *JETP Lett.* (**97**), 400–403, 2013.
- [A50] **Study of the indirect exchange interaction in a strained graphene nanoribbon** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), A. V. Pak & M. B. Belonenko, *Physica B* (**419**), 62–65, 2013.
- [A51] **Propagation of extremely short pulses in a graphene-boron nitride bilayer** pdf, doi  
A. V. Zhukov, [R. Bouffanais](#), A. V. Pak & M. B. Belonenko, *Phys. Lett. A* (**377**), 564–566, 2013.
- [A52] **Nonequilibrium electron interactions in metal films** pdf, doi  
N. Del Fatti, [R. Bouffanais](#), F. Vallée & C. Flytzanis, *Phys. Rev. Lett.* (**81**), 922–925, 1998.

Lightly Refereed Publications (by reverse chronological order)

- [P53] **Collision of 3D bipolar light pulses in an array of carbon nanotubes** doi  
A. V. Zhukov, R. Bouffanais, B. A. Malomed, H. Leblond, D. Mihalache, E. G. Fedorov, N. N. Rosanov & M. B. Belonenko, *IEEE Intl. Conf. Laser Optics (LO)*, pp. R8-69, St. Petersburg, 2016.
- [P54] **Zitterbewegung near a Schwarzschild-type black hole** pdf, doi  
A. V. Zhukov, R. Bouffanais, N. N. Konobeeva & M. B. Belonenko, *Mod. Phys. Lett. A* (**31**), 1650168, 2016.
- [P55] **Three-dimensional extremely-short optical pulses in carbon nanotube arrays in the presence of an external magnetic field** pdf, doi  
A. V. Zhukov, R. Bouffanais, M. B. Belonenko & E. N. Galkina, *Mod. Phys. Lett. B* (**30**), 1650405, 2016.
- [P56] **Excess of Social Activity Reduces the Responsiveness of Swarms** pdf, doi  
D. Mateo & R. Bouffanais, *Int. J. Des. Nat. Ecodyn.* (**11**), 654–662, 2016.
- [P57] **Study of the indirect interaction in a non-Fermi liquid within the AdS/CFT correspondence framework** pdf, doi  
A. V. Zhukov, R. Bouffanais, A. V. Pak & M. B. Belonenko, *Mod. Phys. Lett. B* (**29**), 1550181, 2015.
- [P58] **Physical Limits on Directional Mechanosensing of Amoeboid Crawling Cells** doi  
X. Zhu & R. Bouffanais, *Biophys. J.* (**106**), 176a–177a, 2014.
- [P59] **Directional Mechanosensing of Amoeboid Cells** doi  
X. Zhu, R. Bouffanais & D. K. P. Yue, *Biophys. J.* (**106**), 176a–177a, 2014.
- [P60] **Tunneling characteristics of a contact between a superlattice and non-Fermi liquid using the AdS/CFT correspondence** pdf, doi  
M. B. Belonenko, N. N. Konobeeva, D. M. Smovzh, A. V. Zhukov & R. Bouffanais, *Mod. Phys. Lett. B* (**28**), 1450170, 2014.
- [P61] **Integrated 2D Design in the Curriculum: Effectiveness of Early Cross-Subject Engineering Challenges** pdf, doi  
K. Otto, B. A. Camburn, K. L. Wood, G. Nannicini, R. Bouffanais, E. Kyoseva, J. W. H. Yong, D. Poletti, R. E. Simpson & A. P. Mathur, *121st ASEE Conference & Exhibition*, Indianapolis (IN), pp. 24.763.1–24.763.18 June 15-18, 2014.
- [P62] **Controllability of a swarm of topologically interacting autonomous agents** pdf, doi  
M. Komareji & R. Bouffanais, *Int. J. Complex Systems in Science* (**3**), 11–19, 2013.
- [P63] **Propagation of laser beams in an array of semiconductor carbon nanotubes** pdf, doi  
A. V. Zhukov, R. Bouffanais, M. B. Belonenko & E. G. Fedorov, *Mod. Phys. Lett. B* (**27**), 1350045, 2013.
- [P64] **Computational Fluid Dynamics for Architectural Design** pdf, doi  
S. Kaijima, R. Bouffanais & K. Willcox, In *Open Systems: Proceedings of the 18th International Conference of the Association of Computer-Aided Architectural Design Research in Asia CAADRRIA*, (Eds. R. Stouffs, P. H. T. Janssen, S. Roudavski, B. Tunçer), Hong Kong, 169–178, 2013.
- [P65] **The Hall conductivity of a doped graphene in a quantizing magnetic field** pdf, doi  
M. B. Belonenko, A. V. Pak, A. V. Zhukov & R. Bouffanais, *Mod. Phys. Lett. B* (**26**), 125088, 2012.
- [P66] **Grid Filter Modeling for Large-Eddy Simulation** pdf, doi  
M.A. Habisreutinger, R. Bouffanais & M. O. Deville, In *Notes Num. Fluid Mech. and Multidisciplinary Design* (**110**), 159–165, 2010.
- [P67] **Wavelet analysis of turbulent LES data of the lid-driven cavity flow** pdf, doi  
R. Bouffanais, G. Courbebaisse, L. Navarro & M. O. Deville, In *Notes Num. Fluid Mech. and Multidisciplinary Design* (**110**), 87–94, 2010.
- [P68] **Computational performance of a parallelized 3D high-order spectral element toolbox** pdf, doi  
C. Bosshard, R. Bouffanais, C. Cléménçon, M. O. Deville, N. Fiétier, R. Gruber, S. Kehtari, V. Keller & J. Lätt, In *Lecture Notes in Computer Science* (**5737**), 323–329, 2009.
- [P69] **Grid filter models for large-eddy simulation** pdf, doi  
R. Bouffanais, M. A. Habisreutinger & M. O. Deville, In *Proc. Appl. Math. Mech.* (**7**), 1101203–1101204, 2007.
- [P70] **Résolution des systèmes optiques et Maple** pdf, doi  
R. Bouffanais, *Bulletin de l'Union des Physiciens* (**831**), 1003–1013, 2001.

## GRANTS AND CONTRACTS

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Funding Awarded since June 2011 ( <i>excluding infrastructure grants</i> )	Amount in SGD\$
Total Amount	\$15,320,000
Total Individual Amount (PI and co-PI portions)	\$3,848,000

### As Principal Investigator (PI)

- Pr1** Cooperative Swimming of Microorganisms in a Fluid: Fellowship #PBELA-118718  
▷ Amount Awarded: USD\$60,000. Duration: 1 Year (Jan 2008-Jan 2009)  
Sponsor: Swiss National Science Foundation – Prospective Researcher Fellowship
- Pr2** Real-time Distributed Control and Design in Complex Systems Using Collective Intelligence: Grants #IDD-21100101A/#IDD-11100103A  
▷ Amount Awarded: \$670,600. Duration: 4 Years (Sep 2011-Aug 2015)  
Sponsor: SUTD-MIT International Design Center – Computation & Design
- Pr3** Mechanotactic Cell Signaling and Aggregation: Grant #SREP-11008  
▷ Amount Awarded: \$150,000. Duration: 3 Years (Jun 2011-May 2014)  
Sponsor: Ministry of Education and SUTD – Startup Research Grant
- Pr4** Procurement of a High-Performance Computing Cluster: Infrastructure Grants #30000436/#30000632  
▷ Total Amount Awarded: \$359,120. Financial Years 2012-2013  
Sponsor: SUTD-MIT International Design Center – Research Infrastructure
- Pr5** Procurement of a Fluorescence Microscopy Module for Inverted Microscope with Optical Table: Infrastructure Grant #SU-IDC-INFRA-Task-15  
▷ Total Amount Awarded: \$37,000. Financial Year 2013  
Sponsor: SUTD-MIT International Design Center – Research Infrastructure
- Pr6** Design of a Microfluidic Device and Method for Measurement of Directed Cell Motility: Grant #IDG-31400104  
▷ Amount Awarded: \$100,616. Duration: 1 Year (Jun 2014-May 2015)  
Sponsor: SUTD-MIT International Design Center – Special Projects
- Pr7** Monitoring the Ocean Environment Using Large Numbers of Dynamic Cooperative Mobile Sensors: Grant #SMIG-14006  
▷ Amount Awarded: \$100,000. Duration: 1 Year (Nov 2014-Oct 2015)  
Sponsor: Singapore-MIT Alliance for Research and Technology – Pilot Project II
- Pr8** Social Dynamics in a Virtual Population of Heterogeneous Agents: Industrial Contract #IGEDF-1501  
▷ Contract Price: \$44,800. Duration: 6 months (2016)  
Sponsor: EDF Asian Center for Sustainable Cities
- Pr9** Dynamic and Cooperative Swarming of Mobile Sensors for Monitoring the Singapore Coastline and Reservoirs: Grant #MOE-T1-2015003  
▷ Amount Awarded: \$100,000. Duration: 2 Years (Jan 2016-Jan 2018)  
Sponsor: Ministry of Education – MOE Tier 1
- Pr10** Dynamic and Cooperative Swarming of Mobile Sensing Buoys for Monitoring the Singapore Coastline and Reservoirs: Grant #IGDSS-1501021  
▷ Amount Awarded: \$50,000. Duration: 1 Year (Oct 2015-Sep 2016)  
Sponsor: Ministry of Defence – Temasek Lab SEED Projects
- Pr11** Data-Driven Predictive Modeling of Passive Algal Blooms or Chemical Spills: Grants #SMIG-15003/#SMIG-16003  
▷ Amount Awarded: \$485,490 (+\$40K for travel/equip.). Duration: 2.5 Years (Jun 2015-Dec 2017)  
Sponsor: Singapore-MIT Alliance for Research and Technology – CENSAM IRG
- Pr12** Hybrid multi-modal and multi-domain swarm robotics solution for pervasive monitoring of marine coastal areas  
▷ Amount Awarded: \$300,000. Duration: 2 Years (Oct 2017-Sep 2019)  
Sponsor: Ministry of Education – AcRF Tier 1

- Pr13 Complexity & Emergence: Grant Approved (official signature Oct 2017)
  - ▷ Amount Awarded: \$1,617,847. Duration: 2.5 Years (Oct 2017-Dec 2019)
  - Sponsor: Ministry of Defence – Defence Science Technology Agency (DSTA)
- Pr14 Urban Analytics: Grant Approved (officially announced on 7 Sep 2017)
  - ▷ Amount Awarded: \$1,495,308. Duration: 3 Years (Sep 2017-Aug 2020)
  - Sponsor: Ministry of National Development (MND) – L2NIC Program
- Pr15 A Unified Paradigm to Teach IoT, Robotics, Control, Decentralized Systems (and more) using LEGOs
  - ▷ Amount Awarded: \$9,500. Duration: 7 months (Sep 2017-Mar 2018)
  - Sponsor: SUTD Pedagogy Initiative

### As Co-Principal Investigator (co-PI)

- Pr16 Arch-CFD: Computational Fluid Dynamics for Architecture: Grant #IDD-21100102/#IDG-21100104
  - ▷ Amount Awarded: \$152,250. Duration: 2 Years (Jul 2011-Jun 2013)
  - ▷ Individual Co-PI Funding: \$75,000
  - Sponsor: SUTD-MIT International Design Center – Special Projects
- Pr17 Systems Technology for Autonomous Reconnaissance & Surveillance (STARS): Grants #IGDST1301015 (Autonomy) & #IGDST1301016 (Control)
  - Lead PI: Prof. Kristin L. Wood – Project PI for STARS Autonomy & STARS Control
  - ▷ Total Amount Awarded: \$4,717,000. Duration: 4 Years (Nov 2013-Oct 2017)
  - ▷ Individual Co-PI Funding: \$591,000 (\$411K: Autonomy + \$180K: Control).
  - Sponsor: Ministry of Defence – Temasek Lab
- Pr18 ASPIRE: Design of Secure Cyber Physical Systems: Grant #NRF2014-NCR001-040
  - Lead PI: Prof. Aditya P. Mathur – Project PI for ASPIRE Control
  - ▷ Total Amount Awarded: \$5,326,482. Duration: 4 Years (Apr 2015-Mar 2019)
  - ▷ Individual Co-PI Funding: \$521,000
  - Sponsor: National Research Foundation (NRF) – NCR Program
- Pr19 Tools and Equipment for Imaging and Particle Image Velocimetry Studies: Infrastructure Grant #IDIN-16006 – Lead PI: Prof. Pablo Valdivia y Alvaro
  - ▷ Total Amount Awarded: \$304,660. Financial Year 2016
  - Sponsor: SUTD-MIT International Design Center – Research Infrastructure

### SOFTWARE DEVELOPMENT

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- **marabunta**: A Python library for the design and control of artificial swarms (jointly developed with Dr. David Mateo, Postdoctoral Associate in the Applied Complexity Group) web
- **openSPECULOOS**: open-source parallel spectral and mortar element toolbox in C++
  - Co-manager & Co-developer
  - Co-leader of the massively-parallel implementation on the IBM BlueGene/L and BlueGene/P web



## SUPERVISION AND INDIVIDUAL STUDENT/RESEARCHER GUIDANCE

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### Supervision Summary (since June 2011)

- 23 Junior and Senior Researchers supervised since June 2011
  - 11 Post-Doctoral researchers
  - 6 Ph.D. students (the SUTD Ph.D. program was launched at the end of 2013)
  - 6 Research Assistants/Engineers
- 25 Master students, Graduate Teaching Fellows and Undergraduate students supervised

### Post-Doctoral Researchers

1. Dr. Vahid Hassani (Dec 2016–present)  
Postdoctoral Associate (Ph.D. Sharif University of Technology)
2. Dr. Jurriaan J. J. Gillissen (2016–present)  
Research Scientist (Ph.D. TU Delft: co-supervised with Prof. Dick K. P. Yue)
3. Dr. Wen Xin (Nov 2015–Nov 2016)  
Postdoctoral Associate (Ph.D. NTU: co-supervised with Prof. Dick K.P. Yue)
4. Dr. Mohammadreza Chamanbaz (Oct 2015–Mar 2017)  
Postdoctoral Associate (Ph.D. NUS)
5. Dr. Malik M Barakathullah (Oct 2015–Jun 2016)  
Postdoctoral Associate (Ph.D. Indian Institute of Science)
6. Dr. David Mateo (Jun 2013–present)  
Postdoctoral Associate (Ph.D. University of Barcelona)
7. Dr. Yilun Shang (Feb 2012–Feb 2014)  
Postdoctoral Associate (Ph.D. Shanghai Jiao Tong)
8. Dr. Alex V. Zhukov (Jul 2012–Jun 2016)  
Postdoctoral Associate (Ph.D. Kharkov University)
9. Dr. Mohammad Komareji (Jun 2012–Dec 2014)  
Postdoctoral Associate (Ph.D. Aalborg University Denmark)
10. Dr. Xiaoying Zhu (Sep 2011–May 2015)  
SUTD–MIT Postdoctoral Fellow, Postdoctoral Associate (Ph.D. NUS)
11. Dr. Jianmin Sun (Jan 2012–Jan 2013)  
Postdoctoral Associate (Ph.D. University of Utah)

### Ph.D. Students (the SUTD Ph.D. program was launched at the end of 2013)

1. Jabez Leong Kit – Ph.D. Student (B.Eng. EPD SUTD) (Jan 2017–present)
2. Nikolaj Horsevad Sørensen – Ph.D. Student (M.Sc. Aalborg University) (Sep 2016–present)
3. Thommen Karimpanal George – Ph.D. Candidate (M.Sc. NUS) (Sep 2016–present)  
(Previously supervised by Prof. Erik Wilhelm)
4. Komal Agarwal – Ph.D. Student (B.Tech. VTU: First Class) (Jan 2016–present)  
co-supervised with Prof. Avinash Bajji
5. Sreetej Lakkam – Ph.D. Candidate (M.Eng. NTU–TUM) (Sep 2015–present)
6. Yoke Kong Kuan – Ph.D. Candidate (M.Sc. University of Chicago) (Sep 2013–present)

### Research Assistants & Engineers

1. M. Zaki B. Djuanda – Research Engineer (B.Eng. SUTD) (Jan 2017–present)  
co-supervised with Prof. Dick K. P. Yue (MIT)
2. Manivannan Ajaykumar (Ajay) – Research Assistant (M.Sc. NTU-TUM) (Nov 2016–present)
3. Francesco Valleggra – Research Engineer (M.Sc. KTH Stockholm) (May 2016–present)
4. Chaitanya Ganesh – Research Assistant (LNM IIT, Jaipur) (Jan 2016–present)
5. Louis Goh Cheng Rong – Research Assistant (B.Eng. EE NUS) (Sep 2015–present)
6. Suresh Naidu – Research Engineer (M.Eng. ENSAE France) (Oct 2011–Oct 2012)

## Undergraduate & Master Students

- Summer 2017 Anthony Coutin – M.Eng. student (Polytech Paris – UPMC)
- Summer 2017 Amirhesam Abedsoltan – B.Eng. student (Sharif University of Technology, Iran)
- Summer 2017 Naman Goyal – Sophomore student (IIT Delhi)
- 2017 Nikita Surya – Final Year Project (Shiv Nadar University, India)
- 2016 Jatinder Goyal – Semester Project (PEC University of Technology, Chandigarh, India)
- 2016 Nguyen Van Duong – UTOP Student
- 2016 Abdullah Bin Rawshan – UTOP Student
- 2016 Manivannan Ajaykumar (Ajay) – Master’s thesis from NTU-TUM
- 2015 Nikolaj Sørensen – Visiting Master Student from Aalborg University (1 semester)
- Spring 2015 Michael Woo – Visiting B.Eng. Student (University of Waterloo, Canada)
- Summer 2014 Nhat V Cao – MIT Aero-Astro UROP (Prof. Karen Willcox)
- 2014 Jabez Leong Kit – UROP Student
- 2014 Nguyen Van Duong – UROP Student
- 2013 Chen Yuankang – UTOP Student (10.008 Bootcamp)
- 2013 Daniel Solomon Quake – Sembawang Greenwave Project: Finalist
- 2013 André Kradbup Sekunda – Visiting Master Student from Aalborg University (1 semester)
- Spring 2013 Christie Lin – MIT Graduate TA (10.008)
- Spring 2013 Lai Lipeng – MIT Graduate TA (10.008)
- 2012 Yiyao Li – UROP Student
- 2012 Hanwei Li – UROP Student
- 2012 Lisa Kwok – UROP Student
- 2012 Alister Lusuan – UROP Student
- 2011 Law Che Kun – SUTD Campus Builder
- 2011 Liza Ng – SUTD Campus Builder
- 2011 Leong Hei Kern – Singapore Polytechnique Intern
- Fall 2007 Christoph Boeckle – Semester project (EPFL–ME)
- Fall 2006 Michel Curina – Master’s Thesis co-supervised with Prof. M. O. Deville (EPFL–ME)
- Summer 2006 Christoph Boeckle – Internship (EPFL–ME)
- Spring 2006 Marc-Antoine Habisreutinger – Master’s Thesis co-supervised with Prof. M. O. Deville (EPFL–ME)
- Spring 2006 Michel Curina – Graduate project co-supervised with Prof. M. O. Deville (EPFL–ME)
- Fall 2005 Marc-Antoine Habisreutinger – Graduate project co-supervised with Prof. M. O. Deville (EPFL–ME)
- Spring 2005 Tryphon Antonakakis – Graduate project co-supervised with Prof. M. O. Deville (EPFL–ME)

## PRESS COVERAGE AND MEDIA ATTENTION

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- **Straits Times (Singapore)** – Friday 28 October 2011  
Interview with Students Madeline Wong & Raymond Te, Campus Builders – Mind-controlled Robot  
By Melissa Pang, Straits Times.
- **Straits Times (Singapore)** – January 26, 2016 web  
Experts’ advice on what to do if trapped in a car underwater: “If you are trapped in a car underwater, your best course of action is to keep calm and wait for water to fill the car.”  
By Linette Lai, Straits Times.
- **torque.com.sg** – February 2, 2016 web  
How to escape from a sinking car: “Experts say staying calm and keeping a window breaker tool in your vehicle can help you escape.”
- **Channel NewsAsia (Singapore)** – November 7, 2016 web  
To beat traffic jams, learn from the swarm: “SINGAPORE: Ants, fish and amoeba all have something in common that humans don’t – they can work perfectly in tandem to solve a common problem.”  
By Steffi Koh, Channel NewsAsia.
- **EurekaAlert American Association for the Advancement of Science (AAAS)** – October 5, 2017 web  
“SUTD researchers discovered excessive social interaction reduced collective response.”

## INVITED PRESENTATIONS

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### Invited Presentations

- I.1 St John's Island National Marine Lab – 15th Anniversary Public Celebrations, Singapore (Nov 2017)  
“Swarm Robotics for Pervasive Monitoring of the Marine Environment”
- I.2 IMFT Invited Seminar – Institute of Fluid Mechanics, Toulouse, France (Jul 2017)  
“Growth mechanisms of perturbations in boundary layers over a compliant wall”
- I.3 Invited Talk – 10<sup>th</sup> Annual CENSAM Workshop, SMART, Singapore (Jun 2017)  
Marine: Integrated solutions for off-shore monitoring, modeling, and utilization. “Distributed System of Autonomous Buoys for Scalable Deployment and Monitoring of Marine Environment”
- I.4 Group Seminar – CQT Interdisciplinary Theory Group, NUS, Singapore (Jan 2017)  
“Excess of Social Behavior Reduces the Capacity to Respond to Perturbations”
- I.5 Invited Seminar – NTU Complexity Institute Seminar Series, Singapore (Dec 2016)  
“Collective Dynamics of Swarms in the Presence of Conflicting External Signals”
- I.6 Invited Talk – 9<sup>th</sup> Annual CENSAM Workshop, NUS Shaw Foundation, Singapore (Jun 2016)  
Joint talk with Prof. Dick K.P. Yue (MIT) “Marine Operational Guidance Using Large-Scale Phase-Resolved Wave Prediction and Networked Field Sensing—Predictability & Capacity”
- I.7 Plenary Lecture – IEEE RAS Multi-Robot Systems Summer School, NUS, Singapore (Jun 2016)  
“Design and Control of Swarming Systems”
- I.8 Departmental Seminar – Boldrewood Campus, The University of Southampton, U.K. (Jun 2016)  
Department of Engineering and the Environment: “Distributed System of Autonomous Buoys”
- I.9 Invited Talk – SUT Technical Meeting, Park Royal Hotel, Singapore (May 2016)  
Society for Underwater Technology (SUT Singapore Branch) – New Technologies Meeting: “Swarming technology for pervasive monitoring of the marine environment”
- I.10 Invited Workshop Presentation – ETH Future Resilient Systems Center, Singapore (May 2016)  
Resilient Systems Workshop: “Swarming Systems: Design & Control”
- I.11 Invited Plenary Lecture – Winter School on Complexity, NTU Complexity Institute (Mar 2016)  
“Design and Control of Swarm Dynamics”
- I.12 Invited Seminar – CPU Cluster of Excellence (Visiting Scholar Program), Bordeaux, France (Jul 2015)  
University of Bordeaux: “Design of Artificial Swarming Behaviors”
- I.13 Invited Talk – 8<sup>th</sup> Annual CENSAM Workshop, NUS Shaw Foundation, Singapore (Jun 2015)  
Joint talk with Prof. Dick K.P. Yue (MIT) “SMART SWARMS: Dynamic Tracking of Chemical or Biological Contamination”
- I.14 Plenary Talk & Panelist – SCy-Phy Systems International Workshop, Singapore (Jun 2015)  
“Secure Dynamic Control of Cyber-Physical Systems”
- I.15 Invited Lecture – Singapore MIT Alliance for Research and Technology (SMART), Singapore (Apr 2015)  
CENSAM Seminar Series on Marine Research: “Design of Artificial Swarming Behaviors”
- I.16 Invited Group Seminar – VFRL, Department of Mechanical Engineering, MIT, Cambridge (Dec 2014)  
“Design and Control of Dynamic Collective Behaviors”
- I.17 Invited Lecture – Graduate School of Materials Science and Engineering, NTU, Singapore (Apr 2014)  
“Design and Control of Dynamic Collective Behaviors”
- I.18 Invited Seminar – Dept. of Mechanical Engineering, Faculty of Engineering, NUS (Apr 2010)  
Air travel & Accommodation covered: “Transitional and Turbulent Incompressible Driven-Cavity Flows”
- I.19 Invited Seminar – LTH, Paul Scherrer Institute (PSI), Villigen, Switzerland (Oct 2009)  
Air travel & Accommodation covered: “Unsteady transitional swirling flow in the presence of a moving free surface”
- I.20 Invited Group Seminar – Laboratory of Fluid Mechanics and Instabilities, EPFL, Lausanne (Oct 2009)  
“Unsteady transitional swirling flow in the presence of a moving free surface”
- I.21 Invited Lecture – The von Kármán Institute for Fluid Dynamics, Rhode-St-Genèse, Belgium (May 2009)  
“HPC with Spectral Element Methods” (co-Lecturer) – Lecture Notes form a Book Chapter
- I.22 Invited Seminar – Scientific Computing Seminar Series, DAM, Brown University, Providence (May 2009)  
With Honorarium: “Unsteady transitional swirling flow in the presence of a moving free surface”

- I.23 Invited NMPDE Seminar – Department of Applied Mathematics, MIT, Cambridge (MA) (Mar 2009)  
“Unsteady transitional swirling flow in the presence of a moving free surface”
- I.24 Invited Seminar – IBM Deep Computing Seminars, Zürich, Switzerland (Oct 2008)  
Air travel & Accommodation covered by IBM Research: “Simulation of shear-driven flows: transition with a free surface & confined turbulence”
- I.25 Award Lecture – Award Ceremony, Doctoral School, EPFL, Lausanne, Switzerland (Oct 2008)  
“Simulation of shear-driven flows: transition with a free surface & confined turbulence”
- I.26 Invited Seminar – MMEC Series, Dept. of Civil & Env. Eng., MIT, Cambridge (MA) (Apr 2008)  
“Simulation of shear-driven flows: transition with a free surface & confined turbulence”
- I.27 Invited Presentation – Royal Academy, ERCOFTAC Science Forum, Brussels, Belgium (Oct 2007)  
Air travel & Accommodation covered: “Large-eddy simulation of cavity flow by the spectral element method”
- I.28 Invited Departmental Seminar – CREATIS-LRMN Research Lab, Lyon, France (Sep 2007)  
UMR 5220, INSERM U 630 – Transportation & Accommodation covered: “Moving-grid techniques using spectral element methods for moving boundary problems”
- I.29 Invited Lecture – Continuing Education Lecture Series, EPFL, Lausanne, Switzerland (Aug 2007)  
“Parallelization of Spectral Element Methods” (co-Lecturer)
- I.30 Invited Seminar – TREFLE Research Lab, UMR 8508, ENSCPB Bordeaux, France (Mar 2007)  
Air travel & Accommodation covered: “Large-eddy simulation of cavity flow by the spectral element method”
- I.31 Invited Seminar – Physical Mathematics Seminar Series, MIT, Cambridge (MA) (Nov 2006)  
“Spectral Element Method for LES of Turbulent Confined Flows”
- I.32 Invited Talk – Annual Meeting of the Leonhard Euler Center, EPFL, Lausanne, Switzerland (Nov 2006)  
European Research Community on Flow Turbulence and Combustion (ERCOFTAC): “Spectral Element Method for LES of Turbulent Confined Flows”
- I.33 Invited Lecture – Conference of the Dutch-Flemish Numerical Analysis Communities (Oct 2006)  
Lecture Series on Numerical Analysis (co-lecturer), Woudschoten, The Netherlands: “The Spectral Element Method for Fluid Flow Problems”
- I.34 Invited Departmental Seminar – Center for Environmental and Applied Fluid Mechanics (Jul 2006)  
Johns Hopkins University, Baltimore (MD): “Spectral Element Method for LES of Turbulent Confined Flows”

## CONFERENCE PRESENTATIONS

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Oral and poster presentations – List arranged in reverse chronological order:

- 20<sup>th</sup> World Congress of the Intl. Fed. of Automatic Control (IFAC), Toulouse, France: Paper “*Randomized Constraints Consensus for Distributed Robust Linear Programming*” with oral presentation (Jul 2017)
- Intl. Conf. on Computational Science (ICCS 2017), Zürich, Switzerland: Contributed talk “*Agent-based Simulations of Swarm Response to Predator’s Attack*” (Jun 2017)
- Conf. on Complex Systems (CCS 2016), Amsterdam, The Netherlands: 2 Contributed talks: (1) “*Excess of Social Behavior Reduces the Capacity to Respond to Perturbations*”, (2) “*Influence of interaction network topology on the dynamical response of swarming systems*” (Sep 2016)
- STATPHYS26, Satellite on Complex Networks, Marseille, France: Contributed talk “*Influence of interaction network topology on the dynamical response of swarming systems*” (Jul 2016)
- Conf. on Complex Systems 2016, Wessex Institute, New Forest, UK: Paper “*Excess of Social Activity Reduces the Responsiveness of Swarms*” with oral presentation (Jun 2016)
- Conf. on Complex Systems (CCS 2015), Tempe, AZ: 2 Contributed talks: (1) “*Information flow and effective swarm responses*”, (2) Effect of the number of interactions on collective responses (Sep 2015)
- Intl. Conf. on Computational Science (ICCS 2015), Reykjavik, Iceland: Contributed talk “*Swarming collapse under limited information flow between individuals*” (Jun 2015)
- Conf. on Directed Cell Migration, Gordon Research Conferences (Frontiers in Science), Galveston (TX): Contributed Poster “*Mechanotactic control and trapping of amoeboid cells*” (Jan 2015)
- Eur. Conf. on Complex Systems (ECCS’14), Lucca, Italy: 2 Contributed talks: (1) “*Impact of local communication rate on emergent swarming behaviors*”, (2) “*Interplay between signaling network design and*

- swarm dynamics*” (Sep 2014)
- Intl. Conf. on Computational Science (ICCS 2014), Cairns, Queensland, Australia: Contributed talk “*Consensus reaching in swarms ruled by a hybrid metric-topological distance*” (Jun 2014)
  - 58<sup>th</sup> Annual Meeting of the Biophysical Society, San Francisco (CA): 2 Contributed posters: (1) “*Directional Mechanosensing of Amoeboid Cells*”, (2) “*Physical Limits on Directional Mechanosensing of Amoeboid Crawling Cells*” (Feb 2014)
  - Intl. Conf. Net-Works 2013, El Escorial, Spain: 1 Paper and 2 Contributed talks: (1) “*Controllability of a swarm of topologically interacting autonomous agents*”, (2) “*Influence of the structure of the signaling network on swarm dynamics*” (Dec 2013)
  - 18<sup>th</sup> Intl. Conf. of the Association of Computer-Aided Architectural Design Research in Asia (CAADRIA 2013), Singapore: Paper “*Computational Fluid Dynamics for Architectural Design*” and oral presentation (Nov 2013)
  - 65<sup>th</sup> Annual Meeting of the APS Division of Fluid Dynamics, San Diego (CA): Contributed talk “*The influence of cell crawling onto cell–cell chemical signaling*” (Nov 2012)
  - 64<sup>th</sup> Annual Meeting of the APS Division of Fluid Dynamics, Baltimore (MD): Contributed talk “*Hydrodynamics of cell–cell mechanical signaling*” (Nov 2011)
  - 8<sup>th</sup> Intl. Conf. for Mesoscopic Methods in Engineering and Science, Lyon, France: Contributed talk “*Simulation of the flow inside the cochlear duct using the Lattice Boltzmann method*” (Jul 2011)
  - 62<sup>nd</sup> Annual Meeting of the APS Division of Fluid Dynamics, Minneapolis (MN): Contributed talk “*Hydrodynamic mapping using pressure sensing*” (Nov 2009)
  - 2<sup>nd</sup> Conference on Turbulence and Interaction, Sainte-Luce, France: 2 Papers and oral presentations: (1) “*Grid Filter Modeling for Large-Eddy Simulation*”, (2) “*Wavelet analysis of turbulent LES data of the lid-driven cavity flow*” (Nov 2008)
  - 61<sup>st</sup> Annual Meeting of the APS Division of Fluid Dynamics, San Antonio (TX): Contributed talk “*Swirling flow in presence of a moving free surface*” (Nov 2008)
  - 18<sup>th</sup> Congrès français de Mécanique, Grenoble, France: Paper “*Simulation of the flow in a lid-driven cavity using dynamic approximate deconvolution models*” and oral presentation (Aug 2007)
  - 6<sup>th</sup> Intl. Congress on Industrial and Applied Mathematics (ICIAM), Zürich, Switzerland: Paper “*Grid filter modeling for LES*” and oral presentation (Aug 2007)
  - 7<sup>th</sup> Intl. Conf. On High-Order And Spectral Method (ICOSAHOM), Chinese Academy of Sciences, Beijing, PRC: 2 Contributed talks: (1) “*Recent advances in large-eddy simulations by the spectral element method*”, (2) “*Direct numerical simulation of free-surface swirling flows by the Legendre spectral element method*” (Jun 2007)
  - 59<sup>th</sup> Annual Meeting of the APS Division of Fluid Dynamics, Tampa Bay (FL): Contributed talk “*LES of the flow in a lid-driven cavity using dynamic approximate deconvolution models*” (Nov 2006)
  - Symposium on Advanced Numerical Methods in Engineering, Brussels, Belgium: Contributed talk “*Large-eddy simulation of cavity flow by the spectral element method*” (Jul 2006)
  - Intl. Conf. on Turbulence and Interaction, Porquerolles, France: Contributed talk “*Large-eddy simulation of cavity flow by the spectral element method*” (May 2006)
  - Schweizer Numerik Kolloquium, Lausanne, Switzerland: Contributed poster “*Large-eddy simulations of turbulent free-surface flows by the spectral element method*” (Apr 2006)
  - 17<sup>th</sup> IMACS World Congress on Scientific Computation Applied Mathematics and Simulation, Paris, France: Contributed talk “*Moving-grid techniques using spectral element methods for moving boundary problems*” (Jul 2005)
  - 7<sup>th</sup> Intl. Conf. on Mathematical and Numerical Aspects of Waves, Brown University, Providence (RI): Paper “*Simulation of standing waves using moving-grid techniques with spectral element methods*” and oral presentation (Jun 2005)
  - 3<sup>rd</sup> MIT Conf. on Computational Fluid and Solid Mechanics, Cambridge (MA): Contributed talk “*Simulation of free-surface flows using moving-grid techniques with spectral element methods*” (Jun 2005)
  - 6<sup>th</sup> Intl. Conf. On High-Order And Spectral Method (ICOSAHOM), Brown University, Providence (RI): Contributed talk “*Moving-boundary problems with the spectral element method*” (Jun 2004)

## SERVICE

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### Professional Service

- *IEEE RAS Multi-Robot Systems Summer School 2016*: Co-organizer
  - *Satellite Session “Swarming Systems: Analysis, Modeling and Design”*: Lead Organizer  
Conference on Complex Systems – Complex Systems Society (Amsterdam, The Netherlands 2016)
  - *Conference/Competition Committees and Chairs*:
    - Member – Awards Selection Committee: Complex Systems Society (CSS) for CCS 2017 in Mexico
    - Member – Program Committee: Conference on Complex Systems (CCS 2016, Amsterdam)
    - Member – Technical Committee of the International Unmanned Surface Vehicle Competition (Maritime RobotX Challenge 2014, Singapore)
    - Session Chair – Estimation and filtering: IFAC 2017 (Toulouse, France, 11 Jul 2017)
    - Session Chair – Main Track: ICCS 2015 (Reykjavik Iceland)
    - Session Chair – Complexity Conference (NTU Singapore, 3–5 Mar 2014)
    - Session Chair – Parallel session “Biofluids and Complex Interactions” APS-DFD Annual Meeting (San Diego CA, 11 Nov 2012)
    - Member – Jury Award Committee: 2012 Palabos Challenge (open-source CFD software)
  - *Massive Open Online Course (MOOC) on Coursera*: (launch Sep 2017)
    - Course Title: “Introduction to Complexity” in collaboration with the Complexity Institute at NTU
  - *Marine Technology Society*: Chairman & Faculty Advisor of the MTS Singapore Chapter
  - *Peer-Review Activity*:
    - Member of the Editorial Board of *Computers & Fluids* (Published by Elsevier)
    - Review of Grant proposals and Fellowships for International Organizations:
      - MacArthur Fellows Program, National Science Centre (NCN) Poland, FONDECYT – National Commission for Scientific Research of Chile, Austrian Science Fund (FWF)
    - In the top 5% of reviewers in the fields of Engineering/Physics (according to [publons.com](http://publons.com) records) web
    - Completed 160 verified pre-publication reviews (as of 07-09-2017 according to ORCID and [publons.com](http://publons.com))
    - Reviewed for 40 Journals (as of 07-09-2017 — see list below) and several International Conferences
- *J. R. Soc. Interface*
  - *Swarm Intell.*
  - *J. Fluid Mech.*
  - *Chem. Reviews*
  - *Automatica*
  - *PLoS one*
  - *Int. J. Sys. Sci.*
  - *Phys. Rev. E*
  - *R. Soc. Open Science*
  - *J. Comput. Phys.*
  - *ACM Trans. Autonom. Adapt. Sys.*
  - *IEEE Trans. Comput. Biol. Bioinf.*
  - *Computers & Fluids*
  - *Phys. Fluids*
  - *Eur. J. Control*
  - *Comm. Comput. Phys.*
  - *J. Eng. Math.*
  - *IEEE Trans. Ind. Elec.*
  - *Chem. Sciences*
  - *J. Fluid Struc.*
  - *Int. J. Heat. Fluid Flow*
  - *Mod. Phys. Lett. B*
  - *App. Num. Math.*
  - *Open J. Fluid Dyn.*
  - *Int. J. Num. Meth. Heat Fluid Flow*
  - *App. Math. Model.*
  - *Int. J. Num. Meth. Fluids*
  - *J. Para. Distri. Comput.*
  - *Int. J. Comput. Fluid Dyn.*
  - *Computers & Chem. Eng.*
  - *Beilstein J. Nanotech.*
  - *J. Biomechanics*
  - *Opt. Commun.*
  - *ACM Trans. Comput. Biol. Bioinf.*
  - *Math. Computers in Simulation*
  - *Cognitive Computation*
  - *Fluid Dyn. Res.*
  - *Symmetry*
  - *MTS Marine Tech. Soc.*
  - *Int. J. Num. Modeling*
  - *J. NeuroInterventional Surgery*
  - *Building and Environment*
  - *Int. J. Comput. Meth. Eng. Sci. Mech.*
  - *ASME–OMAE Conferences*
  - *ASEE Conferences*
  - *Conf. Ocean, Offshore & Artic Eng.*