Curriculum Vitæ

Victor Michel-Dansac

Contact

Professional address	Institut de Recherche Mathématique Avancée 7 Rue René Descartes 67000 Strasbourg, France
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Research areas (keywords)

Scientific computing; mathematical modeling; development of finite volume schemes; well-balanced schemes; asymptotic preserving schemes; high-order schemes in space and time; hyperbolic systems; shallow-water equations.

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Personal details

Name Victor Michel-Dansac
Date of birth 27th December 1991
Place of birth Saint-Nazaire (Loire-Atlantique, France)
Nationality French

Contact

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67000 Strasbourg, France
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Current employment: ISFP at Inria (09/2020 – now)

Project-team TONUS (TOkamaks and NUmerical Simulations),
Inria Nancy-Grand Est Research Centre
Institution Institut de Recherche Mathématique Avancée, Strasbourg

Post-doctoral researcher (09/2017 – 08/2020)

Institution Institut de Mathématiques de Toulouse, INSA Toulouse
Supervisors Pascal NOBLE and Jean-Paul VILA

Post-doctoral researcher (10/2016 – 08/2017)

Institution Institut de Mathématiques de Toulouse, Université Paul Sabatier
Supervisors Raphaël LOUBÈRE and Marie-Hélène VIGNAL

PhD studies (10/2013 – 09/2016)

Advisors Christophe BERTHON and Françoise FOUCHER
Institution Laboratoire de Mathématiques Jean Leray (LMJL), Université de Nantes
Thesis title Development of high-order well-balanced schemes for geophysical flows

Education

2012 – 2013 Master's degree in Mathematical Engineering (second year), Université de Nantes
04/2013 – 09/2013: Internship supervised by Matthieu DE LEFFE, HydrOcean, Nantes – Study of the kernel smoothing length in the SPH (Smoothed Particle Hydrodynamics) particle method
2011 – 2012 Master's degree in Pure and Applied Mathematics (first year), Université de Nantes
2010 – 2011 Bachelor's degree in Mathematics, Université de Caen Basse-Normandie
2007 – 2010 Classes Préparatoires aux Grandes Écoles, Lycée Saint-Stanislas, Nantes

1 Teaching (TD $\iff$ problem sessions, TP $\iff$ computer labs)

	2013-2014, Université de Nantes (64h)
Analytical Geometry	32h TD, 1st-year engineering majors
Numerical Analysis	32h TP with Scilab, 2nd-year mathematics majors
	2014-2015, Université de Nantes (64h)
General mathematics	16h TD, 1st-year biology majors
Numerical Analysis	32h TP with Scilab and 16h TD, 2nd-year mathematics majors
	2015-2016, Université de Nantes (64h)
General mathematics	16h TD, 1st-year biology majors
Numerical Analysis	32h TP with Scilab and 16h TD, 2nd-year mathematics majors
	2017-2018, INSA Toulouse (60h)
Numerical Analysis	60h TP with Python, 2nd-year engineering majors
	2018-2019, INSA Toulouse (100h)
Numerical Analysis	4h lectures and 76h TD and TP with Python and MATLAB, 2nd-year engineering majors
Numerical Analysis, Optimization	21h TP with Python, 3rd-year engineering majors
	2019-2020, INSA Toulouse (95h)
Numerical Analysis	5h lectures and 48h TD and TP with Python, 2nd-year engineering majors
Numerical Analysis, Optimization, Neural networks	42h TP with Python, 3rd-year engineering majors
	2020-2021, Université de Strasbourg (54h)
Computer Science – Algorithms and Programming	39h TD/TP with C++, 3nd-year applied mathematics majors
Scientific computation – Discretization of PDEs	15h TP, 4th-year pure mathematics majors

2 Publications list

Submitted articles are available on my homepage:

https://http://irma.math.unistra.fr/~micheldansac/recherche_publis_en.html

Articles published in peer-reviewed international journals

- ⋆ G. Dimarco, R. Loubère, V. Michel-Dansac, and M.-H. Vignal. **Second-order implicit-explicit total variation diminishing schemes for the Euler system in the low Mach regime**. *J. Comput. Phys.* 372 (2018), pp. 178–201
- ⋆ V. Michel-Dansac, C. Berthon, S. Clain, and F. Foucher. **A well-balanced scheme for the shallow-water equations with topography or Manning friction**. *J. Comput. Phys.* 335 (2017), pp. 115–154
- ⋆ V. Michel-Dansac, C. Berthon, S. Clain, and F. Foucher. **A well-balanced scheme for the shallow-water equations with topography**. *Comput. Math. Appl.* 72.3 (2016), pp. 568–593

Short communications published in peer-reviewed international journals

- ⋆ C. Berthon and V. Michel-Dansac. **A simple fully well-balanced and entropy preserving scheme for the shallow-water equations**. *Appl. Math. Lett.* 86 (2018), pp. 284–290

Peer-reviewed conference papers

- ⋆ V. Michel-Dansac and A. Thomann. **On high-accuracy L^∞-stable IMEX schemes for scalar hyperbolic multi-scale equations**. accepted. 2019
- ⋆ C. Berthon, R. Loubère, and V. Michel-Dansac. **A Second-Order Well-Balanced Scheme for the Shallow Water Equations with Topography**. *Theory, Numerics and Applications of Hyperbolic Problems I*. Springer International Publishing, 2018, pp. 165–177
- ⋆ C. Berthon, M. de Leffe, and V. Michel-Dansac. **A conservative well-balanced hybrid SPH scheme for the shallow-water model**. *Finite volumes for complex applications. VII. Elliptic, parabolic and hyperbolic problems*. Vol. 78. Springer Proc. Math. Stat. Springer, Cham, 2014, pp. 817–825

Submitted articles

- ⋆ V. Michel-Dansac, C. Berthon, S. Clain, and F. Foucher. **A two-dimensional high-order well-balanced scheme for the shallow water equations with topography and Manning friction**. submitted. 2020
- ⋆ V. Michel-Dansac and A. Thomann. **TVD IMEX Runge-Kutta schemes based on arbitrarily high order Butcher tableaux**. submitted. 2020
- ⋆ V. Michel-Dansac, P. Noble, and J.-P. Vila. **Consistent section-averaged shallow water equations with bottom friction**. submitted. 2018

Articles in progress

- ⋆ see https://http://irma.math.unistra.fr/~micheldansac/recherche_publis_en.html

PhD thesis

V. Michel-Dansac. **Development of high-order well-balanced schemes for geophysical flows**. Thèse de doctorat. Université de Nantes, Faculté des sciences et des techniques, 2016

3 Research activities

The slides of my talks, as well as my posters, are available on my homepage:

https://http://irma.math.unistra.fr/~micheldansac/recherche_comm_en.html

Talks and posters in international conferences

02/2020: **32nd CEA/GAMNI seminar on computational fluid dynamics**, Paris, France (invited)
Consistent section-averaged shallow water equations with bottom friction

06/2019: **NumHyp2019**, Málaga, Spain
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

04/2018: **Workshop: Numerical aspects of hyperbolic balance laws**, Ferrara, Italy
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

05/2017: **SHARK-FV 4**, Ofir, Portugal (invited)
Asymptotically accurate high-order space and time schemes for the Euler system in the low Mach regime

08/2016: **HYP 2016**, Aachen, Germany (poster)
A well-balanced scheme for the shallow-water equations with topography and friction

05/2016: **SHARK-FV 3**, São Félix, Portugal (invited)
A well-balanced scheme for the shallow-water equations with topography and Manning friction

08/2015: **Eight ICIAM Congress**, Beijing, China
A well-balanced scheme for the shallow-water equations with topography and bottom friction

06/2014: **Finite Volumes for Complex Applications – FVCA VII**, Berlin, Germany (poster)
A conservative well-balanced hybrid SPH scheme for the shallow-water model

Talks and posters in French conferences and seminars

03/2019: **Numerical Analysis and Scientific Computing Seminar**, Besançon, France
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

03/2019: **Journées Jeunes ÉDPistes**, Rennes, France
Consistent section-averaged shallow water equations with bottom friction

02/2019: **Scientific Computing and Modeling Seminar**, Bordeaux, France
Consistent section-averaged shallow water equations with bottom friction

02/2019: **Partial Differential Equations Seminar**, Strasbourg, France
A high-order well-balanced scheme for the shallow-water equations with topography and Manning friction

03/2018: **PDE-Analysis Seminar**, Lyon, France
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

03/2018: **ANEDP Seminar**, Lille, France
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

03/2018: **MIP Seminar**, Toulouse, France
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

03/2018: **EDPAN Seminar**, Clermont-Ferrand, France
A high-order well-balanced scheme for the shallow-water equations with topography and Manning friction

02/2018: **ACSIOM Seminar**, Montpellier, France
A high-order well-balanced scheme for the shallow-water equations with topography and Manning friction

12/2017: **Workshop NumWave**, Montpellier, France
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

11/2017: **Workshop: Numerical schemes for low Mach number flows**, Toulouse, France
Second order Implicit-Explicit TVD schemes for the Euler system in the low Mach regime

09/2017: **MathOcéan Work Group**, Toulouse, France
A well-balanced scheme for the shallow-water equations with topography and Manning friction

03/2017: **Journées Jeunes EDPistes Français 2017**, Autrans, France (poster)
Asymptotically accurate high-order space and time schemes for the Euler system in the low Mach regime

01/2017: **Newcomers' day**, Toulouse, France
A fully well-balanced scheme for the shallow-water equations with topography

09/2016: **ANR GeoNum workshop** (PhD thesis), Nantes, France
Development of high-order well-balanced schemes for geophysical flows

06/2015: **Third summer school of the GDR EGRIN**, Piriac-sur-Mer, France
A well-balanced scheme for the shallow-water equations with topography and bottom friction

07/2014: **Second summer school of the GDR EGRIN**, Domaine de Chalès, France (poster)
A conservative well-balanced hybrid SPH scheme for the shallow-water model

Invitations to other departments

07/2015: Centre of Mathematics of the Universidade do Minho, Braga, Portugal
Collaboration with **Stéphane Clain**, two weeks

10/2013: Centre of Mathematics of the Universidade do Minho, Guimarães, Portugal
Collaboration with **Stéphane Clain**, one week

Participation to scientific events

05/2015: **Thirteenth SEME** (Week of Interactions between Math and Industries), Nantes, France
Topic offered by **IFP Energies nouvelles**: *Schémas numériques d'ordre deux en temps pour les équations de désorption 1D d'un gaz de schiste*

07/2013: **ESSIM 2013**: Summer school and ECMI modeling week, Madrid, Spain
Modeling week topic: *Modeling forest as porous medium; canopy properties in wind park simulations*

Vulgarization activities

2020: Article in the 2020 ECCOMAS newsletter: **A Bernoulli's relation capturing scheme to simulate the 2011 Japan tsunami**, submitted

Reviews for international journals

- Reviewer for the journal Computers & Mathematics with Applications
- Reviewer for the Journal of Fluid Mechanics
- Reviewer for zbMath