

# Stijn Vantieghem

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## Curriculum Vitae

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### Personal Data

Given Names Stijn Arnold Marieke Vantieghem  
Date of Birth August 21st, 1983  
Citizenship Belgian  
Web page [https://www.researchgate.net/profile/S\\_Vantieghem/?ev=hdr\\_xprf](https://www.researchgate.net/profile/S_Vantieghem/?ev=hdr_xprf)  
Research <http://jupiter.ethz.ch/~stijn>

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### Academic curriculum

- Since 05/2011 **Postdoc - Lecturer**, *ETH Zürich, Institute of Geophysics*, Switzerland.
- Development of a parallel finite-volume code for the simulation of rotating MHD flows and dynamo processes.
  - Theoretical and numerical study of rapidly rotating flows undergoing libration and precession.
  - Since september 2012: Lecturer (Dozent), co-responsible for three courses within the BSc and MSc Earth Sciences (Geophysics) program.
  - Informale role in mentoring 2 PhD students.
- 09/2006 – 03/2011 **PhD in Physics**, *Université Libre de Bruxelles*, Belgium.  
PhD Thesis: Numerical simulations of quasi-static magnetohydrodynamics using an unstructured finite volume solver: development and applications. Supervised by Prof. Bernard Knaepen. Defended on February 11, 2011.
- Development of an unstructured, massively parallel finite-volume code for the simulation of MHD flows, i.e. liquid metal flows affected by the presence of a magnetic field. The code can handle arbitrary geometries.
  - Numerical simulations of fundamental aspects of laminar and turbulent MHD flows in ducts, pipes and right-angle bends.
- 10/2003 – 07/2006 **Burgerlijk Natuurkundig Ingenieur**, *Universiteit Gent*, Belgium.  
MSc of Engineering Physics obtained after a three-year program (180 credits). The curriculum is aimed at educating engineers with a strong R&D profile.
- Obtained degree: Magna cum laude.
  - MSc thesis: Modeling and manufacturing of tunable DFB lasers by means of BFB bonding.
- 09/2001–07/2003 **Kandidaat Burgerlijk Ingenieur**, *Katholieke Universiteit Leuven*, Belgium.  
Initial academic engineering degree obtained after a two-year program (120 credits). Curriculum consists both of basic sciences, and introductory courses into various engineering branches.

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### Teaching

- 2015 Lecturer (Dozent) for the ‘Geomagnetism’ (50%) lecture, offered within the BSc Earth Sciences program at ETH Zürich.

- 2012-2013 Lecturer (Dozent) for the ‘Mathematical Methods for Geophysics’ (50%) and ‘Geophysical & Astrophysical Fluid Dynamics’ (20%) lectures, offered within the MSc Earth Sciences - Geophysics program at ETH Zürich.
- 2013 Co-supervisor of the MSc thesis of Mr. Daniel Juncu at ETH Zurich, entitled ‘Numerical study of solidification processes in convective systems.’

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## Academic service

Reviewer for Journal of Fluid Mechanics, Geophysical Journal International and Theoretical and Computational Fluid Dynamics.

Member of the ‘D-ERDW Unterrichtskommission’ (Teaching commission of the department of Earth Sciences) ETH Zürich.

Student representative within various education-related administrative bodies.

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## Scientific Profile

Keywords *Rotating flows*: Inertial waves, hydrodynamic stability, parametric resonances, libration, precession.

*Magnetohydrodynamics*: Dynamo, shear layers, turbulence, simulations.

*High-performance computing*: Finite-volume methods, parallel computing.

Programming Fortran, C++, MPI, OpenMP.

Software OpenFOAM, Matlab, Maple, ParaView, Latex.

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## Invited talks

- 2010 UCLA, UCSB, CORIA-CNRS (France).

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## Grants

- 2012 Principal investigator of a CSCS (Swiss supercomputer centre) 3-year grant for the investigation of mechanically forced flows. Total CPUtime: 12.8 MCPUh.
- 2010 Co-P.I for a supercomputer project for the study of MHD flows in bend geometries. This project was granted an allocation of 1.7 MCPUh at the HPC-FF facility (Forschungszentrum Jülich), awarded by EFDA.

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## Languages

Dutch Mother tongue  
English Fluent  
French Fluent  
German Fluent  
Russian Basic

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## Extracurricular activities

Board member of ‘Vereniging voor Natuurkunde’, a students association that is organizing general public lectures on various topics in physics.

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## References

- S. Vantieghem, D. Cébron, and J. Noir. Latitudinal libration driven flow in triaxial ellipsoids. *J. Fluid Mech.*, accepted, 2015.
- Z. Stelzer, D. Cebron, S. Miralles, S. Vantieghem, J. Noir, P. Scarfe, and A. Jackson. Experimental and numerical study of electrically-driven MHD flow in a modified cylindrical annulus: (1) base flow. *Phys. Fluids*, submitted, 2015.
- S. Vantieghem. Inertial modes in a rotating triaxial ellipsoid. *Proceedings of the Royal Society of London-A*, 470(2168), 2014.
- P. Marti, N. Schaeffer, R. Hollerbach, D. Cébron, C. Nore, F. Luddens, J.-L. Guermond, J. Aubert, S. Takehiro, Y. Sasaki, Y.-Y. Hayashi, R. Simitev, F. Busse, S. Vantieghem, and A. Jackson. Full sphere hydrodynamic and dynamo benchmarks. *Geophysical Journal International*, 197(1):119–134, 2014.
- A. Jackson, A. Sheyko, P. Marti, A. Tilgner, D. Cébron, S. Vantieghem, R. Simitev, F. Busse, X. Zhan, G. Schubert, S. Takehiro, Y. Sasaki, Y.-Y. Hayashi, A. Ribeiro, C. Nore, and J.-L. Guermond. A spherical shell numerical dynamo benchmark with pseudo-vacuum magnetic boundary conditions. *Geophysical Journal International*, 196(2):712–713, 2014.
- D. Cébron, S. Vantieghem, and W. Herreman. Libration-driven multipolar instabilities. *J. Fluid Mech.*, 739:502–43, 2014.
- R. Hollerbach, C. Nore, P. Marti, S. Vantieghem, F. Luddens, and J. Léorat. Parity-breaking flows in precessing spherical containers. *Phys. Rev. E*, 87:05320, 2013.
- S. Vantieghem and B. Knaepen. Numerical simulation of magnetohydrodynamic flow in a toroidal duct of square cross-section. *Int. J. Heat Fluid Flow*, 32(6):1120–1128, 2011.
- S. Vantieghem. *Numerical simulations of quasi-static magnetohydrodynamics using an unstructured finite-volume solver: development and applications*. PhD thesis, Université Libre de Bruxelles, 2011.
- S. Vantieghem, X. Albets-Chico, and B. Knaepen. The velocity profile of laminar MHD flows in circular conducting pipes. *Theor. Comp. Fluid Dyn.*, 23(6):5252–533, 2009.
- M. Mareschal, S. Vantieghem, M.L. Mugnai, S. Capara, G. Ciccotti, and C. Pierloni. Compressible convective instability by molecular dynamics. *Progr. Theor. Phys. Suppl.*, 178(15):15–23, 2009.