Julien VANHAREN

Ph.D. in Computational Fluid Dynamics

Personal Data

Place and Date of Birth:	Soissons, France | July 31, 1989
Citizenship:	French
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Professional Experience

Oct 2022 — Research fellow
Inria Saclay in Palaiseau, France
Meshing, anisotropic mesh adaptation and high-order numerical methods
Anisotropic unstructured mesh adaptation. Numerical schemes for Computational Fluid Dynamics (CFD). Reynolds-Averaged Navier–Stokes (RANS) and Large Eddy Simulation (LES). High Performance Computing.

Jun 2020 – Sep 2022 — Research engineer
ONERA in Châtillon, France
CEDRE developer
CEDRE is a multi-physics platform working on general unstructured meshes intended to both advance research and process industrial applications in the fields of energetics and propulsion. High-order and high-fidelity numerical methods. High Performance Computing optimization.

May 2017 – May 2020 — Postdoctoral fellow
Inria Saclay - Île-de-France in Palaiseau, France
Time-accurate anisotropic mesh adaptation for fluid-structure interaction (FSI) simulations
Implementation and validation of the Finite Element method for the unsteady linear elasticity equations. Coupling with a code solving the Euler equations based on the Finite Volume method. Development of error estimates for fluid-structure interaction applied to unsteady anisotropic mesh adaptation. Project RAPID funded by Direction Générale de l'Armement (DGA).

Education

May 2014 – Apr 2017 — Ph.D. in Computational Fluid Dynamics
AIRBUS & Université de Toulouse in Toulouse, France
High-order numerical methods for unsteady flows around complex geometries
Collaboration between AIRBUS and CERFACS. Several numerical methods and codes are investigated for industrial applications. The coupling with a nonconforming grid interface of high-order schemes for structured and unstructured zones in elsA. The Spectral Difference Method in JAGUAR. The Lattice Boltzmann Methods in ProLB.

Jul 2016 – Aug 2016 — Argonne Training Program on Extreme-Scale Computing (ATPESC)
Argonne National Laboratory (ANL) in Lemont, IL, USA
Intensive, two-week training on the key skills, approaches, and tools to design, implement, and execute computational science and engineering applications on current high-end computing systems and the leadership-class computing systems of the future
Computer architectures and predicted evolution. Numerical algorithms and mathematical software. Approaches to building community codes for HPC systems. Data analysis, visualization, I/O, and methodologies and tools for big data applications. Performance measurement and debugging tools.

Sep 2012 – Jun 2013 — M.Sc. Fluid Dynamics
ISAE-SUPAERO in Toulouse, France

Sep 2009 – Jun 2013 — M.Sc. Aerospace and Aeronautical Engineering
ISAE-SUPAERO in Toulouse, France

Teaching

Oct 2022	Anisotropic unstructured mesh generation for complex geometries Université Paris-Est Créteil (UPEC) in Créteil, France
Jun 2019	Incompressible fluid mechanics [MF102] ENSTA Paris in Palaiseau, France
May 2016	Fundamentals to understand and analyze high fidelity compressible Large Eddy Simulation (LES) CERFACS in Toulouse, France

Languages

English	Full working proficiency
French	Native proficiency
German	Good working knowledge
Polish	Basic communication skills

Thesis

[11] Julien Vanharen. **High-Order Numerical Methods For Unsteady Flows Around Complex Geometries**. PhD thesis. Université de Toulouse, 2017. [PDF].

Peer-reviewed journal & conference papers

[1] Frédéric Alauzet, Francesco Clerici, Adrien Loseille, Matthieu Maunoury, Lucien Rochery, Cosimo Tarsia-Morisco, Lucille-Marie Tenkes, and Julien Vanharen. **4th AIAA CFD High Lift Prediction Workshop results using metric-based anisotropic mesh adaptation**. *AIAA Fluid Dynamics Conference*. Chicago, IL, USA, 2022. [10.2514/6.2022-3521].

[2] Frédéric Alauzet, Francesco Clerici, Adrien Loseille, Cosimo Tarsia-Morisco, and Julien Vanharen. **Some progress on CFD high lift prediction using metric-based anisotropic mesh adaptation**. *AIAA Scitech Forum*. San Diego, CA, USA, 2022. [10.2514/6.2022-0388].

[4] Julien Vanharen, Adrien Loseille, Frédéric Alauzet, and Micheal Andrew Park. **Nearfield anisotropic mesh adaptation for the third AIAA Sonic Boom Workshop**. *J. Aircr.* (2022). [10.2514/1.C036502].

[5] Lucille-Marie Tenkes, Frédéric Alauzet, and Julien Vanharen. **Hybrid anisotropic mesh adaptation using metric-orthogonal approach**. *AIAA Scitech Forum*. Virtual Event, 2021. [10.2514/6.2021-1779].

[7] Julien Vanharen, Adrien Loseille, and Frédéric Alauzet. **Non-manifold anisotropic mesh adaptation: application to fluid–structure interaction**. *Eng. Comput.* (2021). [10.1007/s00366-021-01435-2].

[8] Julien Vanharen, Adrien Loseille, Frédéric Alauzet, and Michael Andrew Park. **Nearfield anisotropic mesh adaptivity for the third AIAA sonic boom workshop**. *AIAA Scitech Forum*. Virtual Event, 2021. [10.2514/6.2021-0347].

[9] Julien Vanharen, Rémi Feuillet, and Frédéric Alauzet. **Mesh adaptation for fluid-structure interaction problems**. *AIAA Fluid Dynamics Conference*. Atlanta, GA, USA, 2018. [10.2514/6.2018-3244].

[12] Julien Vanharen, Guillaume Puigt, Xavier Vasseur, Jean-François Boussuge, and Pierre Sagaut. **Revisiting the spectral analysis for high-order spectral discontinuous methods**. *J. Comput. Phys.* 337 (2017), 379–402. [10.1016/j.jcp.2017.02.043].

[15] Julien Vanharen, Guillaume Puigt, and Marc Montagnac. **Theoretical and numerical analysis of nonconforming grid interface for unsteady flows**. *J. Comput. Phys.* 285 (2015), 111–132. [10.1016/j.jcp.2015.01.013].

Conferences and seminars

[3] Eric Quémerais, Bastien Andrieu, Bruno Maugars, Julien Coulet, Stéphanie Lala, and Julien Vanharen. **ParaDiGM: a library to handle Parallel Distributed General Meshes**. 22nd ONERA-DLR Aerospace Symposium, ODAS 2022. Hamburg, Germany, 2022. [PDF].

[6] Julien Vanharen. **Anisotropic mesh adaptation. Theory and applications**. CEA-Cesta seminar. Le Barp, France, 2021.

[10] Julien Vanharen, Rémi Feuillet, and Frédéric Alauzet. **Mesh adaptation for fluid-structure interaction problems**. 6th European Conference on Computational Mechanics (ECCM 6). 7th European Conference on Computational Fluid Dynamics (ECFD 7). Glasgow, UK, 2018. [PDF].

[13] Julien Vanharen, Guillaume Puigt, Xavier Vasseur, Jean-François Boussuge, and Pierre Sagaut. **Comparing the resolution power of standard finite difference and spectral difference schemes**. TILDA - Symposium & Workshop on Industrial LES & DNS. Toulouse, France, 2016. [PDF].

[14] Julien Vanharen, Guillaume Puigt, Xavier Vasseur, Jean-François Boussuge, and Pierre Sagaut. **Revisiting the spectral analysis for high-order spectral discontinuous methods**. TILDA - Symposium & Workshop on Industrial LES & DNS. Toulouse, France, 2016. [PDF].

[16] Julien Vanharen, Guillaume Puigt, and Marc Montagnac. **Two-dimensional spectral analysis of nonconforming grid interface. Emphasis on unsteady flows**. 50^{th} 3AF International Conference on Applied Aerodynamics. Toulouse, France, 2015. [PDF].