

# Yoann LE HÉNAFF

Born on Oct. 31, 1997, in Aubergenville, France.

Tübingen, Germany

*Numerical Analysis*  
*Applied mathematics*

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## Employment

- 2024-... **Postdoctoral researcher**, *Universität Tübingen, Germany*  
Working on the theoretical and numerical aspects of the Bogoliubov approximation in the nonlinear Schrödinger equation. Under the supervision of Christian Lubich.

## Education

- 2021-2024 **PhD in mathematics**, *University of Rennes, France*  
***Modulated particle methods and high orders: a few contributions in numerical analysis.***
  - Theoretical and numerical study of a particle scheme for the approximation of the solution to the Vlasov-Poisson equation.
  - Study of a modulated particle method for the cubic nonlinear Schrödinger equation.
  - Study of the spectral concentration problem, and of a robust approximation algorithm overcoming the numerical instabilities.Supervised by Erwan FAOU and Nicolas CROUSEILLES (University of Rennes, INRIA Brittany).
- 2019-2021 **Master's degree in fundamental mathematics**, *University of Rennes, France*  
2019 **Semester of study**, *Université KAIST, Corée du Sud*
- 2015-2021 **Engineering degree in Applied mathematics**, *INSA Rennes*

## Notable projects

- 2022 **CEMRACS '22 research project**, *CIRM, Marseille, France*  
Study of a variation of a finite-volume scheme.  
Supervised by Philippe HOCH (CEA DAM, Saclay, France) 
- 2021 **Research internship**, *INRIA & Cailabs*  
Theoretical and numerical study of an industrial problem (confidential).  
Supervised by Erwan FAOU (University of Rennes, INRIA Brittany) 
- 2020 **Research internship**, *CEA, Saclay*  
Study of numerical schemes in the modelling of hydraulic systems in the incompressible case.  
Supervised by Xavier MERLHIOT (CEA, lab. Nano Innov) 
- 2019 **Research project**, *Université Rennes I*  
Part of my master's degree. Study of the pseudospectra of a matrix.  
Supervised by Benjamin BOUTIN (University of Rennes)
- 2018 **Software development**, *TDF, Cesson-Sévigné, France*  
Creation of a software used to analyze logs coming from transmission equipments.  
Supervised by Jean-François TRAVERS (TDF) 
- Research project**, *INSA Rennes*  
Part of my engineering degree. Analysis of the convexity of the Gibbs functions in the thermodynamical model of Van der Waals.  
Supervised by Mounir HADDOU (INSA Rennes)

## Languages

English **C1** level, fluent.

*TOEIC (Feb. 04, 2021) : 980 / 990*

French Native.  
Spanish **B1** level.

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## Computer skills

Programming **Julia, Python, Matlab, Octave, C++, C, L<sup>A</sup>T<sub>E</sub>X**  
Tools **Git, VisualStudioCode**

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## Conferences and presentations

- 2024 **PhD students' day**, *IRMAR*, Rennes, France  
Meeting of all PhD students in Rennes. Presentation of some results concerning the spectral concentration problem.
- Workshop on molecular dynamics**, *LAREMA*, Angers, France  
Presentation of some modulation techniques for the Schrödinger equation.
- 2023 **INRIA MINGuS team meeting**, *INRIA Brittany*, Rennes, France  
Presentation of some modulation techniques for the Schrödinger equation.
- ANR KEN meeting**, *LMJL*, Nantes, France  
Presentation of a convergence result of a particle method on the Vlasov-Poisson equation.
- PhD seminar**, *IRMAR*, Rennes, France  
Presentation of some modulation techniques for the Schrödinger equation.
- Congress of young researchers in mathematics and their applications**, Gif-sur-Yvette, France  
Presentation of a convergence result of a particle method on the Vlasov-Poisson equation.
- 2022 **CEMRACS**, Marseille, France  
Mathematical modelling, analysis and numerical simulation of transport problems. 1 week of summer school, followed by 5 weeks of research projects.
- Dobbacio summer school**, Dobbiaco, Italy  
Numerical methods for kinetic equations. Lecturers: E. Sonnendrücker and L. Einkemmer.

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## Teaching

- 2021-2024 **Mathematics tutoring sessions for undergraduates**, *University of Rennes*, Rennes, France  
+120h.

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## Communications and public outreach

- 2023 **Math C2+**, *Rennes, France*  
Public outreach about research in mathematics for an audience made of high-school students.

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## Publications and preprints

- [1] Erwan Faou and Yoann Le Henaff. A generalized spectral concentration problem and the varying masks algorithm, October 2024.
- [2] Mohamed Boujoudar, Emmanuel Franck, Philippe Hoch, Clément Lasuen, Yoann Le Hénaff, and Paul Paragot. A composite finite volume scheme for the Euler equations with source term on unstructured meshes, April 2024.
- [3] Yoann Le Hénaff. Grid-free weighted particle method applied to the Vlasov–Poisson equation. *Numerische Mathematik*, 155(3-4):289–344, December 2023.

- [4] Erwan Faou, Yoann Le Hénaff, and Pierre Raphaël. Modulation algorithm for the nonlinear Schrödinger equation, October 2023.