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## TRAINING AND PRESENT/PAST POSITIONS

I am a former student of *ENS Cachan* (now *ENS Saclay*) in mathematics and computer science. I defended my PhD in 2004 at Université Nancy 2 and my habilitation thesis in 2011 at Université Nancy 1 (both now *Université de Lorraine*).

I have been a *professeur des universités* in computer science at *Université de Lorraine* since 2018, affiliated with *École des Mines* for teaching and *Loria* for research. Previously, I was a professor (PU) at *Université Paris-Est Marne-la-Vallée* (now *Université Gustave Eiffel*) in 2013-18, and a researcher (CR) at INRIA Nancy in 2005-13.

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## RESEARCH AREAS

I work in discrete mathematics and algorithms, in *discrete and computational geometry*. I study combinatorial structures that arise from geometric objects (*e.g.* oriented matroids of point configurations, geometric hypergraphs, nerves of geometric covers, ...) using methods from (algebraic) topology, probabilistic geometry and (extremal) combinatorics. I am also fond of classical line geometry.

**Keywords:** combinatorial convexity, nerves, homological minors, smoothed complexity, random polytopes, VC dimension, excluded patterns, geometric transversals, imaging systems.

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## TEACHING ACTIVITIES

I mostly teach courses in theoretical computer science (*algorithms, complexity theory, discrete mathematics, cryptography, distributed computing*) as well as in *computer architecture*. I occasionally teach *programming* courses (C, Python, assembly x86).

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## RECENT SERVICE

- Co-chair of the program committee of the *Symposium of Computational Geometry* (SoCG) 2022.
- Co-organizer of the *Oberwolfach meeting on discrete geometry* 2017, 2020 and 2024.
- Head of the computer science department of *École des Mines de Nancy* (2022–).
- Co-head of the computer science department of the doctoral school IAEM (2025–).

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## DISTINCTIONS

- Junior member of the *Institut Universitaire de France* (2014–2019).
- Four best paper awards at the *Symposium of Computational Geometry* (SoCG) in, respectively, 2020, 2018, 2016 and 2012 (for the preliminary versions of [2], [4], [7] and [8], see below).

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## SUPERVISION

I co-advised the PhD thesis of Julien Demouth (2005-08, now senior engineer at NVIDIA), Guillaume Batog (2008-11, now professor in classes préparatoires), Galatée Hémery (2018-20, interrupted to take a professor position in highschool, now professor in classes préparatoires), Sarah Wajsbrot (2023-) and Marguerite Bin (2024-).

I hosted, as postdoctoral fellows, Eduardo Ferraz (2013, now a professor of economy at Universidad del Rosario, Bogotá), Alfredo Hubard (2013-14, now a professor of computer science at UPEM), Florent Koechlin (2022-23, now a CNRS researcher) and Niloufar Fuladi (2024-25, now a postdoctoral fellow at Charles University, Prague).

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## GRANTS

I am co-PI of an INRIA *associate team* with Andreas Holmsen, KAIST (2021-23 and 2025-27). (Past) I was PI of the ANR collaborative project PRESAGE (2011–15) and of international bilateral PHC grants (with Andreas Holmsen, KAIST, with Martin Tancer, Charles University, and with Otfried Cheong, KAIST).

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## SELECTED PUBLICATIONS.

- [1] **A Canonical Tree Decomposition for Chirotopes**, with M. Bouvel, V. Feray, and F. Koechlin. *SIAM J. of Discrete Mathematics*, to appear.
- [2] **Convex hulls of random order types**, with E. Welzl. *J. of the ACM*, 2023.
- [3] **Random polytopes and the wet part for arbitrary probability distributions**, with I. Bárány, M. Fradelizi, A. Hubard, and G. Rote. *Annales Henri Lebesgue*, 2020.
- [4] **Shellability is NP-complete**, with P. Paták, Z. Patáková, M. Tancer, and U. Wagner. *J. of the ACM*, 2019.
- [5] **Shatter functions with polynomial growth rates**, with B. Bukh. *SIAM J. in Discrete Math.*, 2019.
- [6] **The discrete yet ubiquitous theorems of Carathéodory, Helly, Sperner, Tucker, and Tverberg**, with J. A. De Loera, F. Meunier and N. Mustafa. *Bulletin of the AMS*, 2019.
- [7] **The number of holes in the union of translates of a convex set in three dimensions**, with B. Aronov, O. Cheong and M. Dobbins. *Discrete & Computational Geometry*, 2017.
- [8] **Helly numbers of acyclic families**, with É. Colin de Verdière and G. Ginot. *Advances in Math.*, 2014.
- [9] **Bounded-Curvature Shortest Paths through a Sequence of Points Using Convex Optimization**, with H.-S. Kim and S. Lazard. *SIAM Journal of Computing*, 2013.
- [10] **Admissible linear map models of linear cameras**, with G. Batog and J. Ponce. *Proc. IEEE Conference in Computer Vision and Pattern Recognition (CVPR)*, 2010.

Complete list: [https://members.loria.fr/Xavier.Goacoc/file/list\\_of\\_publications\\_XG.pdf](https://members.loria.fr/Xavier.Goacoc/file/list_of_publications_XG.pdf)

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## SELECTED RECENT INVITED LECTURES

- The *European Workshop on Computational Geometry* (2024).
- The *Discrete & Computational Geometry Day in Memory of E. Goodman and R. Pollack* (2022).
- The *École jeunes chercheurs en informatique mathématique* (2020).
- The *École de mathématiques expérimentales* (2018).