

Xavier Goaoc

Curriculum vitæ, December 2022.

PRESENT POSITION

Since Sept. 2018, I am a professor (*professeur des universités*) at *Université de Lorraine*, affiliated with the CS department of *École des Mines de Nancy* and with LORIA (the joint laboratory of Université de Lorraine, CNRS and INRIA). I am a member of the INRIA project GAMBLE.

TRAINING AND PROFESSIONAL EXPERIENCE

From 2013 to 2018, I was a professor at the computer science department of *Université Paris-Est Marne-la-Vallée*, now *Université Gustave Eiffel*. From 2005 to 2013, I was a full-time researcher at INRIA Nancy, and received my *habilitation à diriger les recherches* from *Université Nancy 1* in 2011. I trained as a post-doctoral researcher in the algorithm group of the *Technische Universität* of Eindhoven (2004–05) after receiving a PhD in computer science from *Université Nancy 2* (2004) and graduating from ENS Cachan (1997–2001, math department, *agrégé* in 2000).

RESEARCH ACTIVITY

I work in discrete mathematics and algorithms, in *discrete and computational geometry*. I study combinatorial structures that arise from geometric objects (*e.g.* order types of point sets, 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.

Selected publications:

- [1] **Convex hulls of random order types**, with E. Welzl. *Journal of the ACM*, to appear.
- [2] **Shellability is NP-complete**, with P. Paták, Z. Patáková, M. Tancer, and U. Wagner. *Journal of the ACM*, 2019.
- [3] **Shatter functions with polynomial growth rates**, with B. Bukh. *SIAM Journal in Discrete Math.*, 2019.
- [4] **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 American Mathematical Society*, 2019.
- [5] **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.
- [6] **Helly numbers of acyclic families**, with É. Colin de Verdière and G. Ginot. *Advances in Mathematics*, 2014.

Complete list of publications: <https://members.loria.fr/XGoaoc/publications.html>

DISTINCTIONS

Junior member of the *Institut Universitaire de France* (2014–2019). The preliminary versions of [1], [2], [5] and [6] received the *best paper* award at the *Symposium of Computational Geometry* (SoCG) in, respectively, 2020, 2018, 2016 and 2012.

TEACHING

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

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) and Galatée Hémary (2018–2020, interrupted to take a professor position in highschool). I hosted, as postdoctoral fellows, Eduardo Ferraz (2013, now a professor of economy at Universidad del Rosario, Bogotá), Alfredo Hubard (2013-2014, now a professor of computer science at UPEM) and Florent Koechlin (2022-).

SERVICE

Co-chair of the program committee of the *Symposium of Computational Geometry* 2022.

Co-organizer of the *Oberwolfach meeting on discrete geometry* 2017, 2020 and 2024.

Chair of the computer science department of École des Mines de Nancy (2022–).

Member of several local councils (conseil d'administration Mines Nancy (2021–), pôle automatique-maths-informatique UL (2022–), Fédération Charles Hermite (2018–), ...).

Past: co-founder of the *Discrete and computational geometry* seminar hosted at IHP since 2014 and co-organizer of conferences¹ or schools.² Head of the computer science master program (UPEM, 2014-18), chair of the *INRIA COST-GTRI* (2011-13), chair of the Video & multimedia track for the *Symposium of Computational Geometry* 2017, member of the founding editorial board of the *Journal of Computational Geometry* (2009–11).

GRANTS

IUF (2014-19), 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). Currently: co-PI of an INRIA *associate team* with Andreas Holmsen, KAIST.

SELECTED RECENT LECTURES

Discrete & Computational Geometry Day in Memory of E. Goodman and R. Pollack (2022).

École jeunes chercheurs en informatique mathématique (2020, 3h).

École de mathématiques expérimentales (2018, 3h)

¹<http://igm.univ-mlv.fr/AlgoB/algoperm2012/> and <https://rpm2019.sciencesconf.org/>

²<http://wiki-math.univ-mlv.fr/gemecod/doku.php/winterschool2015> and <http://geomschool2018.univ-mlv.fr/>