

# Augustin Cosse

augustin.cosse@univ-littoral.fr

Université du Littoral Côte d'Opale

Laboratoire de Mathématiques Pures et Appliquées Joseph Liouville

50 Rue Ferdinand Buisson,

62100 Calais, France

- Research Interests** Convex and large scale optimization, machine learning, compressed sensing, numerical analysis, algorithms and complexity, inverse scattering and wave propagation.
- Appointments (Present)** **Université du Littoral Côte d'Opale (ULCO)**, Calais, FR  
Laboratoire de Mathématiques Pures et Appliquées Joseph Liouville  
École d'Ingénieurs du Littoral-Côte-d'Opale  
Maître de conférence/Directeur des études ING2  
Sept 2022 - present.
- New York University**, Paris/NYC/Shanghai.  
Lecturer, CSCI-UA 9473 - Introduction to Machine Learning,  
CSCI-UA 9472 - Artificial Intelligence  
CSCI-UA 9102 - Data Structures  
MATH-UA 263 - Partial Differential Equations  
(Sept. 2018 - present)
- Appointments (Past)** **Ecole Normale Supérieure**, Paris  
Postdoctoral Fellow, Nov. 2017 - Nov 2020.  
Département de Mathématiques et Applications (DMA).  
(2019 - 2020) Postdoc CNRS.  
(2017 - 2019) Fondation Sciences Mathématiques de Paris
- New York University**, New York, NY.  
Visiting Postdoctoral Fellow, Oct. 2016 - Oct. 2017  
Courant Institute of Mathematical Sciences and Center for Data Science.  
Francqui Foundation Fellow
- Education** **The University of Chicago**, Chicago, IL.  
Invited student, Sept. 2015 - Sept. 2016  
Department of Statistics.
- Harvard University**, Cambridge, MA.  
Fellow, Sept. 2014 - July 2015  
Institute for Applied Computational Science, School of Engineering.
- Massachusetts Institute of Technology**, Cambridge, MA.  
Invited graduate student, Sept. 2013 - Sept. 2014  
Imaging and Computing Group, Department of Mathematics.  
*FNRS travel grant, MISTI grant, MITEI fund*  
Activities : MIT sailing club, MIT soccer, MIT rowing club, MIT MUN
- Université Catholique de Louvain**, Louvain-la-Neuve, Belgium  
PhD in Engineering (EECS and Applied Math.), 2012 - 2016  
Image and Signal Processing Group, ICTEAM Institute.  
Supervisors : Laurent Demanet, Laurent Jacques
- Ecole Polytechnique de Louvain**, Louvain-la-Neuve, Belgium  
M.Eng Mathematical Engineering, 2009 - 2011  
2010 - 2011 : *Summa cum laude* (ranked first in mathematical engineering)  
2009 - 2010 : *Magna cum laude*  
Signal Processing, Modeling and simulation in physics

## Publications

N. Haas, F. Gatine, A. Cosse, Z. Bouraoui, Why Deep Jacobian Spectra Separate : Depth-Induced Scaling and Singular-Vector Alignment, *submitted to ICML*, 2026.

A. Cosse, Infinite families of graphs and stable completion of arbitrary matrices, Part I, *arXiv preprint arXiv :2512.24468*, 2025.

A. Cosse, Sparse recovery from quadratic equations, part II : hardness and incoherence, *arXiv preprint arXiv :2412.19341*, 2024.

A. Cosse, In the recovery of sparse vectors from quadratic measurements, the presence of linear terms breaks the square root bottleneck, *Applied Numerical Mathematics*, 2024.

A. Cosse, Compressed super-resolution I : Maximal rank Sum-of-Squares, *preprint arXiv :2001.01644*, 2019.

A. Cosse and L. Demanet, Stable rank-one matrix completion is solved by the level-2 Lasserre relaxation, *Foundations of Computational Mathematics (FOCM)*, 2018.

A. Cosse, From blind deconvolution to blind super-resolution through convex programming, *under revision, arXiv :1709.09279*, 2017.

## Proceedings

A. Cosse, A note on the blind deconvolution of multiple sparse signals from unknown subspaces, *in Proc. SPIE Optical Engineering + Applications conference on Wavelets and Sparsity XVII*, 2017.

A. Cosse, L. Demanet, Rank-one matrix completion is solved by the sum-of-squares relaxation of order two, *in Proc. IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2015)*

A. Ahmed, A. Cosse, L. Demanet, A convex approach to blind deconvolution with diverse inputs, *in Proc. IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2015)*

A. Cosse, S. D. Shank, L. Demanet, A short note on rank-2 relaxation for waveform inversion, *in Proc. of the Society of Exploration Geophysicists (SEG), annual meeting 2015*.

A. Cosse, Diffeomorphic surface-based registration for MR-US fusion in prostate brachytherapy, *in Proc. IEEE 20th Mediterranean Electrotechnical Conference (MELECON 2012)*.

## Awards/Grants

Qualification CNU Section 26 (Math. Appliquées)

AFOSR/EOARD Research Grant FA9550-18-1-7007, 2018-2021

*Error quantification and complexity limits in deep learning*

Fondation Sciences Mathématiques de Paris (FSMP) Fellow 2017-2019.

Francqui Foundation Fellow 2016-2017

Travel Award, Hausdorff Institute for Mathematics, Bonn, DE.

Belgian National Science Foundation Research Fellow, 2014-2016

MISTI (MIT International Science and Technology) Grant, 2013

Belgian National Science Foundation (FNRS) Travel Grant, 2013

Belgian National Science Foundation Research Fellow, 2012-2014

IEEE Region 8 Best Paper Award (3rd place), 2012

IEEE UCL Student Chapter Best Thesis Award, 2011

FFJM, SCM and Véolia award for the optimization of

a public transport network, 2009

<b>Teaching</b>	<p>Université du Littoral    ING1 - Analyse numérique  ING2 - Machine Learning  GEE - Intelligence Artificielle  M1 Systèmes complexes - Optimization</p> <p>NYU Paris    CSCIUA 9473 - Introduction to Machine Learning  CSCIUA 9472 - Artificial Intelligence  CSCI-UA 9102 - Data Structures  MATH-UA 263 - Partial Differential Equations</p> <p>UChicago, 2015/16    STAT/MATH37760 - Modern Signal Processing  STAT31100 - Numerical Methods for PDEs</p> <p>UCLouvain, 2011-13    LLSMF2018 - Technological and Quantitative Project  LEPL1502 - Projet 2</p>
<b>Service</b>	<p>IEEE International Conference on Sampling Theory and Applications  Applied Numerical Mathematics  Journal of Fourier Analysis and Applications  IEEE Transactions on Image Processing  AIMS Mathematical Control and Related Fields (MCRF)  Applied Numerical Mathematics (APNUM)  Mathematical Programming  Journal of Symbolic Computation  International Conference on Machine Learning (ICML), 2019 - present  International Conference on Learning Representations (ICLR), 2020-present  Neural Information Processing Systems (NEURIPS), 2020-present.  International Conference on Artificial Intelligence and Statistics (AISTATS),  (2024-present)  Association for the advancement of artificial intelligence (AAAI) Conference,  (2025-present)  International Symposium on Symbolic and Algebraic Computation (ISSAC)</p>
<b>Research Stays</b>	<p>Hausdorff Research Institute for Mathematics (HIM), Bonn, Germany, ja-  nuary 2016, Trimester Program on the Mathematics of Signal Processing</p>
<b>Advising</b>	<p>Nathanaël Haas, EECS, 2024 - present.  PhD student, <i>MAIA Maîtrise des Applications de l'Intelligence Artificielle</i>,  ULCO-Artois</p> <p>Salim Issa, EECS, 2025  MS Intern, now PhD student at Université d'Avignon</p>
<b>Invited Talks</b>	<p>Numerical Analysis and Scientific Computation with Applications, Kala-  mata, Greece, 2026  Numerical Analysis and Scientific Computation with Applications, National  and Kapodistrian University of Athens 2022  Katholieke Universiteit Leuven, ESAT-STADIUS 2021  Université Gustave Eiffel, Laboratoire d'informatique Gaspard Monge, 2021.  ENS Lyon, FR, Machine Learning and Signal Processing Seminar 2021.  LAAS/ENSEEIH/ENAC, Toulouse FR, Optimization Seminar, 2020.  TU München, Workshop on Mathematical Signal and Image Analysis, 2019  Ecole Normale Supérieure, FR, Laplace Reading Group, 2018.  University of Delaware, DE, Inverse problems and Analysis Seminar, 2017.  SPIE Wavelets and Sparsity, San Diego, CA, 2017.  Courant Institute, NYC, Harmonic Analysis Seminar, 2017.  Université Catholique de Louvain, BE, Applied Math Seminar, 2016.</p>
<b>Programming</b>	<p>Java, Julia, Python, C, Matlab, Html, CSS</p>
<b>Languages</b>	<p><b>French</b> : Native  <b>English</b> : Fluent  <b>Dutch</b> : Intermediate</p>