

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 optimization, machine learning, large scale optimization and big data, compressed sensing, numerical analysis, algorithms and complexity, inverse scattering and wave propagation.

Employment (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.

Employment (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, Paris, FR.
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 - Sept 2022.)

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

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.

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

A. Cosse, In the recovery of sparse vectors from quadratic measurements, the presence of linear terms breaks the square root bottleneck, *preprint arXiv :2310.20428v1*, 2023.

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

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| Teaching | <p>Université du Littoral ING1 - Analyse numérique ING2 - Machine Learning GEE - Intelligence Artificielle M1 Systèmes complexes - Optimization</p> <p>NYU Paris, 2018-22 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> |
| Reviewing | <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 International Conference on Machine Learning (ICML), 2019 - present International Conference on Learning Representations (ICLR), 2020-present Annual Conference on Neural Information Processing Systems (NEURIPS), 2020-present.</p> |
| Research Stays | <p>Hausdorff Research Institute for Mathematics (HIM), Bonn, Germany, ja- nuary 2016, Trimester Program on the Mathematics of Signal Processing</p> |
| Invited Talks | <p>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> |
| Programming | <p>Java, Julia, Python, C, Matlab, Html, CSS</p> |
| Languages | <p>French : Native English : Fluent Dutch : Intermediate</p> |