Franck Iutzeler

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Personal Information

Date of Birth:	September 2, 1987
Place of Birth:	Besançon (Doubs)
Nationality:	French
Professional Address:	Office 153 – DAO team Laboratoire Jean Kuntzmann – Université Grenoble Alpes 700, Avenue Centrale 38401 Domaine Universitaire de Saint-Martin-d'Hères
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Current position

Since Sept. 2015	Assistant Professor *Maître de Conférences* in Applied Mathematics	Univ. Grenoble Alpes Laboratoire Jean Kuntzmann – DAO team

Previous positions

01/2015-08/2015	Post-Doc Louvain-la-Neuve (Belgique)	Université Catholique de Louvain INMA team – with J. Hendrickx
01/2014-01/2015	Post-Doc Gif-sur-Yvette (France)	Supélec LANEAS team – with M. Debbah and R. Couillet

Diplomas

2013	Ph.D. degree Dir. Ph. Ciblat and W. Hachem Defended December 6, 2013	Telecom Paris *Distributed Estimation and Optimization for Asynchronous Networks* Jury: C. Richard (U. Nice, President), M. Rabbat (McGill, Reviewer), J. Hendrickx (Louvain-la-Neuve, Reviewer), G. Leus (Delft), P. Borgnat (ENS Lyon), P. Bianchi (Telecom Paris).
2010	Engineer degree	Telecom Paris
2010	M.Sc	Paris VI

Research

Themes

My current research is centered around numerical optimization, notably for solving machine learning problems. More precisely, I'm interested in how to accelerate theoretically and/or pratically optimization methods. The topics I mainly considered recently are:

T1- Inertial methods *à la* Nesterov to accelerate the convergence of first order methods (e.g. the proximal gradient) or more generally fixed points of monotone operators – publications A8,A10,A17;

T2- Distributed optimization problems where the agents only have access to a local part of the problem (e.g. data in machine learning, or partial oracles in optimization) and are coordinated in order to solve a global problem – publications A9,A11,A13,A15,A21,P2;

T3- Randomized methods in which only a randomly selected part of the coordinates are updated at each iteration in order to reduce the synchronization delay incurred by the computation of all the coordinates (and thus reducing the exchanges in distributed systems) – publications A5,A16,A18,A21.

T4 Finally, I am interested in the notion of structure in optimization problems, notably with respect to regularized learning problems. My aim is to mathematically and numerically characterize the structure of the iterates produced by optimization methods in order to exploit this information to a computational advantage – publis A17,A20,A21,P3.

Publications

This section lists my publications, most of them are available on my webpage.
Bibliometry in July 2021 from Google scholar: 882 citations – h-index=14.

Preprints

P3- G. Bareilles, F. Iutzeler : *Newton acceleration on manifolds identified by proximal-gradient methods*, arXiv:2012.12936, Dec. 2020.

P2- Y.-G. Hsieh, F. Iutzeler, J. Malick, P. Mertikopoulos : *Multi-Agent Online Optimization with Delays: Asynchronicity, Adaptivity, and Optimism*, arXiv:2012.11579, Dec. 2020.

P1- C. Laclau, F. Iutzeler, I. Redko : *Rank-one partitioning: formalization, illustrative examples, and a new cluster enhancing strategy*, arXiv:2009.00365, Sep. 2020.

Journal Articles & NeurIPS/ICML/COLT Conferences

Nota Bene: I chose to include in this section my journal articles as well as my articles published in NeurIPS, ICML, *and* COLT. *I made this choice since these selective conferences (20% acceptance rate) lead to autonomous articles (without associated journal papers) with a depth similar to journal articles; for these reasons, they belong more in that category than with other conferences (IEEE CDC, ICASSP, etc.).*

A22- W. Azizian, F. Iutzeler, J. Malick, and P. Mertikopoulos: *The last-iterate convergence rate of optimistic mirror descent in stochastic variational inequalities* , 34th Annual Conference on Learning Theory (COLT), 2021.

A21- D. Grishchenko, F. Iutzeler, J. Malick, M.-R. Amini: *Distributed Learning with Sparse Communications by Identification*, SIAM Journal on Mathematics of Data Science, vol. 3, no. 2, pp. 715-735, 2021.

A20- F. Iutzeler, J. Malick: *Nonsmoothness in Machine Learning: specific structure, proximal identification, and applications*, Set-Valued and Variational Analysis, vol. 28, no. 4, pp. 661-678, 2020.

A19- Y.-G. Hsieh, F. Iutzeler, J. Malick, P. Mertikopoulos : *Explore Aggressively, Update Conservatively: Stochastic Extragradient Methods with Variable Stepsize Scaling*, Advances in Neural Information Processing Systems 34 (NeurIPS) spotlight, Dec. 2020.

A18- G. Bareilles, Y. Laguel, D. Grishchenko, F. Iutzeler, J. Malick: *Randomized Progressive Hedging methods for Multi-stage Stochastic Programming* , Annals of Operations Research, vol. 295, no. 2, pp. 535-560, 2020.

A17- G. Bareilles, F. Iutzeler : *On the Interplay between Acceleration and Identification for the Proximal Gradient algorithm*, Computational Optimization and Applications, vol. 77, no. 2, pp. 351–378, 2020.

A16- D. Grishchenko, F. Iutzeler, and J. Malick : *Proximal Gradient Methods with Adaptive Subspace Sampling*, to appear in Mathematics of Operations Research, 2020.

A15- K. Mishchenko, F. Iutzeler, and J. Malick : *A Distributed Flexible Delay-tolerant Proximal Gradient Algorithm*, SIAM Journal on Optimization, vol. 30, no. 1, pp. 933-959, 2020.

A14- Y.-G. Hsieh, F. Iutzeler, J. Malick, and P. Mertikopoulos : *On the convergence of single-call stochastic extra-gradient methods*, Advances in Neural Information Processing Systems 32 (NeurIPS), Dec. 2019.

A13- F. Iutzeler, J. Malick, and W. de Oliveira : *Asynchronous level bundle methods*, Mathematical Programming, vol. 184, pp. 319-348, 2020.

A12- F. Iutzeler and L. Condat : *Distributed Projection on the Simplex and ℓ_1 Ball via ADMM and Gossip*, IEEE Signal Processing Letters, vol. 25, no. 11, pp. 1650-1654, Nov. 2018.

A11- K. Mishchenko, F. Iutzeler, J. Malick, M.-R. Amini : *A Delay-tolerant Proximal-Gradient Algorithm for Distributed Learning*, International Conference on Machine Learning (ICML), PMLR 80:3584-3592, Stockholm (Sweden), July 2018.

A10- F. Iutzeler and J. Malick : *On the Proximal Gradient Algorithm with Alternated Inertia*, Journal of Optimization Theory and Applications, vol. 176, no. 3, pp. 688-710, March 2018.

A9- B. Joshi, F. Iutzeler and M.-R. Amini : *Large-scale asynchronous distributed learning based on parameter exchanges*, International Journal of Data Science and Analytics, vol. 5, no. 4, pp. 223-232, June 2018.

A8- F. Iutzeler and J. M. Hendrickx : *A Generic online acceleration scheme for Optimization algorithms via Relaxation and Inertia*, Optimization Methods and Software, vol. 34, no. 2, 2019.

A7- B. Joshi, M.-R. Amini, I. Partalas, F. Iutzeler, Yu. Maximov : *Aggressive Sampling for Multi-class to Binary Reduction with Applications to Text Classification*, Advances in Neural Information Processing Systems 30 (NeurIPS), Dec. 2017.

A6- F. Iutzeler : *Distributed Computation of Quantiles via ADMM*, IEEE Signal Processing Letters, vol. 24, no. 5, pp. 619-623, May 2017.

A5- P. Bianchi, W. Hachem, and F. Iutzeler : *A Stochastic Coordinate Descent Primal-Dual Algorithm and Applications to Distributed Optimization*, IEEE Transactions on Automatic Control, vol. 61, no. 10, pp. 2947-2957, Oct. 2016.

A4- F. Iutzeler, P. Bianchi, P. Ciblat, and W. Hachem : *Explicit Convergence Rate of a Distributed Alternating Direction Method of Multiplier*, IEEE Transactions on Automatic Control, vol. 61, no. 4, pp. 892-904, Apr. 2016.

A3- A. Abboud, F. Iutzeler, R. Couillet, M. Debbah, and H. Siguerdidjane : *Distributed Production-Sharing Optimization and Application to Power Grid Networks*, IEEE Transactions on Signal and Information Processing over Networks, vol. 2, no. 11, pp. 16-28, March 2016.

A2- F. Iutzeler, P. Ciblat, and W. Hachem : *Analysis of Sum-Weight-like algorithms for averaging in Wireless Sensor Networks*, IEEE Transactions on Signal Processing, vol. 61, no. 11, pp. 2802-2814, June 2013.

A1- F. Iutzeler, P. Ciblat, and J. Jakubowicz : *Analysis of max-consensus algorithms in wireless channels*, IEEE Transactions on Signal Processing, vol. 60, no. 11, pp. 6103-6107, November 2012.

International Conferences

C12- Y.-G. Hsieh, F. Iutzeler, J. Malick, P. Mertikopoulos : *Optimization in Open Networks via Dual Averaging*, to appear at the 60-th IEEE Conference on Decision and Control (CDC), Austin (USA), 2021. (see arXiv:2105.13348)

C11- M. Chastan, A. Lam, F. Iutzeler: *Unsupervised density based machine learning for abnormal leveling signatures detection*, SPIE Advanced Lithography, Online, Feb. 2021.

C10- D. Grishchenko, F. Iutzeler, M.-R. Amini: *Sparse Asynchronous Distributed Learning*, 27-th International Conference on Neural Information Processing (ICONIP), Online, November 2020.

C9- D. Grishchenko, F. Iutzeler, J. Malick: *Distributed First-order Optimization with Tamed Communications*, Signal Processing with Adaptive Sparse Structured Representations (SPARS workshop), Toulouse (France), July 2019.

C8- B. Joshi, F. Iutzeler, M.-R. Amini: *Asynchronous Distributed Matrix Factorization with Similar User and Item Based Regularization*, 10-th ACM Conference on Recommender Systems (RecSys), Boston (USA), Sept. 2016.

C7- F. Iutzeler, P. Bianchi, P. Ciblat and W. Hachem: *Linear Convergence Rate for Distributed Optimization with the Alternating Direction Method of Multipliers*, 53-rd IEEE Conference on Decision and Control (CDC), Los Angeles (USA), December 2014.

C6- P. Bianchi, W. Hachem and F. Iutzeler: *A Stochastic Primal-Dual algorithm for Distributed Asynchronous Composite Optimization*, 2-nd IEEE Global Conference on Signal and Information Processing (GlobalSip), Atlanta (USA), December 2014.

C5- P. Bianchi, W. Hachem, and F. Iutzeler : *A Stochastic Coordinate Descent Primal-Dual Algorithm And Applications*, 24-th IEEE International Workshop on Machine Learning for Signal Processing (MLSP), Reims (France), September 2014.

C4- F. Iutzeler , P. Bianchi, P. Ciblat and W. Hachem: *Asynchronous Distributed Optimization using a Randomized Alternating Direction Method of Multipliers*, 52-nd IEEE Conference on Decision and Control (CDC), Florence (Italy), December 2013.

C3- F. Iutzeler and P. Ciblat: *Fully-distributed spectrum sensing: application to cognitive radio*, 21-st European Signal Processing Conference (EUSIPCO), Marrakech (Morocco), September 2013.

C2- F. Iutzeler, P. Ciblat, W. Hachem, and J. Jakubowicz : *A new broadcast based averaging algorithm over wireless sensor networks*, 37-th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Kyoto (Japan), March 2012.

C1- F. Iutzeler, J. Jakubowicz, W. Hachem and P. Ciblat : *Distributed estimation of the maximum value over a wireless sensor network*, 45-th Asilomar Conference on Signals, Systems, and Computer, Pacific Grove (USA), November 2011.

Funding and Students

Fundings

- *ANR JCJC* – STROLL: Harnessing Structure in Optimization for Large-Scale Learning – 2019-2023
  PI – 145kE
- *PGMO - PRMO* – Distributed Optimization on Graphs with Flexible Communications – 2019-2020
  PI – 5kE – with D. Grishchenko (LJK, Grenoble).

- *MIAI Chair* – Optimization and Learning – 2019-2023
  220+kE – with J. Malick (PI), P. Mertikopoulos, R. Hildenbrand (Grenoble).
- *CNRS INSMI and INS2I - AI and ML* – Optimization for implicit recommender systems – 2017-2018
  PI – 8kE – with M. Clausel (IECL, U. Lorraine), M.-R. Amini (LIG, Grenoble).
- *IDEX Grenoble Alpes - Initiatives de Recherche Stratégiques* – Distributed Optimization for Large-scale Learning – 2017-2020
  PI – 110kE – with J. Malick (LJK, Grenoble), M.-R. Amini (LIG, Grenoble).
- *IDEX Grenoble Alpes - Pedagogical Initiatives* – Optimisation Distribuée pour le Big Data – 2017-2019
  30kE – avec J. Malick (Porteur), A. Iouditski, R. Hildenbrand, J. Lelong, L. Viry (LJK, Grenoble).
- *PGMO - PRMO* – Advanced nonsmooth optimization methods for stochastic programming – 2016-2018
  125kE – avec J. Malick (PI) (LJK, Grenoble), W. Van Ackooij (EDF, Paris), W. de Oliveira (UERJ, Rio de Janeiro, Brésil).
- *Young researchers GDR ISIS/GRETSI* – "ON FIRE" Interferometry Calibration – 2016-2018
  7kE – with N. El Korso (co-PI), A. Breloy (LEME, Paris X), R. Flamary (Lagrange, Nice).

Ph.D. Students

- Gilles Bareilles – Harnessing Structure in Optimization for Large-Scale Learning – 2019-
  80% – with J. Malick – funded by ANR STROLL
- Yu-Guan Hsieh – Variational inequalities in machine learning – 2019-
  30% – with J. Malick and P. Mertikopoulos – funded by MIAI
- Mathias Chastan – Détection de défauts dans les wafers – 2019-
  Industrial thesis with ST MicroElectronics (Crolles) – with J. Malick and A. Lam (ST)

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- Dmitry Grishchenko – Distributed Optimization for Learning – 2017-2020
  50% – with J. Malick and M. Amini – funded by IDEX IRS
  Now: Senior Algorithm Engineer, Huawei, Moscow.
- Bikash Joshi – Large-Scale classification and recommendation – 2014-2017
  50% – with M. Amini – funded by Labex Persyval
  Now: Data Scientist, Elsevier, Amsterdam.

Interns

- Waiss Azizian – ENS and MVA – 2020&2021
- Gilles Bareilles – ENSTA and MVA – 2019
- Yu-Guan Hsieh – ENS and MVA – 2019
- Konstantin Mishchenko – MIPT and MASH – 2017

Service

- Elected to the liaison commitee of the MODE groupe (thematic group on Optimization&Decision) of SMAI (French equivalent of SIAM) – 2020-now
- PhD jury : D. Babichev (2018, Adv. F. Bach)
- Jury of the 2021 PGMO PhD prize

Reviewing

- Learning Conferences: NeurIPS (2017-), ICML (2018-), ICLR (2021-)
- Optimization journals: SIOPT, Math. Prog, JOTA, JOGO
- Signal Processing/Control journals: IEEE TSP, TAC, TSIPN, SPLetters, Automatica
- Projects: ANR, IDEX Grenoble Alpes, Research Council of Canada

Local Responsibilities

- Member of the research commission of the Maths/CS faculty – 2018-now
- Elected member of the laboratory council – 2018-now
- Elected member of the research council of Telecom Paris – 2011-2013
- President of the Ph.D. students association at Telecom Paris – 2011-2012

Event Organization

- Co-organizer of the ECML/PKDD 2022 in Grenoble
- Co-organizer of the "Grenoble Optimization Days", two days in June 2018
- Program Committee: CAp (2017-)
- Organizer of the graduate course "GdR MOA" given by J. Mairal before SMAI-MODE 2018 (Autrans, France)
- Organization commitee of CAp 2017 (Grenoble, France)
- Co-organizer with P. Bianchi of the Special Session "Distributed Optimization for Wireless Networks" at EUSIPCO 2013 (Marrakech, Maroc)

Seminars and oral communications

- June 2021 : Harnessing Structure in Regularized Empirical Risk Minimization, CAp (virtual).
- Nov. 2020 : Nonsmooth regularizations in Machine Learning: structure of the solutions, identification, and applications, IMAG Montpellier (virtual).
- Sep. 2020 : a Randomized Proximal Gradient Method with Structure-Adapted Sampling, Journées SMAI MODE (virtual).
- Mar. 2020 : Harnessing Structure in Optimization for Machine Learning, Optimization for Machine Learning, CIRM (France).
- Oct. 2018 : Distributed Learning with Sparse Communications and Structure Identification, Séminaire INRIA Magnet, Lille (France).
- Jul. 2018 : Distributed Learning with Sparse Communications and Structure Identification, International Symposium on Mathematical Programming (ISMP), Bordeaux (France).
- June 2018 : Distributed Learning with Sparse Communications and Structure Identification, Séminaire Polaris, Grenoble (France).
- June 2018 : Distributed Learning with Sparse Communications and Structure Identification, Séminaire D.A.T.A., Grenoble (France).
- May 2018 : Distributed Learning with Sparse Communications and Structure Identification, Journées de Statistique, Saclay (France).
- Apr. 2017 : Monotonicity, Acceleration, Inertia, and the proximal gradient algorithm , Optimization and Statistical Learning, Les Houches (France).
- Nov. 2016 : Gossip Algorithms: Tutorial and Recent advances , SMILE in Paris, Paris (France).
- Oct. 2016 : Modified fixed points iterations and applications to randomized and accelerated optimization algorithms , Workshop Cavalieri, Paris (France).

- Sep. 2016 : Practical acceleration for some optimization methods using relaxation and inertia , Seminaire d'Analyse non lineaire and Optimisation, Avignon (France).
- June 2016 : Practical acceleration for some optimization methods using relaxation and inertia , Seminaire Signal-Image de l'Insitut de Mathematiques de Bordeaux, Bordeaux (France).
- June 2016 : Practical accelerations for the alternating direction method of multipliers , PICOF Workshop , Autrans (France).
- May 2016 : Descente par coordonnéees stochastique dan l'algorithme du point fixe and application aux méthod d'optimisation , Congres d'Analyse Numerique (CANUM) , Obernai (France).
- Nov. 2015 : Relaxation and Inertia on the Proximal Point Algorithm , Titan Workshop , Grenoble (France).
- Nov. 2015 : Relaxation and Inertia on Fixed point algorithms , Journées EDP Rhone-Alpes-Auvergne (JERAA), Clermont-Ferrand (France).
- Mar. 2015 : Online Relaxation Method for Improving Linear Convergence Rates of the ADMM , Benelux meeting on Systems and Control, Lommel (Belgium).
- Aug. 2014 : Asynchronous Distributed Optimization , Journées MAS, Toulouse (France).
- May. 2014 : Distributed Optimization Techniques for Learning over Big Data , 2014 ESSEC/Centrale-Supélec Conference Bridging Worlds in Big Data, ESSEC CNIT Campus, La Défense Paris (France).
- Apr. 2014 : Distributed Asynchronous optimization using the ADMM, Large graphs and networks seminar, Université Catholique de Louvain-la-Neuve , ICTEAM institute, Louvain-La-Neuve (Belgium).
- Jul. 2013 : Distributed Optimization using a Randomized Alternating Direction Method of Multipliers , Digicosme Research Day, Digiteo, Gif-sur-Yvette.
- Nov. 2012 : Distributed Estimation of the Average Value in Wireless Sensor Networks , Alcatel-Lucent Chair Seminar, Supélec, Gif-sur-Yvette.
- Apr. 2012 : Some useful results on Matrix Products for Signal Processing , Ph.D. Candidates Seminar, Telecom ParisTech, Paris.
- Oct. 2011 : Distributed Maximal Value Estimation , Ph.D. Candidates Seminar, Telecom ParisTech, Paris.

Teaching

UFR IM2AG (2015-)

This part corresponds to my teaching as assistant professor since September 2015.

Undergraduate Level

- *Statistics for biologists* – L2 Biology – 2018-now
  Course+Tutorials – 24 h/year
- *Maths for engineers* – L2 Engineering – 2015-2019
  Tutorials – from 18 to 78 h/year
- *Applied Maths* – L3 Biology – 2015-2016
  Course – 30 h/year
- *Calculus* – L1 Maths-CS – 2015-2016
  Tutorials – 50 h/year

Graduate courses

- *Mathematics of Operation Research* – M1 Applied Maths. – 2018-now
  Basics of game theory, spectral graph theory, optimal transport.
  Course – 18 h/year
- *Numerical Optimization* – M1 Applied Maths. – 2016-now
  Tutorial on proof techniques and Labs https://github.com/iutzeler/NumericalOptimization.

Tuto/Course and Labs – 26 h/year

- *Introduction to Python for Data Science* – M1 Stat/Data Science – 2017-NOW
  Mixed Course/Lab as Jupyter notebooks available at https://github.com/iutzeler/Introduction-to-Python-for-Data-Sc
  Course/Labs – 30 h/year
- *Introduction to Operation Research* – M2 Stat/Data Science – 2017-NOW
  LP, MILP, QP with CVX{R,Py}
  Labs – 12 h/year
- *Refresher Course in Numerical Analysis and Optimization* – M2 App. Maths/C.S. – 2017-NOW
  One-week crash course before the second year of Master.
  Course/Tuto/Labs – Between 10 and 20 h/year
- *Convex and Distributed Optimization* – M2 App. Maths/C.S. – 2016-2019
  Optimization in the context of multiple machine. Course/Tuto/Labs – Between 15 and 35 h/year

Teaching Assistant (2011-2015)

at Université Catholique de Louvain

- *Linear Automatic Control* – Bachelier (L3) Maths/CS/Eng. – 2014-2015
  Tutorials – 30 h

at Université de Marne la vallée

- *Information Theory* – 2nd year engineers (M1) – 2013-2014
  Course and Tutorials – 30 h
- *Calculus* – L2 Maths – 2012-2013
  Tutorials – 36 h

at Telecom Paris

- *Digital Communications* – 2nd year engineers (M1) – 2011-2013
  Tutorials and Labs – 30 h / year