INRIA - Centre de Paris
2 rue Simone Iff
75012 PARIS
Tel: + 33 1 80 49 42 95
Page web : https://who.rocq.inria.fr/Julien.Salomon/
E-mail : julien.salomon@inria.fr

JULIEN SALOMON

Born 26.8.1977, in NANTES (France, 44).

Positions

Sept. 2017-	Directeur de Recherche, INRIA *INRIA Paris and Laboratoire J-L. Lions (UMR CNRS 7598), Sorbonne-Université*
Sept. 2006- Sept. 2017	Maître de Conférence de l'Université Paris-Dauphine *Centre de Recherche en Mathématiques de la Décision (UMR CNRS 7534), Université Paris-Dauphine*
Sept. 2015- Sept. 2016	Half sabatical CNRS. *Centre de Recherche en Mathématiques de la Décision (UMR CNRS 7534), Université Paris-Dauphine*
Sept. 2010- Sept. 2012	Half sabatical CNRS. *Centre de Recherche en Mathématiques de la Décision (UMR CNRS 7534), Université Paris-Dauphine*

Education

2005-2006	Post-doctoral position - Applied mathematics. Corotational formulation for linear and non-linear elasticity models. under the supervision of Barbara Wohlmuth. *Institut für Angewandte Analysis und Numerische Simulation, Universität Stuttgart*.
2002-2005	Ph.D. Thesis - Applied mathematics. "Contrôle en chimie quantique : conception et analyse de schémas d'optimisation". under the supervision of Yvon Maday & Gabriel Turinici. *Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, Paris*.
2001-2002	Master D. - Applied mathematics, Université de Versailles Saint-Quentin-en-Yvelines. "Analyse d'un problème de minimisation en contrôle quantique". under the supervision of Yvon Maday & Gabriel Turinici. *Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, Paris*.
2001-2002	Master D. - Science dynamics, Université Denis Diderot-Paris 7. "Etude d'une controverse en physique ionique (1897-1930)". under the supervision of Benoît Lelong. *Laboratoire Rheseis, Université Denis Diderot, Paris*.
2000-2001	Agrégation (French highest level for teaching certification) - Mathematics. *Ecole Normale Supérieure de Cachan - Antenne de Bretagne, Rennes*.
1998-1999	Bach. D. - Mathematics. *Ecole Normale Supérieure de Cachan - Antenne de Bretagne, Rennes*. Training course: "Semi-lagrangian methods in meteorology". under the supervision of Mikhail Tolstykh. *Institute of Numerical Mathematics, Moscow*.

Main contributions

Proof of convergence of a class of monotonic algorithms in bilinear control (ref. [5,10]),
Local matching indicators for concave cost optimal transport (ref. [16]),
Time Parallelization methods for optimal control (ref. [4,28]),
Conservative scheme for the co-rotational formulation (ref. [6]),
Reduced basis methods for variational inequalities, a posteriori analysis (ref. [18,23]),
Analysis of the Method of Reflections (ref. [29]),
Analysis of the Blade Element Momentum Theory (ref. [31]),

Peer reviewed articles

[1] " Optimal molecular alignment and orientation through rotational ladder climbing ",
J. Salomon, C. Dion, G. Turinici, **J. Chem. Phys. 123 (14), 144310 (2005).**

[2] " Monotonic time-discretized schemes in quantum control ",
Y. Maday, J. Salomon, G. Turinici, **Num. Math. 103 (2), pp. 323-338 (2006).**

[3] " On the relationship between the local tracking procedures and monotonic schemes in quantum optimal control ",
J. Salomon, G. Turinici, **J. Chem. Phys. 124 (7), 074102 (2006).**

[4] " Parareal in time control for quantum systems ",
Y. Maday, J. Salomon, G. Turinici, **SIAM J. Num. Anal. 45 (6), pp. 2468-2482 (2007).**

[5] " Convergence of the time-discretized monotonic schemes ",
J. Salomon, **M2AN, 41 (1), pp. 77-93 (2007).**

[6] " Energy conserving algorithms for a co-rotational formulation ",
J. Salomon, A. Weiss, B. Wohlmuth, **SIAM J. Num. Anal., 46 (4), pp. 1842-1866 (2008).**

[7] " Formulation and numerical solution of finite-level quantum optimal control problems ",
A. Borzì, J. Salomon, S. Volkwein, **J. Comp. App. Math., 216, pp.170-197 (2008).**

[8] " Energy consistent co-rotational schemes for frictional contact problems ",
P. Hauret, J. Salomon, A. Weiss, B. Wohlmuth, **SIAM J. Sci. Comp., 30 (5), pp. 2488-2511 (2008).**

[9] " A stable toolkit method in quantum control ",
M. Belhadj, J. Salomon, G. Turinici, **J. Phys. A, 41 (36), 2001 (2008).**

[10] " Constructive solution of a bilinear control problem ",
L. Baudouin, J. Salomon, **Syst. Cont. Lett., 57, pp. 453-464 (2008).**

[11] " Computation of mean field equilibria in economics ",
A. Lachapelle, J. Salomon, G. Turinici, **M3AS, 20 (4), pp. 567-588 (2010).**

[12] " Fast transport optimization on the circle ",
J. Delon, J. Salomon, A. Sobolevskiĭ, **SIAM J. App. Math., 70 (7), pp.2239-2258 (2010).**

[13] " A smoothing monotonic convergent optimal control algorithm for NMR pulse sequence design ",
I. I. Maximov, J. Salomon, G. Turinici, N. C. Nielsen, **J. Chem. Phys., 132, 084107-1-084107-9 (2010).**

[14] " A monotonic method for solving nonlinear optimal control problems ",
J. Salomon, G. Turinici, **Int. J. Cont., 84 (3), pp. 551-562 (2011).**

[15] " Analysis of the Toolkit method for the time-dependant Schroedinger equation ",

L. Baudouin, J. Salomon, G. Turinici, **J. Sci. Comp., 49 (2), pp. 111-136 (2011).**

[16] " Local matching indicators for transport problems with concave costs",
J. Delon, J. Salomon, A. Sobolevskii, **SIAM J. Disc. Math., 26 (2), pp. 801-827 (2012).**

[17] " Time-optimal monotonic convergent algorithms for the control of spin systems",
M. Lapert, J. Salomon, D. Sugny, **Phys. Rev. A., 85 (3), 033406 (2012).**

[18] "A Reduced Basis Method for Parametrized Variational Inequalities",
B. Haasdonk, J. Salomon, B. Wohlmuth, **SIAM J. Num. Math., 50 (5), pp. 2656-2676 (2012).**

[19] " Newton algorithm for operator identification in quantum control ",
M. Ndong, J. Salomon, D. Sugny, **J. Phys. A, 47 (26), pp. 265302 (2014).**

[20] "Parareal in time 3D numerical solver for the LWR Benchmark neutron diffusion transient model",
A.-M. Baudron, J.-J. Lautard, Y. Maday, K. Riahi, J. Salomon, **J. Comp. Phys., 279, pp. 67-79 (2014).**

[21] "A method for solving exact-controllability problems governed by closed quantum spin systems",
A. Borzì, G. Ciaramella, J. Salomon, **Int. J. Cont., 88 (4), pp. 682-702 (2015)**.

[22] " Simultaneous controllability and discrimination of collections of perturbed bilinear control systems on the Lie group $SU(N)$ ",
M. Belhadj, J. Salomon, G. Turinici, **Eur. J. Cont., 22, pp. 23-29 (2015)**.

[23] "Reduced basis methods for pricing options with the Black-Scholes and Heston model",
O. Burkovska, B. Haasdonk, J. Salomon, B. Wohlmuth, **SIAM J. Fin. Math., 6 (1), pp. 685-712 (2015).**

[24] "Discrete-valued-pulse optimal control algorithms: Application to spin systems",
G. Dridi, M. Lapert, J. Salomon, S. J. Glaser, D. Sugny, **Phys. Rev. A, 92 (4), 043417 (2015).**

[25] "A fully efficient time-parallelized quantum optimal control algorithm",
M. K. Riahi, J. Salomon, S. J. Glaser, and D. Sugny, **Phys. Rev. A, 93 (4), 043410 (2016).**

[26] "Optimal periodic control of spin systems: Application to the maximization of the signal to noise ratio per unit time",
N. Jbili, K. Hamraoui, S. Glaser, J. Salomon, D. Sugny, **Phys. Rev. A, 99 (5), 053415 (2019).**

[27] "Methods of Reflections: relations with Schwarz methods and classical stationary iterations, scalability and preconditioning",
G. Ciaramella, M. J. Gander, L Halpern, J. Salomon, **SMAI journal of computational mathematics, (2019).**

[28] "PARAOPT: A parareal algorithm for optimality systems",
M. Gander, F. Kwok, J. Salomon, **SIAM J. Sci. Comp., 42 (5), pp. A2773-A2802 (2020).**

[29] "On the method of reflections",
P. Laurent, G. Legendre, J. Salomon, **Num. Math. 148 (2), pp. 449-493 (2021).**

[30] "Optimization of bathymetry for long waves with small amplitude",
P.-H. Cocquet, S. Riffo, J. Salomon, **SIAM J. Cont. and Opt. 59 (6), pp. 4429-4456 (2021).**

[31] "Analysis of the Blade Element Momentum Theory",
J. Ledoux, S. Riffo, J. Salomon, **SIAM J. App. Math., 81 (6), pp. 2596-2621 (2021).**

[32] "Analysis of a greedy reconstruction algorithm",
S. Buchwald, G. Ciaramella, J. Salomon, **SIAM J. Cont. and Opt. 59 (6), pp. 4511-4537 (2021).**

[33] "Reduced model-based parareal simulations of oscillatory singularly perturbed ordinary differential equations",
L. Grigori, S. A. Hirstoaga, V.-T. Nguyen, J. Salomon, **J. Comp. Phys. 436, 110282 (2021).**

[34] "Greedy reconstruction algorithm for the identification of spin distribution",
S. Buchwald, G. Ciaramella, J. Salomon, D. Sugny, **Phys. Rev. A, 104 (6), 063112 (2021).**

[35] "Optimal periodic resource allocation in reactive dynamical systems: Application to microalgal production",

O. Bernard, L. Lu, J Salomon, **Int. J. Robust and Nonlinear Control, pp. 1-22 (2022).**

[36] "Shape optimization of a microalgal raceway to enhance productivity",
O. Bernard, L. Lu, J. Sainte-Marie, J. Salomon, **Submitted (2020) hal-02994713.**

Workshop proceedings

" Development and calibration of a modeling tool for the analysis of clinical data in human nutrition ",
B. Juillet, J. Salomon, D. Tomé, H. Fouillet,
ESAIM Proc. 14 , pp. 124-155 (2005).

" Minimum-weight perfect matching for non-intrinsic distances on the line",
J. Delon, J. Salomon, A. Sobolevskii,
Proceedings of "Optimization and stochastic methods for spatially distributed information", St-Petersburg, May 11–15-th 2010.

"A Reduced Basis Method for the Simulation of American Options",
B. Haasdonk, J. Salomon, B. Wohlmuth,
Proceedings of ENUMATH Conference 2011, Leicester, September 5th-9th 2011.

"Parareal in time intermediate targets methods for optimal control problem",
Y. Maday, K. Riahi, J. Salomon,
Proceedings of "Control and Optimization of PDEs", Mariatrost, Oct. 10-14 2011, International Series of Numerical Mathematics (Birkhäuser, Basel).

"Review of the Methods of Reflections",
G. Ciaramella, M. J. Gander, L. Halpern, J.Salomon,
Proc. of Oberwolfach (2017), 27.

"Mixing strategies combined with shape design to enhance productivity of a raceway pond",
O. Bernard, L. Lu, J. Salomon,
IFAC-PapersOnLine, Volume 54 (3), pp. 281-286, (2021).

Conference peer reviewed Proceedings

" Discretely monotonically convergent algorithm in quantum control ",
Y. Maday, J. Salomon, G. Turinici,
Proceedings of the LHMNLC03 IFAC conference, p 321, Sevilla, April 2003.

" Limit points of the monotonic schemes ",
J. Salomon,
Proceedings of the 44th IEEE Conference on Decision and Control, Sevilla, December 2005.

" Control of molecular orientation and alignment by monotonic schemes ",
J. Salomon, G. Turinici,
Proceedings of the 24-th IASTED International Conference on modelling, identification and control, pp 457-187, Innsbruck, Februar 2005.

" A monotonic algorithm for the optimal control of the Fokker-Planck equation ",
G. Carlier, J. Salomon,
Proceedings of the 47th IEEE Conference on Decision and Control, Cancun, December 2008.

" A greedy algorithm for the identification of quantum systems ",

Y. Maday, J. Salomon,
Proceedings of the 48th IEEE Conference on Decision and Control, Shanghaï, December 2009.

"An intermediate targets method for time parallelization in optimal control ",
Y. Maday, M. K. Riahi, J. Salomon,
Proceedings of "Tendances dans les Applications Mathématiques en Tunisie, Algérie, Maroc", Sousse, April 23–26-th 2011.

"Control through operators for quantum chemistry",
P. Laurent, H. Rabitz, J. Salomon, G. Turinici,
Proceedings of the 51th IEEE Conference on Decision and Control, Maui, 10-13 December 2012.

"Controlling the bottom topography of a microalgal pond to optimize productivity",
O. Bernard, L. Lu, J. Sainte-Marie, J. Salomon,
Proceedings of the 2021 Am. Cont. Conf. (ACC), pp. 634-639, New-Orleans (online), 25-28 May 2021.

"Optimizing microalgal productivity in raceway ponds through a controlled mixing device",
O. Bernard, L. Lu, J. Salomon,
Proceedings of the 2021 Am. Cont. Conf. (ACC), pp. 640-645, New-Orleans (online), 25-28 May 2021.

Short papers in C.R.A.S

" Constructive solution of a bilinear quantum control problem ",
L. Baudouin, J. Salomon, *C. R. Math. Acad. Sci. Paris, Ser. I, 342, pp. 119-124 (2006).*

" Local matching indicators for concave transport costs "
J. Delon, J. Salomon, A. Sobolevskiĭ, *C. R. Math. Acad. Sci. Paris, Ser. I, 348, pp. 901-905 (2010).*

Thesis

"Contrôle en chimie quantique : conception et analyse de schémas d'optimisation",
Thèse de l'Université Pierre et Marie Curie, soutenue le 30 septembre 2005.

Summary — Many numerical simulations in quantum (bilinear) control use monotonically convergent algorithms (introduced by V. Krotov, D. Tannor, W. Zhu and H. Rabitz). Yet, few mathematical analysis was available concerning these procedures. We propose in this thesis a relevant monotonic time discretization of these algorithms and apply it to the control of a quantum particle between two potential wells and to the control of molecular orientation and alignment. In order to accelerate the computation, we also couple the monotonic schemes with a relevant parallel procedure, following concepts developed with the parareal scheme (introduced by Y. Maday, J-L. Lions, G. Turinici), which enable us to divide the time of computation by 10. Finally, we study the convergence of these algorithms from a theoretical point of view and obtain a first sufficient condition of convergence.
Keywords — Optimal control, bilinear control, monotonic schemes, time parallelization.

Habilitation à diriger des recherches

"Conception d'algorithmes performants pour le contrôle, le transport optimal et l'accélération de la résolution d'EDP."
Thèse d'habiliation à diriger des recherches, soutenue le 18 novembre 2010.

Summary The first part of this text concerns optimization algorithms. The first chapter is in the field of optimal control, throught a class of method usually called *monotonic algorithms*. The results deal with their time discretization, interpretation and convergence properties. In the second chapter, three algorithms related to optimal transport are described: a method to compute optimal transport plans in the case of the circle and convex costs, an scheme dealing with concave costs in dimension one and a fast procedure to tackle a simplified transport problem in higher dimension. The second part describes various methods to accelerate the resolution of partial differential equations. The acceleration is based on time parallelization in the case of optimal control problems (first chapter), on a particular formulation in simulation of elasto-dynamic models (second chapter) and on precomputations in the cases of the Schrödinger equation and of variational inequalities (third chapter).
Keywords Numerical optimization, optimal control, quantum control, optimal transport, assignment problems, crowd motions, mean field games, time prallelization, cor-rotationnal formulation, élastodynamic, reduced basis.

Funding (Agence National de la Recherche)

2022-2026, A.N.R DEEP-NUM	Deep Learning et Modélisation Numérique, (P.I.). Participation: 20% .
2020-2024, A.N.R AL-LOWAP	ALgorithms for Large-scale Optimization of WAve Propagation Problems, (P.I.L. Halpern). Participation: 20% .
2016-2020, A.N.R MFG	Mean Field Games, (P.I. P. Cardaliaguet). Participation: 12.5% .
2016-2019, A.N.R HyFloE-Flu	Hydroliennes Flottantes et Energie Fluviale (P.I.). Participation: 40% .
2016-2020, A.N.R CINE-PARA	Méthodes de parallélisation pour cinétiques complexes (P.I. Y. Maday). Participation: 30% .
2011-2016, A.N.R EMAQS	Estimation and MAnipulation at Quantum Scale (P.I. K. Beauchard). Participation: 25% .
2008-2011, A.N.R OTARIE	Optimal transport : Theory and Applications to cosmological Reconstruction and Image processing (P.I. A. Sobolevskii). Participation: 55% .
2007-2011, A.N.R C-QUID	Quantum control and Identification (P.I. J-M. Coron).
2006-2009, A.N.R PITAC	Parallélisation Incluant le Temps pour Accélérer les Calculs (P.I. Y. Maday). Intervenant extérieur.
2005-2008, A.N.R ACC-QUAREL	Approches Computationnelles en Chimie QUAntique RELativiste (P.I. G. Turinici).

Other fundings

2016-2018	Procore Hong-Kong - France funding (with Felix Kwok).
2012-2013	Bayerisch-Französiches Hochschulzentrum vertrag with Würzburg Universität (with Alfio Borzi).
2009-2011	French "Convention de recherches CNRS-ASR" (with Julie Delon and Andreï Sobolevskii).

International conferences

Prag, 25-29.07.22	”Operator analysis of the ParaOpt algorithm.”, *27-th International Conference on Domain Decomposition Methods.*
Marseille, 11-15.07.22	”Time parallelized data assimilation”, *11-th Parallel-in-time Integration Workshop (PinT 2022).*
New-Orleans, 25-28.05.21	”Controlling the bottom topography of a microalgal pond to optimize productivity”, *2021 Am. Cont. Conf. (ACC 2021).*
New-Orleans, 25-28.05.21	”Optimizing microalgal productivity in raceway ponds through a controlled mixing device”, *2021 Am. Cont. Conf. (ACC 2021).*
Hong-Kong, 7-12.12.20	”A time parallelisation method for identification.”, *26-th International Conference on Domain Decomposition Methods.*
St-John’s, 23-27.07.18	”Domain-decomposition methods for integral equation problems”, *25-th International Conference on Domain Decomposition Methods.*
Roscoff, 1-4.05.2018	”Time parallelisation for optimal control and data assimilation”, *7-th Parallel-in-time Integration Workshop (PinT 2018).*
Longyearbyen, 6-10.02.17	”A Parareal Algorithm for Coupled Systems Arising from Optimal Control Problems”, *24-th International Conference on Domain Decomposition Methods.*
Banff, 27.11-2.12.16	”A Parareal Algorithm for Coupled Systems Arising from Optimal Control Problems”, *Fifth Parallel-in-time Integration Workshop.*
Marseille, 9-13.11.2015	”Optimal control in quantum chemistry”, *Controllability of Partial Differential Equations and Applications.*
Pekin, 10-14.08.2015	”Multiple-Gradient Descent Algorithm for Perturbed Bilinear Quantum Systems”, *ICIAM 2015.*
Nice, 29.06-3.07.15	”Time parallelization and full efficiency for control problems”, *27th IFIP TC7 Conference 2015 on System Modeling and Optimization.*
Pau, 1-5.06.15	”Reduced basis method for Variational inequalities”, *MAMERN VI-2015: 6 th International Conference on Approximation Methods and Numerical Modelling in Environment and Natural Resources.*
Salt Lake City, 14-18.03.15	”Reduced Basis Methods for Option Pricing”, *SIAM Conference on Computational Science and Engineering.*
Chps.-Marne, 17-19.06.14	”A reduced basis method for Variational inequalities”, *Numerical methods for high-dimensional problems.*
Erlangen, 17-19.06.14	”Time parallelization and full efficiency for control problems”, *GAMM meeting 2014.*
Blois, 3-6.11.13	”A reduced basis method for Variational inequalities”, *2nd International Workshop on Reduced Basis, POD and PGD model.*
Valladolid, 16-20.09.13	”Time parallelization and full efficiency for control problems”, *SciCADE 2013.*
Ascona, 1-6.09.13	”Time parallelization and full efficiency for control problems”, *Domain Decomposition Methods for Optimization with PDE Constraints.*
Erice, 10-17.06.13	”Computation of equilibria in a model of economics”, *Nonlinear Optimization: a Bridge from Theory to Applications*
Rennes, 25-29.06.12	”A parallel scheme for optimal control in NMR”, *21-th International Conference on Domain Decomposition Methods.*
Vienne, 30.05-02.06.12	”An optimization scheme for the computation of mean field games equilibria”, *12th Viennese Workshop on Optimal Control, Dynamic Games and Nonlinear Dynamics.*
Graz, 10-14.10.11	” Control through operators in quantum chemistry”, *Workshop on Control and Optimization of PDEs.*
Berlin, 12-16.09.11	” The Bloch Equation : some numerical tools to achieve control.”, *25-th IFIP conference on system modeling and optimization.*
Kos, 20-22.06.11	” Reduced Basis Method for Parametrized Variational Inequalities ” *Coupled Problems in Science and Engineering (Coupled 2011).*
San-Diego, 7-11.02.11	” Time parallelization for optimal control problems”, *20-th International Conference on Domain Decomposition Methods.*
Pittsburgh, 12-16.07.10	”A parallel in time solver for optimal control problems”, *SIAM Annual Meeting 2010.*
Sandbjerg, 15-18.06.10	”Time parallelization for quantum control”, *PRACCQSYS 2010.*
St-Petersbourg, 11-15.05.10	”Local matching indicators for concave cost transport”, *Optimization and Stochastic methods for spatially distributed information.*
Shanghaï, 16-18.12.09	” A greedy algorithm for the identification of quantum systems ”, *48-th IEEE Conference on Decision and Control.*
Haïfa, 22-26.03.09	” A monotonic algorithm for the optimal control of the Fokker-Planck equation ”, *At the interface of dynamical and statistical cosmology and transport optimization.*
Minneapolis, 02-06.03.09	” A greedy algorithm for the identification of quantum systems ”, *Coherence, Control, and Dissipation.*

Cancun, 10-12.12.08	” A monotonic algorithm for the optimal control of the Fokker-Planck equation ”, *47-th IEEE Conference on Decision and Control.*
Paris, 16-20.07.08	” Numerical analysis of the “Toolkit” method ”, *Control of Physical Systems and Partial Differential Equations.*
Strobl, 3-7.07.06	” Parareal in time control for quantum systems ”, *17-th International Conference on Domain Decomposition Methods* .
Séville, 12-15.12.05	” Limit points of the monotonic schemes ”, *44-th IEEE Conference on Decision and Control.*
Montréal, 7-12.08.05	” Controlling molecular orientation with non-zero temperature ”, *Equations aux dérivées partielles de grandes dimension en sciences et en génie.*
Innsbruck, 16-18.02.05	” Control of molecular orientation and alignment by monotonic schemes ”, *24-th IASTED International Conference on modelling, identification and control.*

National conferences

Roscoff, 4-10.03.2019	” Analysis of the Blade Element Momentum, application to river current power extraction” *Conférence d’ouverture des 50 ans du LJLL.*
Sophia, 20-22.02.17.	” Some mathematical results abtout ”The Blade Element Momentum Theory ” *Workshop on wind and marine current power.*
Nantes, 21.10.16,	”Calcul de topographies pour la production d’énergie houlomotrice”. *GdR EMR: journée récupération de l’énergie des vagues.*
Toulouse, 24-26.02.10	” Indicateurs d’appariement locaux pour le transport optimal en coût concave ”, 11^e *Congrès de la Société Française de Recherche Opérationnelle et d’Aide à la Décision (ROADEF2010).*
Guidel, 29.05-2.06.06	” Un schéma simplectique pour la formulation corotationnelle ”, 38^e *Congrès National d’Analyse Numérique.*
Evian, 23-27.05.05	” A parareal in time monotonic scheme for quantum control ”, 2^e *Congrès national de mathématiques appliquées et industrielles.*

Seminars

Paris, 16.04.20	” Analysis of the Blade Element Momentum, application to river current power extraction”. *Groupe de travail de l’équipe ANGE.*
Paris, 02.03.20	” Time parallelisation for optimal control and data assimilation ”. *GdT STAT-NUM, CEREMADE.*
Porto-Novo, 05.02.20	” Décomposer et itérer pour résoudre un problème complexe, quelques exemples en calcul scientifique”. *Seminare IMSP, Université d’Abomey-Calavi.*
Paris, 06.06.19	” Time parallelisation for optimal control and data assimilation ”. *Journée ANR Cine-Para.*
Konstanz, 14.11.18	” Numerical methods for quantum control”. *Seminare Leherst. S. Volkwein.*
Paris, 16.05.18	” Time parallelisation for optimal control and data assimilation”. *Groupe de travail de l’équipe ANGE.*
Palaiseau, 15.05.18	” La méthode des réflexions, une méthode de décomposition de frontière”. *Séminaire du CMAP.*
Paris, 30.03.18	” La méthode des réflexions, une méthode de décomposition de frontière”. *Séminaire du laboratoire J.-L. Lions.*
Clermont-Ferrand, 01.02.18,	” La méthode des réflexions Une méthode de décomposition de frontière par projections alternées pour la résolution de problèmes elliptiques”. *Séminaire du laboratoire de mathématiques Blaise Pascal.*
Paris, 07.11.17,	” Optimal control and time parallelization”. *Journée interne du labo J.-L. Lions.*
Paris, 18.09.17,	” Some mathematical results about ”The Blade Element Momentum Theory””. *Rencontres INRIA-JLL.*
Villetaneuse, 05.02.16,	”The method of reflections”. *Séminaire d’analyse du LAGA.*
Genève, 19.11.14,	”Some results about the method of reflections”. *Séminaire du laboratoire de mathématiques appliquées.*
Avignon, 20.02.14,	”Une méthode de base réduite pour les inégalités variationnelles”. *Séminaire d’Analyse non linéaire et Optimisation.*

Caen, 17.02.14,	”Une méthode de base réduite pour les inégalités variationnelles”. *Séminaire et Groupe de travail deMathématiques Appliquées*.
Besançon, 23.01.14,	”Une méthode d’optimisation monotone issue du contrôle quantique”. *Séminaire du groupe Analyse Numérique et Calcul Scientifique*.
Paris, 17.12.13,	”Une introduction aux Jeux à champs moyen”. *Horizon Maths 2013*.
Orsay, 25.11.13,	”Une méthode des bases réduites pour les inégalités variationnelles”. *Séminaire GT CalVa*.
Genève, 12.11.13,	”A Reduced Basis Method for Variational Inequalities”. *Séminaire d’analyse numérique* .
Würzburg, 25.05.12,	”Control through operators for laser control”. *Oberseminar Wissenschaftliches Rechnen*.
Munich, 19.02.12,	”Some numerical methods for Time-dependent Quantum optimal control”. *Seminar Department Chemie*
Würzburg, 21.11.11,	”Algorithms for optimal transport in dimension 1 ”. *Oberseminar Wissenschaftliches Rechnen*.
Rennes, 02.10.11,	”Quelques algorithmes pour le transport optimal”. *Séminaire du dept. de Math. de l’Antenne de Bretagne*.
Paris, 25.03.11,	”Quelques algorithmes pour le transport optimal ”. *Séminaire du laboratoire Jacques-Louis Lions*.
Strasbourg, 22.02.11,	”Quelques méthodes numériques pour le contrôle bilinéaire”. *Séminaire Equations aux dérivées partielles*.
Dijon, 31.03.09,	”Contrôle et optimisation en chimie quantique”. *Séminaire du Groupe de travail Théorie et Analyse des Systèmes.*.
Chambery, 12.05.08,	”Mouvements de foules et contrôle de l’équation de Fokker-Planck”. *Séminaire du Lab. LAMA*.
Paris, 18.03.08,	”Schémas conservatifs pour la formulation Corotationnelle”. *Groupe de travail “Méthodes numériques”*.
Paris, 05.11.07,	”Convergence de suites optimisantes pour le contrôle quantique”. *Groupe de travail “Calcul des variations”*.
Chambery, 09.03.07,	”Control and optimisation in quantum Control”. *Séminaire du Lab. LAMA*.
Rennes, 29.11.06,	”Contrôle et optimisation en chimie quantique”. *Séminaire du dept. de Math. de l’Antenne de Bretagne*.
Evry, 16.11.06,	”Suites optimisantes pour le contrôle quantique”. *Séminaire d’Analyse.*
Paris, 7.11.06,	”Contrôle et optimisation en chimie quantique”. *Séminaire Analyse-Probabilités du CEREMADE* .
Orsay, 11.11.06,	”Contrôle et optimisation en chimie quantique”. *Groupe de Travail numérique*.
Graz, 16.11.05,	”Mathematical aspects of quantum control”. *Seminar, Institut für Mathematik.*
Stuttgart, 13.09.05,	”Mathematical aspects of quantum control”. *Seminar, Mathematik Institut für Angewandte Analysis und Numerische Simulation.*
Montpellier, 03.05.05,	”Control and optimisation in quantum Control”. *Séminaire du Lab. Acsiom*.
Paris, 15.01.05,	”Control of molecular orientation and alignment by monotonic schemes”. *Journées internes, Lab. J-L. Lions*.
Princeton, 16.12.04,	”Reduced basis for time-dependent Schrödinger equation”. *Séminaire du département de chimie, Univ. Princeton.*
Paris, 12.06.04,	”Introduction to science sociology”. *Groupe de Travail des Thésards, Lab. J-L. Lions.*
Paris, 12.01.04	”Parareal and monotonic schemes in quantum control”. *Journées internes, Lab. J-L. Lions*.
Paris, 12.03.03,	”Optimisation and quantum control”. *Groupe de Travail des Thésards, Lab. J-L. Lions*.

Conferences as an organizer

Roscoff, 30.05-02.06.22	”Simulation and Optimization for Renewable Marine Energy (EMRSim2022)”. *organized with M. Bossy, M. Parisot and A. Rousseau.* Webpage: `https://emrsim2022.sciencesconf.org/`
Roscoff, 02-04.07.19	”Simulation and Optimization for Renewable Marine Energy (EMRSim2019)”. *organized with S. Aubrun, M. Parisot and G. Balarac.*

	Webpage: https://emrsim2019.sciencesconf.org/
Paris, 10-12.01.18	"Simulation and Optimization for Renewable Marine Energy (EMRSim2018)". *organized avec M. Parisot and S. Aubrun.* Webpage: https://emrsim2018.sciencesconf.org/
Paris, 10-12.09.13	"Modeling and Control of Large Interacting Dynamical Systems". *Organized with A. Borzì.* Webpage: http://www9.mathematik.uni-wuerzburg.de/ESF-InterDyn2013/index.html
Paris, 07-09.06.11	"Optimal Transport, algorithms and applications". *Organized with G. Carlier and J. Delon.* Webpage: http://www.mccme.ru/~ansobol/otarie/paris110607.html

Mini-symposia Organization

St. John's, 23-27.07.18	"Domain-decomposition methods for integral equation problems ". *organized with G. Ciaramella and M. Gander.* 25-th International Conference on Domain Decomposition Methods.
Longyearbyen, 6-10.02.17	"24-th International Conference on Domain Decomposition Methods". *Organized with G. Ciaramella and M. Gander.* 24-th International Conference on Domain Decomposition Methods.
Nice, 29.06-03.07.15	"New Results for Quantum Control Problems". *Organized with A. Borzì and G. Ciaramella.* 27th IFIP TC7 Conference 2015 on System Modeling and Optimization.
Paris, 8-10.06.15	"Optimal Transport, algorithms and applications". *Organized with I. Ben Tahar.* SIAM Conference on Control and Its Applications.
Pekin, 10-14.08.15	"Large perturbations in controlled quantum systems: theoretical and numerical approaches". ICIAM 2015.

Ph.D supervision

04.2022-, Sorbonne Université	Norbert Tognon. Topic: Time parallelization for the numerical solving of optimality systems.
09.2021-, Sorbonne Université	Lune Maillard. Topic: Time parallelization for the numerical solving of optimality systems. with Martino Trassinelli and Fabio Finocchi.
09.2021-, Sorbonne Université	Lucas Perrin. Topic: Acceleration alogrithms for data assimilation.
09.2020-, Sorbonne Université	Mingus Leon. Topic: Deep Neural Networks for transport modeling and simulation. with Patrick Gallinari.
09.2018-09.2021, Sorbonne Université	Liudi Lu. Topic: Lagrangian Approaches for Modelling and Optimization of Hydrodynamic-Photosynthesis Coupling. with Olivier Bernard, defended 29.09.2021.

01.09.2017-09.09.2021, INRIA	Antoine Lesieur. Topic: Estimation and modeling applied to noise pollution in an urban environment. with Vivien Mallet, defended 09.09.2021.
02.16-12.19, Univ. Paris-Dauphine	Nadia Jbili. Topic: Optimal control schemes for Nuclear Magnetic Resonance. defended 03.12.2019.
02.16-11.19, Univ. Paris-Dauphine	Sebastian Reyes-Riffo. Topic: numerical methods for hydrolic energy extraction. defended 29.11.2019.
07.13-09.15, Paris-Dauphine	Philippe Laurent. Topic: fast numerical methods for electrolocation. with Guillaume Legendre and Frédéric Boyer, defended 26.10.2015.
09.08-06.12, Univ. Paris VI	Kamel Riahi. Topic: time-parallelization for optimal control. with Yvon Maday, defended 10.06.2012.
09.07-06.10, Univ. Paris-Dauphine	Aimé Lachapelle. Topic: numerics for mean-field games models. with Guillaume Carlier, defended 3.06.2010.

Post-doc supervision

09.11-08.12, Univ. de Bourgogne	Mamadou Ndong, Post-doctoral training course. Topic: Identification methods in NMR. with Dominique Sugny.

Training courses supervision

06.2022-12.2022, INRIA	Ewen Lallinec, Master D. Topic : Parareal algorithm for Vlasov Systems. with Sever Hirstoaga.
06.2022-12.2022, INRIA	Maël Karembe, Master D. Topic : Vortex Methods for wind turbines.
03.2022-07.2022, INRIA	Dylan Machado, Bachelor D. Topic : Optimal Mixing strategies. with Liudi Lu.
10.2021-12.2021, INRIA	Norbert Tognon, Master D. Topic : ParaOpt algorithm for unstable systems.
03.2021-07.2021, INRIA	Lucas Perrin, Master D. Topic : Time parallelization and data assimilation.
03.2021-07.2021, INRIA	Dylan Machado, Bachelor D. Topic : Numerical study of the Blade Element Momentum Theory.
03.2018-07.2018, INRIA	Liudi Lu, Master D. Topic : Lagrangian reduction for transport phenomenon. with Jacques Sainte-Marie.

03.2018-07.2018, Paris-Dauphine	Quentin Petit, Master D. Topic : An Approximation for a First Order Mean Field Game Problem by a Discrete Mean Field Game. with Daniela Tonon.
05.14-07.14, Paris-Dauphine	Aude Genevay, Master D. Topic: algorithms for concave cost transport.
05-08.11, Univ. Paris-Dauphine	Ardacan Celebi, Bachelor D. Topic: Algorithms for transport with congestion.
05-08.10, Univ. Paris-Dauphine	Philippe Laurent, Master D. Topic: Operator control in quantum chemistry with Gabriel Turinici.
05-07.09, Univ. Paris-Dauphine	Mehdi Benhamouche, Master D. Topic: Implicit monotonic schemes.
03-07.08, Univ. Paris VII	Pierre Bazot, Master D. Topic: numerical methods for red blood cell modelling. with Benjamin Mauroy.

Administration responsabilities

2020-	Leader of INRIA-Team ANGE.
2020-	In charge of the french applied math. periodical "Matapli" (with Maxime Chupin)
2015	Member of the selection committee for assitant professor position.
2014-	Member of the laboratory council (CEREMADE).
2011-2017	Member of the University Paris-Dauphine administrative council.
2010-	Local responsible of SMAI (french applied mathematics learned society).
2004-2005, Lab. J-L. Lions.	Responsible for the seminar "Méthodes numériques".

Review activities

- ESAIM proceedings,
- IEEE, CDC conference proceedings,
- M2AN,
- SIAM : SISC, SINUM, SICON.

Workshops and summer schools

Palaiseau, 27.03.19	Workshop RheoSuNN.
Le Lioran, 25-28.06.19	École d'été du GDR EGRIN.
Le Lioran, 18-21.06.18	École d'été du GDR EGRIN.
Manchester, 17-19.06.13	Innovative space-time-parallel methods: Analysis and Applications.
Benasque, 28.08-09.09.11,	École d'été "Partial Differential Equations".
Moscou, 07.05.10,	"L'optimisation et ses environs : une journée franco-russe au laboratoire Poncelet"
Washington, 22-24.10.07,	Atelier "Modeling and High Performance Computing Workshop".

Benasque, 26.08-09.09.07,	École d'été "Partial Differential Equations, Optimal Design and Numerics".
Oberwolfach, 22-28.10.06,	Atelier "Mathematical and numerical aspects of quantum and chemistry problems".
Bergen, 22-28.01.06,	Atelier "Streamlines methods for porous media simulation".
Benasque, 28.8-09.09.05,	École d'été "Partial Differential Equations, Optimal Design and Numerics".
Marseille, 9-22.08.04,	École d'été CEMRACS.

Large audience conferences

Paris, 06.12.22	Exposé "chiche" au lycée Charlemagne. " Procédures de vote, quelles règles pour quels impératifs ? ".
Paris, 05.10.21	Exposé pour le cycle SMAI/MAME du CNAM. "Diviser pour mieux régner : un principe utile aussi en calcul !".
Limay, 8.12.12	Conference about applied maths in Lycée Condorcet, Limay.
Paris, 20.03.12	Journée de la recherche à Dauphine. " Transport optimal, les mathématiques comme outil".
Paris, 20.12.12	Colloque au lycée Chaptal. " Procédures de vote, quelles règles pour quels impératifs ? ".
Paris, 24.05.12	Colloque au lycée Chaptal. " Comment résoudre des problèmes avec un dé ?".
Paris, 26.05.11	Colloque au lycée Chaptal. " Mathematiques et transport optimal".

Research promotion

Paris, 22.11.12	Salon de l'éducation. Animation du stand SMAI/SMF.
Paris, 26.05.11	Participation à l'animation du salon des jeux mathématiques.

Teaching activities (french)

Bachelor 1

Lectures

- Cours d'analyse (54H/ans), D.U. GEA 1ère Année,
  2006-2008, Université Paris-Dauphine
- Cours d'analyse (64H/ans), D.E.U.G. Sc. de la Mat. 1ère Année,
  2003-2005, Université Pierre et Marie Curie

Tutorials

- Analyse 1, suites et fonctions (30H/ans), L.1. , 2012-2014,
  Université Paris-Dauphine
- Algèbre linéaire (32H/ans), D.E.U.G. MIAS, 1ère Année,
  2002-2003, Université Pierre et Marie Curie
- Analyse et géométrie (32H/ans), D.E.U.G. MIAS, 2ème Année,
  2002-2003, Université Pierre et Marie Curie

Bachelor 2

Tutorials

- Introduction au calcul et à l'analyse numérique (64H/ans), L.2., 2006-2007,
  Université Paris-Dauphine
- Analyse 3, séries et intégrales généralisées (30H/ans), L.2., 2008-2010,
  Université Paris-Dauphine

Bachelor 3

Supervision of "Projet numérique" (15H/ans), L.3., 2007-2008,
Université Paris-Dauphine

Master 1

Lectures

- Traitement numérique du signal (32H/ans), M.1. , 2006-2010,
  Université Paris-Dauphine
- Analyse fonctionnelle approfondie (32H/ans), M.1. , 2012-2015,
  Université Paris-Dauphine

Tutorial

- Traitement numérique du signal (64H/ans), M.1. , 2006-2010,
  Université Paris-Dauphine
- Analyse fonctionnelle approfondie (64H/ans), M.1. , 2012-2015,
  Université Paris-Dauphine

Coding training course

- Calcul et analyse numérique 3 (12H/ans), M.1. , 2007-2010,
  Université Paris-Dauphine
- Analyse numérique des équations aux dérivées partielles (12H/ans), M.1., 2011-2017,
  Université Paris-Dauphine

Master 2

Lecture

- Méthodes numériques pour des problèmes incluant des solvers EDP (30H/ans), IMSP, 2019-,
  Université d'Abomey-Calavi, Benin
- Méthodes numériques pour des problèmes incluant des solvers EDP (30H/ans), Master "Analyse et probabilités", 2014-,
  Université Paris-Dauphine
- Analyse numérique des équations aux dérivées partielles (30H/ans), Master "EDPMAD" puis "Analyse et probabilités", 2009-2014,
  Université Paris-Dauphine
- Optimisation et Contrôle, applications (12H/ans), 2006-2008,
  Univers. Iasi, Roumanie
- Cours de remise à niveau en analyse numérique (15H/ans), M.2. "Analyse et probabilités", 2015,2016,
  Université Paris-Dauphine

Coding training course

- Algorithmes stochastiques et Méthodes de Monte - Carlo (12H/ans), M.2. "ISF-apprentissage", 2007-2009,
  Université Paris-Dauphine

Doctoral lecture

- Parameterized Partial Differential Equations and the Proper Orthogonal Decomposition (3H), 2016,
  Ecole des Mines-Paritech.
- Inégalités variationnelles et réduction de modèle (6H), 2014, 2016, 2017,
  Ecole des Mines-Paritech.
- Time parallelization methods and parareal algorithm (1h), 2019,
  Summer school on advanced DD methods, MOX Lab, Politecnico di Milano.
- Parareal methods for optimal control (2h), 2022,
  Research School - Domain Decomposition for Optimal Control Problems.

In charge of internships in the mathematics department (MIDO), 2009-2017.

Lecture notes

"Traitement numérique du signal", 91 pages. *Can be downloaded here (french):* `https://who.rocq.inria.fr/Julien.Salomon/docs/teaching/poly.pdf?file=poly.pdf`
Updated version by Maxime Chupin : `https://www.ceremade.dauphine.fr/~chupin/?page=3&lang=fr`.