Gabriel Provencher Langlois

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EDUCATION

2022 (Expected)	Ph.D., Applied Mathematics, Brown University.
	Dissertation advisor: Prof. Jérôme Darbon.
2015	M.Sc., Applied Mathematics, ETH Zürich.
	Thesis Title: Nonlinear dynamics of finite-size particles in unsteady fluid flows, and spatially linear solutions to the Navier–Stokes equations.
2013	B.Sc., Applied Mathematics and Physics, McGill University.

PUBLICATIONS

The authors in the two most recent refereed journal articles, the book chapter, and the manuscripts in preparation are listed in alphabetical order.

REFEREED JOURNAL ARTICLES

2021 Jérôme Darbon and **Gabriel P. Langlois**. On Bayesian posterior mean estimators in imaging sciences and Hamilton–Jacobi partial differential equations. *Journal of Mathematical Imaging and Vision* 33: 1-34. DOI: 10.1007/s10851-021-01036-0.

2020 Jérôme Darbon, **Gabriel P. Langlois**, and Tingwei Meng. Overcoming the curse of dimensionality for some Hamilton–Jacobi partial differential equations via neural network architectures. *Research in the Mathematical Sciences* 7, no. 3: 1-50. DOI: 10.1007/s40687-020-00215-6.

2020 Tiemo Pedergnana, David Oettinger, **Gabriel P. Langlois**, and George Haller. Explicit unsteady Navier—Stokes solutions and their analysis via local vortex criteria. *Physics of Fluids* 32, no 4: 046603. DOI: 10.1007/s40687-020-00215-6.

2018 **Gabriel P. Langlois**, Donald M. Arnold, Jayson Potts, Brian Leber, David C. Dale, and Michael C. Mackey. Cyclic thrombocytopenia with statistically significant neutrophil oscillations. *Clinical Case Reports* 6: 1347-1352. DOI: 10.1002/ccr3.1611.

2017 **Gabriel P. Langlois**, Morgan Craig, Antony Humphries, Michael C. Mackey, Joseph M. Mahaffy, Jacques Bélair, Thibault Moulin, Sean R. Sinclair, and Liangliang Wang. Normal and pathological dynamics of platelets in humans. *Journal of Mathematical Biology* 75: 1-52. DOI: 10.1007/s00285-017-1125-6.

2015 **Gabriel P. Langlois**, Mohammad Farazmand, and George Haller. Asymptotic dynamics of inertial particles with memory. *Journal of Nonlinear Science* 25, no. 6: 1225-1255. DOI: 10.1007/s00332-015-9250-0.

2012 Grace Brooks, **Gabriel P. Langlois**, Jinzhi Lee, and Michael C. Mackey. Neutrophil dynamics after chemotherapy and G-CSF: The role of pharmacokinetics in shaping the response. *Journal of Theoretical Biology* 315: 97-109. DOI: 10.1016/j.jtbi.2012.08.028.

BOOK CHAPTERS

2021 Jérôme Darbon, **Gabriel P. Langlois**, and Tingwei Meng. Connecting Hamilton-Jacobi Partial Differential Equations with Maximum a Posteriori and Posterior Mean Estimators for Some Non-convex Priors. *Handbook of Mathematical Models and Algorithms in Computer Vision and Imaging: Mathematical Imaging and Vision* 1-25. DOI: 10.1007/978-3-030-03009-4_56-1.

MANUSCRIPTS IN PREPARATION

Jérôme Darbon and **Gabriel P. Langlois**. Efficient and robust high-dimensional maximum entropy estimation via nonlinear primal-dual hybrid gradient algorithms.

Jérôme Darbon and **Gabriel P. Langlois**. Efficient and robust high-dimensional sparse logistic regression via nonlinear primal-dual hybrid gradient algorithms. A preprint is available on arXiv (https://arxiv.org/abs/2111.15426)

Jérôme Darbon and **Gabriel P. Langlois**. Accelerated nonlinear primal-dual hybrid gradient algorithms with applications to machine learning. A preprint is available on arXiv (https://arxiv.org/abs/2109.12222).

AWARDS AND HONORS

2013 Dean's Multidisciplinary Undergraduate Research List.

2013 First class honors in Applied Mathematics.

2013 First class honors in Physics.

GRANTS AND FELLOWSHIPS

2020 IPAM Travel Award for the three-months long program "High Dimensional Hamilton-Jacobi PDEs", UCLA.

2020 Doctoral Research Travel Grant, Brown University.

INVITED TALKS

2022 On Bayesian Posterior Mean Estimators in Imaging Sciences and Hamilton-Jacobi Partial Differential Equations. Invited talk for the Sparse Optimization in Image and Signal Processing Minisymposium (MS99), SIAM Conference on Imaging Science (March 21-25).

CONTRIBUTED TALKS AND SEMINARS

2021 Nonlinear Primal-Dual Algorithms for Solving Sparse Logistic Regression Problems. Contributed lecture for the SIAM Conference on Optimization (July 20-23).

2020 On Bayesian posterior mean estimators in imaging sciences and Hamilton-Jacobi partial differential equations. Contributed talk for the long program "High Dimensional Hamilton-Jacobi PDEs" at the IPAM (April 19), UCLA, Los Angeles, CA.

2017 Asymptotic dynamics of inertial particles with memory. Contributed department talk to Prof. Karniadakis' CRUNCH group (March 7), Brown University, Providence, RI.

TEACHING

EXPERIENCE

Instructor	Applied Ordinary Differential Equations, Summer 2019.
Teaching assistant	Introduction to modelling, Fall 2021.
	Statistical inference I, Fall 2020.
	An introduction to numerical optimization, Fall and Spring 2019.
	Theory of probability I, Fall 2018.
	Recent applications of probability and statistics, Spring 2018.
	Applied ordinary differential equations, Fall 2017.

PEDAGOGY TRAINING

2018	**Graduate certificate in reflective teaching**. Sheridan Center, Brown University. Developed and refined fundamental teaching and assessment strategies and communication skills using a student-centered, evidence-based approach.

MENTORING

2018	**Directed Reading Program**. Division of Applied Mathematics, Brown University. Shoshana Simons (undergraduate): Supervised an independent reading project on writing systems and the mathematics of formal languages. Shoshana is now pursuing a Ph.D. in mathematical logic at the University of California, Berkeley.

RESEARCH EXPERIENCE

2017-	Graduate Research Assistant, Brown University. Currently conducting research in machine learning, optimization, and imaging science under the supervision of Prof. Jérôme Darbon.
2015-2016	Research Assistant, McGill University. Conducted research in mathematical physiology under the supervision of Prof. Michael C. Mackey.
2013-2015	Graduate Research Assistant, ETH Zürich. Conducted research in nonlinear dynamics and fluid mechanics under the supervision of Prof. George Haller.
2011-2013	Undergraduate Research Assistant, McGill University. Conducted research in mathematical physiology under the supervision of Prof. Michael C. Mackey.

SERVICE

2019-2020	Vice president, Brown University SIAM student chapter.
2018-2019	Treasurer, Brown University SIAM student chapter.

LANGUAGES

Native or bilingual proficiency: French and English.

Elementary proficiency: German.

PROFESSIONAL AFFILIATIONS

2016-	Society of Industrial and Applied Mathematics (SIAM).
2016-	American Mathematical Society (AMS).