Matías G. Delgadino

Curriculum Vitae

✉ *Matias.Delgadino@utexas.edu*

Employment

2021-present **Assistant Professor**, *University of Texas at Austin*, Texas, United States.

2020-2021 **Lecturer**, *Queens College*, Oxford, England.

2019-2021 **Professor**, *PUC*, Rio de Janeiro, Brazil.

Post-Doctoral Experience

2020-2021 **Hooke Research Fellow**, *University of Oxford*, Oxford, England.

2017-2019 **Postdoctoral position**, *Imperial College*, London, England.
Mentors: Prof. J.A. Carrillo & Prof. G. A. Pavliotis

2016-2017 **Postdoctoral position**, *ICTP*, Trieste, Italy.
Mentor: Prof. Francesco Maggi

November 2016 **Postdoctoral position**, *Mittag-Leffler Institute*, Stockholm, Sweden.

Education

2011-2016 **PhD. in Applied Mathematics and Scientific Computing**, *University of Maryland*, College Park, Maryland.
Thesis: Analysis of Self-organization; Adviser: Prof. Antoine Mellet

2006-2011 **Degree in Mathematics**, *Universidad Nacional de Córdoba, Facultad de Matematica, Astronomia Y Fisica*, Córdoba, Argentina.
Thesis: Control theory, applied in chemotherapy treatments Adviser: Prof. Andres Barrea

Fellowhips and Grants

2022-2025 **NSF standard grant: DMS-2205937**, *$ 229K*.

2020 **Programma per Giovani Ricercatori: Rita Levi Montalcini**, *€ 195K*, Declined.

2020-2021 **Young Scientist Support**, *Instituto Serrapilheira*, R$ 100K.

2020-2023 **Bolsas de Produtividade em Pesquisa**, *Research incentive*, CNPq, R$ 40K.

Ph.D. Students

2021-Present **Kenneth DeMason**, *Doctoral Student*, University of Texas.

2020-2022 **Daniel Wesser**, *Doctoral Student*, University of Texas, Co-advising with Prof. Maggi.
Postdoc at UNC

2018-2022 **Jeremy Wu**, *Doctoral Student*, University of Oxford, Co-advising with Prof. Carrillo.
Postdoc at UCLA

Undergraduate Students

2022-2024 **Reese Feldmeier**, *Dean's Scholars*, University of Texas.
PhD Student Stanford University

2019-2020 **Bruno Suassuna**, PUC-Rio De Janeiro.
Masters at IMPA and PhD Student PUC-Rio De Janeiro

Postdoc Mentoring

2022-Present **Rene Cabrera**, *NSF-RTG Analysis of Partial Differential Equations*, University of Texas.

2021-2023 **Mary Vaughan**, *NSF-RTG Analysis of Partial Differential Equations*, University of Texas.
Postdoc at UWA

Invited Talks

April 2024 **VAPS: Virtual Analysis Seminar and PDE Seminar**, *Generative Adversarial Networks: Dynamics and Mode Collapse*, Online Seminar.

March 2024 **Computational Analysis Seminar**, *Generative Adversarial Networks: Dynamics and Mode Collapse*, Vanderbilt Univerisity, USA.

January 2024 **Numerical methods for optimal transport problems, mean field games, and multi-agent dynamics**, *Generative Adversarial Networks: Dynamics and Mode Collapse*, Universidad Tecnica Federico Santa Maria, Chile.

December 2023 **Recent Advances in Fluid Dynamics: Singularity, Regularity and Mixing**, *Entropy maximization in the two-dimensional Euler equations*, Duke-Kunshan Univerisity, China.

July 2023 **MPI Seminar**, *Phase transitions and interacting diffusions*, Max-Planck-Institute for Mathematics, Germany.

July 2023 **Worshop: Interacting particle systems**, *Phase transitions and interacting diffusions*, Imperial College, UK.

June 2023 **BIRS: Nonlinear Diffusion and nonlocal Interaction Models - Entropies, Complexity, and Multi-Scale Structures**, *Re-arrangement for higher order models*, BIRS-IMAG, Spain.

March 2023 **Applied Mathematics and PDE Seminar**, *Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions*, UMD.

March 2023 **PDE Seminar**, *Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions*, Simon Frasier Univeristy, Canada.

November 2022 **Kinetic Equations: Recent Developments and Novel Applications**, *Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions*, BIRS Oaxaca.

March 2022 **PDE Seminar**, *Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions*, NUS, Singapore.

March 2022 **Workshop: Frontiers in the Interplay Between Probability and Kinetic Theory**, *Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions*, ICMS, Edinburgh.

February 2022 **Frontiers in kinetic theory: connecting microscopic to macroscopic scales - KineCon 2022**, *Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions*, Newton Institute, Cambridge.

February 2021 **Analysis and/of PDE Seminar**, *Interacting particle systems and phase transitions*, Durham University, UK.

Articles

[21] M.G. Delgadino, B.B. Suassuna, R. Cabrera, Generative Adversarial Networks: Dynamics, Submitted 2024.

[20] M. Coti-Zelati, M.G. Delgadino, Entropy maximization in the two-dimensional Euler equations, Submitted 2024.

[19] M.G. Delgadino, M. Vaughan, Continuous symmetrizations and uniqueness of solutions to nonlocal equations , Submitted 2024.

[18] U.A. Trigos-Raczkowski, R. Lyons, M.G. Delgadino, A.S. Ackleh, A. Ostling, Disturbance-generated competitive coexistence, Submitted 2023.

[17] M.G. Delgadino, D. Wesser, A Heintze–Karcher inequality with free boundaries and applications to capillarity theory, Submitted 2023.

[16] M.G. Delgadino, R. S. Gvalani, G.A. Pavliotis, S. Smith, Phase transitions, logarithmic Sobolev inequalities, and uniform-in-time propagation of chaos for weakly interacting diffusions, CMP 2023.

[15] J.A. Carrillo, M.G. Delgadino, R.L. Frank, M. Lewin , Fast Diffusion leads to partial mass concentration in Keller-Segel type stationary solutions, M3AS 2023.

[14] J.A. Carrillo, M.G. Delgadino, J. Wu, Boltzmann to landau from the gradient flow perspective, Nonlinear Analysis 2022.

[13] J.A. Carrillo, M.G. Delgadino, L. Desvillettes, J. Wu, The Landau equation as a Gradient Flow, A&PDE 2022.

[12] M.G. Delgadino, R. S. Gvalani, G.A. Pavliotis, On the diffusive-mean field limit for weakly interacting diffusions exhibiting phase transitions, Arch. Ration. Mech. Anal. 2021.

[11] M.G. Delgadino, X. Yan, Y. Yao, Uniqueness and non-uniqueness of steady states of aggregation-diffusion equations, Comm. Pure Appl. Math. 2020.

[10] J.A. Carrillo, M.G. Delgadino, G.A. Pavliotis, A proof of the mean-field limit for lambda-convex potentials by Gamma-convergence, J. Functional Analysis 2020.

[9] M.G. Delgadino, A. Mellet, On the relationship between the thin film equation and Tanner's law, Comm. Pure Appl. Math. 2020.

[8] J.A. Carrillo, M.G. Delgadino, J. Dolbeault, R.L. Frank, F. Hoffmann, Reverse Hardy-Littlewood-Sobolev inequalities, JMPA 2019.

[7] M. Coti-Zelati, M.G. Delgadino, T.M. Elgindi, On the relation between enhanced dissipation time-scales and mixing rates. Comm. Pure Appl. Math. 2019.

[6] J.A. Carrillo, M.G. Delgadino, F. S. Patacchini, Existence of ground states for aggregation-diffusion equations, Anal. Appl 2018.

[5] M.G. Delgadino, F. Maggi, Alexandrov Theorem revisited, Anal. & PDE. 2019.

[4] M.G. Delgadino, F. Maggi, C. Mihaila, R. Neumayer, Bubbling with L^2-almost constant mean curvature and an Alexandrov-type theorem for crystals, Arch. Ration. Mech. Anal. 2018.

[3] M.G. Delgadino, S. Smith, Hölder estimates for fractional parabolic equations with critical divergence free drifts, Ann. Ins. Henri Poincare (C) 2017.

[2] M.G. Delgadino, Convergence of the one-dimensional Cahn-Hilliard equation with degenerate mobility, SIAM journal of Mathematical Analysis 2018.

[1] J.A. Carrillo, M.G. Delgadino, A. Mellet, Regularity of local minimizers of the interaction energy via obstacle problems, Comm. Math. Phys. 2016.

Teaching Experience

2021-Present **Mathematics Department**, *UT Austin*.

- M 393C: Optimal transportation gradient flows with applications to mean field limits of parameter training dynamics, Spring 2024
- M 408C: Calculus I, Fall 2023
- M 374M: Mathematical Modelling, Fall 2022
- M 374M: Mathematical Modelling, Fall 2021

Outreach

2024 **Organizer of the Winter program in Mathematical Foundations of Machine Learning**, *University of Texas at Austin*.
Website

2023 **NSF Applied Math Panelist**.

2020 **Part-time researcher in Research and Development**, *Petrobras*, Reducing cost in well-testing by employing machine learning, code available at GAS.

2019 **Main Organizer of UNESCO's ICTP 1st Latin American School in Applied Mathematics**, *UFSQ/EPN*, Quito, Ecuador.
Video

2017 **Hearing the self: A Spectral Experience**, *ICMC*, Shanghai, China.
Website

Service to UT

2024 **Development of new Machine Learning Course**.

2024 **New website committee member**.

2023 **Postdoc Search committee member**.