Carles DOMINGO-ENRICH

CONTACT DATA

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EDUCATION

MAY 2024	PhD in Computer Science at the Courant Institute of Mathematical Sciences, New
Sept 2019	York University. Advisor: Joan Bruna. Topics of research: diffusion models, generative model-
	ing, theory of deep learning, hypothesis testing, optimization for continuous games.
Sept 2014	Student of Bachelor's degrees in Mathematics and Engineering Physics
Sept 2014 - May 2019	Student of Bachelor's degrees in Mathematics and Engineering Physics at Universitat Politècnica de Catalunya (UPC), Barcelona. Student at CFIS (Interdisciplinary

RESEARCH AND WORK EXPERIENCE

<i>Current</i> Sept 2024	Senior Researcher at Microsoft Research New England in Cambridge, MA, working on generative AI models
А∪с 2024 Ост 2022	Visiting Researcher (part-time) at Meta FAIR Labs in New York City, NY, working with Ricky T. Q. Chen and Brandon Amos.
May-Aug 2022	Intern at Microsoft Research New England in Cambridge, MA (remote), working with Lester Mackey.
May-Aug 2021	Intern at IBM Research AI in Yorktown Heights, NY (remote), working with Youssef Mroueh.
2020-2022	TA for the courses DS-GA 1014 Optimization and Computational Linear Algebra for Data Science (Fall 2020), and CSCI-GA 3033-079 Special Topic: Mathematics of Deep Learning (Spring 2022). TA and grader for the course DS-GA 1005 Inference and Representation (Fall 2021).
Sept '18-May '19	Student intern at NYU, Courant Institute of Mathematical Sciences
May-Aug 2018	Data scientist intern at Gauss & Neumann (SEM firm) in Barcelona
JUL-SEPT 2017	Summer research intern at Nokia Bell Labs in Paris (Nokia Paris-Saclay)

PUBLICATIONS AND PREPRINTS

- Pidstrigach, J., Baker, E., **Domingo-Enrich, C.**, Deligiannidis, G., Nüsken, N. Conditioning Diffusions Using Malliavin Calculus. arXiv preprint Apr. 2025.
- Domingo-Enrich, C., Dwivedi, R., Mackey, L. Cheap permutation testing. arXiv preprint Feb. 2025.
- Wang, C., Alamdari, S., **Domingo-Enrich, C.**, Amini, A., Yang, K. K. Towards deep learning sequencestructure co-generation for protein design. Current Opinion in Structural Biology, 2025.
- Domingo-Enrich, C. A taxonomy of loss functions for stochastic optimal control. arXiv preprint Oct. 2024.

- Domingo-Enrich, C., Drozdzal, M., Karrer, B., Chen, R.T.Q. Adjoint matching: fine-tuning flow and diffusion generative models with memoryless stochastic optimal control. ICLR 2025 (spotlight, $\sim 5\%$ of submissions).
- Domingo-Enrich, C., Han, J., Amos, B., Bruna, J., Chen, R.T.Q. Stochastic optimal control matching. NeurIPS 2024.
- Pooladian, A.-A., **Domingo-Enrich, C.**, Chen, R.T.Q., Amos, B. Neural optimal transport with Lagrangian costs. UAI, 2024.
- Jelassi, S., d'Ascoli, S., **Domingo-Enrich, C.**, Wu, Y., Li, Y., Charton, F. Length generalization in arithmetic transformers. arXiv preprint Jun. 2023.
- Cabannes, V., **Domingo-Enrich, C.** Open problem: learning with variational objectives on measures. arXiv preprint Jun. 2023.
- **Domingo-Enrich, C.**, Pooladian, A.-A. An explicit expansion of the Kullback-Leibler divergence along its Fisher-Rao gradient flow. TMLR 2023.
- Pooladian, A.-A.*, Ben-Hamu, H.*, **Domingo-Enrich, C.***, Amos, B., Lipman, Y., Chen, R.T.Q. Multisample flow matching: straightening flows with minibatch couplings. ICML 2023. *Equal contribution
- Domingo-Enrich, C., Dwivedi, R., Mackey, L. Compress then test: powerful kernel testing in near-linear time. AISTATS 2023.
- **Domingo-Enrich, C.** Computing the variance of shuffling stochastic gradient algorithms via power spectral density analysis. arXiv preprint Jun. 2022.
- Domingo-Enrich, C., Mroueh, Y. Auditing differential privacy in high dimensions with the kernel quantum Rényi divergence. arXiv preprint May 2022.
- Domingo-Enrich, C., Schiff, Y., Mroueh, Y. Learning with stochastic orders. ICLR 2023 (spotlight, $\sim 8\%$ of submissions).
- Domingo-Enrich, C., Bruna, J. Simultaneous transport evolution for minimax equilibria on measures. arXiv preprint Feb. 2022.
- **Domingo-Enrich, C.** Depth and feature learning are provably beneficial for neural network discriminators. COLT 2022.
- **Domingo-Enrich, C.**, Mroueh, Y. Tighter sparse approximation bounds for ReLU neural networks. ICLR 2022 (spotlight, $\sim 5\%$ of submissions).
- Domingo-Enrich, C., Bietti, A., Gabrié, M., Bruna, J., Vanden-Eijnden E. Dual training of energy-based models with overparametrized shallow neural networks. arXiv preprint July 2021.
- **Domingo-Enrich, C.**, Mroueh Y. Separation results between fixed-kernel and feature-learning probability metrics. NeurIPS 2021 (oral, < 1% of submissions).
- Domingo-Enrich, C., Bietti, A., Vanden-Eijnden, E., Bruna, J. On energy-based models with overparametrized shallow neural networks. ICML 2021 (long talk, ~ 3% of submissions).
- Domingo-Enrich, C., Pedregosa, F., Scieur, D. Average-case acceleration for bilinear games and normal matrices. ICLR 2021.
- Domingo-Enrich, C., Jelassi, S., Mensch, A., Rotskoff, G., Bruna, J. A mean-field analysis of two-player zero-sum games. NeurIPS 2020.
- Jelassi, S.*, **Domingo-Enrich, C.***, Scieur, D., Mensch, A., Bruna, J. Extragradient with player sampling for faster Nash equilibrium finding. ICML 2020. *Equal contribution.

• Domingo-Ferrer, J., Ricci, S., **Domingo-Enrich, C.** Outsourcing scalar products and matrix products on privacy-protected unencrypted data stored in untrusted clouds. Information Sciences, vol. 436-437, pp. 320-342, April 2018.

Fellowships and achievements

- OCT 2021 | NeurIPS 2021 Outstanding Reviewer award
- JUL 2018 La Caixa Fellowship for postgraduate studies in North America and the Asia-Pacific region. 55 fellowships were awarded among 446 Spanish applicants. The fellowship covers tuition of the PhD program and a stipend of around \$30k/year for 24 months.
- JUN 2014 **First student ever to achieve a perfect score (10/10)** in the general phase of the University Entrance Examinations of Catalonia (Proves d'Accés a la Universitat - PAU). These examinations have taken place every year for more than 30 years. The general phase consists of 5 tests that all students applying for a degree in a Catalan university must take. Newspaper article (in Spanish): http://ccaa.elpais.com/ccaa/2014/06/27/catalunya/1403862593_090989.html
 - 2014 Bronze medal at the 2014 Spanish Mathematical Olympiad and silver medal at the 2014 Spanish Physics Olympiad.

LANGUAGES AND COMPUTER SKILLS

Languages: CATALAN (mother tongue), SPANISH (proficient), ENGLISH (Cambridge English: Advanced, TOEFL 113), FRENCH (Upper intermediate, DELF B2), GERMAN (Intermediate, B1+, EOI - Official Language School of Catalonia)

Programming languages: PYTHON, PYTORCH, C++, MATLAB, OCAML, R, MYSQL