

# Carles DOMINGO-ENRICH

## CONTACT DATA

---

ADDRESS: 21 Stuyvesant Oval Apt 4D, New York, NY, 10009  
PHONE AND EMAIL: +1 929 334 5312, [cd2754@nyu.edu](mailto:cd2754@nyu.edu)  
NATIONALITY: Spanish, holding F1 visa until the end of my PhD

## EDUCATION

---

Current SEPT 2019	PhD student in <b>Computer Science</b> at the <b>Courant Institute of Mathematical Sciences, New York University</b> . Advisor: Joan Bruna. Topics of research: diffusion models, generative modeling, theory of deep learning, hypothesis testing, optimization for continuous games.
SEPT 2014 - MAY 2019	Student of Bachelor's degrees in <b>Mathematics</b> and <b>Engineering Physics</b> at <b>Universitat Politècnica de Catalunya (UPC)</b> , Barcelona. Student at CFIS (Interdisciplinary Higher Education Center). FINAL GRADES: 8.63/10 (Math.), 8.98/10 (Eng. Physics)

## RESEARCH AND WORK EXPERIENCE

---

Current OCT 2022	Visiting Researcher (part-time) at <b>Meta FAIR</b> in New York City, NY, working with Ricky T. Q. Chen.
MAY-AUG 2022	Intern at <b>Microsoft Research</b> New England in Cambridge, MA (remote), working with Lester Mackey.
MAY-AUG 2021	Intern at <b>IBM Research AI</b> 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

---

- Pooladian, A.-A., **Domingo-Enrich, C.**, Chen, R.T.Q., Amos, B. Neural Optimal Transport with Lagrangian Costs. ICML Workshop on New Frontiers in Learning, Control, and Dynamical Systems, 2023
- 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**,  $\sim 3\%$  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.

## TALKS

---

- Microsoft Research New England Seminar, Feb. 2023. *Speeding up generative modeling and distribution testing.*
- Yingzhen Li's group meeting, Imperial College, July 2022. *Separation results between fixed-kernel and feature-learning probability metrics & Depth and Feature Learning are Provably Beneficial for Neural Network Discriminators.*
- Joan Bruna & Jason Lee's joint group meeting, June 2022. *Depth and Feature Learning are Provably Beneficial for Neural Network Discriminators.*
- IBM Research AI seminar, June 2022. *Auditing Differential Privacy in High Dimensions with the Kernel Quantum Rényi Divergence.*
- MIT - IBM Watson AI Lab invited seminar, March 2022. *Depth and Feature Learning are Provably Beneficial for Neural Network Discriminators.*

- MIT - IBM Watson AI Lab invited seminar, Nov. 2021. *Tighter sparse approximation bounds for ReLU neural networks.*
- MIT - IBM Watson AI Lab invited seminar, July 2021. *Separation results between fixed-kernel and feature-learning probability metrics.*
- Weinan E's group meeting at Princeton, April 2020. *A mean-field analysis of two-player zero-sum games.*
- Princeton PACM Graduate Student Seminar, March 2020. *A mean-field analysis of two-player zero-sum games.*

## FELLOWSHIPS AND ACHIEVEMENTS

---

OCT 2021	NeurIPS 2021 Outstanding Reviewer award
JUL 2018	<b>La Caixa Fellowship</b> 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	<b>First student ever to achieve a perfect score (10/10)</b> 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): <a href="http://ccaa.elpais.com/ccaa/2014/06/27/catalunya/1403862593_090989.html">http://ccaa.elpais.com/ccaa/2014/06/27/catalunya/1403862593_090989.html</a>
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 (proficient, 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