

Sebastià Agramunt Puig

Interests & Contact Information

As a Software and Artificial Intelligence Engineer with a PhD in Theoretical Physics, I bring eight years of diverse industry experience. My academic endeavors are detailed in my ORCID profile, illustrating a deep-seated foundation in scientific research, analysis, and innovative problem-solving. I specialize in tackling sophisticated challenges using advanced mathematical techniques and the integrated application of software engineering, machine learning, and artificial intelligence principles. I thrive in collaborative settings, preferring to work within small to mid-sized teams, yet I am equally adept at navigating projects independently. In leadership roles, such as Tech Lead, I have directed small teams towards achieving collective objectives and ensuring the successful completion of projects. For more information about my professional journey, personal projects and interests, or to get in touch, please visit my website at 🌐 agramunt.me or email me at ✉ [contact\[at\]agramunt\[dot\]me](mailto:contact[at]agramunt[dot]me).

Education

- March-2025. **BUS-217: Accelerate your Startup Idea** *Stanford University*, Palo Alto, California.
- May-2025 In person two months course at Stanford campus covering topics to scale an idea to a profitable business: Product-market fit, venture capital and financing, business economic models, market landscape, storytelling, pitching ideas, and much more.
- 2010-2013 **PhD in Physics** *Universitat Autònoma de Barcelona (UAB)*, Bellaterra, Barcelona, Catalonia, Spain.
Developed novel algorithms and made numerical simulations for two applications: Magnetic levitation with superconductors and magnetic recording with magnets at the nanoscale. Graduated with highest distinction *Cum Laude*. For further details download the dissertation from the public repository TDX.
- 2009-2010 **M.S. Science and Technology of Materials.** *UAB*.
- 2005-2009 **B.S. in Physics.** *UAB*.

Experience

- Mar 2025. **Staff Software Engineer** *Eikon Therapeutics*, Millbrae, California, US.
- Present Eikon Therapeutics, a drug discovery firm, utilizes advanced single molecule tracking technology developed by Nobel Laureate Prof. Eric Betzig (cofounder of Eikon) and collaborates closely with the University of Berkeley. Having a production capacity of more than one terabyte of data per day, the company is at the forefront of high-throughput compound screening.
Focused on high-performance computing for drug discovery. Lead a team of two. Implemented software for detection and localization (DL) of proteins in images using GPU hardware (C++ and CUDA) and created Python bindings to run in production. Built entire CI/CD testing (Docker containers orchestrated in Bamboo Atlassian) and publishing artifacts to internal PyPI repository. Achieved 100x speedup in particle detection using GPU. Build tools to compare and benchmark DL algorithms with ground-truth simulated data (previous role).
- Jan 2021. **Senior Software Engineer** *Eikon Therapeutics*, Hayward, California, US.
- Feb 2025 As an early member of the software team, my roles have been diverse: analyzing cell imagery from experiments, enhancing our software pipeline for high-throughput analysis, standardizing tests, dockerizing projects, and automating private PyPI deployments. I have implemented a comprehensive MLOps platform for model training, testing, and deployment, developed software to simulate Brownian motion of proteins, and ported functionalities to C++ for efficiency.
- Jan 2021. **Privacy Preserving AI Researcher Contractor (Remote)** *Neurocat*, Berlin, Germany.
- June 2021 Coauthored a comprehensive report on the current state-of-the-art in privacy-preserving machine learning as a contractor for Neurocat. This collaboration was with Federal Office for Information Security, the primary public institution regulating IT security in Germany. The research primarily focused on threats associated with transfer learning, specifically investigating poisoning methods such as backdoor and adversarial attacks.

- Nov.2018 **AI Engineer and Privacy Preserving Machine Learning Lead** *Telefónica Alpha*,
 Aug. 2020 Barcelona, Spain.
 Initiated and led the company's Privacy Preserving Machine Learning (PPML) initiative from scratch. Acquired a deep understanding of the mathematics behind techniques such as Differential Privacy, Secure Multi-Party Computation (SMPC), and Fully Homomorphic Encryption (FHE). Developed a proof-of-concept for Federated Learning with Secure Aggregation (a SMPC technique) and guided a small team to evolve this concept into a functional product for mobile phones. In addition to these responsibilities, I performed other duties, including refactoring code to transition a neural collaborative filtering recommender system into production.
- March.2020 **Research Scientist** *OpenMined*, Remote.
 Aug. 2020 Contributed to privacy-preserving machine learning research for the OpenMined community. Developed an "Introduction to Cryptography" MOOC, focusing on mathematical foundations and Python implementations, attracting over 7,000 students worldwide. Research also encompassed secure inference on secretly shared machine learning models, with a particular focus on activation function approximation within algebraic rings.
- Jul.2016 **Artificial Intelligence and Algorithmics** *Shotl*, Barcelona, Spain.
 Oct.2018 Shotl is an application designed for ride-sharing with passengers who have similar travel routes. In my role at Shotl, I was responsible for creating the routing algorithm from scratch, which involved an extensive review of scientific literature and the development of fast, reliable software for the algorithm's deployment. Additionally, I analyzed urban demand patterns using machine learning techniques and developed a simulator to assess the performance of the routing algorithms. As the fourth employee, I played a significant role in the company's growth, contributing to its acquisition by Swvl and its eventual listing as a publicly traded company on NASDAQ in 2022.
- Jul.2015 **Data Science Consultant** *Accenture Digital*, Sant Cugat (Barcelona), Spain.
 Jul.2016 Utilized ARIMA family models for sales forecasting in various markets for a large cosmetics firm. Created and managed a PostgreSQL database, handling data in various formats such as CSV and Excel. Developed automation scripts in Bash and R, integrated with CRON jobs to streamline data loading processes.
- Jan.2015 **Fellow Data Science Europe (DSE)**, Dublin, Ireland.
 March.2015 Acquired fundamental skills in data science, covering SQL, Hive, R, and various machine learning models. Applied this knowledge to analyze New York City taxi data, aiming to predict pickup probabilities based on time and location within Manhattan. The analysis primarily employed Bayesian statistics and nonlinear models, such as Random Forest.
- Nov.2014 **Postdoctoral Position** *Catalan Institute for Nanoscience and Nanotechnology (CIN2)*, Bel-
 Dec.2014 laterra, Barcelona, Catalonia, Spain.
- Nov.2013 **Postdoctoral Position** *UAB, Physics Department, Group of Smart Nanoengineered materials*,
 July.2013 *Nanomechanics and Nanomagnetism (GNM3)*, Bellaterra, Barcelona, Catalonia, Spain.

Others

- 2024-* **Business Ambasator in Silicon Valley** *Catalan Agency for Business Competitiveness*,
 ACCIO, San Francisco, CA.
 Facilitate business relationships between companies in Silicon Valley and companies in Catalunya. Market analysis and strategy.
- 2009-2013 **Teaching Assistant.** *UAB*, Bellaterra, Barcelona, Catalonia, Spain.
 Teach experimental physics to students of second year in physics degree.
- Scientific Divuligation.**
 Always committed to share science and technology advancements: Active collaborator of CienciaProp giving talks and writing a paper about levitation. Also collaborated to *Dissabtes de la física*, an initiative from UAB to explain physics to high school students.
- Peer-Review.**
 Actively reviewing papers for Cognitive Systems Research journal.

Tech stack

- Languages C/C++, CUDA, Go
 Scripting Python, BASH, R

Databases	Postgresql, MongoDB, Redis
GPU Kernels	CUTLASS, CuTe DSL, Triton, cuBLAS, cuSOLVER
ML Frameworks	PyTorch
Inference & Serving	vLLM, PyTorch, TFServing
Profiling	Nsight Compute, Nsight Systems, roofline analysis
CI/CD	Github Actions, Atlassian Bamboo, Jenkins
MLOps	Metaflow, Airflow, ZenML
Visualization	Gnuplot, Ggplot, Matplotlib
Data	Numpy, scikit-learn, Pandas, Polars, Torch, Keras
Other Tools	Docker, Git, Pybind11

Scientific experience

Selected publications (see full list here)

- **Modeling the collective magnetic behavior of highly-packed arrays of multi-segmented nanowires** S. Agramunt-Puig, N. Del-Valle, E. Pellicer, J. Zhang, J. Nogués, C. Navau, A. Sanchez and J. Sort [New J. Physics](#) **18**, 013026 (2016).
- **New Reversal Mode in Exchange Coupled Antiferromagnetic / Ferromagnetic Disks: Distorted Viscous Vortex** D. A. Gilbert, L. Ye, A. Varea, S. Agramunt-Puig, N. Del-Valle, C. Navau, J. F. Lopez-Barbera, K. Buchanan, A. Hoffmann, A. Sanchez, J. Sort, K. Liu and J. Nogués [Nanoscale](#) **7**, 9878-9885 (2015).
- **Magnetic vortex evolution in self-assembled $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ nanoislands under in-plane magnetic field** J. Zabaleta, M. Jaafar, A. Asenjo, S. Agramunt-Puig, N. Del-Valle, C. Navau, A. Sanchez, T. Puig, X. Obradors and N. Mestres [APL Mater.](#) **2**, 076111 (2014).
- **Imprinting magnetic skyrmions in thin films by ferromagnetic and superconducting templates** N. Del-Valle, S. Agramunt-Puig C. Navau and A. Sanchez. [Appl. Phys. Lett.](#) **107**, 133103 (2015).

Patents

- **An Automatic On-Demand Multi-Passenger Ride Sharing Computer-Implemented Method, Computer Program and System** Sebastia Agramunt Puig, Aitor Lagunas Fernandez [European Patent Office](#) EP3471051A1, (2019).