CURRICULUM VITAE

Nil Adell Mil

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Given name: Nil
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Gender: Male
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EDUCATION

02.2018 - 01.2021 — **MSc Neural Systems and Computation** — **ETH Zürich (ETH) and Zurich University, Zurich, Switzerland**

Master's thesis "*Graph Neural Networks for Computational Polymer Design*" under the supervision of Matteo Manica and Prof. Mehmet Fatih Yanik.

09.2013 - 07.2017 — **BSc Biomedical Engineering** — **Pompeu Fabra University (UPF), Barcelona, Spain**

Bachelor's thesis "*Representation of self-motion by cortical neuronal ensembles*" carried out at Dr. Miguel Nicolelis' laboratory, Duke University.

WORK EXPERIENCE

08.2021 – Present — **Machine Learning Engineer** — **Arctoris, Oxford, United Kingdom**

Working on machine learning and deep learning methods for drug discovery. These include classic QSAR modelling, Deep Learning, Graph Neural Networks, Active and Reinforcement Learning.

01.2021 – 05.2021 — **Data Scientist** — **Novartis, Basel, Switzerland & ETH Juniors, Zurich, Switzerland**

Employee at ETH Juniors for a project in Novartis. Working on in-silico formulation using Graph Neural Networks.

02.2020 – 12.2020 — **Student Researcher** — **IBM Research, Zurich, Switzerland**

Worked on polymer design and graph neural networks in the context of my Master's thesis.

04.2020 – 06.2021 — **Student Research Assistant at the lab for Methods of Plasticity Research** — **Zurich University, Zurich, Switzerland**

Part-time student assistant position helping with research projects, deep learning and software implementation. In charge of managing the HPC infrastructure.

01.2020 – 04.2021 — **Machine Learning Researcher in Immunotherapy** — **MyNeo, Gent, Belgium**

Continued (see below) the development of **neoMS** for it to be used as the main internal prediction engine in MyNeo's patient pipeline.
Patent and **journal article** pending publication.

08.2019 – 11.2019 **Internship on Deep Learning in Immunotherapy** — **MyNeo, Gent, Belgium**

Worked on modelling neoantigen presentation in the cell surface of cancerous cells. The project is part of a bigger pipeline dedicated to fully personalized immunotherapy treatments (i.e. patient specific neoantigen design) for cancer.
Designed and developed **neoMS**, a **self-attention based deep learning model** that leverages mass spectrometry data on peptides presented in the cell membrane via the MHC-I complex.

05.2019 – 07.2019 **Privacy Preserving Machine Learning Research Intern** — **Decentriq AG, Zurich, Switzerland**

Worked on **Federated Learning** for deep learning models, **Differential Privacy** and data leakage via **Membership Inference** (MI). Proposed a pipeline for the evaluation of MI vulnerabilities during the training of deep learning models.

01.2017 – 07.2017 **Student Researcher at the Nicolelis Lab** — **Duke University, Durham, NC, USA**

Worked on **Brain-Computer Interfaces** (BCIs), signal analysis, machine learning, and neural decoding.
My project was to develop a setup to run experiments of VR navigation using **intracranial brain** implants (on animals). With that setup, we studied how self-motion is perceived in sensorimotor areas under different visual input scenarios. The project, of which this work was a part of, was presented at the conference Frontiers of Neuroscience.

09.2015 – 11.2016 **Student Researcher and member at the UPF-CRG iGEM Team** — **iGEM & Pompeu Fabra University (UPF), Barcelona, Spain**

Co-creator of the UPF-CRG Barcelona iGEM Team.
Our project was focused on the creation of a probiotic organism capable of decreasing risk factors (polyamines) of colorectal cancer and the creation of an easy tool for cancer risk estimation. The project was awarded a bronze medal at the 2016 iGEM Jamboree.

06.2015 – 09.2015 **Intern at the Complex Systems Lab** — **Pompeu Fabra University (UPF), Barcelona, Spain**

Project on the study of the behavior and spatial organization of a system of cooperative (symbiotic) cell strains in a chemostat.
The project involved wet-lab work setting up the entire experiments, as well as, a computational part modeling the growth in a 3D environment of the different strains.

PUBLICATIONS

Adell Mil, Nil, Cedric Bogaert, Wim Van Criekinge, Bruno Fant . "neoMS: Attention-based prediction of MHC-I epitope presentation“ In publication process, preprint available under request (2021).

Born, Jannis, Matteo Manica, Joris Cadow, Greta Markert, Modestas Filipavicius, Nil Adell Mill, Nikita Janakarajan, Antonio Cardinale, Teodoro Laino, and María Rodríguez Martínez. "Data-driven Molecular Design for Discovery and Synthesis of Novel Ligands-A case study on SARS-CoV-2." Machine Learning: Science and Technology (2021).

Adell Mill, Nil, Born Jannis, Park Nathaniel, Hedrick James, Rodrigez Martinez Maria, and Manica Matteo. "On the Importance of Looking at the Manifold," 2021. Review and re-submission in process. https://openreview.net/forum?id=zFM0Uo_GnYE.

Lebedev, Mikhail A., Alexei Ossadtchi, Nil Adell Mill, Núria Armengol Urpí, Maria R. Cervera, and Miguel AL Nicolelis. "Analysis of neuronal ensemble activity reveals the pitfalls and shortcomings of rotation dynamics." Scientific Reports 9, no. 1 (2019): 1-14.

AWARDS

(2016) Finalist on the Gemma Rossell i Romero award with the project: *Using genetic algorithms to enhance airflow linearity inside the tachometer of a spirometer.*

TECHNICAL SKILLS

- Previous work on several projects with **Tensorflow** and **PyTorch.** Such as projects in Natural Language Understanding (**NLP**), Generative Adversarial Networks (**GANs**), pose estimation, Self-Attention (**Transformer**) networks in **peptide-protein interaction**, Graph Convolutional Neural Networks (**GNNs**) for drug discovery and formulation, and adversarial defense on deep neural networks. Also, experience in **Privacy-Preserving Machine Learning** and Membership Inference.
- Independently worked on **Deep Reinforcement Learning** applied to trade data and cryptocurrency price trends in real-time extracted from trade platforms.
- Experienced in several programming languages like **Python, Matlab, R, Julia, Arduino, Netlogo;** knowledge of **Javascript**, full-stack web and app development, and containerization management **Docker** and **Kubernetes**. Managed servers and HPC infrastructures in AWS, Google Cloud Platform (using TPUs), and Linode.
- Additional experience: signal and image analysis, finite element simulation software automation (OpenFoam)**,** system optimization via **Evolutionary Algorithms,** and experimental environment simulation and video game design on Unity and Unreal Engine.

OTHER PROJECTS AND ACTIVITIES

- Co-founded a startup in fintech. I managed a team of four people, talked to several early stage investors, reached out to clients, and did a bit of everything from designing the architecture needed to doing market and competitor analysis. It ended up failing but I learnt a lot from it.
- Designed and prototyped a low-cost and portable medical device for the early diagnosis of skin cancer. The device would use Raman Spectrography to perform the screening. The project was part of my Bachelor's program.
- Worked on the university hacklab building and programming an Open Source 3D printed robot (InMoov).

OTHER COURSES

Summer 2012	**INTRODUCTION TO VIDEOGAMES DESIGN** **FX Animation Barcelona 3D School**
Summers 2010 and 2011	**INTRODUCTION TO 3D MODELLING AND ANIMATION** **FX Animation Barcelona 3D School**

LANGUAGES

Catalan	(Native)
Spanish	(Native)
English	(C2)
Japanese	(A1)