Iñigo Martinez Lopez

inigomlap@gmail.com / Linkedin & Github: imartinezl

Education

Ph.D. in Applied Engineering @ UNIVERSITY OF NAVARRA – TECNUN SCHOOL OF ENGINEERING **2018 – Present**

Subjects covered: *Time series analysis; Anomaly detection; Functional data analysis; Agent-based modeling; Differential geometry; Bayesian statistics; Data visualization; Data science methodologies*.

- Scalable time series clustering under limited computational and time resources, using elastic functional data analysis.
- Novel method for elastic functional data analysis: temporal transformers with diffeomorphic warping functions obtained by integration of continuous piecewise velocity fields.
- High-resolution discrete event agent-based simulations for complex large-scale systems.
- Data science methodologies for holistic team, project, and data management

M.Sc. in Industrial (Mech.) Engineering @ UNIVERSITY OF NAVARRA – TECNUN SCHOOL OF ENGINEERING **2015 – 2017**

GPA: 9,34 / 10; Summa cum laude.

Subjects covered: *Mechatronics and robotics; Engineering and product design; Modeling and simulation; Operations research; Manufacturing engineering; Control theory; Hydraulics and pneumatics.*

Master's thesis developed at the MIT Media Lab - City Science group

B.Sc. in Industrial Technologies @ UNIVERSITY OF NAVARRA – TECNUN SCHOOL OF ENGINEERING **2011 - 2015**

GPA: 9,47 / 10; Summa cum laude.

Subjects covered: *Multivariate calculus, linear algebra, complex analysis, differential equations; Statistics and probability; Mechanism & machine design; Strength of materials and solid mechanics; Thermodynamics, heat transfer; CAD-CAE-CAM; Fluid mechanics; Electrical Systems, Power Electronics*

Experience

Data Scientist @ VICOMTECH RESEARCH CENTER **Jun. 2019 – Present**

Data Intelligence projects for Energy and Industrial Processes

- Developed supervised and unsupervised machine learning models, including CNN, Temporal Transformer, LSTM, GraphCNN.
- Worked on advanced data analytics and visualization tools for the models developed by the group.
- Built ad-hoc agent-based simulations for shared autonomous micro-mobility, and air quality and pandemic risk assessment.
- Led real-world machine learning projects and coordinated research with industrial sponsors, such as Repsol, Gestamp, or Mahou San Miguel.

Data Scientist @ NEM, SIEMENS GAMESA RENEWABLE ENERGY **Jul. 2017 – May 2019**

Wind turbine data monitoring and failure prediction

- Engineered active and passive solutions to prevent predictive accuracy deterioration over time due to concept drift.
- Formulated predictive failure indicators based on data affinity between different assets using statistical analysis and comparative metrics.

Research Assistant and Master's Thesis @ MIT MEDIA LAB – CITY SCIENCE **Sept. 2016 - May 2017**

Persuasive Electric Vehicle (PEV); an autonomous three-wheeled vehicle for shared use

- Developed an active tilting system that enhanced user experience by increasing the stability in the curves and minimizing the perceived acceleration.
- Designed a robust control strategy and built a full scale-prototype that validated the design of the tilting system, which was controlled by odometer readings and a haptic drive-by-wire system.

Data Science Intern @ CEIT – IK4 RESEARCH ALLIANCE **Jun. 2015 - Aug. 2015**

Computational Cancer Biology: predictive biomarkers in breast cancer

- Used supervised learning methods to predict and diagnose the class of breast cancer.
- Evaluated and compared the performance of different machine learning models such as feed-forward neural nets, random forest, and support vector machines.

Head of Chassis Design @ TECNUN ELECTRIC FORMULA STUDENT **Sep. 2014 – Jun. 2016**

Student-led design, manufacturing, and assembly of an electric Formula SAE car.

- Management of the chassis team, responsible for the CAD design of the space frame chassis, finite element analysis optimization, and ensuring driver ergonomics and safety compliance.
- The car successfully passed the scrutineering in the Montmeló, Barcelona, Formula SAE competition

Student Intern @ NANOGUNE NANOMAGNETISM GROUP **Jul. 2014 – Sep. 2014**

Study of cobalt thin films with varying interatomic distances.

- Epitaxial growth of cobalt films with layer-by-layer ultra-high vacuum sputter deposition.
- Post-deposition structural characterization with X-ray diffraction techniques.
- Analyzed optical and magneto-optical properties with generalized magneto-optical ellipsometry.

Publications

Martinez, I., Bruse, J. L., Florez, A. M., Viles, E., Olaizola, I., 2021, ArchABM: an agent-based simulator of human interaction with the built environment. CO_2 and viral load analysis for indoor air quality. *Building and Environment, Elsevier* (Under review)

Martinez, I., Otamendi, U., Olaizola, I., Solsona, R., Maiza, M., Viles, E., Fernandez, A., Arzua, I., 2021, A novel method for uncertainty analysis in radiation thermometry with application to industrial furnaces. *Journal of Measurement, Elsevier* (Under review)

Sánchez, N.C., **Martinez, I.**, Pastor, L.A. and Larson, K., 2021. Simulation study on the fleet performance of shared autonomous bicycles. *arXiv preprint arXiv:2106.09694. Transportation Research Part E - Logistics and Transportation Review, Elsevier* (Under review)

Martinez, I., Viles, E. and Olaizola, I., 2021. Data Science Methodologies: Current Challenges and Future Approaches. *Big Data Research*, *24*

Otamendi, U., **Martinez, I.**, Quartulli, M., Olaizola, I.G., Viles, E. and Cambarau, W., 2021. Segmentation of cell-level anomalies in electroluminescence images of photovoltaic modules. *Solar Energy*, *220*, pp.914-926.

Martinez, I., Viles, E. and Cabrejas, I., 2018, October. Labelling Drifts in a Fault Detection System for Wind Turbine Maintenance. In *International Symposium on Intelligent and Distributed Computing* (pp. 145-156). Springer, Cham.

Academic Reviewer

- International Conference on Predictive APIs and Apps (PAPIs) - Boston 2017 , São Paulo 2017/2018/2019, London 2018
- Journal of Decision Systems (JDS) 2021

Teaching and Mentorship

- Organizing committee International Conference on Predictive APIs and Apps (PAPIs) (2016 - 2020)
- Thesis supervisor for B.Sc. in Industrial Engineering: *Proposal for a taxonomy of professional profiles in data science* (2020). *Estimating the benefits of using organizational methodologies for data science projects* (2021)
- Teacher in Cosmos Academy: private teaching for Tecnun and Mondragon University students in computer science, electric systems, thermodynamics, heat transfer, strength of materials, electronics. Groups of 10 to 25 students. (2015-2020)
- Teaching Assistant: Strength of Materials II (B.Sc.) with Prof. Aitziber López, 2013; Electric Systems (B.Sc.) with Prof. Luis Fontán, 2014, Introductory Tecnun Course, 2012-2013.

Grants and Awards

- Best Paper Award - IDC 2018 International Symposium (2018)
- Best Use of Firebase/Google - HackMIT (2016)
- Santander Bank Scholarship (M.Sc.) - Santander Bank (2016-2017)
- Summa cum laude (B.Sc.) - Tecnun University of Navarra (2011-2015)
- Best academic record award (B.Sc.) - KutxaBank (2015)
- End of degree award for highest GPA (B.Sc.) - University of Navarra (2015)
- Award in Design & Engineering - Tecnun-Gaztempresa Competition (2011)

Skills

- **Code**: R, Python, Julia, C++, CUDA, Matlab, Java, Processing, p5.
- **Data**: PyTorch, Tensorflow, Keras, Scikit-Learn, Numpy, Pandas.
- **Web**: Javascript, React, React-Native, Vue, WebGL, Node, Shiny.
- **Simulation**: Simpy, GAMA, Simulink, Unity.
- **Languages**: Spanish/Basque (native), English (C1), German (A1)
- **Maps**: Qgis, Carto, Mapbox, Leaflet, deck.gl.
- **Fabrication**: Laser cutter, Water Jet, 3D Printing, CNC
- **CAD CAE**: SolidWorks, PTC Creo, AutoCAD, ANSYS
- **Graphics**: Adobe CC