

# Nahuel Costa Cortez

Machine Learning researcher

## Contact

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## Research interests

Prognostics & Health Management  
Explainable & Interpretable AI  
Generative AI  
Domain Adaptation  
Conformal Prediction  
LLMs and RAG





## Core Competencies

Problem formulation  
Critical thinking  
Organization  
Open-mindedness

## Computer Skills

Proficient with Python,  
Java,  
C++,  
C,  
Matlab,  
L<sup>A</sup>T<sub>E</sub>X

## Links

 nahuelcosta.com  
 NahuelCostaCortez  
 nahuel-costa-cortez  
 mrdKa3EAAAAJ&hl

## Languages

English and Spanish

## Research Experience

### Assistant Professor

Computer Science Department  
Computer Science & Artificial Intelligence

University of Oviedo **September 2023-Now**

### Lecturer

Computer Science Department  
Languages and computer systems

University of Oviedo **2021-2023**

### Visiting Researcher

Laboratoire d'informatique, de robotique et de microélectronique de Montpellier  
Research and development of medical diagnostic methods based on emission tomography images

University of Montpellier **May-July 2023**

### Visiting Researcher

Hawaii Natural Energy Institute  
Research and development of Machine Learning tools for the diagnosis and prognosis of lithium-ion batteries

University of Hawaii at Manoa **May-August 2022**

### Research Assistant

Metrology and Modeling Lab  
Development of computational health models for the treatment of rechargeable batteries

University of Oviedo **2019-2021**

### Research intern

Metrology and Modeling Lab  
Analysis of intracardiac electrocardiograms for the prediction of cardiovascular diseases

University of Oviedo **2019-2020**

## Education

### PhD Machine Learning

University of Oviedo **2020-2023**

### MA Computer Science

University of Oviedo **2019-2020**

### BA Computer Science

University of Oviedo **2015-2019**

## Publications

### Journal articles

ICFormer: A Deep Learning model for informed lithium-ion battery diagnosis and early knee detection

**Nahuel Costa**, David Anseán, Matthieu Dubarry, Luciano Sánchez

Journal of Power Sources (2023), DOI:10.1016/j.jpowsour.2023.233910

Learning remaining useful life with incomplete health information: A case study on battery deterioration assessment

Luciano Sánchez, **Nahuel Costa**, José Otero, David Anseán, Inés Couso

Array (2023), DOI: 10.1016/j.array.2023.100321

Physics-informed learning under epistemic uncertainty with an application to system health modeling

Luciano Sánchez, **Nahuel Costa**, José Otero, Inés Couso

International Journal of Approximate Reasoning (2023), DOI: 10.1016/j.ijar.2023.108988

Simplified models of remaining useful life based on stochastic orderings

Luciano Sánchez, **Nahuel Costa**, Inés Couso

Reliability Engineering & System Safety (2023), DOI: 10.1016/j.ress.2023.109321

Data-Driven Diagnosis of PV-Connected Batteries: Analysis of Two Years of Observed Irradiance

*Matthieu Dubarry, Fahim Yasir, Nahuel Costa, Dax Matthews*

Batteries (2023), DOI: 10.3390/batteries9080395

Data-driven direct diagnosis of Li-ion batteries connected to photovoltaics

*Matthieu Dubarry, Nahuel Costa, Dax Matthews*

Nature Communications (2023), DOI: 10.1038/s41467-023-38895-7

Remaining Useful Life Estimation Using a Recurrent Variational Autoencoder

**Nahuel Costa**, *Luciano Sánchez*

Logic Journal of the IGPL (2022)

Li-ion battery degradation modes diagnosis via Convolutional Neural Networks

**Nahuel Costa**, *Luciano Sánchez, David Anseán, Matthieu Dubarry*

Journal of Energy Storage (2022), DOI: 10.1016/j.est.2022.105558

RUL-RVE: Interpretable assessment of Remaining Useful Life

**Nahuel Costa**, *Luciano Sánchez*

Software Impacts (2022), DOI: 10.1016/j.simpa.2022.100321

Variational encoding approach for interpretable assessment of remaining useful life estimation

**Nahuel Costa**, *Luciano Sánchez*

Reliability Engineering & System Safety (2022), DOI: 10.1016/j.ress.2022.108353

Semi-Supervised Recurrent Variational Autoencoder Approach for Visual Diagnosis of Atrial Fibrillation

**Nahuel Costa**, *Luciano Sánchez*

IEEE Access (2021), DOI: 10.1109/ACCESS.2021.3064854

Graphical Analysis of the Progression of Atrial Arrhythmia Using Recurrent Neural Networks

**Nahuel Costa**, *Jesús Fernández, Inés Couso, Luciano Sánchez*

International Journal of Computational Intelligence Systems (2020), DOI: 10.2991/ijcis.d.200926.001

## Conference and workshop papers

Enhancing Time Series Anomaly Detection Using Discretization and Word Embeddings

*Lucas Pérez, Nahuel Costa, Luciano Sánchez*

International Conference on Soft Computing Models in Industrial and Environmental Applications (SOCO), 2023, Salamanca, Spain, DOI: 10.1007/978-3-031-42536-3\_26

Weakly supervised learning of the motion resistance of a locomotive powered by liquefied natural gas

*Luciano Sánchez, Pablo Luque, Daniel Álvarez-Mántaras, José Otero, Nahuel Costa*

International Workshop on Soft Computing Models in Industrial and Environmental Applications (SOCO), 2022, Salamanca, Spain, DOI: 10.1007/978-3-031-18050-7\_59

Informed Weak Supervision for Battery Deterioration Level Labeling

*Luciano Sánchez, Nahuel Costa, David Anseán*

International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems (IPMU), 2022, Milano, Italy, DOI: 10.1007/978-3-031-08974-9\_59

Explainable condition monitoring from imprecise information

**Nahuel Costa**, *Luciano Sánchez*

Conference of the Spanish Association of Artificial Intelligence (CAEPIA), 2021, Málaga, Spain

Remaining Useful Life Estimation Using a Recurrent Variational Autoencoder

**Nahuel Costa**, *Luciano Sánchez*

International Conference on Hybrid Artificial Intelligence Systems (HAIS), 2021, Bilbao, Spain, DOI: 10.1007/978-3-030-86271-8\_5

Graphical analysis of the progression of atrial arrhythmia through an ensemble of Generative Adversarial Network Discriminators

**Nahuel Costa**, *Jesús Fernández, Inés Couso, Luciano Sánchez*

Conference of the European Society for Fuzzy Logic and Technology (EUSFLAT), 2019, Praga, Czech Republic, DOI: 10.2991/eusflat-19.2019.78

## Teaching Experience

### Associate Professor

University of Oviedo **2023-2024**

*Co-Supervisor, PhD in Computer Science*

*Algorithmics (EN), Business Intelligence*

Bachelor's Degree in Computer Engineering in Information Technology

*Algorithmics, Data Visualization*

Bachelor's Degree in Data Science

### Lecturer

University of Oviedo **2022-2023**

*Co-Supervisor for four BA thesis (one thesis award)*

*Introduction to programming, Algorithmics, Business Intelligence*

Bachelor's Degree in Computer Engineering in Information Technology

*Algorithmics*

Bachelor's Degree in Data Science

*Operating Systems (EN)*

Bachelor's Degree in Software Engineering

### Lecturer

University of Oviedo **2021-2022**

*Algorithmics*

Bachelor's Degree in Data Science

*Operating Systems (EN), Databases*

Bachelor's Degree in Software Engineering

*Introduction to programming, Algorithmics*

Bachelor's Degree in Computer Engineering in Information Technology

### Lecturer

University of Oviedo **2020-2021**

*Operating Systems (EN), Databases, Programming Methodology (EN)*

Bachelor's Degree in Software Engineering

## Awards

### Mobility Fellowship

University of Oviedo **2022**

Regional competition

### Second best thesis project - Doctoral Consortium

Conference of the Spanish Association of Artificial Intelligence **2021**

For the thesis project "Explainable condition monitoring from imprecise information"

### Best master's thesis project

University of Oviedo **2020**

For the project "Diagnosis of Atrial Fibrillation by intelligent analysis of intracardiac of recordings"

### Mentee

IMFAHE **2019**

Chosen as one of the 10 students selected from the University of Oviedo to participate in the professional and academic development programs of excellence promoted by the International Mentoring Foundation for the Advancement of Higher Education (IMFAHE). Mentored by Dr. Francisco Costela, researcher at Schepens Eye Research Institute, Harvard Medical School.

### Master Fellowship

Principado de Asturias **2019**

Full tuition scholarship

### Most innovative Idea

EbIC University Awards **2019**

For the project "Preprocessing and intelligent treatment of intracardiac electrocardiograms"

## Professional Activities and Service

### Guest Editor

2023

*Array*

Special issue: Weak and cautious learning: conceptual foundations and practical algorithms

### Session Chair

Salamanca 2023

*International Conference on Soft Computing Models in Industrial and Environmental Applications*

Chaired the session: Genetic and Evolutionary Computation in Real World and Industry

### Special Session Organizer

Milano 2022

*International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems*

Organized special session on Machine Learning for Partially Labeled Data

### Reviewer

IPMU (2022), IEEE JBHI, IJAR, Array, Journal of Supercomputing

## Talks

### Generative AI - Benefits and Limitations

2023

*Total Energies*

Total Energies Web Publication

ES slides

### ChatGPT and generative AI

2023

*Total Energies*

### AI in Biomedicine

2023

*CEU San Pablo University*

## Courses

### Professional Development Program for Professors and Researchers

Online 2024

*IMFAHE*

### Qualitative Research: Steps and Components of Design Creation

Online 2024

*INIE*

### Inclusive University and University Inclusion

2024

*INIE*

### Approach to University Management

2024

*INIE*

### Elaboration of a Teaching Innovation Project: Tips and Practical Suggestions

2023

*INIE*

### Peer Reviewer Course

Online 2022

*Elsevier*

### Identify and train your research talents

Online 2021

*INIE*

### Convolutional Neural Networks in Tensorflow

Online 2021

*DeepLearning.AI*

### Natural Language Processing in TensorFlow

Online 2021

*DeepLearning.AI*

### Sequences, Time Series and Prediction

Online 2021

*DeepLearning.AI*

**Quarter Course in Professional Development**  
*IMFAHE*

Online **2020**

**How to present a scientific communication**  
*INIE*

Online **2021**

**Practical Deep Learning for Coders, v3**  
*FastAI*

Online **2019**

**Android development from scratch**  
*Udemy*

Online **2019**

## Certifications



**ELSEVIER**

Certified Peer Reviewer



**DeepLearning.AI**

Professional Certificate  
TensorFlow Developer



**ELSEVIER**

Elsevier Reviewer  
Certificate



**UNIVERSITY OF  
CAMBRIDGE**

Certificate in Advanced  
English

## Other Experience

**Software Developer, Internship**  
*Bytácora Soluciones Informáticas*

Gijón, Spain **2018**

Development of a help desk ticketing system - Enterprise Resource Planning (ERP) – Odoo modules – Pycharm – Python – XML

**Software Developer, Internship**  
*PSWService*

Gijón, Spain **2018**

Web app development – Ionic – AngularJS (HTML5, CSS, Javascript) – PHP