

Nahuel Costa Cortez

Machine Learning researcher

Contact

costanahuel@uniovi.es
Campus de Gijón, Office 2.6.14
Gijón (Spain), 33204
(+34) 985 182 686

Research interests

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





Fields of application

Biomedical
ECG
Medical imaging (fPET/X-Ray)
Industrial
Lithium-ion Batteries
Aircraft Engines
Industrial Fans

Computer Skills

Proficient with Python,
Java,
C++,
C,
Matlab,
L^AT_EX

Links

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

Languages

English and Spanish

Research Experience

Assistant Professor <i>Computer Science Department</i> Computer Science & Artificial Intelligence	University of Oviedo September 2023-Now
Lecturer <i>Computer Science Department</i> Languages and computer systems	University of Oviedo 2021-2023
Visiting Researcher <i>Laboratoire d'informatique, de robotique et de microélectronique de Montpellier</i> Research and development of medical diagnostic methods based on emission tomography images	University of Montpellier May-July 2023
Visiting Researcher <i>Hawaii Natural Energy Institute</i> 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 <i>Metrology and Modeling Lab</i> Development of computational health models for the treatment of rechargeable batteries	University of Oviedo 2019-2021
Research intern <i>Metrology and Modeling Lab</i> 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

Projects

MCINN-24-PID2023-146257OB-I00 <i>Sustainable Computing in Limited Information Scenarios</i> Team member	2024-Now
UO-177745 <i>Automated Moodle quiz creation and optimization using learning analytics, application to learning programming languages</i> Team member	2024-2025
PID2022-141792OB-I00 <i>Accurate estimation of health status and remaining life in advanced lithium-ion technologies</i> Collaborating researcher	2022-Now
FUO-354-23, TOTAL ENERGIES <i>Artificial Intelligence applied to Data Analysis and Process Modeling</i> Team member	2022-Now
MCI-21-PID2020-112726RB-I00 <i>Computational intelligence for emissions mitigation: new learning methodologies with incomplete data</i> Team member	2021-2024

FUO-231-22, TALLERES ZITRÓN, S.A.

2022-2023

Intelligent and explainable condition monitoring of jet fans

Team member

FC-GRUPIN-IDI/2018/000226

2019-2020

Data engineering applied to eco-efficient energy management (IDAGEE)

Collaborating researcher

Publications

Journal articles

Integrating imprecise data in generative models using interval-valued Variational Autoencoders

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

Information Fusion(2024), DOI:10.1016/j.inffus.2024.102659

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 (2024), DOI:10.1016/j.jpowsour.2023.233910

Remaining Useful Life Estimation Using a Recurrent Variational Autoencoder

Nahuel Costa, Luciano Sánchez

Logic Journal of the IGPL (2024), DOI:10.1093/jigpal/jzae023

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

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

Automated generation of python programming multiple choice questions using reflection and metaprogramming

José Otero, Nahuel Costa

ICERI (2024), ICERI

Rapidae: A Python library for creation, experimentation, and benchmarking of Autoencoder models

Nahuel Costa, *Luciano Sánchez*

IEEE World Congress on Computational Intelligence, 2024, YOKOHAMA, Japan

Cities Datalex: software de acceso inteligente a la normativa de desarrollo urbano y territorial sostenible

Maria Rosario Alonso, Luciano Sánchez, Mari Cruz Rozada, Joaquín Meda, Nahuel Costa

XI Congreso Internacional de Ordenación del Territorio CIOT, Gijón

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

Assistant Professor

University of Oviedo **2023-Present**

Supervising several bachelor's theses and co-supervising a Ph.D. thesis in "Prognosis of Degenerative Diseases Using Unsupervised and Partially Supervised Learning Techniques"

Algorithmics (EN), Business Intelligence

Bachelor's Degree in Computer Engineering in Information Technology

Algorithmics, Data Visualization, Generative Models

Bachelor's Degree in Data Science

Lecturer

University of Oviedo **2022-2023**

Co-Supervisor for four BA thesis (two 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

Is AI Hitting a Wall? <i>Outreach Day of the Total Energies Chair of Data Analytics and Artificial Intelligence</i>	2024
Rapidae - A Python Library for Creation, Experimentation, and Benchmarking of Autoencoder Models <i>IEEE World Congress on Computational Intelligence</i>	2024
Image generation with Artificial Intelligence <i>Instituto Asturiano de Administración Pública Adolfo Posada</i>	2024
Learn how to create a realistic and intelligent NPC <i>Feria de la Ciencia y la Innovación de Asturias</i>	2024
Generative AI - Benefits and Limitations <i>Total Energies</i> Total Energies Web Publication ES slides	2023
Enhancing Time Series Anomaly Detection Using Discretization and Word Embeddings <i>18th International Conference on Soft Computing Models in Industrial and Environmental Applications</i>	2023
ChatGPT and Other Generative AIs <i>Total Energies</i> ES slides	2023
AI in Biomedicine <i>CEU San Pablo University</i> ES slides	2023

Courses

Design and Implementation of the Rubric as an Evaluation Resource <i>INIE</i>	Online 2024
Professional Development Program for Professors and Researchers <i>IMFAHE</i>	Online 2024
Gamification Applied to University Education <i>INIE</i>	Online 2024
Qualitative Research: Steps and Components of Design Creation <i>INIE</i>	Online 2024
Inclusive University and University Inclusion <i>INIE</i>	2024
Approach to University Management <i>INIE</i>	2024
Elaboration of a Teaching Innovation Project: Tips and Practical Suggestions <i>INIE</i>	2023
Peer Reviewer Course <i>Elsevier</i>	Online 2022
Identify and train your research talents <i>INIE</i>	Online 2021
Convolutional Neural Networks in Tensorflow <i>DeepLearning.AI</i>	Online 2021

Natural Language Processing in TensorFlow <i>DeepLearning.AI</i>	Online 2021
Sequences, Time Series and Prediction <i>DeepLearning.AI</i>	Online 2021
Quarter Course in Professional Development <i>IMFAHE</i>	Online 2020
How to present a scientific communication <i>INIE</i>	Online 2021
Practical Deep Learning for Coders, v3 <i>FastAI</i>	Online 2019
Android development from scratch <i>Udemy</i>	Online 2019

Other Experience

Podcaster <i>The Training Loop Podcast</i>	Gijón, Spain 2024-Now
An AI researcher and an entrepreneur team up to create an entertainment podcast. A wide variety of guests from different fields.	
Software Developer, Internship <i>Bytácora Soluciones Informáticas</i>	Gijón, Spain 2018
Development of a help desk ticketing system - Enterprise Resource Planning (ERP) – Odoo modules – Pycharm – Python – XML	
Software Developer, Internship <i>PSWService</i>	Gijón, Spain 2018
Web app development – Ionic – AngularJS (HTML5, CSS, Javascript) – PHP	