

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





Fields of application

Lithium-ion Batteries
Aircraft Engines
Industrial Fans
Cardiovascular Diseases
Medical imaging
Urban Regulation

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

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**

Projects

MCI-21-PID2020-112726RB-I00

Computational intelligence for emissions mitigation: new learning methodologies with incomplete data
Team member

2021-Now

PID2022-1417920B-I00

Accurate estimation of health status and remaining life in advanced lithium-ion technologies
Collaborating researcher

2022-Now

FUO-354-23, TOTAL ENERGIES

Artificial Intelligence applied to Data Analysis and Process Modeling
Team member

2022-Now

FUO-231-22, TALLERES ZITRÓN, S.A.

Intelligent and explainable condition monitoring of jet fans
Team member

2022-2023

FC-GRUPIN-IDI/2018/000226

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

2019-2020

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.res.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.res.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

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

Nahuel Costa Cortez , Phd

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 **2023-2024**

Co-Supervisor for a PhD thesis in Computer Science

Project: Automated Moodle quiz creation and optimization using learning analytics, application to learning programming languages

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

Operating Systems (EN), Databases, Programming Methodology (EN)
Bachelor's Degree in Software Engineering

University of Oviedo **2020-2021**

Awards

Mobility Fellowship

Regional competition

University of Oviedo **2022**

Second best thesis project - Doctoral Consortium

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

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

Best master's thesis project

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

University of Oviedo **2020**

Mentee

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.

IMFAHE **2019**

Master Fellowship

Full tuition scholarship

Principado de Asturias **2019**

Most innovative Idea

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

EbIC University Awards **2019**

Professional Activities and Service

Guest Editor

Array

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

2023

Session Chair

International Conference on Soft Computing Models in Industrial and Environmental Applications

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

Salamanca **2023**

Special Session Organizer

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

Organized special session on Machine Learning for Partially Labeled Data

Milano **2022**

Reviewer

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

Talks

Generative AI - Benefits and Limitations

Total Energies

Total Energies Web Publication

ES slides

2023

ChatGPT and generative AI

Total Energies

ES slides

2023

AI in Biomedicine

CEU San Pablo University

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

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	