

UNIVERSITÀ DEGLI STUDI DI MILANO

selezione pubblica per n. 1 posto di Ricercatore a tempo determinato ai sensi dell'art.24, comma 3, lettera a) della Legge 240/2010, per lo svolgimento di attività di ricerca vincolata su tematiche green e innovazione - DM 10 agosto 2021 n. 1062, per il settore concorsuale 09/H1 - Sistemi di Elaborazione delle Informazioni, settore scientifico-disciplinare ING-INF/05 - Sistemi di Elaborazione delle Informazioni presso il Dipartimento di INFORMATICA "GIOVANNI DEGLI ANTONI", (bando pubblicato sul sito Web d'Ateneo in data 14/12/2021) Codice concorso 4931

Alessandro Incremona

CURRICULUM VITAE

(N.B. IL CURRICULUM NON DEVE ECCEDERE LE 30 PAGINE E DEVE CONTENERE GLI ELEMENTI CHE IL CANDIDATO RITIENE UTILI AI FINI DELLA VALUTAZIONE.

LE VOCI INSERITE NEL FACSIMILE SONO A TITOLO PURAMENTE ESEMPLIFICATIVO E POSSONO ESSERE SOSTITUITE, MODIFICATE O INTEGRATE)

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	INCREMONA
NOME	ALESSANDRO
DATA DI NASCITA	[28, 06, 1993]

TITOLI**TITOLO DI STUDIO**

(indicare la Laurea conseguita inserendo titolo, Ateneo, data di conseguimento, ecc.)

Master of Science, October 2017, Computer Engineering - Embedded and Control Systems (110 cum laude)
University of Pavia
Pavia, PV, Italy
THESIS - Seasonal components estimation for the long-term forecasting of the Italian electric load
Advisor - Prof. Giuseppe De Nicolao

Bachelor of Science, September 2015, Electronic and Informatic Engineering (110 cum laude)
University of Pavia
Pavia, PV, Italy
THESIS - Sintesi di Controllori Predittivi Vincolati per il Pancreas Artificiale
Advisor - Prof. Lalo Magni

TITOLO DI DOTTORE DI RICERCA O EQUIVALENTI, OVVERO, PER I SETTORI INTERESSATI, DEL DIPLOMA DI SPECIALIZZAZIONE MEDICA O EQUIVALENTE, CONSEGUITO IN ITALIA O ALL'ESTERO

(inserire titolo, ente, data di conseguimento, ecc.)

Ph.D., October 2020, Electronics, Computer Science and Electrical Engineering Ph.D. School
University of Pavia
Pavia, PV, Italy
THESIS - Machine Learning methods for long and short term energy demand forecasting
Advisor - Prof. Giuseppe De Nicolao

CONTRATTI DI RICERCA, ASSEGNI DI RICERCA O EQUIVALENTI

(per ciascun contratto stipulato, inserire università/ente, data di inizio e fine, ecc.)

Postdoctoral Researcher in Electronics, Computer Science and Electrical Engineering
Academic Discipline (SSD) ING-INF/04-AUTOMATICA
University of Pavia, Dipartimento di Ingegneria Industriale e dell'Informazione
October 2020 - October 2021

ATTIVITÀ DIDATTICA A LIVELLO UNIVERSITARIO IN ITALIA O ALL'ESTERO

(inserire anno accademico, ateneo, corso laurea, numero ore, ecc.)

Tutor of Identificazione dei Modelli e Analisi dei Dati (IMAD)
University of Pavia
Pavia, Italy
2018 - 2021
106 hours

Co-supervisor of a master thesis for the Identificazione dei Modelli e Analisi dei Dati (IMAD) course
THESIS - Forecasting energy prices and volumes in the Italian Ancillary Service Market: A Machine Learning approach
Supervisor - Prof. Giuseppe De Nicolao
Year - 2021

Co-supervisor of a bachelor thesis for the Identificazione dei Modelli e Analisi dei Dati (IMAD) course
THESIS - Previsione a breve termine del carico elettrico nazionale tramite Reti Neurali RBF
Supervisor - Prof. Giuseppe De Nicolao
Year - 2020

Co-supervisor of a bachelor thesis for the Identificazione dei Modelli e Analisi dei Dati (IMAD) course
THESIS - Stima parametrica e non parametrica della curva di potenza di turbine eoliche
Supervisor - Prof. Giuseppe De Nicolao
Year - 2020

Co-supervisor of a master thesis for the Object-oriented programming course
THESIS - Design and development of a cross platform application for the oncological screening and disease prevention management
Supervisor - Prof. Cristiana Larizza
Year - 2020

DOCUMENTATA ATTIVITÀ DI FORMAZIONE O DI RICERCA PRESSO QUALIFICATI ISTITUTI ITALIANI O STRANIERI;

(inserire anno accademico, ente, corso, periodo, ecc.)

Research Intern at IBM Research
IBM Research Technology Campus,
Dublin, Ireland
TOPIC - Time series forecasting for IBM Research Castor Cloud System
(Project which received funding from the European Research Council under the European Unions Horizon 2020 research and innovation programme)
Advisor - Engr. Bradley J Eck
28 May 2019 - 31 August 2019

REALIZZAZIONE DI ATTIVITÀ PROGETTUALE

(indicare, data, progetto, ecc.)

Analisi e modelli predittivi per il mercato elettrico italiano
Project between University of Pavia and ENI S.p.A.
Supervisors: Prof. Davide M. Raimondo and Prof. Giuseppe De Nicolao
Collaborator: Dr. Marco Capelletti
Year - 2021

Controllo statistico dei processi per la previsione della domanda di gas residenziale
Project between University of Pavia and A2A S.p.A.
Supervisor: Prof. Giuseppe De Nicolao
Year - 2018

ATTIVITÀ DI RELATORE A CONGRESSI E CONVEGNI NAZIONALI E INTERNAZIONALI

(inserire titolo congresso/convegno, data, ecc.)

Presentation of a poster: 'Spectral characterization of the multiseasonal component of the Italian electric load'
SIDRA Automatica 2018
University of Florence, 2018

Presentation of a paper: 'Spectral characterization of the multiseasonal component of the Italian electric load'
58th Conference on Decision and Control (CDC)
Nice - France, 2019

CONSEGUIMENTO DI PREMI E RICONOSCIMENTI NAZIONALI E INTERNAZIONALI PER ATTIVITÀ DI RICERCA

(inserire premio, data, ente organizzatore, ecc.)

Prize in memory of Mons. Cesare Angelini, issued by Associazione Alumni Almo Collegio Borromeo
Pavia, May 2017

Best poster award: 'Spectral characterization of the multiseasonal component of the Italian electric load'
Convegno nazionale Automatica.it (SIDRA), Florence, September 2018

ETIC district prize for Master Thesis about 'Ethic and Information and Communications Technologies',
issued by AICA and Rotary International
Naples, May 2019

PRODUZIONE SCIENTIFICA

PUBBLICAZIONI SCIENTIFICHE

(per ciascuna pubblicazione indicare: nomi degli autori, titolo completo, casa editrice, data e luogo di pubblicazione, codice ISBN, ISSN, DOI o altro equivalente)

[1] A. Incremona, G. De Nicolao. 'Spectral Characterization of the Multi-Seasonal Component of the Italian Electric Load: a LASSO-FFT Approach', IEEE Control Systems Letters
Publisher: IEEE
Date of Publication: June 2019
DOI: 10.1109/LCSYS.2019.2922192

[2] A. Incremona, G. De Nicolao, F. Fusco, S. Tirupathi, B. J. Eck. 'Aggregation of nonlinearly enhanced experts with application to electricity load forecasting', Applied Soft Computing Publisher: Elsevier
Date of Publication: November 2021
DOI: <https://doi.org/10.1016/j.asoc.2021.107857>

[3] A. Incremona, G. De Nicolao. 'Short-term forecasting of the Italian load demand during the Easter Week', Neural Computing and Applications, 2021
Publisher: Springer
DOI: 10.1007/s00521-021-06797-8

[4] A. Incremona. 'Machine Learning methods for long and short term energy demand forecasting'. Ph.D. Thesis, University of Pavia, 2020

[5] A. Incremona, G. De Nicolao 'Regularization methods for the short-term forecasting of the Italian electric load', SUBMITTED

ATTIVITÀ DI REVISORE

(journal e congressi per cui ho svolto attività da revisore)

Automatica
American Control Conference
IEEE Conference on Decision and Control
International Journal of Robust and Nonlinear Control
IEEE Control Systems Letters
International Journal of Adaptive Control and Signal Processing
IFAC World Congress
IEEE Transactions on Cybernetics
European Control Conference

EDUCATIONAL ACTIVITIES

(corsi, seminari, scuole di dottorato)

Course 'Deep Learning and TensorFlow',
by Prof. Marco Piastra,
University of Pavia, 2018
21 hours

Course 'Neural Networks for Time Series Analysis',
by Oleksandr Honchar,
University of Verona, 2018
8 hours

Course 'Linguaggi, Problemi e Metodi della Comunicazione Scientifica',
by Prof. Marco Cagnotti ('I Fondamenti della Comunicazione')
by Prof. Maria Freddi ('Writing in English for Scientists')
by Prof. Alessandro Bacchetta ('Presentation Making')
by Prof. Gianluca Mainino ('Public Speaking')
University of Pavia, 2018
34 hours

Seminar 'Dynamic Interactions in Smart Electronic Power Distribution Systems',
by Prof. Paolo Mattavelli,
University of Pavia, 2017
2 hours

EECI International Graduate School on Control, 'Computational Issues in Nonlinear control and estimation',
by Prof. Arthur Krener,
University of Padova, 2018
21 hours

Course 'Regularization Methods for Machine Learning',
by Prof. Lorenzo Rosasco,
University of Genova, 2018
22 hours

Course 'SummeR School - Data mining and data analysis with R',
by Dott. Davide Gentilini and Dott. Antonino Oliveri,
University of Pavia, 2018
20 hours

Seminar 'Fast Radial Basis Functions for Engineering Applications',
by Prof. Marco Evangelos Biancolini,
University of Pavia, 2018
2 hours

Seminar 'Open Access, Open Data, Open Science',
by Prof. Paola Galimberti,
University of Pavia, 2018
8 hours

Course 'Self branding',
organized by Assolombarda,
Sede di Assolombarda, Milano, 2019
20 hours

4th Spring School 'Data-driven Model Learning of Dynamic Systems',
by Prof. Xavier Bombois ('Linear System Identification'; 'Design of Optimal Identification Experiments')
by Prof. Paul Van den Hof ('Dynamic Network Identification')
by Prof. Laurent Bako ('Hybrid System Identification')
Ecole Centrale de Lyon, Ecully, France, 2021
17 hours

Data

28/12/2021

Luogo

COMISO (RG)

CURRICULUM VITAE OF ALESSANDRO INCREMONA

PERSONAL DETAILS

Date of birth and place: June 28th, 1993, Comiso (RG), Italy
Residence: Via Galileo Galilei, 70, 97013, Comiso (RG), Italy
Domicile: Via Defendente Sacchi, 13, 27100, Pavia (PV), Italy
mobile: +39 334 2639630
e-mail: alessandro.incremona@gmail.com



CURRENT POSITION (since November 2021)

Data Scientist, at VIDRIO Italia, Via San Felice al Monastero 4, 27100 Pavia (PV), Italy.

PREVIOUS POSITION (October 2020 - October 2021)

Postdoctoral Researcher in Electronics, Computer Science and Electrical Engineering, Academic Discipline (SSD) ING-INF/04–AUTOMATICA, at University of Pavia, Dipartimento di Ingegneria Industriale e dell'Informazione, Via Ferrata 5, 27100 Pavia (PV), Italy.

EDUCATION

Ph.D., October 2020, Electronics, Computer Science and Electrical Engineering PhD School
University of Pavia, Pavia, PV, Italy
THESIS - Machine Learning methods for long and short term energy demand forecasting
Advisor - Prof. Giuseppe De Nicolao

Master of Science, October 2017, Computer Engineering - Embedded and Control Systems (110 cum laude)
University of Pavia, Pavia, PV, Italy
THESIS - Seasonal components estimation for the long-term forecasting of the Italian electric load
Advisor - Prof. Giuseppe De Nicolao

Bachelor of Science, September 2015, Electronic and Informatic Engineering (110 cum laude)
University of Pavia, Pavia, PV, Italy
THESIS - Sintesi di Controllori Predittivi Vincolati per il Pancreas Artificiale
Advisor - Prof. Lalo Magni

Diploma, October 2013, Faculty of Engineering
Almo Collegio Borromeo, Pavia, PV, Italy

Diploma, July 2012, Liceo Classico (100/100)
Istituto Statale d'Istruzione Superiore "Giosué Carducci", Comiso, RG, Italy

RESEARCH EMPLOYMENTS

Research Intern at *IBM Research*, May - August 2019
IBM Research Technology Campus, Dublin, Ireland
TOPIC - Time series forecasting for IBM Research Castor
Advisor - Engr. Bradley J Eck

RESEARCH ACTIVITIES

Control and identification for an artificial pancreas (B.Sc. Thesis) 2015

Diabetes mellitus is a chronic disease that occurs when the pancreas is no longer able to produce insulin, or when the body cannot effectively use the insulin it produces. This motivates the development of artificial pancreas devices that automatically control blood glucose levels by administering insulin according to suitable closed-loop algorithms. In particular, Model Predictive Control (MPC) is well suited to solve this kind of problem. An improvement of linear MPC performance on a population of 100 virtual patients has been realized through a smart modification of saturation constraints in order to minimize the occurrence of hyperglycemic and hypoglycemic events. This activity was included in the “Artificial Pancreas” project, supervised by Prof. L. Magni.

Models for electric load forecasting (M.Sc. Thesis) 2017

Recently, the analysis of several years of electric load data showed that there is a remarkably stable multiseasonal component that can be exploited for long-term forecasting. This multiseasonal component can be seen as a function defined on a torus (for daily prediction) or hyper-torus (for intra-day prediction). From a computational viewpoint, its estimation can be very inefficient because of large matrices computations required by least squares estimation. In the thesis, an Expectation Maximization algorithm was designed and successfully validated, that exploits orthogonality property of sinusoidal functions in order to reduce computations resorting to FFT-based techniques.

Machine learning techniques for energy time series forecasting (Ph.D. Research) 2020

Time series forecasting is a very active of research in the energy field. Both long-term and short-term forecasting of the energy demand are needed in order to ensure the stability and reliability of supply and for planning maintenance and investing in new capacity. A mixed approach based on spectral analysis, statistical inference, statistical process control and machine learning is being adopted to address electricity and gas forecasting on a national and local scale. In particular, the approach leverages on advanced models of seasonalities as well as on regularization machine learning techniques such as LASSO and ridge regression.

Analysis and forecasting of the energy demand and the bidding strategies of the operators within the Italian Ancillary Service Market (Postdoctoral Research) 2021

The growing usage of renewable energy sources, which are extremely volatile by nature, is making the issue of facing imbalances within the electricity network more frequent and challenging. In the Italian Ancillary Service Market (MSD), Terna manages these imbalances by trading the energy with the qualified units. Each operator wants to maximize its profit by adopting a suitable strategy. In order to do so, it is crucial to predict the expected volumes needed by Terna and to guess the

moves of the other players. A deep data and correlation analysis as well as a variety of statistical and machine learning modelling techniques are required in order to understand which are the most relevant factors that drive the players' decisions and to generate useful insights that can help to create profitable bidding strategies.

Research interests

- Time series forecasting
- Energy forecasting
- Optimization problems
- Machine Learning techniques
- Regularization
- Kernel methods
- Gaussian processes
- Nonlinear estimation
- Spectral analysis
- Fast Fourier Transform
- Statistical Process Control
- Bayesian Learning

Programming languages

- MATLAB
- Python
- C
- Java
- R
- SQL
- Dart

Seminars

Faculty of Engineering
Almo Collegio Borromeo, Pavia, Italy
SEMINAR TITLE - Imparare a Usare ARDUINO
Lecturer - S. Majocchi (ARDUINO.CC)

Spring 2013 – 2015
(Co-organizer)

Tutorial Activity

Faculty of Engineering

2013 – 2015

Almo Collegio Borromeo, Pavia, Italy

Tutor for the students who attend the Faculty of Engineering of the University of Pavia

Faculty of Engineering

2018 – 2021

University of Pavia, Pavia, Italy

Tutor of Identificazione dei Modelli e Analisi dei Dati (IMAD) for the students who attend the Faculty of Engineering of the University of Pavia

PUBLICATIONS

International journals

- [J.1] A. INCREMONA, G. DE NICOLAO, “Spectral Characterization of the Multi-Seasonal Component of the Italian Electric Load: A LASSO-FFT Approach”, *IEEE Control Systems Letters*.
- [J.2] A. INCREMONA, G. DE NICOLAO, F. FUSCO, S. TIRUPATHI, B. ECK, “Aggregation of nonlinearly enhanced expertswith application to electricity load forecasting”, *Applied Soft Computing*.
- [J.3] A. INCREMONA, G. DE NICOLAO, “Short-term forecasting of the Italian load demand during the Easter Week”, *Neural Computing and Applications*.
- [J.4] A. INCREMONA, G. DE NICOLAO, “Regularization methods for the short-term forecasting of the Italian electric load”, SUBMITTED.

HONORS

- Prize in memory of Mons. Cesare Angelini, issued by Associazione Alumni Almo Collegio Borromeo May 2017
- Best poster award: “Spectral characterization of the multiseasonal component of the Italian electric load”, Convegno nazionale Automatica.it (SIDRA), Firenze September 2018
- ETIC distric prize for Master Thesis about ”Ethic and Information and Communications Technologies”, organized by AICA and Rotary International, Napoli May 2019

Reviewer for

- *Automatica*
- *American Control Conference*
- *IEEE Conference on Decision and Control*
- *Internation Journal of Robust and Nonlinear Control*
- *IEEE Control Systems Letters*
- *International Journal of Adaptive Control and Signal Processing*
- *IFAC World Congress*

- *IEEE Transactions on Cybernetics*
- *European Control Conference*

EDUCATIONAL ACTIVITIES

- Unipv course “*Deep Learning and TensorFlow*” by Prof. Marco Piastra, from 04/05/2018 to 14/06/2018, University of Pavia (21 hours).
- Univr course “*Neural Networks for Time Series Analysis*” by Oleksandr Honchar, from 21/03/2018 to 29/03/2018, University of Verona (8 hours).
- Course “*Linguaggi, Problemi e Metodi della Comunicazione Scientifica (“I Fondamenti della Comunicazione”* by Prof. Marco Cagnotti, “*Writing in English for Scientists*” by Prof. Maria Freddi, “*Presentation Making*” by Prof. Alessandro Bacchetta, “*Public Speaking*” by Prof. Gianluca Mainino), from 05/02/2018 to 10/06/2018, University of Pavia - Collegio Nuovo (34 hours).
- Seminar “*Dynamic Interactions in Smart Electronic Power Distribution Systems*” by Prof. Paolo Mattavelli, 20/11/2017, University of Pavia (2 hours).
- EECI International Graduate School on Control, “*Computational Issues in Nonlinear control and estimation*” by Prof. Arthur Krener, from 12/05/2018 to 16/05/2018, University of Padova (21 hours).
- Course “*Regularization Methods for Machine Learning*” by Prof. Lorenzo Rosasco, from 18/06/2018 to 22/06/2018, University of Genova (22 hours).
- Course “*SummeR School - Data mining and data analysis with R*” by Dott. Davide Gentilini and Dott. Antonino Oliveri, from 04/06/2018 to 08/06/2018, University of Pavia - Residenza biomedica - Fondazione Collegio Universitario S.Caterina da Siena (20 hours).
- Seminar “*Fast Radial Basis Functions for Engineering Applications*” by Prof. Marco Evangelos Biancolini, 07/02/2018, University of Pavia (2 hours).
- Seminar “*Open Access, Open Data, Open Science*” by Prof. Paola Galimberti, 16/02/2018, University of Pavia (8 hours).
- Course “*Self branding*” organized by Assolombarda, from 26/02/2019 to 02/04/2019, Milano, sede di Assolombarda (20 hours).
- 4th Spring School “*Data-driven Model Learning of Dynamic Systems*” (“*Linear System Identification*” by Prof. Xavier Bombois, “*Dynamic Network Identification*” by Prof. Paul Van den Hof, “*Hybrid System Identification*” by Prof. Laurent Bako “*Design of Optimal Identification Experiments*” by Prof. Xavier Bombois), from 06/04/2021 to 09/04/2021, Ecole Centrale de Lyon, Ecully - France (17 hours).

SEMINARS AND PRESENTATION HELD

- Presentation (Poster “*Spectral characterization of the multiseasonal component of the Italian electric load*”, Winner of “Best Poster Presentation Award”) at SIDRA Automatica 2018, from 12/09/2018 to 14/09/2018, University of Firenze.
- Presentation (Paper “*Spectral characterization of the multiseasonal component of the Italian electric load*”) at 58th Conference on Decision and Control (CDC), from 11/12/2019 to 13/12/2019, Nice - France.

LAST UPDATE

December 27, 2021

I authorize the processing of my personal data according to Legislative Decree 196 of 30 June 2003 (Italy)