Luca Maurelli's Curriculum Vitae

Data Scientist | Data Engineer

PERSONAL DATA

name & surname:	Luca Maurelli
sex & pronouns:	Male, He\Him
birthdate & birthplace:	June 30, 1993 in Milan, Italy
contacts:	(+39) 340 8192088 lucamaurelli93@gmail.com
location:	Treviglio (BG), 24047, Italy
languages:	Italian, English (spoken B2, written C1)
driving license:	B (cars)

JOB EXPERIENCE

Ph.D. Student at the Department of Engineering and Applied Sciences

Oct 2019 – Current
University of Bergamo

- Theoretical research on the design and estimation of a data-driven direct filter in a stochastic framework formulation and comparison with standard filtering solutions
  (**tools:** MATLAB, YALMIP & Mosek\Gurobi for SDP)
- Project SMART4CPPS, funded by Regione Lombardia, led by 4 OdR and 10 local companies.
  - Management activity of Pilot 1 and Pilot 4
  - Technical activity of Pilot 1: Design of a health monitoring system for electromechanical actuators (University of Bergamo, Camozzi)
  - Technical activity of Pilot 4: Machine learning algorithms for the zero-defect end-of-line tuning of medium-voltage switches (University of Bergamo, Cosberg, ABB, CNR)
    (**tools:** MATLAB)
- Publication of international journal papers and patents regarding academic and industrial results, see items from [C01] to [P01].
  (**tools:** LaTeX, LyX, PowerPoint, VS Code)

Research Assistant at the Department of Management, Information and Production Engineering

May 2018 – Sep 2019
University of Bergamo

- Project CRYOABLATION:
  - Identification of a model and validation of the structure for the study of temperature dynamics in the cryoablation process for atrial fibrillation therapy (Dipartimento di Cardiologia, Ospedale di Seriate)
    (**tools:** MATLAB)
- Project SP@RK-4.0-I.E.S.:
  - Supported design and implementation of a prototype for the acquisition of experimental data in the development of a predictive maintenance system through the analysis of acceleration signals for the fault diagnosis of rotating components (bearings) in high performance work-centers (Mandelli)
    (**tools:** MATLAB, NI C-Daq, LabView)

Software Engineer at Consortium Intellimech (Intership during Master's thesis)

Oct 2017 – Apr 2018

- Project KNOWLEDGIZE, funded by Regione Lombardia, led by Consortium Intellimech, with 2 OdR and 3 local companies.
  - Development of a Django-based web platform for corporate knowledge management by searching for similar tags on content using ML algorithms related to natural language processing through Google cloud services (University of Bergamo, University of Brescia, Cosberg, Elettrocablaggi, Ronzoni)
    (**tools:** Django, Python, Gensim word2vec Skip-Gram model)
- Supported development of software applications:
  - Push-bottom panel for testing procedures on a PLC in C#
  - Development of a monitoring system through an MQTT publisher-subscriber infrastructure between gateway and industrial nodes with support to different communication protocols (MQTT, MTCONNECT, UPC-UA and MODbus) in Python

EDUCATION

Master's degree in Computer Science, University of Bergamo, Italy 110L/110
Development of a Knowledge Management Web Platform with an Innovative ML Algorithm based on Tag Searching Mar 29, 2018

Bachelor's degree in Computer Science, University of Bergamo, Italy 105/110
Development of a library for Mobile Robot Trajectory Control Sep 30, 2015

POST-GRADUATE EDUCATION

Ph.D. **Courses** in:

- *Nonlinear System Identification* 48h, Jan 2019, Politecnico of Milan, Italy
  Proff. L. Piroddi, S. Formentin, S. Garatti, G. Panzani and L. Fagiano
- *Optimization Models and Algorithms* 24h, Jul 2019, University of Bergamo, Italy
  Prof. M. T. Vespucci
- *Advanced Mathematical Methods for Engineering* 24h, Oct 2019, University of Bergamo, Italy
  Proff. M. Pedroni and A. Raimondo
- *Advanced Numerical Methods for Engineering* 20h, Nov 2019, University of Bergamo, Italy
  Prof. C. Vergara
- *Noise and Vibration Control Engineering* 15h, Nov 2019, University of Brescia, Italy
  Prof. N. B. Roozen
- *Statistical Signal Processing in Engineering* 26h, Jan 2020, Politecnico of Milan, Italy
  Prof. U. Spagnolini
- *Numerical Methods for Optimal Control* 30h, May 2020, IMT School for Advanced Studies Lucca, Italy
  Prof. M. Zanon
- *Advanced English Course* 16h, Jun 2020, University of Bergamo, Italy
  Prof. S. J. Kingshott
- *Optimization Models and Algorithms* 15h, Jun 2020, University of Bergamo, Italy
  Prof. M. T. Vespucci
- *Advanced methods for system identification* 20h, Jul 2020, University of Bergamo, Italy
  Prof. M. Mazzoleni
- *Model Predictive Control* 26h, Sep 2020, Politecnico of Milan, Italy
  Proff. M. Farina, R. Scattolini and L. Fagiano
- *Algorithmic Game Theory* 16h, Oct 2020, University of Bergamo, Italy
  Prof. N. Gatti and Dr. A. Marchesi
- *Applied Functional Analysis and Machine Learning* 16h, Nov 2020, University of Padova, Italy
  Prof. G. Pillonetto
- *Applied Linear Algebra* 16h, Nov 2020, University of Padova, Italy
  Prof. L. Schenato
- *Feedback Control in Finance* 25h, Mar 2021, Politecnico of Milan, Italy
  Prof. S. Formentin

Ph.D. **Schools & Workshops** in:

- *EECI-IGSC 2019 – Model based Fault Diagnosis using a MATLAB Linear Framework* 48h, Mar 2019, University of Padova, Italy
  Proff. A. Varga and D. Ossmann
- *Machine Learning: A Computational Intelligence Approach* 20h, Jun 2020, University of Genova, Italy
  Proff. F. Masulli and S. Rovetta
- *RegML 2020 – Regularization Methods for Machine Learning* 20h, Jun 2020, University of Genova, Italy
  Prof. L. Rosasco
- *IFAC 2020 – Set-based Methods in Estimation and Control* 6h, Jul 2020, IFAC (Virtual)
  Proff. R. Paulen, M. E. Villanueva and B. Chachuat
- *SPRING-ID 2021 – Data-driven Model Learning of Dynamic Systems* 20h, Apr 2021, École de Lyon (Virtual)
  Proff. B. Xavier and P. Van den Hof
- *EECI-IGSC 2021 – From Data to Decisions: the Scenario Approach* 48h, Feb 2021, IGSC (Virtual)
  Proff. M. C. Campi and S. Garatti
- *EECI-IGSC 2021 – Learning to Control* 48h, May 2021, IGSC (Virtual)
  Prof. S. Formentin

Ph.D. **Seminars** in:

- *Optimization and control of airborne wind energy systems*
- *Identification for Control*
- *Fault diagnosis application in industry and mechatronics*
- *Kernel-based learning for system identification*

TEACHING EXPERIENCE

Lecture Assistant of the following **MSc courses** at the University of Bergamo:

- *Controlli Automatici* A.Y. 2018/2019 — italian **exercises**, 20h, Sep – Dec 2018
- *Controlli Automatici* A.Y. 2019/2020 — italian **exercises/lectures**, 12h, Sep – Dec 2019
- *Dynamic System Identification* A.Y. 2019/2020 — english **exercises**, 18h, Jan – Jun 2020
- *Controlli Automatici* A.Y. 2020/2021 — italian **exercises**, 12h, Jan – Jun 2021
- *Identificazione dei Modelli ed Analisi dei Dati* A.Y. 2020/2021 — italian **exercises**, 12h, Jan – Jun 2021
- *Controlli Automatici* A.Y. 2021/2022 — italian **exercises**, 12h, Sep – Dec 2021
- *Identificazione dei Modelli ed Analisi dei Dati* A.Y. 2021/2022 — italian **lectures**, 16h, Jan – Jun 2021

Co-advisor of the following **MSc theses** at the University of Bergamo:

- *Sviluppo preliminare di un sistema di health monitoring per un attuatore elettromeccanico* — Mar 2019
  Advisor: prof. F. Previdi — Students: Davide Palazzini, Alen Preda
- *Data-driven health monitoring di attuatori elettromeccanici per automazione industriale* — Dec 2019
  Advisor: prof. F. Previdi — Students: Davide Presciani, Matteo Gusmini
- *Simulatore elettro-termo-meccanico di strisce bimetalliche per interruttori industriali a bassa tensione* — Dec 2019
  Advisor: prof. F. Previdi — Student: Paolo Pasinetti
- *Predizione della vita utile residua di valvole elettropneumatiche usando tecniche di machine learning* — Apr 2020
  Advisor: prof. F. Previdi — Student: Angela Pomata
- *Modellazione, simulazione ed auto-tuning di fine linea per interruttori industriali a bassa tensione* — Mar 2021
  Advisor: prof. F. Previdi — Student: Simone Zanni
- *Progettazione di un algoritmo data driven per la predizione della vita utile residua di valvole elettropneumatiche* — Jul 2021
  Advisor: prof. F. Previdi — Student: Simone Sudati
- *Misure di temperatura per la stima della vita utile residua di valvole industriali* — Mar 2022
  Advisor: prof. F. Previdi — Student: Michele Brillante

PUBLICATIONS

International conferences

[C01] M. Mazzoleni, M. Scandella, L. MAURELLI, F. Previdi.
Mechatronics applications of condition monitoring using a statistical change detection method
21st IFAC World Congress, Berlin, Germany, July 12-17, 2020 DOI

[C02] L. MAURELLI, M. Mazzoleni, F. Previdi.
Modeling and simulation of bimetallic strips in industrial circuit breakers
19th IFAC Symposium on System Identification, (Virtual) Padova, Italy, July 14-16, 2021 DOI

International journals

[J01] L. MAURELLI, M. Mazzoleni, A. Camisani, F. Previdi.
Physics-informed Remaining Useful Life estimation of cost-effective solenoid valves using significant points of the excitation current
Finished - to be submitted

[J02] L. MAURELLI, M. Mazzoleni, F. Previdi.
Direct Filtering
In preparation

International patents

[P01] L. MAURELLI, M. Mazzoleni, A. Camisani, F. Previdi.
Brevetto Camozzi Automation
Finished - to be submitted

PRESENTATION LETTER

About me: I like Linux and have experience with the ArchLinux OS. I am interested in personal finance, savings and investments. For my physical and mental wellbeing I practice Badminton and train weight lifting in the gym.

About work: I am interested in signal processing, in particular in data cleaning (outliers and anomalies detection) and transformation techniques (normalization and features selection/extraction/engineering). I like to model time series and dynamic systems in order to solve prediction, forecasting, and filtering problems. I invest time in data visualization to provide an effective way to explore data or to provide powerful insights on data.