Giovanni De Felice

PH.D. STUDENT · COMPUTER SCIENCE · UNIVERSITY OF LIVERPOOL

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Personal Profile

I am a Ph.D. student in Computer Science, with a background in experimental particle physics. Zealous about interdisciplinary research between Machine Learning (ML) and Science. Primarily, looking for internship opportunities that nicely fit my research interests in Spatio-Temporal ML.

Education

University of Liverpool — *Liverpool, UK*

Ph.D. in Computer Science — *Nov 2020 - Present*

- **Project:** "Spatio-Temporal Machine Learning and Data Mining with applications in Material Science"

University of Pisa — *Pisa, Italy*

Master's Degree in Particle Physics — *Sept 2018 - Oct 2020*

- **Courses:** Statistical Data Analysis, Monte Carlo Methods, Computing Methods for Experimental Physics and Data Analysis, Particle Physics Laboratory, Fundamental Interactions, Particle Physics, Astroparticles, Accelerator Machines, Theoretical Physics, Discrete Symmetries.
  Avg. grade: 29.5 / 30
- **Thesis:** "An updated estimate of the Mu2e experiment sensitivity"
- **Grade:** 110 / 110 cum laude

University of Pisa — *Pisa, Italy*

Bachelor's Degree in Physics — *Sept 2015 - Sept 2018*

- **Thesis:** "The experimental and statistical aspects of the research for $H \rightarrow Z\gamma$ at CMS"
- **Grade:** 109 / 110

Scientific Lyceum Ignazio Vian — *Bracciano, Rome, Italy*

High School Diploma — *Sept 2010 - Aug 2015*

- **Thesis:** "Crisis of physical sciences - even watches are clouds (K.Popper)"
- **Grade:** 100 / 100

Research Projects

Spatio-Temporal Kriging in Weathering, Green-Energy Output and Healthcare Problems — *Liverpool, UK*

University of Liverpool — *Oct 2022 - Present*

- From a dataset of spatial Multivariate Time-Series, predictions of missing sensors in untested locations;
- Serf-supervised learning of a graph representation followed by a Graph-Guided Network;
- Applications: material weathering and energy output in untested climates, epidemiology, general healthcare and traffic predictions.

Weathering Predictions of Paint Formulations — *Liverpool, UK*

Beckers Group / University of Liverpool — *Dec 2020 - Present*

- Use mid-term weathering data to predict longer term performances;
- Use full-history weathering data to predict performances in new locations;
- Use accelerated tests data to provide additional information;
- Extract greater formulatory information and direct development of new products.

Efficient Time Series Kernel from NVAR Embeddings — *Liverpool, UK*

University of Liverpool — *May 2022 - Present*

- Kernel for Time Series data comparing the linear dynamics of a Nonlinear Vector Autoregressive embeddings of the series;
- High efficiency for long time-series;
- Handling of univariate and multivariate time-series of different length.

Internships

Fermi National Accelerator Laboratory *Batavia, IL (USA)*

DOE-INFN Summer Students *Jul 2019 - Sept 2019*

- Improved model for antiproton production from protons on heavy nuclei.
- Numerical integration of the production cross-section.
- Comparative study of the antiproton background in the Mu2e muon beamline and experiment.

University of Goettingen *Goettingen, Germany*

HASCO Summer School *Jul 2019 - Jul 2019*

- Advanced lessons on frontier topics in theoretical and experimental particle physics.
- **Final grade:** A with special mention

Publications

- **G. De Felice**, V. Gusev, J. Y. Goulermas, M. Gaultois, M. Rosseinsky, C. V. Gauvin, "Spatio-Temporal Weathering Predictions in the Sparse Data Regime with Gaussian Processes", *NeurIPS 2022 AI for Science: Progress and Promises*, (2022).
  `https://openreview.net/forum?id=wHP9Y5T83A5`
- Mu2e Collaboration, "Mu2e Run I Sensitivity Projections for the Neutrinoless $\mu^- \to e^-$ Conversion Search in Aluminum", (2022).
  `https://arxiv.org/abs/2210.11380`
- **G. De Felice**, "An updated estimate of the Mu2e experiment sensitivity", *Master's degree thesis* (2020).
  `https://www.osti.gov/biblio/1763411`

Talks

- "Addressing materials weathering with Spatio-Temporal Machine Learning", speaker at *"Machine Learning Applications for Chemical Materials Development and Discovery"*, University of Liverpool, 26 Jan 2022.
- Three talks in two *Mu2e Collab. Meeting*, Jun 2020 and Oct 2020.

Skills

Programming	Python (PyTorch, Pandas, NumPy, Scikit-learn. Matplotlib, Plotly, etc.), C/C++, Root.
Miscellaneous	Shell (Bash), LaTeX(Overleaf/TexStudio), Microsoft Windows, Linux, MacOS, Microsoft Office, Git.
Soft Skills	Inter-disciplinary Vision, Creativity, Teamwork, Time Management, Scientific Writing, Oral Presentation.

Languages

English	Professional proficiency, (C1 level, IELTS overall band score: 7.5/9)
Italian	Native proficiency
French	Basic proficiency

Interests

Music and Classical Piano

Italian Conservatory Journey for Classical Piano and related experiences

- **Classical Piano Degree Admission:** Higher institute of musical studies Pietro Mascagni, Livorno, Italy. Grade: 8/10 (2nd place) (2015);
- **Mid-term exam:** Conservatory Alfredo Casella, l'Aquila, Italy. Grade: 9/10 (2013);
- **Solfeggio and theory of music:** Conservatory Nino Rota, Monopoli, Bari, Italy (2011);
- **GRADE 1 exam:** The Associated Board of the Royal Schools of Music, Varese, Italy. Grade: pass with distinction (2007);
- Alto Saxophone (2022);
- Keyboard live concerts in Italy and France (2013-2015), Pianist in a theater-dance spectacle (2014), Orchestra and Chamber Music (2010-2015).

Others

Other interests and activities

- **Sports:** I love and practice Swimming, Basketball, Skiing, Fishing and Mountain Hiking;
- **Voluntary:** I participated as a voluntary in multiple Special Olympics Italia events;
- **Computer assembly:** I love following the development of PC hardware and assembling desktops.

References available upon request.