

Nicolò Defenu – Resume

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Executive Summary

- Theoretical Physics, PhD with extensive experience in programming (Python, Matlab), statistics, data analysis and machine learning.
- Experience in leading employees and coordinating team members with diverse range of expertise.
- Advanced communication skills and presentation of results (both orally and visually) to a diversified audience.

Relevant Experience

■ Research Associate at ETH Zürich

- Coordinated learning groups in advanced statistical mechanic topics.
- Reported project results to a mathematics and physics collaboration network.
- Analysed the collective behaviour in general data-structures with long-range correlations.

■ Research Associate at Heidelberg University

- Obtained funding for a project on the detection of collective behaviour of data clusters in the Big-Data limit.
- Coordinated the Young researcher board initiative for travel funding.
- Supervised the realisation of a novel machine learning algorithm for phase recognition in magnetic systems.
- Analysed experimental data on dynamics of cold atom clouds.
- Coordinated the master course in statistical physics.
- Tutored master students in statistical mechanics and non-linear physics.

■ PhD student at SISSA, Trieste

- Created the SQL database of former SISSA alumni.
- Maintained the official condensed matter group website.
- Attended several course in business management within the Re-Seed entrepreneurship program.

Skills

■ Programming

- Python, Matlab (advanced, 750+ hours).
- C, C++ (intermediate, 250+ hours).
- HTML, SQL (basic).

■ Data science/Statistics

- Machine Learning: regularised regression, convolutional neural networks, partial least square regression, unsupervised learning, data classification, restricted Boltzmann machines.
- Dimensionality reduction: PCA, PCR, SVD.
- Information theory: principle of maximal entropy, principle of minimal sensitivity, Kullback–Leibler divergence.
- Statistic test methods: t-test, χ^2 -test, ANOVA.
- Data Visualization: Matplotlib, gnuplot, illustrator, excel.

Education

- 11/2010** BSc with honors - Sapienza University of Rome, Roma
110/110 cum laude - 28/30 Average
Third Year Project - Second Quantization with application to phonon propagation.
Advisor: M. Testa
- 10/2012** MSc with honors - Sapienza University of Rome, Roma
110/110 cum laude - 29/30 Average
Final Year Project -Overhauser method for pair correlation function calculation applied to density functional theory.
Advisor: J. Lorenzana
- 10/2016** PhD with honors - International School for Advanced Studies (SISSA), Trieste
PhD cum laude (Maximum degree in the Italian System)
PhD Thesis -Application of Functional Renormalization Group Approach to spin systems and long range models.
Advisors: S. Ruffo, A. Trombettoni and A. Codello

Past Positions

- Dec 2016** Institute for Theoretical Physics (ITP), Philosophenweg, 19 - 69120 Heidelberg, Germany
Four years Post-Doc position in the group of Dr. Tilman Enss and member of the ISOQUANT collaboration

Present Position

- March 2020** Institute for Theoretical Physics, ETH Zürich, Wolfgang-Pauli-Str. 27, 8093, Zürich, Switzerland
Two years Post-Doc position in the group of Prof. Dr. Gian Michele Graf

Awards, Fellowships and Projects

- **Percorso Imprenditoriale Re-Seed**
2014-Awarded of a project-based fellowship to fund a one year business management course.
- **Fellowship for EU collaborations**
2015-Awarded of the merit-based *Job Placement* fellowship to fund a two months visit at the Ruprecht-Karls-Universität in Heidelberg.
- **Exploratory project within STRUCTURES cluster**
2019-Leading investigator of the exploratory project “Universality on network structures” within the cluster “Structures” at the University of Heidelberg.