Paolo Avogadro

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when	where	appointment
01/07/**2021**-present	**Italy,** Essig Research, USA Essig PLM, USA	**Software and Data consultant**

01/05/**2015**-31/06/**2021** **Italy,** UNIMIB **Computer/Data Science researcher**

- Machine Learning: develop (C/C++, Python and Fortran) and apply new technologies for **anomaly detection** in **time series** (in collaboration with Thales Alenia Space). I ranked **top 6**% (170 teams) at the **KDD 2021** - Multi-dataset Time Series Anomaly Detection competition. Use and assess supervised models (**Scikit-Learn**, **Seaborn**, **Jupyter Notebook**). Instruct students on the utilization of these tools.

- Deep Learning: (via **PyTorch**), Convolutional Neural Networks, RNN, GRU, Autoencoders, etc.

- Statistical Analysis: use statistical methods in order to analyze project data (e.g. ENEL portal) **Numpy**, **Pandas**, **Scipy** and **R**.

- Big Data: **Map-reduce** via **MRJob**.

- Parallel Computing: use the main High Performance Computing (HPC) technologies (**MPI**, **OpenMP**, **CUDA**). Teaching and coaching master

students.

- Social Network Analysis: theoretical and numerical study of the social network (**centrality measures**, relevant figures, etc.)
- KPI**:** formulate **new indicators** to analyze and control user populations (**soft skills** analysis).
- Learning Management Systems**:** develop **social-LMS** (**Pollicina**) and define new social tools. Analyze data from Bicocca LMS (Moodle).

when	where	appointment	what
2/9/**2013** 30/4/2015 (20 months)	**Italy**, Self-employed	**Teaching, updating**	Physics, Mathematical Analysis I + II, Statistics, Algebra.
3/1/**2012** 1/9/2013 (18 months)	**USA**, TAMU	**Physics**	Calculations of Giant Resonances in the QRPA framework. Development of numerical codes for explaining experimental data on Giant resonances.
2/1/**2011** 1/2/2012 (12 months)	**Italy**, UNIMI	**Physics**	The effect of a reduced pairing interaction on vortices in the inner crust of Neutron stars. Optimization of the numerical code and analysis of the numerical experiments.
1/6/**2008** 1/1/2011 (30 months)	**Japan**, RIKEN	**Physics**	Development of the Finite Amplitude Method for the QRPA and writing a fully self consistent QRPA code.
2007 2008 (6 months)	**Italy**, UNIMI	**Physics**	Creation of the first microscopic code for studying vortex-nucleus interaction in the inner crust of neutron stars.

Education

Ph.D., Nuclear Astrophysics, Università degli Studi di Milano, Milan, Italy. 2007
Thesis: *Quantum calculations of Vortices in the inner crust of neutron stars,*
Advisor: Ricardo A. Broglia

M.Sc., Theoretical Physics, Università dell'Insubria, Como, Italy. 2003
Thesis: *Stochastic perturbations of dynamical system on a lattice*
grade: 110/110, Advisor: Giorgio Mantica

Schools & Courses:

"Software Developer Workshop - Technical Computing & Artificial Intelligence" Milano, 25-26 Ottobre 2017.

"Understanding Bayesian Networks with examples in R", M.Scutari, Universita' Cattolica, Milano, January 2017. "12TH Advanced School on Parallel Computing"

"Tools and techniques for massive data analysis" Milano (CINECA-Segrate), Italy , October 14-15-16, 2015. Bologna-CINECA February, 15th – 19th 2016

"Parallel Calculations on Grid and CSN4 Cluster" (Secondo corso di formazione "Calcolo Parallelo su Grid e CSN4 cluster). Parma, Italy, 26-28 Sept. 2011

"6th Nordic Summer School: Nuclear Physics" Hillerød, Denmark, 8 - 19 August 2005

"Quantum Chaos: Theory and Applications", Villa Olmo, Como, June 17-22, 2003

"Physics of Black Holes" Villa Olmo, Como, April 20-24, 1998

Languages

		USA/Japan scale	EU scale
English	very fluent	ILR level 4	C1
Italian	native	ILR level 5	C2
Spanish	conversational	ILR level 3	B1
Japanese	beginner/average	JLPT 3 (2010)	A2
French	beginner/average	ILR level 2	A2

Teaching and Presentations:

I have been the assistant professor for the "Sistemi di Calcolo Parallelo (Parallel Calculation)" course (from 2015/2016 to 2020/2021) at the Department of Computer Science (DISCo) at the University of Milan-Bicocca, focusing on theory

and application of MPI, OpenMP, CUDA and Hadoop (my lecture notes: https://4phycs.github.io/). I co-tutor university students, usually from the Computer Science and Statistics Department, for the development of their theses (master and doctorate level). I gave presentations in many international conferences and invited talks I am used to reach experts and non-specialized audiences. In my view, a presentation should be a careful selection of important points with simple visual connections. The papers and presentations at KMIS 2015 and E-society 2016 obtained the best paper award (https://github.com/4phycs/presentations). I have a long standing experience in tutoring math and physics both at high school and university level.

Technical Skills:

Problem Modeling:	Data and process modeling.
Data visualization:	Use clear graphs to guide intuition with **Matplotlib**, **Seaborn**, and **Gnuplot**. Beamer or **Powerpoint** presentations to convey the results.
Statistical analysis:	With the correct metrics (**R**) turn data into information and knowledge for understanding and govering processes.
Machine learning:	Use and development of supervised tools (**Scikit-Learn**), performance analysis. Neural Networks (**PyTorch**). Use of Bayesian inference (**PyMC**). Basic Natural Language Processing (**NLP**). Unsupervised clustering and anomaly detection. Time series analysis (**Pandas, SQL**).

Technology environments:

	Linux **Windows** **OS-X**
	Local virtualization (e.g. **VirtualBox**)
	Amazon **AWS** Cloud
	Jupiter notebook
	Distributed Version-control: **Git**

Computer Languages and Programming:

Fortran, C/C++, R, Python, Latex, Bash, SQL, (learning Go)

Numeric Libraries	Lapack, Blas, FFTW3,...
Parallel Computing (HPC)	MPI, OpenMP, CUDA

Distributed Computing	Map-Reduce via MRJob

Workstyle and Soft Skills:

I use the **scientific mindset** for everyday work and for **problem-solving**. I am accustomed to **making mathematical models** and adjusting them for computational solutions. **International environments** are natural for me. I enjoy collaborative teams where I can learn from the other members and bring my contribution. **Remote collaborations** are not a problem and I can work at both detailed and strategic levels with my colleagues. I learn from my own mistakes, since I believe that they are normal in the process of improvement; when they happen, I consider them carefully in order to move forward as a person and as a professional. I am experienced at submitting papers to “top of the field” international journals. I am acquainted with the reviewer interactions, to analyze and discuss their objections, and to **reshape my work to match the requirements** for a clear publication. I enjoy learning about other cultures, and, when I have time, learning new languages or improving the ones I already know.

Personal Interests:

skiing, swimming, soccer, reading, mushroom hunting, rock climbing, traveling, learning languages, math and physics blogs.

Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base art. 13 del D. Lgs. 196/2003.