

Dario Del Giudice, PhD

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TECHNICAL HIGHLIGHTS & LEADERSHIP EXPERIENCE

- 10 year of data science experience (first internationally recognized machine learning project with python in [2012](#)).
- Unique background, successfully leading diverse teams at world-class research institutions & a Fortune 500 corporation.
- Passionate about model building / validation, discovery / predictive analytics, Bayesian statistics, computer programming.
- Supervised >12 scientists / modelers, authored >20 articles in prestigious journals (e.g. Science, Nature).

PROJECTS ACCOMPLISHED

- Led a German-Danish collaboration and, through a novel Bayesian data assimilation method using Gauss-Markov processes, achieved forecasting accuracy and precision approx. 30% higher than with traditional techniques.
- Drove a Stanford-Chinese partnership leveraging data mining methods to find key predictive features. The selected weighted regression model was able to fit the data 10% better while using one less predictor than existing models.
- Coordinated a team of economists to quantify value-at-risk using mixture distributions, considering parameter uncertainty and correlation between tails, which ended up freeing millions \$ for the institution to be invested more efficiently.

EDUCATION

- PhD, Engineering (computational statistics, hidden Markov models), ETH Zurich, Switz. 2015
- MSc, Engineering (quantitative methods, risk analysis), École Polytechnique, Switz. *Summa cum laude*. 2011
- BSc, Sciences (system modeling, network analysis), University of Bologna, Italy. *Summa cum laude*. 2009

PROFESSIONAL EXPERIENCE

- **Lead Data Scientist, Allstate Insurance.** 2021 – now
- **Sr Data Scientist.** 2020 – 2021

Managing a team of data scientists and driving forward projects on quantifying capital for lines of business in case of tail events, aggregating financial risks using asymmetric copulas, generating operational risk scenarios via compound loss distribution and quantile fitting. Ranked among top performers. Example of achievements:

- o Developed a flexible model selection framework based on maximum likelihood and mixture distributions to quantify extraordinary risks associated to events such as pandemics. The statistical model was praised by the CRO for its rigor.
 - o Built Bayesian vector autoregressive models to predict the response of market variables to economic downturns.
 - o Identified drivers of employee performances applying multiple unsupervised (e.g. PCA) and supervised (e.g. decision trees) learning algorithms to survey results with thousands of entries. Project results received department-wide praise.
- **Postdoctoral Researcher, NC State.** 2018 – 2020

Initiated and executed studies in predictive modeling, including:

- o Developed a dynamic mechanistic model combined with random forest to predict the temporal evolution of pollutants in lakes. Inferred model parameters in a Bayesian framework considering heteroscedastic volatility.
 - o Integrated a biophysical and space-time geostatistical model to probabilistically forecast oxygen levels in estuaries.
- **Postdoctoral Scholar, Stanford.** 2015 – 2017

Accomplished projects in supervised learning, for example:

- o Identified controls of temporal variability of anoxic zones in rivers via a model selection framework based on weighted regression, cross-validation and geostatistical conditional simulation.
 - o Evaluated multiple likelihood functions to optimally estimate parameters of time series models under high bias.
- **PhD Researcher, Swiss Institute of Technology Zurich.** 2011 – 2015

Successfully led multiple scientific collaborations, for instance:

- o Developed a transformed hidden Markov model to better estimate precipitation in conditions of data scarcity. The model was combined with Gibbs sampling to estimate the paths of the stochastic process and improve rainfall forecasts.
- o Expanded a Bayesian-multi-objective calibration algorithm to incorporate autoregressive residual errors and thus more efficiently incorporate diverse data sources to eventually predict sediment transport in streams more reliably.

- **Research Engineer Intern, e-dric, Switz.** 2010
Improved time-series forecasting models, programmed in VBA. Awarded for outstanding performances in industry.

COMMUNICATION SKILLS

- Invited to present statistical methods and project results in Switzerland, France, Denmark, Austria, Germany, UK, US.
- Co-taught six classes in advanced statistics, information technology, predictive modeling, convolution, time series.
- Facilitated Stanford workshops to help scientists effectively communicate their technical knowledge to diverse audiences.

HONORS & AWARDS

- Selected by USCIS as individual of Extraordinary Ability. 2018
- Best Paper Award, modeling conference, Serbia. 1 prize awarded over > 170 papers. 2012
- Veolia Award for the most innovative project, France. 1 prize awarded over > 50 candidates. 2011
- Société de géomatique Prize for the best grade & Environment Prize for an excellent thesis, Switz. 2011
- Grivat Scholarship for the most meritorious student, Switz. 1 grant awarded over ~ 150 students. 2010
- Excellence Scholarship for outstanding performance, Switz. ~1 grant awarded per ~100 students. 2009

SKILLS

- **Software:** R (mcmc, caret, dplyr, zoo, ggplot, knitr), Python (sklearn, pandas, keras), Matlab, Excel, LaTeX, SQL.
- **Languages:** English (fluent), Italian (fluent), French (fluent), Spanish (fluent), German (fluent), Latin (intermediate), Portuguese (intermediate).