# **DANIELE BIGONI**

# http://www.limitcycle.it/dabi - dabi@limitcycle.it

# **PROFESSIONAL SUMMARY**

Solid experience in leading the research and development of algorithms for data analysis, data assimilation and prediction in the context of model driven simulations. Confident with methods for stochastic modeling and statistical analysis. Strong familiarity with the development and distribution of scientific computing software for standalone and distributed architectures. Experience with applications in mechanics, fluid dynamics, geophysics and finance. Strong project origination and management skills.

### EDUCATION

2011 – 2014	PhD., Applied Mathematics and Computer Science – Technical University of Denmark
2009 – 2011	M.Sc., Mathematical Modeling and Computation – Technical University of Denmark
2005 – 2008	B.Sc., <b>Computer Science</b> – Università degli Studi di Trento, Italy

# QUALIFICATIONS

TECH. & PRO	GRAMMING	MATHEMATICS
Python, C++, Fortran, Cuda	C, MPI, SQL,	Stochastic Modeling, Statistical Learning,
GNU/Linux, macOS	Software engineering	Numerical Analysis, Stochastic Optimization,
Git, CI/CD	Docker, Kubernetes	Computational Fluid Dynamics, Control,
AWS, Azure	RESTful API, AMQP,	Non-linear Dynamics, Filtering & Smoothing

#### **PROFESSIONAL EXPERIENCES**

2025 – now 2019 – 2024	<ul> <li>Ind &amp; Func Al Decision Science Manager – Accenture S.p.A, Modena, Italy</li> <li>Data Scientist – Team Lead – Head of Data Science – Ammagamma s.r.l., Modena, Italy</li> <li>Led a team of up to 40 data scientists with skills in forecasting, optimization, SciML, genAl.</li> <li>Sample of projects: data assimilation for oil spill response operations (presented @ SIAM UQ24), routing optimization for autonomous guided vehicles, optimal experimental design for compound production (oil&amp;gas, food)</li> </ul>
2015 – 2019	<ul> <li>Postdoc. Associate &amp; Research Scientist – Massachusetts Institute of Technology, USA</li> <li>Led the development of software for inference and learning (transport maps)</li> <li>Led the research of transport methods for filtering with applications to weather forecast</li> <li>Analyzed real data for the quantification of uncertainties in a scramjet engine (DARPA)</li> </ul>
2010 – 2013	<ul> <li>Consultant and Software Developer – Danish Product Development Ltd., Denmark</li> <li>Developed software for the early diagnosis of Parkinson disease</li> </ul>
2011	Internship on Multi-body Simulations – Alstom Transport, France • Analyzed the non-linear dynamics of very high-speed train AGV
2007	IT support – Università degli Studi di Trento, Italy

#### CODES

transportmaps.mit.edu	Bayesian inference via transport maps – Python
bitbucket.org/dabi86/tensortoolbox	Tensor decomposition & function approximation – Python
github.com/daniele-bigoni/dytsi	DYnamic Train SImulation (DYTSI) – C++
semilattices.readthedocs.io	Lightweight construction of indexes on semilattices – Python

### **SELECTED PUBLICATIONS**

Bigoni, D., Engsig-Karup, A. P., & Marzouk, Y. M. (2016). Spectral Tensor-Train Decomposition.
SIAM Journal on Scientific Computing, 38(4), A2405–A2439. https://doi.org/10.1137/15M1036919
Bigoni, D., True, H., & Engsig-Karup, A. P. (2014). Sensitivity analysis of the critical speed in railway vehicle dynamics. Vehicle System Dynamics, (May 2014), 272–286. https://doi.org/10.1080/00423114.2014.898776

Spantini, A., **Bigoni, D.**, & Marzouk, Y. (2018). Inference via low-dimensional couplings.

Journal of Machine Learning Research. http://jmlr.csail.mit.edu/papers/v19/17-747.html

Bigoni, D., A. Spantini, R. Baptista, Y. Marzouk (2019) Variational Bayesian filtering and smoothing via lowdimensional transports. *7th International Symposium in Data Assimilation*. Kobe, Japan (Best poster award)

Brennan, M., **D. Bigoni**, O. Zahm, A. Spantini, and Y. Marzouk (2020) Greedy inference with structure-exploiting lazy maps. *Advances in Neural Information Processing Systems*. https://proceedings.neurips.cc/