BILAL AL TAKI

Assistant Professor in Applied Mathematics
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SUMMARY

I am currently a Project Manager in the Research and Innovative department at Capgemini Engineering, where I lead a dynamic team focused on the development of a floating datacenter powered by renewable energy. I am also a Part-Time Lecturer at Léonard de Vinci Graduate School of Engineering.
Nowadays, I am seeking for an Assistant Professor position with an opportunity to pursue my interests in the field of PDEs applied to fluid mechanics systems, and/or in the interface between PDEs and the Artificial Intelligence field.

EXPERIENCE

4/2023 – Present **Project Manager** **Capgemini Engineering, Paris**
- Coordination of multidisciplinary technical studies for the development of a floating data center in the sea.
- Technical leadership in implementing innovative solutions to address challenges associated with the design and maintenance of the offshore data center, based on hydrodynamic stability studies and mechanical calculations.
- Supervision of in-depth thermodynamic studies aimed at designing a mixed cooling system, utilizing both air and seawater for maximum efficiency, thereby reducing the data center's carbon footprint.
- Developing a digital twin to harness renewable energies while optimizing cost and maintenance.
- Documenting the results of risk analysis and project requirements, taking into account industry standards and regulations.

8/2022 – 3/2023 **Researcher** **TU Kaiserslautern**
- Theoretical and numerical study of complex fluid flows, particularly in biological applications such as drug transport in blood tissue and geophysical applications

9/2021 – 8/2022 **Research and Teaching Fellow** **Sorbonne University, Paris**
- Taught mathematics courses for first and second-academic-year students.
- Establishing new mathematical results concerning problems related to Landslide phenomena

10/2019 – 8/2021 **Postdoctroal Researcher** **Peking University, Beijing**
- Development and study of a mathematical model for modeling snow avalanches, including a theoretical analysis of the existence of solutions and numerical simulations performed in Python.
- Teaching mathematics to students at various levels, both nationally and internationally, covering a variety of mathematical topics

1/2019 – 8/2019 **Research and Teaching Fellow** **Sorbonne University, Paris**
- Presentation of research results at international conferences in the field, and regular publication of scientific articles in internationally renowned journals, enriching the body of scientific knowledge.
- Research on the shoreline model for the study of coastal phenomena and interactions between oceans and coasts, with implications for coastal risk management and ecosystem preservation.

9/2017 – 12/2018 **Postdoctroal Researcher** **INRIA, Paris**
- Obtaining a well-posedness result for equations designed to model avalanche phenomena
- Taught introductory level courses in mathematics at Sorbonne University.

EDUCATION

10/2013 -12/2016 **PhD in applied mathematics** **Lebanese University & Grenoble-Alpes University**
Title: On some heterogeneous models in fluid mechanics.
Advisors: Didier Bresch and Raafat Talhouk.

9/2012 - 8/2013 **Master degree in mathematics** **Lebanese University & Nantes University**
Title: Hyperbolic boundary problems and numerical schemes.
Advisors: Jean-Francois Coulombel and Ayman Mourad.

TEACHNING ACTIVITIES

1/2023 - 6/2023 **The Leonard de Vinci Engineering School**
- Introduction to Statistic with R
- Probability

9/2018 - 8/2022 **Sorbonne University**
- Analysis and Algebra for the science
- Introduction to differential equations
- Vectorial analysis and multiple integrals
- Calculus I and II

12/2018 - 12/2018 **Lebanese University**
- Model and numerical method in geosciences (Master 2)

9/2015 - 8/2016 **Savoie-Mont Blanc University**

- Real Analysis
- Functional analysis
- Statistics
- Linear Algebra

PUBLICATIONS

- Al Baba, H., Al Taki, B., Hussein, A. (2023). Remark on the local well-posedness of compressible non-newtonian fluids with initial vacuum. arXiv preprint, 2024.
- Al Taki, B. (2023). Well-posedness for a class of compressible non-newtonian fluids equations. Journal of Differential Equations, 349, 138–175.
- Al Taki, B. (2022). A note on functional inequalities and entropies estimates for some higher-order nonlinear PDEs. Methods Appl. Anal., 29(2), 161–178.
- Al Taki, B., Lacave, C. (2022). Degenerate lake equations: Classical solutions and vanishing viscosity limit. Nonlinearity, 36(1), 653. doi:10.1088/1361-6544/aca865.
- Al Taki, B., Atsou, K., Casanova, J.-J., Goudon, T., Lafitte, P., Lagoutière, F., Minjeaud, S. (2021a). Numerical investigations of the compressible navier-stokes system. In Esaim: Proceedings and surveys (Vol. 70, pp. 1–13).
- Al Taki, B., Msheik, K., Sainte-Marie, J. (2021b). On the rigid-lid approximation of shallow water Bingham. Discrete Contin. Dyn. Syst., Ser. B, 26(2), 875–905.
- Al Taki, B. (2017a). Global well posedness for the ghost effect system. Commun. Pure Appl. Anal., 16(1), 345–368.
- Al Taki, B. (2017b). Viscosity effect on the degenerate lake equations. Nonlinear Anal., Theory Methods Appl., Ser. A, Theory Methods, 148,

RESPONSABILITIES

- Co-supervisor: M2 Internship of Mme. C. El Hassanieh (Sorbonne University & Inria Paris and Lebanese University).
- Advance Competition: Participation in the jury of "Advance Concours" at EPITA.
- Supervisor: M2 Internship of M. S. SALADRRIAGA BRAN (Ecole Centrale de Nantes).
- Supervisor: M2 internship of I. T'NKEY DAKOU (University of ROUEN)
- Supervisor: ESILV's pedagogical project, which involves ESILV students producing a study for Capgemini.

PERSONAL PROJECTS

Data Science **Data Science with Python** **(, 2022)**
The aim of this project is to fit a linear regression or a Ridge Regression model to predict the price using the list of features given on a dataset that contains house sale prices for King County.

Machine Learning **Machine Learning with Python** **(, 2022)**
In this project, we use classification models such as K Nearest Neighbor(KNN), Decision Tree, Support Vector Machine, or Logistic Regression to determine whether a loan is paid off or in based on a dataset about past loans.

Data Science **Car's generation detection** **(, 2022)**
The aim of this project is to predict the generation (I or II) of some unknown generation cars based on the features of each generation.

CERTIFICATIONS

- Data Science Prof. Certificate (IBM, Online)
- Machine Learning Special. (Stanford, Online)
- Google Project Management (Google, Online)

SKILLS

Software: Python, Ansys, OpenFoam, Git, R.

Strengths: Management, Adaptability, Leadership.

REFEREES

- Prof. Alain Miranville (University of Poitiers, France)
- Prof. Francisco Guillen-Gonzalez (Univ. of Sevilla, Spain)
- Prof. Pingwen Zhang (Peking University, China)
- Prof. Christophe Lacave (Grenoble-Alpes University, France)

STAY ABROAD

- Germany, Sept-Dec 2022: Stay at TU Kaiserslautern; invitation from Prof. A. Hussein.
- Lebanon, January 2020: Stay at Lebanese University; invitation from Prof. R. Talhouk.
- China, October-December 2019: Stay at BICMR; invitation from Prof P. Zhang.
- Germany, January 2019: Stay at Darmstadt University; invitation from Prof. M. Hieber.

LANGUAGES

English - Professional **French** - Professional **Arabic** - Native