BILAL AL TAKI

Assistant Professor in Applied Mathematics
22 March 1991 | French and Lebanese | Paris, France
bilal.altaki.math@gmail.com | Homepage | GitHub Profile | ORCID Profile | LinkedIn

SUMMARY

I am currently a Project Manager in the Research and Innovation department at Capgemini Engineering, where I lead a dynamic team focused on developing a floating datacenter powered by renewable energy. In parallel, I serve as a Part-Time Lecturer at Léonard de Vinci Graduate School of Engineering, where I share my industry insights and expertise with students.
My primary academic interests lie in the field of Partial Differential Equations (PDEs) applied to fluid mechanics systems and exploring the interface between PDEs and Artificial Intelligence. I am currently seeking an Assistant Professor position that will allow me to advance my research in these areas while contributing to the academic community through teaching and collaboration.

EXPERIENCE

4/2023 – Present **Project Manager** — **Capgemini Engineering, Paris**
- Coordination of multidisciplinary technical studies for the development of a floating structures in the sea.
- Technical leadership in implementing innovative solutions to address challenges associated with the design and maintenance of offshore structures, 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, respecting industry regulations.

9/2023 – Present **Part-Time Lecturer** — **Pole Lénonard de Vinci**
- Taught courses in at ESILV (Engineering School) and EMLV (Business School), delivering lectures, leading seminars, and assessing student performance

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
- Numerical Method
- Financial Econometrics

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. Accepted for publication in JMFM, 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-Supervision of Internships: Co-supervised internships for over 4 students from Sorbonne University, Lebanese University, Centrale Nantes, and University of Rouen, covering topics such as PDEs, Numerical simulations for PDEs, and Hydrodynamics Stability for floating structure.
- Advance Competition: Participation in the jury of "Advance Concours" at EPITA.
- 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