BILAL AL TAKI

Assistant Professor in Mathematics

Mars 22, 1991 | French and Lebanese | 14th arrondissement of Paris
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SUMMARY

Dedicated academic seeking 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 Artificial Intelligence field.

EXPERIENCE

Guest Researcher

Department of Mathematics, TU Kaiserslautern

Sept 2022– Present | Kaiserslautern, DE

- Studying the well-posedness issue of a general compressible non-Newtonian fluid equations with the presence of vacuum at initial state.
- Regularity issue for a nonlinear elliptic system.

Research and Teaching Fellow

LJLL, Sorbonne University

Sept 2021– Aug 2022 | Paris, FR

- Taught mathematics courses for first and second-academic-year students. Motivating students to achieve their potential.
- Working on research projects with applications to fluid dynamics problems. Cooperate with new people and perform applications using programming languages such as Python for instance.

Researcher

BICMR, Peking University

Jan 2020 – Aug 2021 | Beijing, CH

- Working on a mathematical research project arising from fluid mechanics in collaboration with Prof. P. Zhang. This project has received fund from BOYA postdoctoral fellowship.

Research and Teaching Fellow

LJLL, Sorbonne University

Jan 2019– Aug 2019 | Paris, FR

- Taught mathematics courses for first and second academic year students.

Researcher

ANGE, INRIA

Sept 2017 – Dec 2018 | Paris, FR

- Working on a research project supervised by Jacques-Sainte Marie with interest on Tsunami problem.
- Taught introductory level courses in mathematics at Sorbonne University.

EDUCATION

PhD in applied mathematics

Lebanese University & Grenoble-Alpes University

2013 – 2016 | Grenoble, FR – Beirut, LB

Title: On some heterogeneous models in fluid mechanics.
Advisors: Didier Bresch and Raafat Talhouk.

Master degree in mathematics

Lebanese University & Nantes University

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 Darmastadt University; invitation from Prof. M. Hieber.

TEACHING ACTIVITIES

Please consult my Teaching Statement for more details.

- List of courses taught at SU
  - Calculus I and Calculus II
  - Vectorial analysis and multiple integral
  - Introduction to differential equations
- List of courses taught at USMB
  - Calculus I and Calculus II
  - Statistic
  - Linear Algebra
  - Probability
- List of courses taught at LU
  - Model and numerical method in geosciences

SEMINAR TALKS

- Nov. 2019: Peking University, China.
- Jan. 2019: Darmstadt University, Germany.
- Nov. 2018: Aix-Marseille University, France.
- Mai 2018: University of Paris, France.
- Aug. 2016: Institute of Mathematics of the Czech Academy of Sciences, Czech Republic.

STRENGTHS

PDEs | Compressible and incompressible fluids | Degenerate equations | Elliptic regularity | Newtonian and non-Newtonian fluids

Python | Machine Learning | Data Science | DeepLearning | TensorFlow

LANGUAGES

Arabic
French
English

AWARDS

2011 – 2013 Nantes, FR – Beirut, LB

Title: Hyperbolic boundary problems and numerical schemes.
Advisors: Jean-Francois Coulombel and Ayman Mourad.

Bachelor degree in mathematics

Lebanese University

2008 – 2011 Beirut, LB

PUBLICATIONS

Visit my account on Google-scholar for more details about my publications. Please click on the link appeared in each item below to get access on the papers.

PhD Thesis

- Al Taki, B. (2016). *On some heteregenous model in fluid mechanics*. Retrieved from https://tel.archives-ouvertes.fr/tel-01668531

Journal Articles

- Al Taki, B. (2022). Well-posedness for a class of compressible non-newtonian fluids equations. *arXiv preprint arXiv:2202.03719*. Retrieved from https://arxiv.org/abs/2202.03719
- Al Taki, B., & Lacave, C. (2021). Degenerate lake equations: Classical solutions and vanishing viscosity limit. Retrieved from https://arxiv.org/abs/2111.05041
- AL Taki, B., Msheik, K., & Sainte-Marie, J. (2021). On the rigid-lid approximation of shallow water Bingham. *Discrete Contin. Dyn. Syst., Ser. B*, *26*(2), 875–905. doi:10.3934/dcdsb.2020146
- AL Taki, B. (2020). A note on functional inequalities and entropies estimates for some higher-order nonlinear pdes. *To appear in Methods and Applications of Analysis*.
- Al Taki, B. (2017a). Global well posedness for the ghost effect system. *Commun. Pure Appl. Anal.*, *16*(1), 345–368. doi:10.3934/cpaa.2017017
- Al Taki, B. (2017b). Viscosity effect on the degenerate lake equations. *Nonlinear Anal., Theory Methods Appl., Ser. A, Theory Methods*, *148*, 30–60. doi:10.1016/j.na.2016.09.017

Proceedings

- Al Taki, B., Atsou, K., Casanova, J.-J., Goudon, T., Lafitte, P., Lagoutière, F., & Minjeaud, S. (2021). Numerical investigations of the compressible navier-stokes system. In *Esaim: Proceedings and surveys* (Vol. 70, pp. 1–13). Retrieved from https://doi.org/10.1051/proc/202107001

PROJECTS

Here are some projects that I did as a part of my self-training on Data Science and Artificial Intelligence fields. For a complete list, please consult my GitHub-Page.

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 which contains house sale prices for King County.

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.

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.

- Boya postdoctoral fellowship

  Project title: Mathematical and numerical analysis for a class of non-Newtonian fluid dynamics equations.

REFEREES

Recommendations letters are available upon request.

Prof. Alain Miranville
University of Poitiers
alain.miranville@math.univ-poitiers.fr
Poitiers, FR.

Prof. Francisco Guillen-Gonzalez
University of Sevilla
guillen@us.es
Sevilla, ES.

Prof. Pingwen Zhang
Peking University
pzhang@pku.edu.cn
Beijing, CH.

Prof. Christophe Lacave
Grenoble-Alpes University
christophe.lacave@univ-grenoble-alpes.fr
Grenoble, FR.

CERTIFICATIONS

Here is a list of courses that I have accomplished on Coursera.

- What is Data Science (**IBM|Online**) (Syllabus, Certificate)
- Python for Data Science, AI & Development (**IBM|Online**) (Syllabus, Certificate)
- Data Science with Python (**IBM|Online**) (Syllabus, Certificate)
- Machine Learning with Python (**IBM|Online**) (Syllabus, Certificate).
- Machine Learning Specialization (**Stanford|Online**) (Syllabus, Certificate)

RESPONSIBILITIES

- Co-supervisor: M2 Internship of Mme. C. El Hassanieh (Sorbonne University Inria Paris and Lebanese University).
- Advance Competition: Participation in the jury of "Advance Coucours" at EPITA.