BILAL AL TAKI

Assistant Professor in Mathematics

- Mars 22, 1991
- French and Lebanese
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- HomePage
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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 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 funds 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 an interest in the 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 Darmstadt 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 integrals
  - 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

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. *To appear in J. of Diff. Equ*. 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 in the 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 that 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

Recommendation 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 Concours" at EPITA.