21. November 2023

Curriculum Vitæ

"Profound study of nature is the most fertile source of mathematical discoveries. " – Joseph Fourier

Personal information

Name	Aras Bacho
Address	Fürstenbergstraße 21, 80809 München
Phone	+49 163 4259549
E-Mail	bacho@math.lmu.de
Citizenship	German

Positions

12/2021 – present **Postdoctoral Researcher and Lecturer**, *In the group "Mathematical Foundations of Artificial Intelligence" under Prof. Dr. Gitta Kutyniok*, Ludwig-Maximilians-Universität München.
Conducting research in the field of Partial Differential Equations and Machine Learning. Furthermore, I hold lectures in Deep Learning, Partial Differential, and Programming.

06/2017 – 12/2021 **Postdoctoral Researcher and Teaching Assistant**, *In the group "Partial Differential Equations" under Prof. Dr. Etienne Emmrich*, Technische Universität Berlin.

04/2017 – 06/2021 **Research and Teaching Assistant**, *In the group "Partial Differential Equations" under Prof. Dr. Etienne Emmrich*, Technische Universität Berlin.
Conducting research on abstract nonsmooth doubly nonlinear evolution equations of first and second order and teach students in the field of partial differential equations.

07/2012 – 09/2012 **Internship**, *Process Dynamics and Operation Group under Prof. Dr.-Ing. habil. Prof. h.c. Dr. h.c. Günter Wozny*, Technische Universität Berlin.
Researching a special class of potential raw materials and the development of effective methods for refinement. Performed lab tests, numerical experiments, and presented results.

Education

01/2017 – 06/2021 **PhD**, *Partial Differential Equations*, Technische Universität Berlin, Berlin.
Thesis: "On the Nonsmooth Analysis of Doubly Evolution Inclusions of First and Second Order with Applications"
Supervisor: Prof. Dr. Etienne Emmrich,
Committee: Prof. Dr. Etienne Emmrich (TU Berlin), Prof. Dr. Eduard Feireisl (Czech Academy of Sciences), Prof. Dr. Alexander Mielke (WIAS/HU Berlin), Prof. Dr. Martin Skutella (TU Berlin)

04/2013 – 04/2016 **M.Sc.**, *Mathematics*, Technische Universität Berlin, Berlin.
Thesis: "Gradient Flows in Metric spaces and Applications"

09/2014 – 09/2015 **M.Sc.**, *Mathematics*, Université Pierre et Marie Curie, Paris.
Exchange program ERASMUS+

09/2009 – 04/2013 **B.Sc.**, *Technomathematics*, Technische Universität Berlin, Berlin.
Thesis: "Application of the mountain pass lemma to a certain class of semilinear elliptic equations", Technomathematics focuses on technical-mathematical methods used at the intersection of mathematics and engineering.

Honors and Awards

2007/2008 First prize in the Nationwide Mathematics Competition in Germany (Bundeswettbewerb Mathematik).

2009 DPG Prize for special achievements in physics issued by the German Physical Society (Deutsche Physikalische Gesellschaft)

2012 Perfect score in the Math Advent Calendar (Mathekalender) organized by the DFG Research Center MATHEON.

2014-2015 Erasmus+ Scholarship issued by the European Union for studies at Université Pierre et Marie Curie.

2017 PhD-Scholarship issued by TU Berlin. (4 Months)

2021-present Mentoring Program: Young researchers are supported on their way to an academic career financially and through advanced trainings.

Supervision

PhD Students **Adalbert Fono**, Co-Supervison, Topic: Computability theory (2022-present)
Vit Fojtik, Co-Supervison, Topic: Quantum Computing (2022-present)
Sohir Maskey, Co-Supervison, Topic: Graph Neural Networks (2022-present)
Phillip Scholl, Co-Supervison, Topic: Physical Law Learning (2021-present)

Master Students **Beatrice Lorenz**, Supervison, Thesis: Error Estimation for Physics-informed Neural Networks Approximating Semilinear Wave Equations (2022-2023)

Bachelor Students **Helen Zwölfer**, Supervison, Thesis: Deep Learning Methods for Physical Systems (2023-present)

Intern **Pritika Barshilia**, Supervison, Topic: Deep Learning for the Kelvin-Voigt model (2023)

Invited Talks and Posters

8/2023 International Council for Industrial and Applied Mathematics (ICIAM) 2023, Tokyo, Japan (Minisymposium)

8/2023 Lothar-Collatz-Seminar, University of Hamburg, Germany. (Online Talk)

6/2023 Scientific Machine Learning, Banff international Research Station (BIRS), Banff, Cananda (Talk)

6/2023 MCMP-MCML-Workshop, LMU Munich, Germany (Talk)

01/2023 TU-LMU-KU Joint Seminar on Mathematics and Data Science, LMU Munich, Germany (Online Talk)

10/2019 Winter school on Gradient Flows and Variational Methods in PDEs, University of Ulm, Germany (Poster)

10/2019	Workshop 1st Austrian Calculus of Variations Day, University of Vienna, Austria (Talk)
09/2019	Hausdorffschool on Modeling and analysis of evolutionary problems in materials science, HCM Bonn, Germany (Talk)
12/2018	Berlin-Prague workshop on PDE, stochastics and related problems, TU Berlin, Germany (Talk)
04/2018	Workshop on Nonlinear and Nonlocal Evolution Equations and Stochastic Methods, TU Berlin, Germany (Talk)
08/2017	Workshop on Control of Self-Organizing Nonlinear Systems, TU Berlin, Germany (Poster)

Referee for the journals

IMA Journal of Numerical Analysis

Teaching Experience

Summer term 2023	Lecturer, Deep Learning for Partial Differential Equations
Winter term 2022	Lecturer, Computergestützte Mathematik: Einführung in Python
Summer term 2022	T.A., Mathematics of Artificial Intelligence Seminar
Summer term 2022	Tutor, Funktionentheorie, Lebesguetheorie und gewöhnliche Differentialgleichungen
Summer term 2021	Teaching Assistant and Tutor, Partial Differential Equations III: Evolutionsgleichungen
Winter term 2020	Teaching Assistant and Tutor, Differentialgleichungen II B: Nichtlineare stationäre partielle Diffferentialgleichungen
Summer term 2020	Teaching Assistant and Tutor, Differentialgleichungen II A: Lineare stationäre partielle Diffferentialgleichungen
Winter term 2019	Teaching Assistant and Tutor, Differentialgleichungen I: gewöhnliche Diffferentialgleichungen
Summer term 2019	Teaching Assistant, Analysis II
Winter term 2018	Teaching Assistant, Differentialgleichungen I
Summer term 2018	Teaching Assistant, Differentialgleichungen II A
Summer term 2018	Tutor, Differentialgleichungen für Ingenieure
Winter term 2017	T.A. and Tutor, Differentialgleichungen I: gewöhnliche Diffferentialgleichungen
Summer term 2017	Teaching Assistant, Differentialgleichungen III
Summer term 2017	Tutor, Stochastik für Informatiker

Administrative Experience

Konrad-Zuse School for AI	I helped designing the master's program in artificial intelligence for the Konrad Zuse School of Excellence in Reliable AI (2022)
DFG-Proposal	I actively contribute to the drafting of the Deutsche Forschungsgemeinschaft (DFG) grant application focused on the topic of Computability". (2022 - present)

Seminar Leadership:	Demonstrated organizational leadership in the coordination of a weekly seminar series, titled Äbsolventenseminar". The series featured diverse speakers originating both from within the institution and esteemed guest lecturers from external academic institutions. The seminars predominantly emphasized the exploration of various topics related to Partial Differential Equations (PDEs). (2019 - 2021)
Project Coordination:	Project Coordination: Currently serving as a project coordinator, where my responsibilities include organizing and facilitating group meetings within the research theme of "Quantum Computing and Computability". This role commenced in 2022 and continues to date, facilitating in-depth discussions and collaborative efforts within the group. (2022 - present)
Seminar Leadership:	I have also been managing another weekly seminar series, involving speakers from our university and distinguished external academics. The seminar series aims to provide a platform for knowledge exchange on various aspects of Artificial Intelligence, demonstrating my versatility in facilitating interdisciplinary academic discussions. (2023 - present)

Membership in Professional Societies

2023-present	SIAM (Society for Industrial and Applied Mathematics)
2023-present	SIAM Activity Group on Data Science
2023-present	SIAM Activity Group on Analysis of Partial Differential Equations
2023-present	GAMM (Gesellschaft für Angewandte Mathematik und Mechanik)

Technical skills

Programming	Python, Java, C++, Matlab, Latex, Git, Microsoft Office

Languages

German	Native
Englisch	Fluent
French	Fluent
Chinese (Mandarin)	Basic

Extramural Activity

IT Security and Cryptography	Reading about IT security and cryptography
Sports	Jogging in nature, hiking in the mountains, and swimming.

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