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### Position & Contact Information

2018 – **Lecturer  $\simeq$  US Assistant Professor**, *School of Mathematics, University of Bristol*,  
Present Bristol, UK

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- Full official name: Farhad Babaee Ghasemabadi

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### Past Positions

– 2018 **Postdoctoral Research Fellow**, *Département de Mathématiques, Université de Fribourg*, Fribourg, Switzerland  
Hosted by Prof. Emanuele Delucchi

– 2016 **Postdoctoral Research Fellow**, *Département de Mathématiques et applications, Ecole Normale Supérieure*, Paris, France.  
Hosted by Prof. Omid Amini

2014 – 2015 **Postdoc / Research Assistant Professor**, *Department of Mathematics and Statistics, Concordia University*, Montréal, Canada  
Hosted by Prof. Cody Hyndman

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### Research Interests

- Interactions of Holomorphic Dynamics and Complex Geometry with Tropical Geometry
- Stratified Morse Theory
- Geometry of Amoebas
- Geometric and Topological Data Analysis

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### Education

2011 – 2014 **Ph.D. in Pure Mathematics**, *Université de Bordeaux, France – Università di Padova, Italy*

- Dissertation Title: Complex Tropical Currents
- Supervisors: Prof. Alain Yger (Bordeaux), Prof. Andrea D'Agnolo (Padova)
- Note: Très Honorable

2008 – 2010 **M.Sc. in Mathematics**, *Universiteit Leiden, Holland – Università di Padova, Italy*,  
Advisor: Prof. Andrea D'Agnolo

- Thesis Title: Integral Transforms of Constructible Functions
- Prof. Andrea D'Agnolo (Padova)
- Note: 110/110 cum laude
- 2004 – 2007 **M.Sc. in Mathematics**, *Sharif University of Technology, Iran*  
Thesis Title: Global Dynamics of Certain ODE Models in Population Biology
  - Prof Mohammad R Razvan
  - Note: 19/20
- 2000 – 2004 **Bachelor of Mathematics**, *University of Tehran, Iran*

## Certificates

- 2023 **CREATE HEA Fellowship**
- October 2021 **MIT Schwarzman College of Computing**, *Online certificate on Data Science and Machine Learning: Making Data-Driven decisions*
- Fall 2017 **InnoSuisse (CTI) Entrepreneurship & Start-Up Training**, *Fribourg, Switzerland*  
Organized by Ecole Polytechnique Fédérale de Lausanne (EPFL)

## Research

- preprint With Sean Dewar and James Maxwell, *Extremal decompositions of tropical varieties and relations with rigidity theory*. arXiv:2403.00655
- Dynamical tropicalisation*, Journal of Geometric Analysis, A Special Edition in Memory of Nessim Sibony. **33**, 74. (2023). arXiv:2112.09112
- With Karim Adiprasito *Convexity of complements of tropical varieties, and approximations of currents*, Math. Ann. (2019), 373: 237. arXiv:1711.02045
- With June Huh *A tropical approach to a generalized Hodge conjecture for positive currents*, Duke Mathematical Journal **166** (2017), 2749-2813. arXiv:1502.00299
- preprint *Complex Tropical Currents, Extremality, and Approximations*, Preprint, arXiv:1403.7456

## Work in Progress

- with Tien-Cuong Dinh (National University of Singapore), *Tropical Dynamics and Intersections*
- with Roberto Gualdi (University of Barcelona) and Daniele Turchetti (University of Durham), *Dynamical Tropicalisation on Berkovich Spaces*

## Honors, Awards, Fundings

- 2024 Heilbronn Focused Research Workshop, Budget £6,500 (September 2024)
- 2023 London Mathematical Society, Research in Pairs Grant, Budget £1200
- 2021 Heilbronn Focused Research Workshop, Budget £4,500
- 2019 Heilbronn Focused Research Workshop, Budget £10,000
- 2015–2016 Postdoctoral Grant from the Laboratory of Excellence of Paris Sciences & Lettres

- 2011–2014 ALGANT-DOC's grant, full funding for PhD studies in mathematics
- 2008–2010 ALGANT Masters Scholarship, Erasmus Mundus Scholarship of 42,000 EUR
- March 2004 Rank 12/8500, Iranian National Entrance Examination for Masters degree, Held by Sazman Sanjesh Institute, Iran
- April 2002 & 2003 Two Bronze medals of the Iranian National Mathematics Competitions for University Students, Iranian Mathematical Society, Iran
- August 2003 Honorable Mention, International Mathematics Competitions, Cluj-Napoca, Romania. (IMC 2003)

## Professional Activities

- Referee Transactions of AMS, Proc. of the London Mathematical Society, Math. Zeitschrift, Commentarii Mathematici Helvetici
- Reviewer zbMATH, Mathematical Reviews (MathSciNet)
- Grant The Dutch Research Council (NWO)
- Reviewer
- Co-organizer with James Maxwell, Tropical Days in Bristol (LMS meeting)
  - Cohomology of toric arrangement complement III, Heilbronn Focused Research Workshop, July 2022
  - Cohomology of toric arrangement complement II, Focused Research Workshop, Queen Mary University of London
  - with Kevin Grace, Cohomology of toric arrangement complements I, Heilbronn Focused Research Workshop (September 2019)
  - Mini-course on Combinatorial Hodge Theory, Lectures by Omid Amini, University of Fribourg

## Teaching Experience

- 2022–2024 Lecturer and Director of Algebraic Geometry, University of Bristol
  - Designing new module
  - Writing the lecture notes
  - Delivering the lectures in-person or pre-recorded or live online as required
  - Total of 18 students in two years
- 2018–2022 Lecturer of Linear Algebra TB2, University of Bristol
  - Teaching mode: face-to-face/live
  - Devised Online Discussion Forums online/pre-recorded videos
  - Made extracurricular videos discussing the applications
  - Liaised with total of  $\approx 40$  tutors
  - Devised PollEverywhere for interactive Problem Class
  - Course director in 2020 and 2021

- Total of  $\approx 1500$  students
  - Set online three assessed quizzes
  - Made a few extra-curricular videos on applications of Linear Algebra in Machine Learning and Graph Theory
  - Devised interactive non-assessed daily quizzes
  - Set final written exam, and liaised with internal and external exam checkers
- 2018–2024 Tutor of 31 tutorial classes, University of Bristol. Total of  $\approx 400$  students.
- 2020–2022 Lecturer of Mathematical Investigations, University of Bristol, this first-year course content includes
- Discussing time management, teamwork, careers in mathematics
  - Supervised introductory projects various topics
  - Assessment based on two group project reports
  - Teaching  $\text{\LaTeX}$
  - Total of  $\approx 26$  students
- 2016–2018 Teaching Assistant (in English and French) Analysis III, IV Université de Fribourg, Switzerland. Course content included Complex Analysis, Analysis in several variables, Integration on Manifolds, Total of  $\approx 60$  students.
- 2014–2015 Instructor of Math 208: An introductory course on Linear Algebra and Finance, University of Concordia, Montreal, Canada. Total of  $\approx 120$  students.
- 2002–2008 Instructor of Problem Solving Strategies for Highschool Students (Preparations for IMO), Tehran.
- 2007–2008 Instructor for Foundations of Mathematics, Calculus, Alamé Tabataba-ii University, Iran.
- Fall 2004 Instructor for Combinatorics and Linear Algebra Problems of International Mathematics Competitions for University Students (IMC) University of Tehran, Iran.

## Supervision

### PhD

- Daniel Green Tripp, started September 2022 - Expected 2026

### Masters

- co-supervised with Tobias Kley (University of Göttingen), Shashwat Upadhyay, Department of Mathematical Engineering *Empirical Analysis of Forecasting Techniques for Prices of Tradable Financial Assets*
- co-supervised with Tobias Kley (University of Göttingen), Sneha Ramesh, Department of Mathematical Engineering *COVID-19 Spread: Comparative study of forecasting techniques from Traditional time series models to Machine Learning models*
- Max Jaworski, *Real Algebraic Geometry and Viro's Patchworking*, 2020.
- Jack Southgate, *Toric and Tropical Geometry*, 2020. Now PhD student at St. Andrews University

### Undergraduate

- Arun Steward, *Tropical geometry in Neural Networks*, 2021

- Joshua Cowling, *Tropical Geometry, Amoebas, and Complexity Theory*, 2020

### Summer Projects

- Ruta Sliazkaite, *Quantile Regression and Tropical Geometry*, co-supervision with Tobias Kley, Summer 2020.

### Administrative Duties

- 2024 – PhD Admission Tutor
- 2019 – Library Representative for the School of Mathematics

### Relevant Skills

- Languages:
- Farsi: Native
  - English: Fluent
  - French: Upper Intermediate, B1-B2 (European Framework)
  - Italian: Basic, A1-A2 (European Framework)

- Softwares:
- $\text{\LaTeX}$ , Python, Maple, Matlab, C++

### Selected Talks/Invitations

- March 2024 *Dynamical tropicalisation*, Queen Mary University of London, UK
- October 2023 *Dynamical tropicalisation*, University of Warwick, UK
- August 2023 *Tropical Geometry from Complex Dynamics Standpoint*, Conference on Recent Developments in Algebraic Geometry, Arithmetic and Dynamics, National University of Singapore, Singapore
- May 2023 *Dynamical tropicalisation*, University of Bristol, UK
- March 2023 *Dynamical tropicalisation*, University of King's College of London, UK
- August 2022 *Dynamical tropicalisation*, National University of Singapore, Singapore
- May 2022 *Dynamical tropicalisation*, Tropical Mathematics & its Applications/London Mathematical Society meetings, Durham, UK
- March 2022 *Dynamical tropicalisation*, Bristol's Ergodic Theory and Dynamical Systems Seminars, Bristol, UK
- March 2022 *Dynamical tropicalisation*, Latin American Geometria Algebraica Real y TrOpical Seminar (LAGARTOS), Online Seminars, Recording on BlueJeans
- October 2021 *Tropical currents*, Quantitative aspects in complex analysis, geometry and dynamics, University of Lille (Hybrid), France
- December 2019 *Tropical Geometry via Currents*, University of Isphahan, Iran
- December 2018 *Approximability of tropical currents*, University of Swansea, UK

- May 2018 *Two Lectures on Tropical Currents and Toric Varieties*, Université Paris-Sud, Orsay, France
- May 2017 *Tropical currents, Winter School on Geometry, Algebra and Combinatorics of Moduli Spaces and Configurations*, Toblach, Italy
- November 2016 *Tropical intersection theory*, Bern-Fribourg-Neuchatel Intercity Seminars, Bern, Switzerland
- July 2016 *A tropical approach to a generalized Hodge conjecture for positive currents*, 7th European Congress of Mathematics, Mini-Symposium, Berlin, Germany
- April 2016 *A tropical approach to a generalized Hodge conjecture for positive currents*, Seminario Geometria Algebraica, University of Barcelona, Spain
- March 2016 *On approximability of extremal tropical currents*, Séminaire Géométrie, University of Bordeaux, France
- January 2016 *Complex tropical currents*, Weekly Seminars on Arrangements: Combinatorics & Topology, University of Fribourg, Switzerland
- January 2016 *On approximability of extremal tropical currents*, Géométrie et Théorie des Modèles, Monthly Seminars, Ecole Normale Supérieure, Paris, France
- January 2015 *On approximability of extremal tropical currents*, Analyse et Géométrie, Department of Mathematics of Pierre and Marie Curie University, Paris, France
- November 2015 *A tropical approach to the strongly positive Hodge conjecture*, Università degli Studi di Padova, Italy
- October 2015 *A tropical approach to the strongly positive Hodge conjecture*, Weekly Seminars in Tropical Geometry, Department of Mathematics of Pierre and Marie Curie University, Paris, France
- September 2015 *A non-approximable tropical current*, Ecole Normale Supérieure, Paris, France
- June 2014 *Complex Tropical Currents*, PhD defense, Université de Bordeaux, France
- June 2014 *Combinatorics of extremal currents*, Séminaire Géométrie, Université de Bordeaux, France
- February 2014 *Complex Tropical Currents*, Università di Padova, Italy
- February 2012 *Amoebas and Coamoebas*, ALGANT-DOC annual meeting, Université de Bordeaux, France
- October 2012 *Geometry of Amoebas*, Geometry Workgroup, Université de Bordeaux, France
- September 2010 *Integral transforms of constructible function*, Masters thesis discussion, Università di Padova, Italy
- January 2007 *Global Analysis of Certain Models in Biology*, Sharif University of Technology, Iran
- September 2006 *Geometrical Aspects in Stability Analysis*, Sharif University of Technology, Iran
- March 2006 *Discrete Laplacian*, University of Tehran, Iran
- March 2005 *Cycle Index and Applications to Graph Theory*, Sharif University of Technology, Iran

- January 2005 *A Topological Proof for van der Waerden Theorem*, Sharif University of Technology, Iran
- June 2003 *A Proof of Bruck-Ryser Theorem in Combinatorics*, University of Tehran, Iran
- November 2002 *A Proof of Matrix-Tree Theorem*, University of Tehran, Iran
- June 2002 *Symbolic Dynamics and Entropy*, University of Tehran, Iran