# Bijan Ahmadi Kakavandi

*Curriculum Vitae, December 2023.*

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## Personal Information

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| Date of birth | 23 August 1979 |
| | Male, Married. |
| Place of birth | Kermanshah, Iran |
| Citizenship | Iranian |

## Education

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|---|---|
| 2003-2008 | **Ph.D. in Mathematics**, *Tarbiat Modares University*, Tehran, Iran. |
| Thesis | *Nonlinear analysis and Hadamard spaces* |
| Supervisors | Prof. Behzad Djafari Rouhani & Prof. Massoud Amini |
| 2000-2002 | **M.Sc. in Mathematics**, *Sharif University of Technology*, Tehran, Iran. |
| Thesis | *Brezis-Browder order principle and its applications in generalization of Caristi's theorem* |
| Supervisor | Prof. Behzad Djafari Rouhani |
| 1996-2000 | **B.Sc. in Mathematics**, *Shahid Beheshti University*, Tehran, Iran. |
| B.Sc. Project | *Representation of topological groups in Hilbert spaces* |
| Advisor | Prof. Massoud Amini |

## Academic Services

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|---|---|
| 2022-2025 | **Head of the Department of Applied Mathematics**, *Faculty of Mathematical Sciences*, Shahid Beheshti University. |
| 2022-2025 | **Head of the Scientific Committee of**, *Iranian Mathematical Society Competition (IMSC)*. |
| 2013-2021 | **Member of the Scientific Committee of**, *Iranian Mathematical Society Competition (IMSC)*. |
| 2016-Present | **Reviewer for Mathematical Review**, *American Mathematical Society*. |

## Awards and Honors

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|---|---|
| 2012, 2018 & 2021 | **Distinguished Lecturer Prize of**, *Shahid Beheshti University*. |
| 2006 | **Ph.D. Fellowship from**, *Shahid Beheshti University*. |
| 2003 | **1st Place in Ph.D. Entrance Examination of**, *Mathematics Department*, Tarbiat Modares University. |
| 2000 | **Second Prize in International Mathematics Competition (IMC)**, *University College of London*. |

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| 2000 | **Gold** Medal in Iranian Mathematical Society Competition (IMSC), <br> *K. N. Toosi University of Technology.* |
| 2000 | **5th Place in the National Scientific Olympiads for University Student,**, <br> *Ministry of Science, Research and Technology*, Iran. |
| 1999 | **Gold** Medal in Iranian Mathematical Society Competition (IMSC), <br> *Sharif University of Technology .* |
| 1998 & 1999 | **Undergraduate Support from**, <br> *Institute for Research in Fundamental Sciences (IPM).* |
| 1996 | **75th Place among over 500,000 participants in**, <br> *National Entrance Examination for universities (KONKOUR)*, Iran. |

## Academic Positions

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|---|---|
| 2008-Present | **Assistant Professor of Mathematics** , <br> *Faculty of Mathematical Sciences*, <br> Shahid Beheshti University, Tehran, Iran. |
| 2017-Present | Department of Applied Mathematics <br> ○ Data Science Center of Shahid Beheshti University <br> ○ Dynamical Systems and Differential Equations Group |
| 2008-2017 | Department of Mathematics <br> ○ Mathematical Analysis Group |
| 2012-2013 | **Non-Resident Researcher**, <br> *Institute for Research in Fundamental Sciences (IPM)*, Tehran, Iran. |
| 2008 | **Visitor Researcher**, <br> *Max-Planck Institute für Math*, Bonn, Germany. |

## Research Interests

**Optimization**,
*Convex Optimization, Matrix Manifolds.*

**Geometric Analysis**,
*Analysis on Hadamard Spaces, Metric Geometry.*

**Mathematical Physics**,
*Semigroup of Operators, Theory of Evolution Equations.*

## Published Papers

| | |
|---|---|
| 2022 | *Representation and Spacetime: The Hole Argument Revisited*, (with A. Yaghmaie, S. Masoumi and M. Moniri) International Studies in Philosophy of Science, 35 (2), 171–188. |
| 2022 | *The exponential of quasi block-Toeplitz matrices*, (with E.Bolourchian) Acta Mathematica Scientia, 42, 1018-1034. |
| 2021 | *Approximate Diagonalization of some Toeplitz Operators and Matrices*, (with N.Nobari) Linear and Multilinear Algebra, 70 (21), 7093-7114. |
| 2021 | *An approximate method for structured distance to normality of Toeplitz operators*, (with E.Bolourchian) Quarterly of Applied Mathematics, 79, 431-443. |
| 2020 | *Newton's optimization method in geodesic spaces* (in Persian). <br> FARHANG VA ANDISHEH YE RIAZI, Iranian Mathematical Society, 40 (69), 23-46 |
| 2019 | *Strongly continuous semigroups on locally finite graphs*, <br> Quaestiones Mathematicae 42 (10), 1301-1311. |
| 2019 | *Wasserstein barycenters in the manifold of all positive definite matrices*, <br> (with N.Nobari) Quarterly of Applied Mathematics, 77 (3), 655-669. |

2018 *A geometric mean for Toeplitz and Toeplitz-block block-Toeplitz matrices*,
(with N.Nobari) Linear Algebra and its Applications 548, 189-202.

2017 *A note on co-accretive operators and gradient flows in Hadamard spaces*,
Journal of Nonlinear and Convex Analysis 18 (12), 2199-2208.

2015 *Nonlinear ergodic theorems for amenable semigroups of nonexpansive mappings in Hadamard spaces*,
Journal of Fixed Point Theory and Applications 17 (4), 717-731.

2013 *Weak topologies in complete $CAT(0)$ metric spaces*,
Proceedings of the American Mathematical Society 141 (3), 1029-1039.

2011 *Non-linear ergodic theorems in complete non-positive curvature metric spaces*,
(with M.Amini) Bulletin of the Iranian Mathematical Society 37 (3), 11-20.

2010 *Duality and subdifferential for convex functions on complete $CAT(0)$ metric spaces*,
(with M.Amini) Nonlinear Analysis: Theory, Methods & Applications 73 (10), 3450-3455.

2006 *Infinite time-dependent network equilibria with a multivalued cost function*,
(with B.D.Rouhani) Journal of optimization theory and applications 131 (3), 405-415.

## Preprints

- *The principles of quantum mechanics revisited* (with N.Namavarian), 75 pages.
- *Self-concordant functions in geodesic spaces*, 18 pages.
- *A fast and efficient iterative method for solving some class of Toeplitz linear equations*, 10 pages.
- *Exponential reproducing kernel Hilbert spaces with an application in partial differential equations*, 12 pages.

## Book Translation

2023 Hairer, E., Wanner, G., *Analysis by its History*, Undergraduate Texts in Mathematics. Springer-Verlag, New York, 2008. (with N. Nobari, Farsi translation, Shahid Beheshti University Press 2023)

## Some Talks

2021 *Structured distance to normality of Toeplitz operators*,
SIAM Conference on Applied Linear Algebra . (Invited)

2018 *Education via history of concepts*,
SBU-Talk, Shahid Beheshti University. (Invited)

2016 *Gradient flows and non-linear ergodic theorems in non-positively curved spaces*,
Tehran University. (Invited)

2015 *Semigroups on Hadamard space*,
46th Iranian Mathematics Conference, Yazd University.

2013 *Curvature in Metric Spaces*,
Sharif University of Technology. (Invited)

2011 *Some remarks on weak convergence and weak topologies in complete $CAT(0)$ metric spaces*,
International Conference In Modern Analysis, Donetsk National University, Ukraine.

2006 *Noncommutative metrics: N. Weaver approach*,
Noncommutative Geometry Seminar, Tarbiat Modares University.

1999 *An application of undergraduate mathematics in sciences*,
Iranian Mathematical Education Conference, Tehran. (with Professor Mehdi Behzad)

## Advising Experience

**Postdoctoral Researcher**.

Current Nadereh Namavarian, *Mathematical Foundation of Quantum Mechanics*.

**PhD Student**.

| | |
|---|---|
| 2018-2022 | Elahe Bolourchian, *Some numerical and analytical results on Toeplitz and quasi-Toeplitz block operators.* |
| Current | Rohollah Moharami, *Mathematical Analysis*, As advisor. |

**MSc Students**.

| | |
|---|---|
| 2023 | Sana Ariya, *Data Science* |
| 2023 | Arash Sajjadi, *Data Science* |
| 2023 | Fatemeh Babaeian, *Differential Equations and Dynamical Systems* |
| 2022 | MohammadAli Khodadad, *Differential Equations and Dynamical Systems* |
| 2022 | Kourosh Amiri, *Differential Equations and Dynamical Systems* |
| 2022 | Sohrab Faridi, *Data Science* (with H.Hajiabolhassan) |
| 2022 | Abed Aref, *Data Science* (with H.Hajiabolhassan) |
| 2021 | Tara Rasti, *Data Science* (with M. Ganjtabesh) |
| 2021 | Pegah Khazaei, *Data Science* (with S.R. Kheradpisheh) |
| 2021 | Fatemeh Rahimi, *Data Science* (with H.Hajiabolhassan) |
| 2020 | Somayeh Hashemkhani, *Data Science* (with H.Hajiabolhassan) |
| 2020 | Mostafa Khodayari, *Data Science* (with H.Hajiabolhassan) |
| 2020 | Ismaeil Mafakheri, *Data Science* (with H.Hajiabolhassan) |
| 2020 | Sohrab Faridi, *Data Science* (with H.Hajiabolhassan) |
| 2019 | Atieh Poorderakhshan, *Mathematical Logic* (with M.Moniri) |
| 2018 | Mina Pazoki, *Mathematical Analysis* |
| 2018 | Morteza Ebrahim, *Mathematical Analysis* |
| 2017 | Parisa Zare, *Mathematical Analysis* |
| 2017 | Mohsen Nameni, *Mathematical Analysis* |
| 2016 | Maryam Khalaj, *Mathematical Analysis* |
| 2015 | Narges Ashharian, *Mathematical Analysis* |
| 2014 | Elham Ghamari, *Mathematical Analysis* |
| 2014 | Mahsa Hamedi, *Mathematical Analysis* |
| 2014 | Mohammad Besharatlou, *Mathematical Analysis* |
| 2014 | Vahid Ehsani, *Mathematical Analysis* |
| 2013 | Ali Javadi, *Mathematical Analysis* |
| 2013 | Ahmad Delfan, *Mathematical Analysis* |
| 2013 | Zahra Hasanpour, *Mathematical Analysis* |
| 2012 | Akram Akhavan, *Mathematical Analysis* |
| 2012 | Zahra Keyshams, *Mathematical Analysis* |
| 2011 | Sara Shamlo, *Mathematical Analysis* |

## Courses Taught

**Graduate Courses**.

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| Data Science | Mathematical Foundation of Data Science, Optimization for Data Science. |
| Differential Equations & Dynamical Systems | Theory of Linear Semigroups, Basic Toolkits in Differential Equations, Theory of Ordinary Differential Equations, Theory of Partial Differential Equations I&II, Ergodic Theory, Dynamical Systems I&II. |
| Mathematical Analysis | Functional Analysis I&II, Harmonic Analysis, $C^*$-algebras, Metric Geometry, Nonlinear Functional Analysis I&II, Real Analysis, Topics in Analysis, |

**Undergraduate Courses**,
*Calculus I,II & III, Complex Functions, Mathematical Analysis I,II & III, Measure Theory, Linear Algebra I& II, Topology, Differential Geometry.*

## Skills

**Language Knowledge**,
*English: Proficient (Reading & Writing), Farsi: Native.*
**Computer Skills**,
*Python, MatLab, LaTeX, MS Office.*

## Interests

- *Philosophy of Mathematics*
- *Philosophy of Physics*

## References

**Prof. Behzad Djafari Rouhani**,
*Thesis supervisor*,
Department of Mathematical Sciences,
University of Texas at El Paso,
El Paso, Texas, 79968 USA.
Email: behzad@utep.edu

**Prof. Massoud Amini**,
*Thesis supervisor*,
Faculty of Mathematical Sciences,
Tarbiat Modares University,
Tehran 14115-134, Iran.
Email: mamini@modares.ac.ir

**Prof. Bijan Zohouri Zangeneh**,
Department of Mathematical Sciences,
Sharif University of Technology University,
Tehran 11155-9415, Iran.
Email: zangeneh@sharif.edu

**Prof. Hossein Hajiabolhassan**,
Associate Researcher at
Department für Mathematik und
Informationstechnologie,
Montanuniversität,
Leoben, Austria.
Email: hhaji@gmail.com