

Assoc. Prof. BAHAR KIRIK RÁCZ

Personal Information

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International Researcher IDs

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Biography

Bahar KIRIK RÁCZ's main research interests lie in differential geometry and its applications to physics such as in general relativity theory. She studied several mathematical structures of 4-dimensional spaces admitting a metric of arbitrary signature. In particular, the isotropy subalgebras and the possible algebraic types of the Ricci and Weyl tensors are determined for 4-dimensional spaces admitting Killing vector fields, where the signature of the metric of the ambient space was allowed to be arbitrary. She did several researches on the tensor analysis over pseudo-Riemannian manifolds, e. g., the full characterization of second order, recurrent, symmetric and anti-symmetric tensor fields on 4-dimensional spaces of arbitrary signature has been given by using the holonomy theory. She also worked on some special mappings such as conformal, conharmonic and special vector fields over special pseudo-Riemann manifolds like Einstein and its generalizations in arbitrary dimensions. She got her PhD at Istanbul Technical University, Department of Mathematical Engineering in 2016 where she was also a research assistant between 2010-2016. She has been working at Marmara University, Department of Mathematics since 2018 where she got an associate professor position from February, 2020.

Education Information

Doctorate, Istanbul Technical University, Fen Bilimleri Enstitüsü, Matematik Mühendisliği (Dr), Turkey 2011 - 2016

Postgraduate, Istanbul University, Faculty Of Science, Department Of Mathematics, Turkey 2008 - 2011

Undergraduate, Istanbul University, Faculty Of Science, Department Of Mathematics, Turkey 2004 - 2008

Foreign Languages

English, B2 Upper Intermediate

Dissertations

Doctorate, Bazı özel manifoldlar üzerinde vektör alanları, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, Matematik Mühendisliği (Dr), 2016

Postgraduate, Konneksiyonların geometrisi, İstanbul Üniversitesi, Fen Fakültesi, Matematik Bölümü, 2011

Research Areas

Differential Geometry, Natural Sciences

Academic Titles / Tasks

Associate Professor, Marmara University, Faculty Of Arts And Sciences, Mathematics, 2019 - Continues
Assistant Professor, Marmara University, Faculty Of Arts And Sciences, Mathematics, 2018 - 2019
Assistant Professor, Marmara University, Faculty of Arts and Sciences, Mathematics, 2018 - 2018
Assistant Professor, Istanbul Aydin University, Faculty Of Arts And Sciences, Department Of Mathematics And Computer, 2016 - 2017
Lecturer PhD, Istanbul Aydin University, Faculty Of Arts And Sciences, Department Of Mathematics And Computer, 2016 - 2016
Research Assistant, Istanbul Technical University, Fen-Edebiyat Fakültesi, Matematik Bölümü, 2010 - 2016

Academic and Administrative Experience

Erasmus Program Department Coordinator, Marmara University, Faculty Of Sciences, Department Of Mathematics, 2023 - Continues
Adaptation/Exemption Committee Member, Marmara University, Faculty Of Sciences, 2022 - Continues
Adaptation/Exemption Committee Member, Marmara University, Faculty Of Sciences, Department Of Mathematics, 2022 - 2023

Courses

LaTeX ile Doküman Hazırlama, Undergraduate, 2023 - 2024, 2022 - 2023, 2021 - 2022
İleri Diferansiyel Geometri II, Postgraduate, 2023 - 2024, 2022 - 2023, 2021 - 2022
Manifold Teori, Undergraduate, 2023 - 2024, 2022 - 2023
LaTeX Yazılım Programı, Doctorate, 2023 - 2024, 2022 - 2023, 2021 - 2022, 2020 - 2021, 2019 - 2020, 2018 - 2019
İleri Diferansiyel Geometri I, Postgraduate, 2023 - 2024, 2022 - 2023, 2021 - 2022
Analitik Geometri II, Undergraduate, 2021 - 2022
Analitik Geometri I, Undergraduate, 2022 - 2023, 2021 - 2022
Analitik Geometri (TEBİP), Undergraduate, 2020 - 2021
Lineer Cebir II, Undergraduate, 2020 - 2021, 2018 - 2019, 2017 - 2018
Matematik I, Undergraduate, 2021 - 2022, 2020 - 2021, 2018 - 2019
Matematik II, Undergraduate, 2020 - 2021, 2018 - 2019
Lineer Cebir I, Undergraduate, 2020 - 2021, 2018 - 2019
Linear Algebra, Undergraduate, 2018 - 2019
Lineer Cebir, Undergraduate, 2018 - 2019
Matematik III, Undergraduate, 2016 - 2017
Matematik, Undergraduate, 2016 - 2017
Introduction to Differential Equations, Undergraduate, 2016 - 2017

Advising Theses

Kırık Rác B, 4-Boyutlu Manifoldlar Üzerinde Bazı Özel Tensör Alanları, Postgraduate, B.CINDIK(Student), 2024

Jury Memberships

Doctoral Examination, Doctoral Examination, Marmara Üniversitesi, November, 2023

Doctorate, Doctorate, İstanbul Üniversitesi, April, 2021

Post Graduate, Post Graduate, Marmara Üniversitesi, July, 2020

Post Graduate, Post Graduate, İstanbul Teknik Üniversitesi, June, 2019

Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Some special Z-symmetric manifolds with applications to space-times and Ricci solitons**
Kırık Rącz B., Cındık B.
Acta Mathematica Hungarica, pp.1-21, 2024 (SCI-Expanded)
- II. **Zeros of homothetic vector fields in 4-dimensional manifolds of neutral signature**
Hall G., Kırık Rącz B.
Journal of Geometry and Physics, vol.203, 2024 (SCI-Expanded)
- III. **A Study on Killing Vector Fields in Four-Dimensional Spaces**
Kırık Rącz B.
Filomat, vol.33, no.4, pp.1249-1257, 2019 (SCI-Expanded)
- IV. **Applications of a Special Generalized Quasi-Einstein Manifold**
KIRIK B., Zengin F.
BULLETIN OF THE IRANIAN MATHEMATICAL SOCIETY, vol.45, no.1, pp.89-102, 2019 (SCI-Expanded)
- V. **Symmetries in 4-dimensional manifolds with metric of neutral signature**
Hall G., KIRIK B.
JOURNAL OF GEOMETRY AND PHYSICS, vol.133, pp.168-180, 2018 (SCI-Expanded)
- VI. **On Holonomy Algebras of Four-Dimensional Generalized Quasi-Einstein Manifolds**
KIRIK B.
Proceedings Of The National Academy Of Sciences India Section A-Physical Sciences, pp.1-9, 2018 (SCI-Expanded)
- VII. **On skew-symmetric recurrent tensor fields of second order in 4-dimensional manifolds with neutral metric signature**
KIRIK B.
PUBLICATIONES MATHEMATICAE-DEBRECEN, vol.93, pp.487-509, 2018 (SCI-Expanded)
- VIII. **Recurrence structures in 4-dimensional manifolds with metric of signature (plus , plus ,-, -)**
HALL G., KIRIK B.
JOURNAL OF GEOMETRY AND PHYSICS, vol.98, pp.262-274, 2015 (SCI-Expanded)
- IX. **Conformal Mappings of Quasi-Einstein Manifolds Admitting Special Vector Fields**
KIRIK B., ZENGİN F.
FILOMAT, vol.29, no.3, pp.525-534, 2015 (SCI-Expanded)
- X. **CONFORMAL MAPPINGS OF NEARLY QUASI-EINSTEIN MANIFOLDS**
ZENGİN F., KIRIK B.
MISKOLC MATHEMATICAL NOTES, vol.14, no.2, pp.629-636, 2013 (SCI-Expanded)

Articles Published in Other Journals

- I. **On a Simple Characterization of Conformally Flat 4-Dimensional Spaces of Neutral Signature**
Kırık Rącz B.
International journal of advances in engineering and pure sciences (Online), vol.36, no.3, pp.295-300, 2024 (Peer-Reviewed Journal)
- II. **Investigation of some special tensor fields on space-times with holonomy algebras**
Kırık Rącz B., Kiliç C., Toplu R.
NOTE DI MATEMATICA, vol.43, no.2, pp.83-98, 2023 (ESCI)
- III. **On Concircular Curvature Tensor in Space-Times**

KIRIK B.

Süleyman Demirel Üniversitesi Fen Bilimleri Enstitüsü Dergisi, vol.22, pp.1151-1156, 2018 (Peer-Reviewed Journal)

IV. A NOTE ON RECURRENT BIVECTORS IN 4-DIMENSIONAL LORENTZ MANIFOLDS

KIRIK B.

PUBLICATIONS DE L INSTITUT MATHEMATIQUE-BEOGRAD, vol.103, no.117, pp.103-112, 2018 (ESCI)

V. Generalized quasi Einstein manifolds admitting special vector fields

KIRIK B., ZENGİN F.

Acta Mathematica Academiae Paedagogicae Nyíregyháziensis, vol.31, pp.61-69, 2015 (Peer-Reviewed Journal)

VI. On almost pseudo Ricci-symmetric generalized quasi-Einstein manifolds

KIRIK B., ZENGİN F.

Tensor N. S., vol.75, pp.52-60, 2014 (Peer-Reviewed Journal)

VII. On a special type nearly quasi-Einstein manifold

ZENGİN F., KIRIK B.

New Trends in Mathematical Sciences, vol.1, pp.100-106, 2013 (Peer-Reviewed Journal)

Refereed Congress / Symposium Publications in Proceedings

I. On Some Symmetries in 4-Dimensional Manifolds of Neutral Signature and Their Applications to Ricci Solitons

Kırık Rącz B.

KOCAELİ SCIENCE CONGRESS (KOSC-2024), Kocaeli, Turkey, 2 - 04 October 2024, pp.8

II. Fixed Points of Homotheties in 4-Dimensional Manifolds With Metric of Signature $(+,+,-,-)$

Hall G., Kırık Rącz B.

Marmara Geometry Days 2024, İstanbul, Turkey, 6 - 07 May 2024, pp.10

III. Some Special Second-Order Symmetric Tensor Fields on 4-dimensional Lorentzian Spaces

Cındık B., Kırık Rącz B.

International Conference on Mathematics: An Istanbul Meeting for World Mathematicians, İstanbul, Turkey, 11 - 13 July 2023, pp.65

IV. Some Properties of Conircular, Conharmonic and Projective Curvature Tensors on 4-dimensional Lorentzian and Riemannian Spaces

KIRIK RÁ CZ B., KILINÇ C., TOPLU R.

19th International Geometry Symposium, Turkey, 27 - 30 June 2022, pp.45

V. A Study on Some Special Riemannian Manifolds with Semi-Symmetric Metric Connection

YILMAZ H., UYSAL S. A., KIRIK RÁ CZ B.

17th International Geometry Symposium, Erzincan, Turkey, 19 - 22 June 2019, pp.30

VI. On some geometric structures of 4-dimensional manifolds

KIRIK B.

2nd International Conference of Mathematical Sciences (ICMS 2018), İstanbul, Turkey, 31 July - 06 August 2018, pp.119

VII. On some applications of Killing symmetries in 4-dimensional manifolds admitting a metric

KIRIK B., HALL G.

XX GEOMETRICAL SEMINAR, Vrnjačka Banja, Serbia And Montenegro, 20 - 23 May 2018, pp.49-50

VIII. Some results on recurrence structure of real and complex bivectors in space-times

KIRIK B.

Differential Geometry 2017, Poznan, Poland, 19 - 23 June 2017, pp.18-19

IX. An investigation of symmetric and skew-symmetric recurrent tensors of second order on 4-dimensional manifolds

KIRIK B.

XIX Geometrical Seminar, Zlatibor, Serbia And Montenegro, 28 August - 04 September 2016, pp.38

- X. **Holonomy theory and recurrence of tensors on 4 dimensional manifolds**
HALL G., KIRIK B.
20th International Summer School on Global Analysis and its Applications General Relativity: 100 years after Hilbert, Stará Lesná, Slovakia, 17 - 21 August 2015, pp.30-31
- XI. **Neredeyse yarı Einstein manifoldlarının bazı özellikleri**
KIRIK B., ZENGİN F.
13. Geometri Sempozyumu YTÜ, İstanbul, Turkey, 27 - 30 July 2015, pp.33
- XII. **Some results on quasi Einstein and generalized quasi Einstein manifolds**
KIRIK B., ZENGİN F.
International Conference on Applied Analysis and Mathematical Modeling (ICAAMM2015), İstanbul, Turkey, 8 - 12 June 2015, pp.65
- XIII. **Conformal mappings of quasi-Einstein manifolds admitting special vector fields**
KIRIK B., ZENGİN F.
XVIII Geometrical Seminar, Vrnjačka Banja, Serbia And Montenegro, 25 - 28 May 2014, pp.60
- XIV. **On almost pseudo Ricci symmetric generalized quasi-Einstein manifolds**
KIRIK B., ZENGİN F.
The 13th International Conference of Tensor Society on Differential Geometry and Its Applications, and Informatics Besides, Iasi, Romania, 3 - 07 September 2013
- XV. **Generalized quasi-Einstein manifolds admitting special vector fields**
KIRIK B., ZENGİN F.
Joint Events of Colloquium on Differential Geometry and its Applications and IX-th International Conference on Finsler Extensions of Relativity Theory, Debrecen, Hungary, 26 - 30 August 2013, pp.21
- XVI. **Pseudo Ricci symmetric generalized quasi-Einstein manifolds**
ZENGİN F., KIRIK B.
International Conference on Applied Analysis and Mathematical Modeling (ICAAMM 2013), İstanbul, Turkey, 2 - 05 June 2013, pp.88
- XVII. **Conformal mapping of nearly quasi-Einstein manifolds**
ZENGİN F., KIRIK B.
Algebra Geometry Mathematical Physics, Brno, Czech Republic, 12 - 14 September 2012
- XVIII. **On nearly quasi-Einstein manifolds**
KIRIK B., ZENGİN F.
XVII Geometrical Seminar, Zlatibor, Serbia And Montenegro, 3 - 08 September 2012, pp.43
- XIX. **On a special type nearly quasi-Einstein manifold**
ZENGİN F., KIRIK B.
ICAAA 2012 (International Conference on Applied Analysis and Algebra), İstanbul, Turkey, 20 - 24 June 2012, pp.54
- XX. **On generalized concircularly recurrent Kaehlerian Weyl Spaces**
ÖZDEMİR F., CANFES E., KIRIK B.
Riemannian Geometry and Applications- RIGA 2011, Bükreş, Romania, 10 - 14 May 2011, pp.13

Supported Projects

- Kırık Rác B., Hall G., TUBITAK Project, 4-Boyutlu Uzaylarda Bazı Özel Vektör Alanları Ve Ricci Solitonlara Uygulamaları, 2023 - 2024
- Kırık Rác B., Kılınç C., Toplu R., TUBITAK Project, Some Special Tensor Fields on 4-Dimensional Lorentzian and Riemannian Manifolds, 2021 - 2022

Activities in Scientific Journals

Differential Geometry of Manifolds, Committee Member, 2020 - Continues

Scientific Refereeing

Istanbul Journal of Mathematics, Other Indexed Journal, September 2023

Afrika Matematika, Journal Indexed in ESCI, July 2021

International Journal of Advances in Engineering and Pure Sciences, Other Indexed Journal, February 2021

International Journal of Advances in Engineering and Pure Sciences, Other Indexed Journal, June 2020

HACETTEPE JOURNAL OF MATHEMATICS AND STATISTICS, Journal Indexed in SCI-E, October 2019

Communications Faculty of Sciences University of Ankara Series A1 Mathematics and Statistics, Journal Indexed in ESCI, October 2019

MEDITERRANEAN JOURNAL OF MATHEMATICS, Journal Indexed in SCI-E, June 2018

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES INDIA SECTION A-PHYSICAL SCIENCES, Journal Indexed in SCI-E, August 2016

Tasks In Event Organizations

Kırık Rác B., Marmara Geometry Days 2024, Workshop Organization, İstanbul, Turkey, Mayıs 2024

Kırık Rác B., XIV. Bilim-Kültür Günleri, Scientific Congress, İstanbul, Turkey, Nisan 2021

Yılmaz B., Kırık Rác B., International conference on applied mathematics, modeling and Life Sciences, Scientific Congress, İstanbul, Turkey, Ekim 2018

Kırık Rác B., IV. Marmara Matematik Günleri, Scientific Congress, Turkey, Eylül 2018

Kırık Rác B., International Workshop on Theory of Submanifolds, Istanbul Technical University, Workshop Organization, Turkey, Haziran 2016

Metrics

Publication: 37

Citation (WoS): 20

Citation (Scopus): 32

H-Index (WoS): 2

H-Index (Scopus): 3

Scholarships

TÜBİTAK-BİDEB 2219 Yurt Dışı Doktora Sonrası Araştırma Burs Programı, TUBITAK, 2017 - 2017

TÜBİTAK-BİDEB 2211 Yurt İçi Doktora Burs Programı , TUBITAK, 2011 - 2016

TÜBİTAK-BİDEB 2214-A Yurt Dışı Doktora Sırası Araştırma Burs Programı, TUBITAK, 2014 - 2015

TÜBİTAK-BİDEB 2210 Yurt İçi Yüksek Lisans Burs Programı, TUBITAK, 2008 - 2011

Awards

Kırık Rác B., Ödül Belgesi (Yayın), Marmara Üniversitesi Fen-Edebiyat Fakültesi, June 2019

Kırık Rác B., 2008 Yılı İ.Ü. Fen Fakültesi Birincisi, İstanbul Üniversitesi, June 2008