Dr. Ayşe Borat

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Education

2007–2013	**Ph.D. in Mathematics**, *University of Aberdeen*, UK.
	Advisor: Jarek Kedra
	Thesis: Remarks on Symplectically Aspherical Manifolds
2005–2007	**M.Sc. in Mathematics**, *Ege University*, Türkiye.
2001–2005	**B.Sc. in Mathematics**, *Ege University*, Türkiye.

Employment

Mar 2022–present	**Associate professor**, *awarded by the Inter-University Council of Türkiye.*
Feb 2016–Mar 2022	**Assistant professor**, *Bursa Technical University*, Türkiye.
Sep 2014–Feb 2016	**Lecturer**, *Bursa Technical University*, Türkiye.
Oct 2013–May 2014	**Lecturer (part time)**, *Zirve University*, Türkiye.
Sep 2007–May 2010	**Tutor**, *University of Aberdeen*, UK.

Visits

Feb 2022	**Invited visiting researcher**, University of Santiago de Compostela (**1 week**)
	Host: Enrique Macias-Virgos & David Mosquera-Lois
Jul 2019	**Invited visiting researcher**, METU (**1 week**)
	Host: Mehmetcik Pamuk
Jun 2018–Aug 2018	**Visiting research fellow**, University of Aberdeen (**3 months**)
	Host: Mark Grant
Jan 2007–Jun 2007	**Visiting graduate student**, University of Aberdeen (**5 months**)
	Host: Jarek Kedra

Grants, Scholarships & Funding

2023–present	**TÜBİTAK 1002 Scientific and Technological Research Projects Grant** (PI)
	Title: *"On discretisation of homotopic distance"*, 75000 ₺
2022–2023	**TÜBİTAK 1002 Scientific and Technological Research Projects Grant** (PI)
	Title: *"Higher discrete topological complexity"*, 60000 ₺
2022	**Support** to visit University of Santiago de Compostela, provided by MICINN grant to Enrique Macias-Virgos
2015–2018	**Bursa Technical University Scientific Research Projects Coordination Unit Grant** (PI)
	Title: *"Motion planners on $F(S^2, k)$"*, 4500 ₺
2007–2010	**Ph.D. scholarship**, funded by University of Aberdeen.

Papers & Preprints

(13) **Higher analogues of discrete topological complexity** (with H. Alabay, E. Cihangirli, E. Dirican Erdal), submitted. arXiv

(12) **Contiguity distance between simplicial maps** (with M. Pamuk, T. Vergili), Turkish Journal of Mathematics, Vol 47, No 2 (2023), 664-677. pdf arXiv

(11) **Topological spaces induced by homotopic distance** (with T. Vergili), *Journal of Linear and Topological Algebra*, Vol 11, No 02 (2022), 85-91. pdf arXiv

(10) **A randomized greedy algorithm for piecewise linear motion planning** (with C. Ortiz, A. Lara, J. Gonzalez), *Mathematics*, Vol 9, Issue 19 (2021), 2358. pdf arXiv

(**Simplicial distance**, preprint - improved and mingled into the above paper. arXiv)

(9) **Higher homotopic distance** (with T. Vergili), *Topological Methods in Nonlinear Analysis*, Vol 57, No 2 (2021), 525-534. pdf arXiv

(8) **Digital homotopic distance between digital functions**, *Applied General Topology* Vol 22, No 1 (2021), 183-192. pdf

(7) **Higher dimensional simplicial complexity**, *New York Journal of Mathematics*, Vol 26 (2020), 1130-1144. pdf

(6) **Digital Lusternik-Schnirelmann category of digital functions** (with T. Vergili), *Hacettepe Journal of Mathematics and Statistics*, Vol 49, No 1 (2020), 1414-1422. pdf

(5) **Directed topological complexity of spheres** (with M. Grant), *Journal of Applied and Computational Topology*, Vol 4, No 1 (2020), 3-9. pdf arXiv

(4) **Digital Lusternik-Schnirelmann category** (with T. Vergili), *Turkish Journal of Mathematics*, Vol 42, No 4 (2018), 1845-1852. pdf

(3) **Motion planning algorithms for configuration spaces in the higher dimensional case**, *Topological Methods in Nonlinear Analysis*, Vol 47, No 2 (2016), 763-767. pdf

(2) **Symplectically aspherical manifolds with nontrivial Flux groups**, *Acta Mathematica Hungarica*, Vol 149, No 2 (2016), 523-525. pdf

(1) **A characterisation of symplectically aspherical manifolds**, *Journal of Fixed Point Theory and Applications*, Vol 17, No 3 (2015), 477-482. pdf

Electronic Lecture Notes

(5) Simplicial Homology, 1st edition, Jun 2022 (in Turkish)

(4) Elementary Knot Theory, 1st edition, Jun 2022 (in Turkish)

(3) Topology, 2nd edition, Feb 2022 (in Turkish)

(2) Introduction to Algebraic Topology, 1st edition, Jan 2022 (in Turkish)

(1) Real Analysis, 1st edition, Aug 2022 (in Turkish)

(all the e-books can be found here)

Talks at Conferences and Workshops (selected)

Jan 2024 (upcoming) Advances in Homotopy Theory V, Southampton University, UK

TBA, Invited speaker

Sep 2022 Algebra, Topology and Related Fields, Dokuz Eylul University, Izmir, Türkiye

"A survey on homotopic distance", Invited speaker

Jul 2022	[Applied Topology in Bedlewo 2022](#), Bedlewo, Poland
	"Contiguity distance", Semi-plenary speaker
Sep 2021	[Algebraic and Applied Topology Workshop III](#), Galatasaray University, Istanbul, Türkiye
	"Simplicial analogues of homotopic distance", Invited speaker
Sep 2021	33th National Mathematics Symposium, Istanbul University, Türkiye
	"Homotopic distance as pseudometric"
Sep 2020	[Workshop on Topological Complexity and Motion Planning](#), BIRS-CMO, Mexico
	"A simplicial analog of homotopic distance", Invited speaker
Aug 2019	32th National Mathematics Symposium, Ondokuz Mayis Universitesi, Samsun, Türkiye
	"Directed motion planners for directed spheres"
	"Relation between higher homotopic distance with TC_n and with LS-category"
Apr 2019	[Algebraic and Applied Topology Workshop](#), Dokuz Eylul University, Izmir, Türkiye
	"A survey on topological robotics", Invited speaker
Jun 2018	International Conference on Manifolds, Groups and Homotopy, Isle of Skye, UK
	"n-Dimensional Topological Complexity in the Simplicial Realm"
Apr 2017	[IV. Workshop of Association for Turkish Women in Mathematics](#), METU, Türkiye
	"A survey on topological robotics"
Jun 2015	[DyToComp 2015 Conference](#), Bedlewo, Poland
	"Higher dimensional motion planners for $F(R^n, k)$"
Aug 2013	[II. Turkish Women in Mathematics Summer School](#), IMBM, Türkiye
	"Remarks on symplectically aspherical manifolds"
Jun 2013	[Workshop on Symplectic Manifolds](#), Dokuz Eylul University, Türkiye
	"A Characterisation of Symplectically Aspherical Manifolds", Invited speaker
Dec 2009	MAGIC Postgraduate Conference 2009, Leeds, UK
	"Flat Bundles" (poster presentation)

Talks at Seminars

2022	Gebze Technical University
2021	Selçuk, [Bilkent](#)
2020	Southampton
2019	Koç, Yeditepe, Mimar Sinan Guzel Sanatlar
2018	IZTECH
2017	Applied Topology Seminar Series (Ege)
2016	Geometry/Topology Working Days (METU)
2015	Bilkent, Dokuz Eylul, IZTECH
2012	Aberdeen

Seminars/Workshops Organised

2019	Co-founder of [Algebraic and Applied Topology Workshops](#)
Autumn 2019	Organiser of [Algebraic and Applied Topology Workshop II](#), Bursa Technical University

Conferences and Workshops Attended (selected)

10.11.23 & 13.11.23-15.11.23	**9th Mexican Workshop on Applied Geometry and Topology**
	Virtual in gather.town
13.07.22–22.07.22	**TKMD Summer School on Intr. to Applied Topology & Geometric Group Theory**
	METU, Türkiye
02.07.22–08.07.22	**Applied Topology in Bedlewo 2022 w/ ICM Workshop in Poznan**
	Bedlewo, Poland
30.05.22–03.06.22	Workshop on Topological Complexity and Motion Planning, Invited participant
	BIRS-CMO, Oaxaca, Mexico (online)
31.08.21–03.09.21	**33th National Mathematics Symposium**
	Istanbul, Türkiye (online)
17.09.20–20.09.20	**Workshop on Topological Complexity and Motion Planning,** Invited participant
	BIRS-CMO, Oaxaca, Mexico (online)
31.08.19–03.09.19	**32th National Mathematics Symposium**
	Samsun, Türkiye
16.06.18–22.06.18	**International Conference on Manifolds, Groups and Homotopy**
	Isle of Skye, UK
28.04.17–29.04.17	**IV. Workshop of Association for Turkish Women in Mathematics**
	METU, Türkiye
15.06.15–29.06.15	**DyToComp2015 Conference**
	Bedlewo, Poland
26.06.14–04.07.14	**Advanced Courses and Workshop on Applied Topology**
	Castro Urdiales, Spain
26.05.14–31.05.14	**XXI. Gokova Geometry and Topology Conference**
	Mugla, Türkiye
26.08.13–31.08.13	**II. Turkish Women in Mathematics Summer School**
	IMBM, Türkiye
27.05.13–01.06.13	**XX. Gokova Geometry and Topology Conference**
	Mugla, Türkiye
30.03.13	**Low Dimensional Topology Workshop**
	IMBM, Türkiye
10.07.11–15.07.11	**LMS-ESPRC Short Course on Symplectic Geometry**
	Aberdeen, UK
10.05.10–14.05.10	**Spring School on Applied and Toric Topology**
	Malaga, Spain
14.12.09–16.12.09	**MAGIC Postgraduate Conference**
	Leeds, UK
20.04.09–22.04.09	**Geometry and Physics: Atiyah80**, Workshop in honour of Sir Michael Atiyah's 80th Birthday
	Edinburgh, UK
12.01.09–16.01.09	**IAGT: Izmir Algebraic Geometric Topology Days**
	Izmir, Türkiye
26.05.08–31.05.08	**XV. Gokova Geometry and Topology Conference**
	Mugla, Türkiye

24.04.08	**Maxwell Institute Colloqium on Geometry, Topology and Number Theory** Edinburgh, UK

Students Supervised

Ph.D. Students (Bursa Technical University)

2023–present	Nilay Ekiz Yazıcı

M.Sc. Students (Bursa Technical University)

2022–present	Hilal Alabay
2022–present	Esra Cihangirli
2022–2023	Özge Genç Kara, On Homotopic Distance

Senior Projects - selected (Bursa Technical University)

2023	Ceyda Ceren Ay, Simplicial Complexes
2022	Hilal Alabay, Homotopy and Homotopic Distance
2022	Esra Cihangirli, Rips and Cech Complexes
2022	Şevval Güleç, Introduction to Knots and Braids
2022	Gülay Bahar, Introduction to Basic Knot Theory

Teaching Experience

POSTGRADUATE TEACHING

Instructor

2021–present	**Bursa Technical University** Selected Topics in Algebraic Topology I Algebraic Topology I Algebraic Topology II

Examiner

2023	**External examiner for** M.Sc. thesis of Maram Almahariq (Karadeniz Technical University)
2019	**External examiner for** M.Sc. thesis of Mehmet Ali Batan (METU)
2018	**External examiner for** M.Sc. thesis of Mustafa Akkaya (Ege University)

UNDERGRADUATE TEACHING

Instructor

2014–present	**Bursa Technical University** Elementary Knot Theory Introduction to Algebraic Topology Topology Real Analysis Analysis III Analysis IV Differential Equations Linear Algebra Calculus I-II Business Mathematics

Various Engineering Mathematics courses which includes the contents multivariable calculus, complex analysis, vector analysis and Fourier analysis

2013–2014 **Zirve University**
Calculus I
Precalculus

Tutor

2007–2010 **University of Aberdeen**
Calculus
Advanced Calculus
Introduction to Analysis
Algebra
Introductory Mathematics
Sets and Algebraic Structures
Engineering Mathematics

Service to the Profession

Evaluation Jury for	TÜBİTAK project proposals
Referee for	Homology, Homotopy and Applications
	Journal of Applied and Computational Topology
	Hacettepe Journal of Mathematics
	Applied General Topology
	Bulletin/Journal of International Mathematical Virtual Institute
Reviewer for	Mathematical Reviews

Departmental Services

2022–present Departmental ERASMUS exchange coordinator, Bursa Technical University
2016–present Department of Mathematics web officer, Bursa Technical University
2017–2018 Supervisor of the Maths Club, Bursa Technical University

Membership

2008–2012 Edinburgh Mathematical Society, PhD student membership

Public Talks (invited)

May 2023 3rd Topology Workshop
"Motion Planning Problem & Topological Complexity"

Oct 2021 10th Bahar Mathematics Meetings, hosted by Bursa Technical University
"Robotics and Topology"

Feb 2021 Mathematics Club Workshop VI, Istanbul University
"Illusion, Robots and Topology"

Languages

Turkish Native
English Fluent

References

Available upon request.