

# Ümit Işlak

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## Appointments

- Current **Associate Professor**, *Boğaziçi University, Dept. of Mathematics*, Istanbul, Turkey.
- Current **Adjunct Faculty**, *Boğaziçi University, Dept. of Computational Sciences and Engineering*, Istanbul, Turkey.
- 2015-2016 **Jack Hale Postdoctoral Fellow**, *Georgia Institute of Technology*, Atlanta, GA.
- 2014-2015 **Dunham Jackson Assistant Professor**, *University of Minnesota*, Minneapolis, MN.
- 2014 **Research Associate**, *Paris VI, Laboratoire de Probabilités et Modeles Aleatoires*, Paris.
- 2010-2014 **Teaching and Research Assistant**, *University of Southern California*, Los Angeles, CA.
- 2007-2010 **Teaching Assistant**, *Boğaziçi University*, Istanbul, Turkey.

## Education

- 2014 **Ph.D. in Applied Mathematics**, *University of Southern California*, Los Angeles, CA, USA.
- 2013 **M.Sc. in Statistics**, *University of Southern California*, Los Angeles, CA, USA.
- 2010 **M.Sc. in Mathematics**, *Boğaziçi University*, Istanbul, Turkey.
- 2007 **B.Sc. in Mathematics**, *Boğaziçi University*, Istanbul, Turkey.

## Research Interests

Probability theory and related fields. More particularly, Stein's method, subsequence problems, random permutation/word statistics, random graphs/trees, Markov chains, statistical learning theory, time series analysis (theory and applications)

## Publications

(with Yunus E. Demirci and Alperen Y. Ozdemir), *Mixing time bounds for edge flipping on regular graphs*, to appear in *Journal of Applied Probability*, arXiv:2201.03315, 17 pages, 2023.

(with Christian Houdré) *A central limit theorem for the length of the longest common subsequence in random words*, *Electronic Journal of Probability*, 1-24, 2023.

(with Yunus E. Demirci and Mehmet A. Yıldız) *On a cover time problem on a dynamic graph with steps at random times*, Statistics and Probability Letters, 2023.

(with Ella Hiesmayr) *Asymptotic results on Hoppe trees and their variations*. Journal of Applied Probability 57.2: 441-457, 2020.

(with Alperen Yaşar Özdemir) *On an alternative sequence comparison statistic of Steele*. Discrete Mathematics & Theoretical Computer Science 22, 2020.

(with Jay Bartroff and Larry Goldstein) *Bounded size biased couplings for log concave distributions and concentration of measure for occupancy models*, Bernoulli, 24(4B), 3283-3317, 2018.

(with İlker Arslan and Cihan Pehlivan) *On unfair permutations*, Statistics and Probability Letters, 2018.

(with Alperen Yaşar Özdemir), *Asymptotic results on weakly increasing subsequences in random words*. Discrete Applied Mathematics 251,171-189, 2018.

*Descent-Inversion statistics in riffle shuffles*, Turkish Journal of Mathematics 42.2: 502-514, 2018.

*Asymptotic results for random sums of dependent random variables*, Statistics and Probability Letters, 2017.

(with Serdar Altok) *On leaf related statistics in recursive tree models*, Statistics & Probability Letters 121, 61-69, 2016.

Concentration inequalities with bounded couplings, PhD Dissertation, 125 pages, 2014.

(with Larry Goldstein) *Concentration inequalities via zero-biased couplings*, Statistics and Probability Letters, vol 86, pp. 17-23, <http://arxiv.org/abs/1304.5001>, 2014.

Propp-Wilson algorithm and beyond, Master's thesis, Boğaziçi University, 2010

## Preprints

(with İlker Arslan) *On local convexity and convex subsequences in random discrete sequences*, 7 pages, 2023.

(with Altar Çiçeksiz and Yunus E. Demirci) *The Variance and the Asymptotic Distribution of the Length of Longest  $k$ -alternating Subsequences*. arXiv:2107.12459, 13 pages, 2021.

(with Oğuz Güreker and Mehmet A. Yıldız) *A study on random permutation graphs*, preprint, arXiv:1901.06678, 21 pages, 2021.

(with Ella Hiesmayr) *Some remarks on biased recursive trees*, preprint, arXiv:1801.04617, 27 pages, 2018.

(with Ruoting Gong, and Christian Houdré) *A central limit theorem for the optimal alignments score in multiple random words*. arXiv:1512.05699, 30 pages, 2016.

(with Subhankar Ghosh) *Multivariate concentration inequalities with size biased couplings*, 11 pages, <http://arxiv.org/abs/1310.5448>, 2013 (not considered for publication anymore since the main result was proven independently by Arratia and Baxendale in arXiv:1306.0157 in the same year).

## Projects

(TÜBİTAK 1001. Researcher) Title: *Özel Çizgelerin Rastgele Üretilmesi*, Principal investigator: Tınaz Ekim, 2022-.

(BAP 16483. Principal investigator) Title: *Outliers, order statistics, and concentration inequalities*, 2020-.

(BİDEB 2232. Principal investigator) Title: *Stein's method and subsequence problems*, 2017-2019.

## Books

2022 *Ayrık Matematikte Seçme Konular I*, 328 pages, Nesin Yayınevi, 2022.

2022 *Temel Olasılık Teorisi ve Matematiksel İstatistik I*, 384 pages, Nesin Yayınevi, 2022.

2021 (with Arda Akdemir) *Markov Zincirlerine Kısa Bir Giriş*, 120 pages, will not be published, available through Researchgate.

## Translation

2023 Lockhart, P., *Aritmetik*, to appear by TÜBİTAK Yayınları, in preparation. (Original book: Lockhart, Paul. *Arithmetic*. Harvard University Press, 2019.)

2021 (with Fatih Demirkale and Oktay Ölmez) Robin J. Wilson, *Introduction to Graph Theory*, English to Turkish, completed, Palme Yayınevi.

## Teaching Experience

**Boğaziçi University, Instructor, Mathematics Department**

Math 234 - *Advanced Calculus II*

Math 231 - *Advanced Calculus I*

Math 532 - *Real Analysis II*

Math 531 - *Real Analysis I*

Math 544 - *Stochastic processes and martingales*

Math 541 - *Probability Theory*

Math 585 - *Sel. Top. in Probability and Statistics: Statistical learning theory*

Math 345 - *Probability*

Math 132 - *Calculus of a single variable*

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Math 162 - *Discrete Mathematics*

Math 201 - *Matrix Algebra*

Math 344 - *Introduction to Probability and Statistics*

Math 361 - *Combinatorics*

Math 48X - *Introduction to probabilistic number theory*

Math 101 - *Calculus I*

Math 102 - *Calculus II*

Math 331 - *Metric spaces*

**Georgia Institute of Technology**, *Instructor*, Mathematics Department  
Math 1551 - *Differential Calculus*, Fall 2015, Spring 2016

**University of Minnesota**, *Instructor*, Mathematics Department  
Math 5651 - *Basic Theory of Probability and Statistics*, Fall 2014, Spring 2015

**University of Southern California**, *Teaching Assistant*, Mathematics Department

Math 445 - *Advanced Engineering Mathematics II*, Spring 2013

Math 308 - *Statistical Inference and Data Analysis II*, Fall 2013

Math 218 - *Statistics for Business Students*, Spring 2012

Math 118 - *Calculus for Business Students*, Fall 2012

## Graduate Students - MS

- 2022 (joint with Mustafa Baydoğan) Can Hakan Dağdır, *Covariance estimation of spatio-temporal random variables with Kronecker product based models*, BU Math, Master's thesis.
- 2022 (joint with İlker Arslan) Elif Yılmaz, *Short-term forecast methodologies and case studies in traffic flow*, BU CSE, Master's thesis.
- 2021 Yunus Emre Demirci, *Stationary distributions and convergence rates for the edge flipping process*, BU Math, Master's Thesis.
- 2020 Mehmet Akif Yıldız, *On online and approximate cover times*, BU Math, Master's Thesis.
- 2018 Abdurrahman Demirelli, *First moment problem in longest common subsequences*, BU Math, Master's Thesis.
- 2018 Ella Hiesmayr, *On asymptotics of two non-uniform recursive tree models*, BU Math, Master's Thesis.
- current graduate Barış Yeşiloğlu (Boğaziçi Math), Harun Özkan (Boğaziçi CSE), (joint with Atabey Kaygun) Hakan Erçe (Boğaziçi CSE), (joint with Atabey Kaygun) Erkin Şimşek (Boğaziçi CSE), (joint with Atabey Kaygun) Hüseyin Saruhan (İTÜ Math. Eng.),
- undergrad I had around 20 students working with me towards their senior thesis project.

## Selected Awards/Honors

- 2023 Matematik Vakfı Hayri Körezlioğlu Research Award
- 2021 YÖK - Associate Professor.
- 2017 TUBITAK BİDEB-2232 Fellowship.
- 2016 Thank a Teacher Award, Georgia Institute of Technology.
- 2013 Theodore Edward Harris Graduate Research Prize, University of Southern California.
- 2013 Dissertation Completion Fellowship, University of Southern California.
- 2010 Merit Fellowship for 2010-2011 and summer 2011, University of Southern California.
- 2010 Best Graduate Instructor Award, Boğaziçi University.