



IREM B. GÜNDÜZ

PhD Student in Computer Science

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My research centers around the following questions: Which regulatory interactions are involved in changing cell states? What is the role of cell state changes in development systems and disease biology? How can we integrate sparse genomic data to infer disease dynamics? I develop interpretable computational frameworks to perform integrative single-cell multi-omics analysis and, to develop a better understanding of development systems and disease biology.

🎓 Education

Oct 2021- Present	Saarland University <i>Doctor of Philosophy</i> Computer Science GPA: 1.0/1.0 Thesis Title: Inferring Regulatory Dynamics of Cell Fate Decisions using Interpretable Machine Learning Models Supervisor: Prof. Fabian MULLER
Aug 2017-Sep 2021	Marmara University <i>Bachelor of Engineering</i> Bioengineering (English) GPA: 3.21/4.00 Thesis Title: Discovery of New Drugs for the Inhibition of <i>N. Meningitidis</i> Computationally

🔬 Research Experience

June 2022- Present	Chair of Clinical Bioinformatics <i>Supervisor: Prof. Dr. Andreas KELLER</i> Saarland University As a rotation student, I worked on quantification of alternative splicing events and, transcriptional network breakdown in aging content.
Jan 2022- June 2022	Integrative Cellular Biology and Bioinformatics Laboratory <i>Supervisor: Prof. Dr. Fabian MULLER</i> Saarland University As a rotation student, I use single-cell bioinformatics to understand epigenomic changes in the content of pathogen exposure .
June 2021- June 2022	Bioinformatics and Omics Data Science Group <i>Supervisor: Dr. Altuna AKALIN</i> Berlin Institute of Medical System Biology As a bioinformatics intern, I developed an R package called <i>deconvR</i> , to simulate and deconvolute omic profiles. Later, I worked on “ <i>Multi-omics alleviates the limitations of panel-sequencing for cancer drug response prediction</i> ” manuscript.
April - Aug 2021	Bishop Laboratory <i>Supervisor : Dr. Alexander J.R. BISHOP, Dr. Daniel MONTEMAYOR</i> Bioinformatics Research Network As a project participant, I developed ensembl models to test benefits of using Rloop levels as a predictor for cancer tissue status in clinics.

2019 - Aug 2021

Computational Biology and Bioinformatics Laboratory

Supervisor : Assoc. Prof. Dr. Pemra OZBEK SARICA

Marmara University

As a student assistant, I worked on computational investigations of biomolecular complexes.

June - Aug 2019

Neuroscience Laboratory

Supervisor : Assoc. Prof. Dr. Nurcan ORHAN

Aziz Sancar Institute of Experimental Medicine

As an intern, I participated theoretical and practical courses on neuroscience and learned how to perform wet-lab techniques such as western blotting, ELISA.

📁 Work and Teaching Experience

Sep 2022 - Feb 2023

Integrative Cellular Biology and Bioinformatics Laboratory

Supervisor: Prof. Dr. Fabian MULLER

Saarland University

As the tutor of the Single-Cell Bioinformatics course offered in Winter 2022 term at Saarland University, I prepared the course material and, assisted students throughout the projects.

Aug 2021–Sep 2021

Bioinformatics and Omics Data Science Group

Supervisor: Dr. Altuna AKALIN

Berlin Institute of Medical System Biology

I worked as a teaching assistant in *the CompGen 2021: Hands-on Course on Machine Learning for Genomics*. I prepared the course material, including benchmark machine learning models and assisted the participants for capstone project.

Aug 2020–Oct 2020

VEM Pharmaceuticals

As an intern, I learned how to perform quality tests and, finalize the production of drugs.

Leadership and Volunteer Activities

April 2022–Present

Skill Assessment Team

Bioinformatics Research Network (BRN)

As a code reviewer, I assess trainees coding skills in terms of code correctness and, cleanliness.

June 2022–Present

Organization Team

Journal Club in Ageing

As the leader of the club, I keep the club organized to track the up-to-date research in ageing.

June 2022–Present

Community Team

Bioinformatics Research Network (BRN)

As the leader of BRN seminar series team, I led and organized series of workshops and presentations to help students to meet leading experts in the field and, track up-to-date research.

Oct 2018–Oct 2020

Journal And Promotion Team

Marmara University Bioengineering Society (BIYOM)

As the head of the team, I led and organized the content for Marmara University Faculty Of Engineering Students Club Magazine (MUFE'M).

Oct 2018–Jan 2019

Organization Team

IEEE Marmara University Engineering in Medicine & Biology Society (EMBS)

As a team member, I contributed to organization of conferences.

Academic and Professional Honors

- Full Scholarship for Preparatory Phase of Doctoral Studies in Computer Science – *Saarland University*
- TUBITAK 1001 Research Scholarship – *Marmara University, Department of Bioengineering*
- Honor Student – *Marmara University, Department of Bioengineering*
- Open Science Reporter Award - 2022 Saarland University SULB

Conferences, Presentations and Relative Engagements

- Single-Cell System Medicine Summer School – *Berlin Institute of Medical System Biology*
- Uncertainty in Artificial Intelligence (UAI)
- RECOMB 2023: 27th Annual International Conference on Research in Computational Molecular Biology - Presentation of Poster: Chromatin accessibility landscape of human peripheral blood cells upon pathogen exposure

Selected Publications and Open-Source Softwares

- *deconvR* (Available in Bioconductor) : Simulation and Deconvolution of Omic Profiles
- Baranovskii, A.; **Gündüz, I.B.**; Franke, V.; Uyar, B.; Akalin, A. Multi-Omics Alleviates the Limitations of Panel Sequencing for Cancer Drug Response Prediction. *Cancers* **2022**, *14*, 5604.
<https://doi.org/10.3390/cancers14225604>

Courses and Certificates

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| • <u>Data Science R Basics</u> | • Python for Genomics |
| • <u>Introduction to Tidyverse</u> | • <u>Python Data Structures</u> |
| • <u>Intermediate R Programming</u> | • <u>Introduction to Statistics with R</u> |
| • <u>Machine Learning with Caret</u> | • <u>Unsupervised Learning</u> |
| | • <u>Linux Command Line: Shell Scripting</u> |