IREM B. GUNDUZ

PHD CANDIDATE

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PROFILE

Results-driven Ph.D. candidate specializing in epigenomics, with a strong focus on developing computational models and leveraging multi-omics data to gain insights into the role of epigenetic mechanisms in gene regulation and cell identity, while employing explainable modeling techniques and causal inference.

EDUCATION

May 2023 - Present
PhD Student
Saarland University /
Mathematics and Informatics Faculty

Dec 2021 - May 2023
Preparatory Phase PhD Student
Saarland University /
Graduate Schhol of Computer Science

Aug 2017 - Sept 2021
B.Eng in Bioengineering
Marmara University / Faculty of Engineering

EXPERTISE

- Single-Cell Multi-Omics Analysis
- R Package Development
- Deep Learning Applications in Genomics
- Causal Gene Regulation
- Explainable AI

WORK EXPERIENCE

May 2023- Present
ACADEMIC RESEARCH ASSISTANT / PHD STUDENT
Integrative Cellular Biology and Bioinformatics Lab |
Saarland University | Saarbrücken,Germany |
Supervisor: Jun. Prof. Dr. Fabian MULLER

My research focuses on developing interpretable and explainable predictive models for modeling cell-type-specific gene regulation using multi-omics data, with an emphasis on understanding causal relationships, as well as integrating diverse epigenomic data to identify key epigenetic signatures and regulatory interactions involved in cell identity establishment and changes.

» I am currently serving as a Teaching Assistant, actively involved in instructing and supporting courses such as Single-Cell Bioinformatics and other related subjects.

Jun 2022 - Feb 2023
ROTATORY RESEARCH STUDENT
Chair of Clinical Bioinformatics |
Saarland University | Saarbrücken,Germany |
Supervisor: Prof. Dr. Andreas KELLER

As a rotation student, I quantified alternative splicing events and analyzed transcriptional network breakdown in the context of aging and parabiosis.

Jan 2022 - June 2022
ROTATORY RESEARCH STUDENT
Integrative Cellular Biology and Bioinformatics Lab
Saarland University | Saarbrücken,Germany |
Supervisor: Jun-Prof. Dr. Fabian MULLER

As a rotation student, I analyzed single-cell epigenomic data from pathogen-exposed individuals, investigating changes in immune cell type-specific profiles using statistical learning approaches.

July 2021 - June 2022
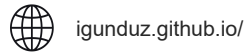**BIOINFORMATICS INTERN**
Bioinformatics and Omics Data Science Group
Berlin Institute of Medical Systems Biology (BIMSB) | Berlin,Germany |
Supervisor: Dr. Altuna AKALIN

As a bioinformatics intern, I engaged in diverse projects, including R package development and drug response prediction.

» I developed and maintain the deconvR package, available on the Bioconductor platform, for analyzing bulk sample deconvolution using reference signature profiles and diverse modeling options.

AWARDS

Dec 2022
Open Science Reporter
Saarland University

Dec 2021 - May 2023
Preparatory Phase PhD Scholarship
Saarland University /
Graduate School of Computer Science

Oct 2020 - June 2021
1001 Research Scholarship
The Scientific and Technological Research
Council of Turkey

Oct 2020 - June 2021
Honor Student
Marmara University,
Department of Bioengineering

LANGUAGE

- **TURKISH**
  native language

- **ENGLISH**
  fluent (speaking, reading,writing)

- **GERMAN**
  intermediate (speaking, reading, writing)

WORK EXPERIENCE   (CONTINUED)

≫ As a teaching assistant in the CompGen 2021: Hands-on Course on Machine Learning for Genomics, I prepared course materials, including benchmark machine learning models, and assisted participants with their capstone projects.

Apr 2021 - Aug 2021
PROJECT INTERN
Bishop Laboratory | Bioinformatics Research Network |
Supervisors: Dr. Alexander J.R. BISHOP, Dr. Daniel MONTEMAYOR
As a project participant, I developed ensemble models to assess the utility of utilizing R-loop levels as a predictor for cancer tissue status in clinical settings.

Oct 2019 - Aug 2021
STUDENT ASSISTANT
Computational Biology and Bioinformatics Laboratory |
Marmara University | Istanbul, Turkey |
Supervisor: Assoc. Prof. Dr. Pemra OZBEK SARICA
As a student assistant supported by the TUBITAK 1001 project scholarship, I conducted computational investigations on biomolecular complexes, with a specific focus on the discovery of new drugs for the inhibition of N. Meningitidis.

Aug 2020 - Oct 2020
SUMMER INTERN
Vem Pharmaceuticals | Tekirdag, Turkey |
As an intern, I gained experience in performing quality tests and contributed to the finalization of drug production processes.

Aug 2020 - Oct 2020
SUMMER INTERN
Neuroscience Lab. 0
Aziz Sancar Institute of Experimental Medicine | Istanbul, Turkey |
Supervisor: Assoc. Prof. Dr. Nurcan ORHAN
As an intern, I participated in theoretical and practical courses on neuroscience and gained hands-on experience in wet-lab techniques including western blotting and ELISA.

PUBLICATIONS

Baranovskii A, <u>Gündüz IB</u>, Franke V, Uyar B, Akalin A. Multi-Omics Alleviates the Limitations of Panel Sequencing for Cancer Drug Response Prediction. Cancers. 2022; 14(22):5604. https://doi.org/10.3390/cancers14225604

RELATED ACTIVITIES

- RECOMB 2023: 27th Annual International Conference on Research in Computational Molecular Biology Poster Presentation: Chromatin accessibility landscape of human peripheral blood cells upon pathogen exposure
- Uncertainty in Artificial Intelligence (UAI) Conference 2022
- e:Med Summer School 2022 - Single-cell based systems medicine
- SCOG Workshop 'Recent Advances in Single Cell Epigenomics 2022'