

# Çiğdem Ak, Ph.D.

(PRONOUNCED: CHEE-DEM)

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## RESEARCH & INTERESTS

My work focuses on building interpretable machine learning models that integrate diverse data types, including single-cell omics, spatial profiling, and longitudinal clinical data, to model disease progression and enable patient stratification. I have developed methods that bridge computational innovation with biological insight, advancing our understanding of the molecular and spatial mechanisms underlying cancer and treatment response.

Interpretable ML | multi-omic integration | spatiotemporal modeling | precision oncology

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## EDUCATION

### Oregon Health & Science University

*Portland, Oregon United States*

#### Postdoctoral Scholar at Cancer Early Detection Advanced Research (CEDAR) Center

*Jan. 2020 – Present*

Developing interpretable machine learning methods—including multiple kernel learning, topic modeling, and spatial statistics—to model disease progression and treatment response in cancer. My work integrates multi-omic and spatial data across scales to uncover regulatory mechanisms driving clinical outcomes, focusing on interpretability as a requirement for biological insight and translational utility. Key projects include scMKL, a framework for biologically grounded multi-omic classification of healthy and disease cell states and treatment response; EpiConfig, a topic modeling tool for identifying enhancer-gene modules from single-cell multi-omics; and spatial modeling of the prostate tumor microenvironment to reveal immune-stromal niches associated with grade and androgen signaling. These methods support both scientific discovery and clinically relevant predictions. Co-mentored by Drs. Laura Heiser and Sadik Esener.

### Koç University

*Istanbul, Turkey*

#### Ph.D. in Computational Sciences and Engineering

*Sep. 2014 – Jul. 2019*

*Thesis: Spatiotemporal modeling using machine learning with Drs. Önder Ergönül and Mehmet Gönen*

### École Polytechnique

*Paris, France*

**M.Sc. in Mathematics**

Sep. 2013 – Sep. 2014

*Track:* Mathematics for life sciences

*Dissertation:* Identification of bacterial regulatory networks from experimental data at Inria-Grenoble with *Drs. Eugenio Cinquemani and Hidde de Jong*

**École Normale Supérieure de Lyon**

Lyon, France

**M.Sc. in Mathematics**

Sep. 2012 – Sep. 2013

*Track:* Modeling complex systems

*Dissertation:* Stability of a linear system structured on age which describes the production of red blood cells at Inria-Lyon with *Drs. Fabien Crauste and Thomas Lepoutre*

**Galatasaray University**

İstanbul, Turkey

**B.Sc. in Mathematics**

Sep. 2007 – Jun. 2012

*Dissertation:* Newtonian mechanics from a Lagrangian point of view with *Dr. Susumu Tanabe*

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**OTHER RESEARCH EXPERIENCE****Koç University**

İstanbul, Turkey

**Data Scientist**

Jul. 2019 – Jan. 2020

Developed a user-friendly tool for interactive spatiotemporal data visualization and analysis for a European Research Council (ERC) project: Industrialization and Urban Growth from the mid-nineteenth century Ottoman Empire to Contemporary Turkey in a Comparative Perspective, 1850-2000

**Koç University**

İstanbul, Turkey

**Teaching Assistant**

Sep. 2019 – Jan. 2019

Assisted the course Engr 421X Introduction to Machine Learning (Fall 2019): Conducted the lab sessions for participants of the Online Data Science Certificate Program and graded homework and exams

**Koç University**

İstanbul, Turkey

**Research and Teaching Assistant**

Sep. 2014 – Jul. 2019

*Main research topic:* Modeling spatiotemporal dynamics of infectious diseases using structured Gaussian processes

Conducted lab sessions/problem-solving sessions and graded homework, quizzes, and exams for various courses in mathematics and engineering departments

**Inria Grenoble Rhône-Alpes**

Grenoble, France

## M2 Research Intern

May 2014 – Aug. 2014

Identification of bacterial regulatory networks from experimental data

## Inria Lyon

Lyon, France

## M2 Research Intern

Apr. 2013 – Jul. 2013

Stability of a linear system structured on age which describes the production of red blood cells

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## PUBLICATIONS

### \*Corresponding Author

### PEER-REVIEWED

#### POSTDOC PAPERS

#### Interpretable and Integrative Analysis of Single-Cell Multiomics with scMKL

Kupp, S., Vangordon, I., Gonen, M., Esener, S., Eksi, S. E., **Ak, Ç.\*** *Communications Biology*, 2025, 8, 1160, <https://doi.org/10.1038/s42003-025-08533-7>.

#### Multiplex imaging of localized prostate tumors reveals altered spatial organization of AR-positive cells in the microenvironment

**Ak, Ç.**, Sayar, Z., Thibault, G., Burlingame, E., Eng, J., Chitsazan, A., Adey, A., Boniface, C., Spellman, P., Thomas, G., Kopp, R., Chang, Y. H., Stavrinides, V., Demir, E., and Eksi, S. E. *iScience*, 2024, 110668, ISSN 2589-0042, <https://doi.org/10.1016/j.isci.2024.110668>.

#### Automated segmentation of tumor innervating neuronal fibers

Ait-Ahmad, K., **Ak, Ç.**, Thibault G., Chang, Y. H., Eksi, S. E. *Heliyon*, 2024, e41209, <https://doi.org/10.1016/j.heliyon.2024.e41209>.

#### Estrogen regulates divergent transcriptional and epigenetic cell states in breast cancer

Ors, A., Chitsazan A. D., Doe, A. R., Mulqueen R. M., **Ak, Ç.**, Wen Y., Haverlack, M., Handu, M., Naldiga, S., Saldivar, J. C., and Mohammed H. *Nucleic Acids Research*, 2022, Volume 50, Issue 20, Pages 11492–11508, <https://doi.org/10.1093/nar/gkac908>.

#### Fast and interpretable genomic data analysis using multiple approximate kernel learning

Bektaş, A. B., **Ak, Ç.**, Gönen, M. *Bioinformatics*, 2022, vol. 38, Issue Supplement 1, Pages i77–i83, <https://doi.org/10.1093/bioinformatics/btac241>.

#### Spatial prediction of COVID-19 pandemic dynamics in the United States

**Ak, Ç.\***, Chitsazan, A., Gönen, M., Grossberg, A., Etzioni, R. *ISPRS International Journal of Geo-Information*, 2022, 11(9), 470, <https://doi.org/10.3390/ijgi11090470>.

#### PHD PAPERS

### **A prospective prediction tool for understanding Crimean–Congo haemorrhagic fever dynamics in Turkey**

**Ak, Ç.**, Ergönül, Ö., Gönen, M. *Clinical Microbiology and Infection*, 26(1):123.e1-123.e7. 2020, <https://doi.org/10.1016/j.cmi.2019.05.006>.

### **Structured Gaussian processes with twin multiple kernel learning**

**Ak, Ç.**, Ergönül, Ö., Gönen, M. *Proceedings of The 10th Asian Conference on Machine Learning*, PMLR 95:65-80. 2018, <https://proceedings.mlr.press/v95/ak18a/ak18a.pdf>.

### **Spatiotemporal prediction of infectious diseases using structured Gaussian processes with application to Crimean–Congo hemorrhagic fever**

**Ak, Ç.**, Ergönül, Ö., Şencan, İ., Torunoğlu, M. A., Gönen, M. *PLoS Neglected Tropical Diseases*, vol. 12, no. 8, p. e0006737. 2018, <https://doi.org/10.1371/journal.pntd.0006737>.

## **IN PREPARATION**

### **Upregulated NRXN1 expression mediates neuronal phenotypic plasticity in prostate cancer through mitochondrial shuttling at cellular adhesion sites**

Grieco, J. P., Sener, G., Theison, H., Riesterer, J. L., Kuykendall, M. J., Makkawi, R., Davies, A. E., McGann, J., **Ak, Ç.**, Eksi, S. E. Currently in revision at *Cell Methods*. 2025.

### **EpiConfig: Multimodal topic modeling for single-cell multiomics**

**Ak, Ç.**, Szczepanski, N., Doe, A., Chitsazan, A., Yardımcı, G. G. [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2025; Part 1 (Regular Abstracts); 2025 Apr 25-30; Chicago, IL. Philadelphia (PA): AACR; Cancer Res 2025;85(8\_Suppl\_1):Abstract nr 5001. <https://doi.org/10.1158/1538-7445.AM2025-5001>. Manuscript currently in preparation.

### **Investigating the spatial interactions of neural and immune cells in localized prostate cancer via new spatial analysis tools**

**Ak, Ç.**, Ait-Ahmad, K., Kupp, S., Wang, M., Thibault G., Chang, Y. H., Eksi, S. E. Manuscript currently in preparation.

## **MEDIA COVERAGE**

### **Multiplex Imaging of Localized Prostate Tumors Reveals Altered Spatial Organization of AR-Positive Cells in the Microenvironment - Beyond the Abstract**

<https://www.urotoday.com/recent-abstracts/urologic-oncology/prostate-cancer/155143-multiplex-imaging-of-localized-prostate-tumors-reveals-altered-spatial-organization-of-ar-positive-cells-in-the-microenvironment-beyond-the-abstract.html>

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## **GRANTS & FUNDING**

At the Cancer Early Detection Advanced Research (CEDAR) Center at OHSU, researchers lead internally peer-reviewed, competitively funded projects structured similarly to NIH grants. As part of this model, I have served as Principal Investigator (PI) or co-PI on multiple funded research efforts, and as a key team member on several collaborative studies (see, [Being a Postdoc in CEDAR](#)). Below is a summary of these projects and my contributions.

## *PRINCIPAL INVESTIGATOR (PI) ROLES*

### **Building Interpretable Computational Frameworks for Single-Cell Multiomics**

**PI: Ç. Ak** | CEDAR Full Award | Jul. 2022 – Aug. 2025 | \$204,156

Initiated and led the development of interpretable machine learning models (e.g., scMKL) to integrate single-cell and spatial multi-omics for predicting cell states, treatment response, and regulatory programs in cancer. Defined scientific vision, assembled and managed a cross-functional team, oversaw technical strategy and budget, and drove collaborations across computational and experimental groups.

### **EpiConfig: Multimodal Topic Modeling for Single-Cell Multiomics**

**PI(s): Ç. Ak, G. Yardimci** | CEDAR Full Award | May 2021 – Dec. 2024 | \$328,558

Co-led the development of EpiConfig, a topic modeling framework for uncovering gene–regulatory element modules from RNA + ATAC multiomic data. Led model design, software engineering, and cross-functional analysis across cancer types. Developed an interactive visualization interface to drive biological interpretation and hypothesis generation.

### **COVID-19 Prediction Hub of Oregon**

**PI(s): Ç. Ak, A. Grossberg** | CEDAR Exploratory Award | Jun. 2020 – Jun. 2021 | \$65,717

Led model design and deployment of real-time COVID-19 forecasts at the U.S. county level; supported state public health response during the early pandemic.

### **Pathway- and Gene Set–Based Predictive Algorithms for Single-Cell Modeling**

**PI: Ç. Ak** | CEDAR Exploratory Award | Jun. 2020 – Dec. 2020

Developed early gene set–driven modeling strategies that informed the design of kernel-based classification models (later applied in scMKL). Early-stage development of biologically informed kernel representations for classifying cell states in scRNA-seq data using gene sets and regulatory priors.

## *COLLABORATIVE RESEARCH ROLES (TEAM MEMBER)*

### **Defining tumor-innervating axons in prostate cancer through molecular signatures and spatial interactions**

**PI(s): Ç. Ak, S.E. Eksi** | CEDAR Manuscript Prep | Apr. 2025 – Nov. 2025 | \$57,409

Leading the spatial and computational characterization of tumor-innervating axons across prostate cancer grades using cyclF imaging and spatial statistics. Oversaw the design and execution of axon subtype–specific analyses, including proximity, cell-to-cell interaction, and spatial autocorrelation, to uncover relationships between axons and epithelial, stromal, immune, and functionally defined cell states. Directed efforts to map neuronal presence within immune neighborhoods using dual-panel registration and co-localization. Developed figures and refined multi-scale spatial models to reveal the organization and functional roles of axons in tumor progression. This work builds on our previously published frameworks and aims to establish reproducible pipelines for spatial neuro-oncology analysis.

### **Multiplex Imaging for Early Detection of Prostate Cancer**

**PI: Y.H. Chang** | CEDAR Full Award | Jan. 2024 – Jul. 2025

Supported spatial analysis and statistical modeling of early prostate lesions from multiplex tissue imaging data.

#### **Neural–Immune Spatial Interactions in Prostate Cancer**

**PI:** S.E. Eksi | CEDAR Full Award | Feb. 2022 – Jan. 2025

Developed image processing pipelines and spatial statistics to map neural–immune cell neighborhoods.

#### **Modeling Cancer–Neuron Crosstalk**

**PI:** S.E. Eksi | CEDAR Full Award | Aug. 2022 – Aug. 2024

Supported development of tools and models to study interactions between cancer and neural cells in the tumor microenvironment.

#### **Platelet Multi-Omics for Cancer Detection**

**PI:** S.T. Yunga | CEDAR Full Award | Jan. 2020 – Apr. 2022

Performed and guided data integration and biomarker analysis of transcriptomic and proteomic profiles from platelets.

#### **Genomic Risk Prediction in Uterine Cancer**

**PI:** T. Morgan | CEDAR Full Award | Dec. 2019 – Apr. 2022

Contributed to analysis of genomic and clinical data to build risk models for early uterine cancer progression.

#### *ADDITIONAL RESEARCH INITIATIVES*

#### **Integration of multiplex tissue imaging approaches into the clinical**

**PI:** Ç. Ak | Colins Medical Trust Fund | 2024 (not funded)

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### **SELECTED CONFERENCE PRESENTATIONS AND PROCEEDINGS**

- 2025 **Pitch-talk & Poster.** *Enhancing Interpretability of Single-Cell Multi-Omics Analysis*, The Early Detection of Cancer Conference, Portland, USA
- 2025 **Pitch-talk & Poster.** *Spatial Analysis of Androgen Receptor's Role in Prostate Cancer Across Multiple Scales*, The Early Detection of Cancer Conference, Portland, USA
- 2025 **Poster.** *Capturing Cross-Modality Epigenomic and Transcriptomic Interactions in Single-Cell Cancer Data*, The Early Detection of Cancer Conference, Portland, USA
- 2025 **Poster.** *Enhancing interpretability of single-cell multi-omics analysis*, OHSU Research Forum, Portland, USA
- 2025 **Poster.** *Multimodal Topic Modelling*, AACR Annual Meeting, Chicago, USA

- 2024 **Talk.** *Spatial Analysis of Androgen Receptor's Role in Prostate Cancer Across Multiple Scales*, 3rd Annual Spatial Biology Summit, Stanford, USA
- 2024 **Talk & Poster.** *Enhancing interpretability of single-cell multi-omics analysis*, Epigenetics Symposium, Portland, USA
- 2023 **Poster.** *EpiConfig: Multimodal topic modelling for single-cell multiomics*, Machine Learning in Computational Biology, Seattle, USA
- 2023 **Talk & Poster.** *EpiConfig: Multimodal topic modelling for single-cell multiomics*, CSHL Single Cell Analyses meeting, New York City, USA
- 2023 **Poster.** *EpiConfig: Multimodal topic modelling for single-cell multiomics*, Pacific Symposium on Biocomputing (PSB), Hawaii, USA
- 2021 **Poster.** *Functional PTEN mutations in progestin-resistant de novo endometrial intraepithelial neoplasia*, College of American Pathologists (CAP21) Annual Meeting, Chicago, USA
- 2022 **Poster.** *EpiConfig: Multimodal topic modelling for single-cell multiomics*, The Early Detection of Cancer Conference, Portland, USA
- 2022 **Talk & Poster.** *Fast and interpretable genomic data analysis using multiple approximate kernel learning*, 30th Conference on Intelligent Systems for Molecular Biology (ISMB), Madison, USA
- 2022 **Talk.** *Multimodal topic modelling for single-cell multiomics*, *Symposium on Approaches in Single-cell Analysis*, OHSU, Portland, USA
- 2019 **Talk.** *Devising graphical user interfaces to examine structural change and population dynamics*, ENCHOS III, Third Meeting of the European Network for the Comparative History of Population Geography and Occupational Structure (1500-1900), Istanbul, Turkey
- 2018 **Talk & Poster.** *Structured Gaussian processes with twin multiple kernel learning*, 10th Asian Conference on Machine Learning (ACML 2018), Beijing, China
- 2018 **Poster.** *Modeling spatiotemporal dynamics of infectious diseases using structured Gaussian processes*, 17th European Conference on Computational Biology (ECCB 2018), Athens, Greece
- 2017 **Talk.** *Spatiotemporal prediction of infected cases by using structured Gaussian process with application to Crimean–Congo haemorrhagic fever*, 61st ISI World Statistics Congress, Marrakesh, Morocco
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## INVITED TALKS

- 2025 **Panel Discussion “Next Generation Leaders”**, The Mission Moment, OHSU Foundation Mini-Conference.

- 2024 **Spatial Heterogeneity and Sample Size Effects in Prostate Cancer Progression**, Quantitative & Systems Biology seminar series, Knight Cancer Institute, Oregon Health and Science University
- 2022 **Fast and interpretable genomic data analysis using multiple approximate kernel learning**, Lifespan Academic Medical Center, Brown University
- 2022 **Multimodal topic modelling for single-cell multiomics**, Symposium on Approaches in Single-cell Analysis, Knight Cancer Institute, Oregon Health and Science University
- 2022 **EpiConfig: multimodal topic modeling for single-cell multiomics**, Computational Biology Research Retreat, Knight Cancer Institute, Oregon Health and Science University
- 2022 **EpiConfig: multimodal topic modeling for single-cell multiomics**, Single Cell Technology Work Group, Oregon Health and Science University
- 2020 **Spatiotemporal modeling using machine learning**, Mathematics Department, Galatasaray University
- 2019 **Spatiotemporal modeling using machine learning**, Tarentum AI, Istanbul Technical University
- 2017 **Mathematical modelling of infectious diseases**, Spread of Epidemic Diseases Summer School, Feza Gürsey Research Center, Bogazici University
- 2014 **Identification of metabolic network models in E. coli**, Freie Universität Berlin, Department of Mathematics and Computer Science
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## SCHOLARSHIPS

- 2014 – 2019 Koç University Ph.D. Full tuition scholarship, Istanbul, Turkey
- 2013 – 2014 Master Excellence Scholarship from Fondation Mathématique Jacques Hadamard, Paris, France
- 2012 – 2013 The Ampère Scholarships of Excellence of the École Normale Supérieure de Lyon, Lyon, France
- 2007 – 2012 University Scholarship of Ministry of National Education of Turkey, Istanbul, Turkey
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## AWARDS & HONORS

- 2019 Young Scientists Award, first rank prize of the Prof. Enver Tali Çetin Young Scientists Award, Istanbul, Turkey
- 2018 Long Talk, one of the 27 long talks out of 64 papers at the 10th Asian Conference on Machine Learning, Beijing, China



- 2018      Conference Travel Award, awarded to only 5 students presenting at the 10th Asian Conference on Machine Learning, Beijing, China
  - 2012      Dean's High Honor List, Galatasaray University, Istanbul, Turkey
  - 2011      Travel Award, awarded for undergraduate accomplishments from Galatasaray University, Istanbul, Turkey
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## LEADERSHIP & SERVICE

- 2020 – present      **Organizer and Lead Mentor**, CompBio Weekly Journal Club, at CEDAR OHSU, Portland, USA
  - 2019                  **Organization** team and **Lecturer**, Machine Learning Summer School, Koç University, Istanbul, Turkey
  - 2017                  **Lecturer**, Spread of Epidemic Diseases Summer School, Feza Gürsey Research Center, Istanbul, Turkey
  - 2017                  **Organizer**, Invited paper session at the 61st ISI World Statistics Congress, Marrakesh, Morocco
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## SCIENTIFIC TRAINING

- 2020                  15th Machine Learning in Computational Biology Conference (MLCB), virtual
  - 2020                  Machine Learning for Health Workshop, OHSU - PSU, virtual
  - 2020                  International Alliance for Cancer Early Detection (ACED) Summer School, virtual
  - 2015                  7th International Summer School of Spatial Epidemiology, Climate and Health: Concepts and Modeling, Bielefeld University, Bielefeld, Germany
  - 2014                  6th International Summer Course on Research Methodology and Ethics in Health Sciences, Koç University, Istanbul, Turkey
  - 2013                  Biological invasions and evolutionary biology, stochastic and deterministic models, Université Claude Bernard Lyon 1, Lyon, France
  - 2013                  Multiscale modeling in the life sciences summer school, ENS de Lyon, Lyon, France
  - 2011                  Nesin mathematics village summer school, Izmir, Turkey
  - 2011                  4th European Women in Mathematics Summer School, Lorentz Center, Leiden, Netherlands
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## PROFESSIONAL DEVELOPMENT

2024-25	Early Career Faculty Advancement Program (ECAP)	OHSU, USA
2024	Productive Conflict and You Workshop	OHSU, USA
2023	Training Future Faculty (TFF)	OHSU, USA
2023	Vollum Science Writing Class	OHSU, USA
2022	Bystander Intervention Training: Stepping-In for Respect	OHSU, USA
2020	Center for the Improvement of Mentored Experiences in Research (CIMER) Mentoring Up Training	OHSU, USA

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## TEACHING

Fall 2019	Introduction to Machine Learning, Engr 421X/421/521 Dasc 421/521	Koç University
Spring 2019	Introduction to Machine Learning, Comp 421X	Koç University
Fall 2018	Introduction to Machine Learning, Comp 421X Comp/Indr 421/521 Elec443/543	Koç University
Spring 2018	Introduction to Machine Learning, Comp 421X	Koç University
Fall 2017	Introduction to Machine Learning, Indr/Comp 421/521	Koç University
Spring 2016	Statistics for Engineers, Engr 201	Koç University
Fall 2016	Statistics for Engineers, Engr 201	Koç University
Spring 2016	Linear Algebra, Math 107	Koç University
Fall 2015	Differential Equations, Math 204	Koç University
Summer 2015	Differential Equations, Math 204	Koç University
Summer 2015	Statistics, Math 201	Koç University
Spring 2015	Statistics, Math 201	Koç University
Fall 2014	Calculus, Math 106	Koç University
Spring 2012	Abstract Algebra, Math 216	Koç University

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## MENTORING

I mentored three graduate students during their master's internship and advised through their master's thesis. Two of them are writing papers with me and work in projects I lead.

- 2021-2022     **Alyx E. Gray**  
University of Oregon, Bioinformatics and Genomics Master, 9-month research internship  
**Master Thesis:** Benchmarking Integrative Consensus Clustering with Paired Proteomic and Clinical Data Modalities  
**Current Position:** Research Associate - Bioinformatics Data Analyst at University of Colorado, Anschutz Medical Campus
- 2023-2024     **Samuel D. Kupp**  
University of Oregon, Bioinformatics and Genomics Master, 9-month research internship  
**Master Thesis:** Identification of Significant Gene Sets for Cancer Cohort Discrimination using Kernel-Based Machine Learning  
**Current Position:** Computational Biologist 1 at CEDAR, Knight Cancer Institute
- 2024-2025     **Ian Vangordon Jr.**  
University of Oregon, Bioinformatics and Genomics Master, 9-month research internship  
**Master Thesis:** Cell type annotation of multimodal single-cell data with scMKL  
**Current Position:** Computational Biologist Intern at CEDAR, Knight Cancer Institute
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## SERVICE & OUTREACH

**Peer Reviewer:** BioMedInformatics, Genes, Heliyon, International Journal of Infectious Diseases, Proceedings of Machine Learning Research Workshop and Conference Proceedings (PMLR), Scientific Reports

**Talk:** Presented my doctorate research to high school and undergraduate students at Galatasaray University Mathematics Department Alumni Event, 2019

**Speaker:** Discussed graduate programs abroad and scholarship opportunities at Galatasaray University Mathematics Department Alumni Event, 2020

**Volunteer Student Tutor:** Educational Volunteers Foundation of Turkey, Istanbul, Turkey, 2008-2010  
Taught 9- to 11-year-olds on weekends at Math, Science, and Me Research Workshop. This program aimed to help children develop their scientific thinking skills to think scientifically, solve problems, and develop positive attitudes towards science.

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## LANGUAGES

**Programming:** R, Python, MATLAB, LaTeX; familiar with C  
**Written & Spoken:** English (fluent), French (fluent), Turkish (native)

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## REFERENCES

### **Sadik Esener**

Professor of Medicine, School of Medicine  
Director, Cancer Early Detection Advanced Research (CEDAR) Center, Oregon Health & Science University (OHSU), Knight Cancer Institute, School of Medicine  
Wendt Family Endowed Chair in Early Cancer Detection, Biomedical Engineering, School of Medicine  
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### **Laura Heiser**

Associate Professor of Biomedical Engineering, School of Medicine  
Vice Chair, Biomedical Engineering, School of Medicine  
OHSU Center for Spatial Systems Biomedicine  
Program Co-Leader, Quantitative Oncology, OHSU Knight Cancer Institute, School of Medicine  
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### **Mehmet Gonen**

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