

# Gün Kaynar

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## Research Interests

My research develops methods grounded in biological and physical principles for problems in computational biology, including translation regulation, genomics, and clinical decision-making. In collaboration with Arm, I work on programmable cloud laboratories, addressing orchestration, scheduling, error handling, and agentic supervision of automated labs, with a modular simulation framework as a foundational enabler for RL policy learning and agentic AI development. I am also broadly interested in advancing ML theory and large language models.

## Education

- Aug 2024 **Carnegie Mellon University, Pittsburgh, PA, Ph.D. student, School of Computer Science, Computational Biology, Advisor:** Carl Kingsford.  
Present
- Sep 2021 **Bilkent University, Ankara, Turkey, M.Sc., Computer Science, Advisor:** A. Ercument Cicek.  
Aug 2024  
**Thesis:** Pathway-Informed Deep Learning Model for Survival Analysis and Pathological Classification of Gliomas
- Sep 2015 **Bogazici University, Istanbul, Turkey, B.Sc., Molecular Biology and Genetics.**  
Aug 2021
- Feb 2020 **Universitat de Barcelona, Barcelona, Spain, Exchange student.**  
Jul 2020

## Honors and Awards

- 2026 **Graduate Student Assembly/Provost Conference Funds, Carnegie Mellon University,** Travel funding to present at RECOMB 2026.
- 2026 **CBD Travel Award, Ray and Stephanie Lane Computational Biology Department, Carnegie Mellon University,** Travel funding to present at ISMB 2026.
- 2026 **ISMB 2026 Conference Fellowship.**
- 2026 **Randy Bryant Endowed Fellowship Fund, School of Computer Science, Carnegie Mellon University,** Recognizes potential for sustained academic excellence and groundbreaking research. Provides partial funding for tuition, stipend, and support costs..
- 2025 **HPC and Data Science Summer Institute Scholarship, San Diego Supercomputer Center.**
- 2024 **Featured Article in Nature Communications Editors' Highlights, 50 Best Papers in Biotechnology and Methods category of Nature Communications.**
- 2024 **Carnegie Mellon University SCS Ph.D. Research Assistantship, full tuition waiver, health insurance and stipend during Ph.D. studies..**
- 2024 **Tri-Institutional Ph.D. Fellowship, full tuition waiver, health insurance and stipend during Ph.D. studies..**

- 2024 **UCLA Ph.D. Fellowship**, full tuition waiver, health insurance and stipend during Ph.D. studies..
- 2022 **International Scientific Publication Incentive Program**, Scientific and Technological Research Council of Turkey (TÜBİTAK).
- 2021-2024 **Bilkent University Comprehensive Scholarship**, full tuition waiver, stipend, health insurance, and accommodation during M.Sc.
- 2021-2024 **Scientist Supporting Program Scholarship**, Scientific and Technological Research Council of Turkey, Merit-based monthly stipend during M.Sc.
- 2020 **Erasmus Mobility Grant**, European Commission, full coverage for mobility.

## Publications (Google Scholar, ResearchGate)

### Journal Articles

- **Gün Kaynar**, Carl Kingsford, “seq2ribo: Structure-aware integration of machine learning and simulation to predict ribosome location profiles from RNA sequences”, in *Bioinformatics*, June 2026. [Online].
- Mehmet Alper Yilmaz\*, Ahmet Arda Ceylan\*, **Gün Kaynar\***, A Ercument Cicek, "LYCEUM: Learning to call copy number variants on low coverage ancient genomes", in *Bioinformatics*, July 2025. [Online]. Available: [https://academic.oup.com/bioinformatics/article/41/Supplement\\_1/i285/8199375](https://academic.oup.com/bioinformatics/article/41/Supplement_1/i285/8199375)  
\*: equal contribution
- Berk Mandiracioglu, Furkan Ozden, **Gün Kaynar**, Mehmet Alper Yilmaz, Can Alkan, A. Ercument Cicek, "ECOLE: Learning to call copy number variants on whole exome sequencing data", in *Nature Communications*, Jan 2024. [Online]. Available: <https://www.nature.com/articles/s41467-023-44116-y>
- **Gün Kaynar**, Doruk Cakmakci, Caroline Bund, Julien Todeschi, Izzie Jacques Namer, A Ercument Cicek, "PiDeeL: Metabolic Pathway-Informed Deep Learning Model for Survival Analysis and Pathological Classification of Gliomas", in *Bioinformatics*, November 2023. [Online]. Available: <https://academic.oup.com/bioinformatics/article/39/11/btad684/7413171>
- Doruk Cakmakci\*, **Gün Kaynar\***, Caroline Bund, Martial Piotto, Francois Proust, Izzie Jacques Namer, A Ercument Cicek, "Targeted metabolomics analyses for brain tumor margin assessment during surgery", in *Bioinformatics*, June 2022. [Online]. Available: <https://academic.oup.com/bioinformatics/article/38/12/3238/6581075>  
\*: equal contribution

### Peer-Reviewed Conference Proceedings/Talks

- **Gün Kaynar**, Carl Kingsford, “seq2ribo: Structure-aware integration of machine learning and simulation to predict ribosome location profiles from RNA sequences”, in *ISMB 2026*, Washington, DC, US, July 2026.
- Mehmet Alper Yilmaz\*, Ahmet Arda Ceylan\*, **Gün Kaynar\***, A Ercument Cicek, "LYCEUM: Learning to call copy number variants on low coverage ancient genomes", in *ISMB/ECCB 2025*, Liverpool, UK, July 2025.  
\*: equal contribution
- Berk Mandiracioglu, Furkan Ozden, **Gün Kaynar**, Mehmet Alper Yilmaz, Can Alkan, A. Ercument Cicek, "ECOLE: Learning to call copy number variants on whole exome sequencing data", in *RECOMB 24*, Cambridge, MA, US, April-May 2024.
- Berk Mandiracioglu, Furkan Ozden, **Gün Kaynar**, Mehmet Alper Yilmaz, Can Alkan, A. Ercument Cicek, "ECOLE: Learning to call copy number variants on whole exome sequencing data", in *HIBIT 23*, Ankara, Turkey, October 2023.

- **Gün Kaynar**, Doruk Cakmakci, Caroline Bund, Julien Todeschi, Izzie Jacques Namer, A Ercument Cicek, "Pathway-Informed Deep Learning Model for Survival Analysis and Pathological Classification of Gliomas", in *RECOMB CCB*, Istanbul, Turkey, April 2023.

## Preprints / Under Review

- **Gün Kaynar**, Carl Kingsford, "Conciseness-Aware Reasoning Distillation for Diffusion Language Models", under review in *NeurIPS 2026*.
- Sina Barazandeh\*, **Gün Kaynar**\*, Arth Banka, Joshua Kangas, Carl Kingsford<sup>†</sup>, Jose Lugo-Martinez<sup>†</sup>, "An Open-Framework Simulator and Benchmark Generator for Programmable Cloud Laboratories", manuscript in preparation.  
\*: equal contribution, <sup>†</sup>: co-senior authors
- Jiayi Li, Shijie Tang, **Gün Kaynar**, Shiyi Du, Carl Kingsford, "Models Know Their Shortcuts: Deployment-Time Shortcut Mitigation", in revision in *ACL ARR 2026*.
- Shiyi Du, **Gün Kaynar**, Jiayi Li, Zhaoyi You, Shijie Tang, Carl Kingsford, "CodonRL: Multi-Objective Codon Sequence Optimization Using Demonstration-Guided Reinforcement Learning", under review in *Nature Communications*, 2026.
- **Gün Kaynar**, Zhaoyi You, Carl Kingsford, "TIGER: Targeted Iterative Generation and Refinement for Imbalanced Classification", manuscript in preparation.
- **Gün Kaynar**, Zhaoyi You, Richard D. Boyce, Takahiro Yakoh, Carl Kingsford, "Augmenting Electronic Health Records for Adverse Event Detection", in revision in *Journal of Biomedical Informatics*, 2026.
- **Gün Kaynar**, Chethan Ashokkumar, Rakesh Sindhi, et al., "Viremia and PTLD detection method for EBV in pediatric liver transplants", manuscript in preparation.
- Aadyaa Maddi, **Gün Kaynar**, et al., "Differentially Private Generation of Temporal Electronic Health Record Data", manuscript in preparation.
- **Gün Kaynar**, Boshen Yan, Carl Kingsford, "Retry Amplification: When Agent Error Recovery Makes Things Worse", under review in *Workshop on Failure Modes of Agentic AI at ICML 2026*.

## Posters

- **Gün Kaynar**, Carl Kingsford, "seq2ribo: Structure-aware integration of machine learning and simulation to predict ribosome location profiles from RNA sequences", in *RECOMB 2026*, Thessaloniki, Greece, May 2026.
- **Gün Kaynar**, Carl Kingsford, "Modeling Ribosome Dynamics with Structure-Aware TASEP", in *Annual CPCB program retreat*, Pittsburgh, PA, US, August 2025.
- **Gün Kaynar**, Doruk Cakmakci, Caroline Bund, Julien Todeschi, Izzie Jacques Namer, A Ercument Cicek, "PiDeeL: Pathway-Informed Deep Learning Model for Survival Analysis and Pathological Classification of Gliomas", in *16th The International Symposium on Health Informatics and Bioinformatics*, Ankara, Turkey, October 2023.
- **Doruk Cakmakci**\*, **Gün Kaynar**\*, Caroline Bund, Martial Piotto, Francois Proust, Izzie Jacques Namer, A Ercument Cicek, "Targeted metabolomics analyses for brain tumor margin assessment during surgery", in *RECOMB 2023*, Istanbul, Turkey, April 2023.

\*: equal contribution

## Patents

- **Gün Kaynar**, Carl Kingsford, "seq2ribo: Structure-aware integration of machine learning and simulation to predict ribosome location profiles from RNA sequences", patent application filed.

- Shiyi Du, **Gün Kaynar**, Jiayi Li, Zhaoyi You, Shijie Tang, Carl Kingsford, “Methods and Systems for Multi-Objective Codon Optimization of mRNA Sequences Using Reinforcement Learning”, patent application filed.
- Jiayi Li, Hong-Sheng Lai, Litian Liang, Shiyi Du, Shijie Tang, **Gün Kaynar**, Carl Kingsford, “Controllable Codon Design from Foundation Models via Activation Engineering”, patent application filed.

## Academic Duty

### Reviewer

- **ACL ARR 2026** Association for Computational Linguistics Rolling Review
- **ICML 2026** Workshop on Failure Modes of Agentic AI at the 43rd International Conference on Machine Learning
- **RECOMB 2026** 30th Annual International Conference on Research in Computational Molecular Biology
- **ACM TCBB** IEEE/ACM Transactions on Computational Biology and Bioinformatics 2025
- **ISMB/ECCB 2025** 33rd Edition of The International Conference on Intelligent Systems for Molecular Biology
- **RECOMB 2025** 29th Annual International Conference on Research in Computational Molecular Biology
- **ACM TCBB** IEEE/ACM Transactions on Computational Biology and Bioinformatics 2024
- **ISMB 2024** 32nd Edition of The International Conference on Intelligent Systems for Molecular Biology
- **RECOMB 2024** 28th Annual International Conference on Research in Computational Molecular Biology
- **RECOMB 2023** 27th Annual International Conference on Research in Computational Molecular Biology
- **ACM BCB 2022** The 13th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics
- **ISBRA2022** 18th International Symposium on Bioinformatics Research and Applications
- **ACM TCBB** IEEE/ACM Transactions on Computational Biology and Bioinformatics 2022

### Service

- **CMLH 2025** Fellowship Applicant Reviewer, Center for Machine Learning and Health, Carnegie Mellon University

### Contributions

- **Humanity’s Last Exam** Contributed 2 questions in computational biology to the benchmark.

### Organization

- **RECOMB 2023** 27th Annual International Conference on Research in Computational Molecular Biology
- **RECOMB-SEQ 2023** The 13th RECOMB Satellite Conference on Biological Sequence Analysis
- **RECOMB-CCB** The 15th RECOMB Satellite Workshop on Computational Cancer Biology
- **RECOMB-CG** The 20th RECOMB Satellite Conference on Comparative Genomics
- **RECOMB-Genetics 2023** The 11th RECOMB Satellite Workshop on Computational Methods in Genetics
- **BIO-Arch** Workshop on Hardware Acceleration of Bioinformatics Workloads

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## Experience

- 2024-Present **Graduate Research Assistant**, *School of Computer Science, Kingsford Lab*, Carnegie Mellon University, Pittsburgh, PA, US.
- 2026-Present **Anthropic–Arm–CMU Collaboration**, *Model Hardware Standard (MHS) Early Access Program*, Carnegie Mellon University, Pittsburgh, PA, US.
- 2026-Present **CMU–Optum Research Partnership**, *with Prof. Giulia Fanti*, Carnegie Mellon University, Pittsburgh, PA, US.  
Differentially private generation of temporal electronic health record data.
- 2024-Present **Graduate Teaching Assistant**, Carnegie Mellon University, Pittsburgh, PA, US.
  - Automation of Scientific Research (Spring 2026)
  - Algorithms and Advanced Data Structures (Fall 2025)
- 2021-2024 **Graduate Research Assistant**, *Computer Engineering Department, CICEKLAB, Supported by Scientific and Technological Research Council of Turkey*, Bilkent University, Ankara, Turkey.
- 2021-2024 **Graduate Teaching Assistant**, Bilkent University, Ankara, Turkey.
  - CS473/CS573: Algorithms I (Spring 2024, Fall 2023, Spring 2023, Fall 2022)
  - Introduction to Python and Artificial Intelligence (Summer 2023, Summer 2022)
  - CS115: Introduction to Programming in Python (Spring 2022, Fall 2021)
- 2019 **Undergraduate Research Intern**, *CICEKLAB, under the supervision of Dr. A. Ercument Cicek*, Bilkent University, Ankara, Turkey.  
Developed Nomind, a research project during the internship.
- 2018 **Undergraduate Research Intern**, *Center for Proteomics and Bioinformatics, under the supervision of Prof. Mark Chance*, Case Western Reserve University, Cleveland, OH, USA.  
Developed Phosphorylator, a research project during the internship.

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## Training and Certificates

- Aug 2025 **Ph.D. Certificate in Ethics and Artificial Intelligence**, *Joint between SCS and Dietrich College of Humanities and Social Sciences*, Carnegie Mellon University.
- Present
- Aug 2025 **HPC and Data Science Summer Institute**, *San Diego Supercomputer Center, UC San Diego*, San Diego, CA, US.  
Workshop on High Performance Computing

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## Software Systems (**GitHub**)

GitHub repositories for paper implementations and research projects:

-  seq2ribo
-  TASER-AE
-  LYCEUM
-  ECOLE (30+ ★)
-  PiDeeL
-  Targeted Metabolomics