Cenk **Baykal**

ML & Quant Researcher

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Education

Massachusetts Institute of Technology
Cambridge, MA

Ph.D. in Computer Science (GPA: 5.00/5.00) *2017–2021*

- Minor: Probability in High Dimension (Mathematics)
- Thesis: *Sampling-based Algorithms for Fast and Deployable AI*
- Advisor: Daniela Rus

Massachusetts Institute of Technology
Cambridge, MA

S.M. in Computer Science (GPA: 4.91/5.00) *2015–2017*

- Thesis: *Algorithms for Persistent Autonomy and Surveillance*
- Advisor: Daniela Rus

University of North Carolina at Chapel Hill
Chapel Hill, NC

B.S. Computer Science with Highest Honors, B.A. Mathematics (GPA: 3.91/4.00) *2011–2015*

- Graduated with Highest Distinction
- Thesis: *Design Optimization Algorithms for Concentric Tube Robots*
- Advisor: Ron Alterovitz

Experience

Two Sigma
New York City, NY

Quantitative Researcher *July 2024 – Present*

- Designed systematic alpha strategies that leverage alternative data sources and advanced machine learning techniques
- Built and maintained research tooling to accelerate signal and forecast evaluation

Google Research
Cambridge, MA

Research Scientist *January 2022 – June 2024*

- Developed conditional computation algorithms for transformers that enabled up to 30% speedups on Large Language Models (LLMs)
- Designed data-efficient knowledge distillation strategies that led to improved transformer architectures with only 50% of teacher labeling cost
- Mentored scholars in Google CSRMP, supporting project design and research execution for students from historically marginalized groups
- Received the 2023 Google Research Tech Impact Award for leading "high-impact projects made sustainable by achieving tech excellence and great team dynamics"
- Received a Google Spot Bonus for "critical contributions to the efficiency of compact Gemini models"

Massachusetts Institute of Technology
Cambridge, MA

Post-doc *September 2021 – January 2022*

- Worked on algorithms for privacy-aware and efficient Machine Learning

J.P. Morgan AI Research
New York City, NY

AI Research Intern *May 2021 – September 2021*

- Developed sampling-based algorithms with regret guarantees for large-scale graph neural network training

Massachusetts Institute of Technology
Cambridge, MA

Teaching Assistant for Advanced Algorithms (6.854J / 18.415J) *Fall 2019*

- Conducted office hours to help students on problem sets and concepts covered in lectures; designed and graded assignments
- TA rating according to the official MIT subject evaluation report: 7.0/7.0

Microsoft, SAS Institute, University of North Carolina at Chapel Hill — *Redmond, WA; Cary, NC; Chapel Hill, NC*

Earlier Industry & Teaching Experience — *2012 – 2015*

- Shipped SQL Server compression optimizations and analytics tooling deployed across academic and enterprise users
- Conducted research in robotics, path planning, and enabling technologies

Honors & Awards

2024	**Google Spot Bonus,** For critical contributions to the efficiency of compact Gemini models	*Google*
2023	**Google Research Tech Impact Award,** For contributions to ML efficiency techniques	*Google*
2023	**NeurIPS Spotlight Paper,** Alternating Updates for Efficient Transformers	*NeurIPS*
2021	**Winner,** MIT The Engine's Interval Program (one of two winning teams)	*MIT*
2020–2021	**Expert Reviewer,** ICLR 2020–2021; ICML 2021	*Various*
2020	**Top 10% of Reviewers,** Neural Information Processing Systems	*NeurIPS*
2017	**RSS Best Paper Award,** Robotics: Science and Systems Conference	*RSS*
2011–2015	**Early Academic Honors,** UNC distinctions including Carolina Research Scholar, CRA Outstanding Undergraduate Finalist, Phi Beta Kappa, SAS Charles H. Dunham Scholarship, Dunlevie Honors Award, Summer Undergraduate Research Fellowship, Honors Carolina, Dean's List	*University of North Carolina at Chapel Hill*

Selected Publications

Transformers & Distillation

Alternating Updates for Efficient Transformers — *NeurIPS (Spotlight)*
Cenk Baykal, Dylan Cutler, Nishanth Dikkala, Nikhil Ghosh, Rina Panigrahy, Xin Wang — *2023*

SLaM: Student-Label Mixing for Distillation with Unlabeled Examples — *NeurIPS*
Vasilis Kontonis, Fotis Iliopoulos, Khoa Trinh, Cenk Baykal, Gaurav Menghani, Erik Vee — *2023*

Robust Active Distillation — *ICLR*
Cenk Baykal, Khoa Trinh, Fotis Iliopoulos, Gaurav Menghani, Erik Vee — *2023*

A Theoretical View on Sparsely Activated Networks — *NeurIPS*
Cenk Baykal, Nishanth Dikkala, Rina Panigrahy, Cyrus Rashtchian, Xin Wang — *2022*

Compression & Robotics

SiPPing Neural Networks: Sensitivity-informed Provable Pruning of Neural Networks — *SIAM SIMODS*
Cenk Baykal*, Lucas Liebenwein*, Igor Gilitschenski, Dan Feldman, Daniela Rus — *2022*

Lost in Pruning: The Effects of Pruning Neural Networks beyond Test Accuracy — *MLSys*
Lucas Liebenwein, Cenk Baykal, Brandon Carter, David Gifford, Daniela Rus — *2021*

Provable Filter Pruning for Efficient Neural Networks — *ICLR*
Cenk Baykal*, Lucas Liebenwein*, Harry Lang, Dan Feldman, Daniela Rus — *2020*

Data-Dependent Coresets for Compressing Neural Networks with Applications to Generalization Bounds — *ICLR*
Cenk Baykal*, Lucas Liebenwein*, Igor Gilitschenski, Dan Feldman, Daniela Rus — *2019*

Sampling-Based Approximation Algorithms for Reachability Analysis with Provable Guarantees — *Robotics: Science and Systems*
Cenk Baykal*, Lucas Liebenwein*, Igor Gilitschenski, Sertac Karaman, Daniela Rus — *2018*

Asymptotically Optimal Design of Piecewise Cylindrical Robots using Motion Planning — *Robotics: Science and Systems (Best Paper Award)*
Cenk Baykal, Ron Alterovitz — *2017*