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*

- Design systematic alpha strategies that combine alternative data and market microstructure signals
- Build and maintain Python/pandas/NumPy research tooling to accelerate signal evaluation and backtesting
- Partner with portfolio managers to translate promising research prototypes into production pilots
- Advanced two production-pilot alpha strategies through signal review with double-digit annualized bps uplift in out-of-sample tests

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

JP Morgan
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
- Led robotics and transportation research initiatives and created instructional content supporting UNC computer science programs

Honors & Awards

2024	**Google Spot Bonus,** Critical contributions to the efficiency of compact Gemini models	*Google*
2023	**Google Research Tech Impact Award,** Recognized within Google Research for ML efficiency breakthroughs	*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	**Top 10% Reviewer,** Neural Information Processing Systems	*NeurIPS*
2017	**Best Paper Award,** Robotics: Science and Systems Conference	*RSS@MIT*
2011–2015	**Selected Undergraduate Honors,** UNC Distinctions: Carolina Research Scholar, CRA Outstanding Undergraduate Researcher finalist, Phi Beta Kappa, competitive scholarships	*University of North Carolina at Chapel Hill*

Selected Publications

Efficient Transformers & Distillation

Alternating Updates for Efficient Transformers (Spotlight) — *NeurIPS*

Cenk Baykal, Dylan Cutler, Nishanth Dikkala, Nikhil Ghosh, Rina Panigrahy, Xin Wang — *2023*

- Introduced alternating forward/backward scheduling that reduced inference latency for sparse transformers.

SLAM: Student-label Mixing for Distillation with Unlabeled Examples — *NeurIPS*

Vasilis Kontonis, Fotis Iliopoulos, Khoa Trinh, Cenk Baykal, Gaurav Menghani, Erik Vee — *2023*

- Demonstrated unlabeled-target distillation with hybrid pseudo-labeling that cut annotation costs in half.

Robust Active Distillation — *ICLR*

Cenk Baykal, Khoa Trinh, Fotis Iliopoulos, Gaurav Menghani, Erik Vee — *2023*

- Coupled active learning with knowledge distillation to improve compact model robustness against label noise.

Weighted Distillation with Unlabeled Examples — *NeurIPS*

Vasilis Kontonis, Fotis Iliopoulos, Cenk Baykal, Gaurav Menghani, Khoa Trinh, Erik Vee — *2022*

- Introduced importance-weighted student objectives for unlabeled corpora, yielding state-of-the-art compact transformers.

Model Compression & Pruning

SiPPing Neural Networks: Sensitivity-informed Provable Pruning of Neural Networks — *SIAM SIMODS*

Cenk Baykal*, Lucas Liebenwein*, Igor Gilitschenski, Dan Feldman, Daniela Rus — *2022*

- Designed a sensitivity-aware pruning scheme with provable bounds that retained accuracy on language models.

Provable Filter Pruning for Efficient Neural Networks — *ICLR*

Lucas Liebenwein*, Cenk Baykal*, Harry Lang, Dan Feldman, Daniela Rus — *2020*

- Provided the first end-to-end guarantees for structural CNN pruning, inspiring broad adoption in efficient CNN research.

Lost in Pruning: The Effects of Pruning Neural Networks beyond Test Accuracy — *MLSys*

Lucas Liebenwein, Cenk Baykal, Brandon Carter, David Gifford, Daniela Rus — *2021*

- Analyzed deployment-side regressions (latency, calibration) caused by aggressive pruning, motivating safer evaluation metrics.

Data-Dependent Coresets for Compressing Neural Networks with Applications to Generalization Bounds *ICLR*

Cenk Baykal*, Lucas Liebenwein*, Igor Gilitschenski, Dan Feldman, Daniela Rus *2019*

- Developed dataset-aware coreset selection that yields compression with theoretical generalization guarantees.

Coresets & Theory

Coresets for Support Vector Machines *Theory of Computing Systems*

Cenk Baykal*, Murad Tukan*, Dan Feldman, Daniela Rus *2021*

- Unified the streaming and distributed coreset constructions for SVMs. Extended version of the TAMC 2020 oral paper.