

# 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

### 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
- Conducted research in robotics, path planning, and enabling technologies

## HONORS & AWARDS

2024	<b>Google Spot Bonus</b> , For critical contributions to the efficiency of compact Gemini models	<a href="#">Google</a>
2023	<b>Google Research Tech Impact Award</b> , For contributions to ML efficiency techniques	<a href="#">Google</a>
2023	<b>NeurIPS Spotlight Paper</b> , Alternating Updates for Efficient Transformers	<a href="#">NeurIPS</a>
2021	<b>Winner</b> , MIT The Engine's Interval Program (one of two winning teams)	<a href="#">MIT</a>
2021	<b>Expert Reviewer</b> , International Conference on Learning Representations	<a href="#">ICLR</a>
2021	<b>Expert Reviewer</b> , International Conference on Machine Learning	<a href="#">ICML</a>
2020	<b>Expert Reviewer</b> , International Conference on Learning Representations	<a href="#">ICLR</a>
2020	<b>Top 10% of Reviewers</b> , Neural Information Processing Systems	<a href="#">NeurIPS</a>
2017	<b>RSS Best Paper Award</b> , Robotics: Science and Systems Conference	<a href="#">RSS</a>
2015	<b>Carolina Research Scholar</b> , University of North Carolina at Chapel Hill	<a href="#">UNC</a>
2015	<b>Finalist</b> , CRA Outstanding Undergraduate Researcher Award	<a href="#">CRA</a>
2014	<b>Phi Beta Kappa</b> , University of North Carolina at Chapel Hill	<a href="#">UNC</a>
2014	<b>Charles H. Dunham Scholarship</b> , SAS-funded scholarship at UNC	<a href="#">UNC</a>
2014	<b>Dunlevie Honors Undergraduate Award</b> , University of North Carolina at Chapel Hill	<a href="#">UNC</a>
2014	<b>Summer Undergraduate Research Fellowship</b> , University of North Carolina at Chapel Hill	<a href="#">UNC</a>
2012–2015	<b>Honors Carolina</b> , UNC Honors Program	<a href="#">UNC</a>
2011–2015	<b>Dean's List</b> , University of North Carolina at Chapel Hill	<a href="#">UNC</a>

## 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

**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

**Weighted Distillation with Unlabeled Examples** [NeurIPS](#)  
VASILIS KONTONIS, FOTIS ILIOPOULOS, CENK BAYKAL, GAURAV MENGHANI, KHOA TRINH, ERIK VEE 2022

### 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

**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](#)  
LUCAS LIEBENWEIN\*, CENK BAYKAL\*, HARRY LANG, DAN FELDMAN, DANIELA RUS 2020

### THEORY & FOUNDATIONS

**A Theoretical View on Sparsely Activated Networks** [NeurIPS](#)  
CENK BAYKAL, NISHANTH DIKKALA, RINA PANIGRAHY, CYRUS RASHTCHIAN, XIN WANG 2022

## **Coresets for Support Vector Machines**

CENK BAYKAL\*, MURAD TUKAN\*, DAN FELDMAN, DANIELA RUS

*Theory of Computing Systems*

2021

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

CENK BAYKAL\*, LUCAS LIEBENWEIN\*, IGOR GILITSCHENSKI, DAN FELDMAN, DANIELA RUS

*ICLR*

2019

## **ROBOTICS**

## **Sampling-Based Approximation Algorithms for Reachability Analysis with Provable Guarantees**

CENK BAYKAL\*, LUCAS LIEBENWEIN\*, IGOR GILITSCHENSKI, SERTAC KARAMAN, DANIELA RUS

*Robotics: Science and Systems*

2018

## **Asymptotically Optimal Design of Piecewise Cylindrical Robots using Motion Planning (Best Paper Award)**

CENK BAYKAL, RON ALTEROVITZ

*Robotics: Science and Systems*

2017