

# ETHAN TUROK

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## EDUCATION

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**Columbia University, School of Engineering and Applied Sciences** New York, NY  
Bachelor of Science in Computer Science, Applied Mathematics | **GPA: 3.95** Expected May 2023  
*Relevant Coursework:* Linear Algebra, Probability, Discrete Math, Optimization, Artificial Intelligence, Natural Language Processing, Numerical Methods, Linear Regression, Machine Learning, Analysis of Algorithms  
*Honors:* Dean's List (all semesters), [Columbia Innovation & Enhancement Award](#), Columbia Community Building Award

## EXPERIENCE

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**Columbia University Department of Computer Science** New York, NY  
*Machine Learning Researcher under Rachel Cummings (Columbia)* September 2021 - Present

- Develop DP-SMOTE, an algorithm to generate synthetic data points in a differentially private (DP) way
- The algorithm uses: uniform hypersphere sampling (computational thermodynamics), k-nearest neighbors (machine learning), disjoint subsets of r-nearest neighbors graphs (graph theory), the exponential mechanism (DP)
- Implement DP-SMOTE in python; design numerical experiments to benchmark performance
- Prove a tighter upper bound on the privacy of DP-SMOTE via the Parallel Composition Theorem of DP

**Columbia University Department of Industrial Engineering and Operations Research** New York, NY  
*Machine Learning Researcher under Kaizheng Wang (Columbia)* May 2021 - August 2021

- [Implemented](#) Clustering via Uncoupled REgression (CURE) from Wang's [NIPS 2020 paper](#) in python
- Demonstrated that CURE 1) outperforms traditional algorithms on classifying elliptically distributed data and 2) performs poorly on data with a non-linear decision boundary, confirming the theoretical results of the paper
- Self-studied Boyd's *Convex Optimization* and Hastie's *Elements of Statistical Learning* to understand the paper
- Implemented machine learning algorithms from scratch in numpy: K-Means, Feed Forward NN, EM, SGD, etc.

**StudBud** New York, NY  
*Co-founder* June 2020 - June 2021

- Co-founded [StudBud](#), a social platform that matches students into ideal study groups with a machine learning algorithm during Covid-19, specifically, an agglomerative hierarchical clustering algorithm
- Fall 2020: [StudBud](#) had 1300+ sign-ups at Columbia University
- [StudBud](#) was featured in the [school paper](#) and won the [Columbia Innovation and Enhancement Award](#) (2021)

## EXTRACURRICULAR ACTIVITIES

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**Emerging Scholars Program, Workshop Assistant** January 2021 - Present

- Teach weekly class to 10+ freshmen on advanced computer science topics: machine learning, graph theory, UI/UX, algorithms, cryptography, etc.
- Awarded Columbia Community Building Award for excellence in teaching and fostering a sense of community

**Columbia Climbing Team, Member** September 2021 - Present

- Participate in practices and local/national competitions

## SKILLS

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<b>Programming Languages</b>	Python, Java, C, LaTeX, Bash
<b>Technologies/Packages</b>	Git, Numpy, Scikit-Learn, Scipy, Pandas, PyTorch, Spacy
<b>Languages</b>	English (native), Hebrew (professional fluency)
<b>Interests</b>	Classical guitar, creative writing, snowboarding, and rock climbing