

## EDUCATION

<b>GEORGIA TECH</b> , Atlanta, Georgia Advisors: Dr. Jacob Abernethy and Dr. Jamie Morgenstern	<b>PH.D. IN COMPUTER SCIENCE</b>   2017 - Dec 2022 (Expected) <b>GPA: 4.0/4.0</b>
<b>GEORGIA TECH</b> , Atlanta, Georgia Specialization in Machine Learning	<b>M.S. IN COMPUTER SCIENCE</b>   2017 - 2020 <b>GPA: 4.0/4.0</b>
<b>IIT KANPUR</b> , Kanpur, India	<b>B.TECH IN COMPUTER SCIENCE AND ENGINEERING</b>   2013 - 2017 <b>GPA: 9.7/10</b>

**Research Interests:** Fairness and transparency in A.I., online learning, mechanism design, deep learning, privacy preserving A.I.

## PUBLICATIONS

- [1] **Observation Free Attacks on Stochastic Bandits** with Yinglun Xu and Jacob Abernethy. **NeurIPS, 2021**
- [2] **Optimal Spend Rate Estimation and Pacing for Ad Campaigns with Budgets** with Jamie Morgenstern, and Okke Schrijvers. **Talk at INFORMS 2021**
- [3] **Learning Auctions with Robust Incentive Guarantees** with Jacob Abernethy, Rachel Cummings, Jamie Morgenstern, Samuel Taggart. **NeurIPS, 2019**.  
Preliminary version accepted at **Learning in Presence of Strategic Behavior, EC 2019**
- [4] **Bridging Truthfulness and Corruption-robustness in Multi-Armed Bandit Mechanisms** with Jacob Abernethy, Thodoris Lykouris, and Yinglun Xu. **Incentives in Machine Learning, ICML 2020**.
- [5] **Active Regret Minimization with Expert Advice** with Jacob Abernethy and Venkatesh Saligrama. Under review.
- [6] **Accelerated Federated Optimization with Quantization** with Yeojoon Youn and Jacob Abernethy. Under review.
- [7] **Accelerated Parallelizable Projection-Free Algorithm for the Nuclear-Norm Ball Constraint** with Jun-Kun Wang, and Jacob Abernethy. Under review.

## WORK EXPERIENCE

<b>AMAZON</b>	<b>APPLIED SCIENTIST INTERN</b>   MAY 2021 - AUG 2021
<ul style="list-style-type: none"><li>Worked on <u>fairness and transparency in machine learning</u> with Prof. Michael Kearns and Dr. Matthäus Kleindessner.</li><li>Introduced a new notion for group fairness in multi arm bandits and designed a no-regret algorithm.</li></ul>	
<b>UNIVERSITY OF WASHINGTON</b>	<b>RESEARCH SCIENTIST</b>   JAN 2021 - APRIL 2021
<ul style="list-style-type: none"><li>Worked on <u>designing simple and incentive compatible auctions</u> for revenue maximization in repeated auctions.</li></ul>	
<b>FACEBOOK</b>	<b>RESEARCH INTERN</b>   MAY 2020 - NOV 2020
<ul style="list-style-type: none"><li>Part of the <u>Economics, Algorithms, and Optimization</u> research team in Core Data Science.</li><li>Working on automatic bid pacing for budget constraint ad campaigns and developed a no-regret pacing algorithm.</li></ul>	
<b>FACEBOOK</b>	<b>SOFTWARE ENGINEERING ML INTERN</b>   MAY 2019 - JUL 2019
<ul style="list-style-type: none"><li>Optimized for Return on Ad Spend for <u>ads ranking</u> and products ranking in Dynamic Product Ads using <u>deep learning</u>.</li><li>Introduced a new deep learning architecture and <u>increased ad revenue while saving 60 TB memory usage (86 % decrease)</u>.</li></ul>	
<b>NORTHWESTERN UNIVERSITY</b>	<b>VISITING GRADUATE STUDENT</b>   MAY 2018 - JUNE 2018
<ul style="list-style-type: none"><li>Analyzed a regularized variant of the maximum likelihood approach for <u>approximating graphical spin models (Ising model)</u>.</li></ul>	
<b>JOHNS HOPKINS UNIVERSITY</b>	<b>RESEARCH INTERN</b>   MAY 2016 - AUG 2016
<ul style="list-style-type: none"><li>Worked on <u>stochastic methods for Kernel PCA</u> by extending Stochastic PCA methods using non linear feature maps.</li></ul>	
<b>NIKE</b>	<b>SOFTWARE ENGINEERING INTERN</b>   MAY 2015 - JUNE 2015
<ul style="list-style-type: none"><li>Developed a <u>website, ticketing, and check-in system</u> for a Nike event attended by over a 1000 guests.</li></ul>	

## AWARDS

- Awarded **Chair's fellowship** by The School of CS, Georgia Tech.
- Academic Excellence Award**, IIT Kanpur 14',15',16' (Dean's List)
- Secured **All India Rank 269** in JEE Advanced and **All India Rank 321** in JEE Mains, 2013 among the 1.65 million candidates.
- Awarded the **KVPY fellowship 2011** and **NTSE scholarship 2009** by the Govt. of India.
- Cleared the **Mathematics, Informatics, Physics, and Astronomy** Olympiads organised by the Govt. of India.

## TEACHING

- TA:** Machine Learning Theory, GaTech (Fall 18, Fall 19) ; Introduction to Computing, IIT Kanpur (Fall 16, Spring 17)

## OTHER RESEARCH EXPERIENCE

### ACTION RECOGNITION IN VIDEOS

DR. GAURAV SHARMA, IITK | 2017

- Used deep learning with trajectory pooled features for action recognition in videos and achieved state of the art results.
- Implemented alternating minimization for homography estimation to speed up train and test time by 50%.

### ROBUST PCA

DR. P. KAR, IITK AND DR. PRATEEK JAIN, MICROSOFT RESEARCH | 2016

- Solved non-convex Robust PCA for background subtraction in surveillance videos with moving cameras.
- Extended methods for still camera to camera motion by devising fast methods for homography estimation.

### OBJECT AND FACE RECOGNITION IN VIDEOS

DR. H. KARNICK, IITK | 2016

- Developed methods for object recognition for traffic surveillance from traffic camera videos using deep learning.

## LEADERSHIP / SERVICE

- **Conference reviewer for:** NeurIPS, ICML, COLT, ALT, EC, SODA, JMLR
- **Vice President | SCS Graduate Student Association, GaTech:** Founding vice-president of the newly formed School of Computer Science Graduate Student Association for the 2021-2022 academic year.
- **Faculty hiring student nominee | School of Computer Science, GaTech:** Student representative in faculty meetings for faculty hiring. Organized students-candidate meetings and presented student body's feedback for faculty hiring decisions.
- **Co-organizer | ACO Student seminar, GaTech:** Organized weekly Algorithms, Combinatorics, Optimization, and Machine Learning seminars.
- **Co-organizer | CoC Happy Hour, GaTech:** Organized weekly social gathering for the grad students of the college.
- **Coordinator | Programming Club, IITK:** Organized various programming contests, hackathons, summer projects, programming workshops and events for the community while managing a team of over 15 secretaries.
- **Group Leader | Science Coffeehouse, IITK:** Organized regular meets, contests and managed the administrative tasks for the Science discussion group at IITK.

## SELECT PROJECTS

- **photoCENTER - Image/Video Processing App:** Developed an open-source multi-platform software to edit videos and images including background extraction capabilities using computer vision techniques.
- **Artify:** Designed a web app in Django for deep neural style transfer written in Tensorflow creating artistic images.
- **ColourIT:** Developed a learning algorithm to automatically colour a grayscale image deep learning.
- **Research Group Website** Designed a package to manage a research group's website using Node.js.

## SKILLS

### Languages

**Expert:** C++ • Python • C  
**Proficient:** Matlab • Octave

### Scientific Libraries

Tensorflow • Keras • PyTorch  
• SKlearn • OpenCV • pandas

### General Tools

MySQL • Presto • OpenGL  
• Latex • Git

### Webdev

Node.js • web.py • Django  
• Javascript • HTML • CSS