

# WOOJOO NA

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## EDUCATION

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### Tufts University

Sep. 2021 - Present

*Ph.D. in Computer Science*

· Advisor : Professor Bert Huang (On Medical Leave from Academia since May 2022)

· Focus : Machine Learning & Optimization

*M.S. in Computer Science*

Sep. 2021 - June 2023 (Expected)

[2019-2021] : Mandatory military service in the Republic of Korea Army

### University of Oxford

Oct. 2016 - July 2019

*B.A. (Hons) in Mathematics*

## RESEARCH EXPERIENCE

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### Data Intensive Studies Center, Tufts University

Sep. 2021 - Present

*Graduate Researcher, Advisor : Professor Bert Huang*

- Worked on convex optimization for deep learning. Identified a convex hull structure in the solution space for label functions on weakly supervised learning algorithms, and devised a new algorithm taking advantage of the characteristics found in this space, including analytic forms of worst case error bounds and dimension reduction.

### University of Oxford, Mathematical Institute

July 2019 - Dec. 2019

*Undergraduate Researcher, Advisor : Professor Christophe Petit*

- Developed a trapdoor attack against parameters suggested at NutMiC2019 conference on Cayley hash functions

- Presented at the 17<sup>th</sup> IMA International Conference on Cryptography and Coding

### University of Oxford, Department of Computer Science

July 2019 - Dec. 2019

*Undergraduate Researcher, Advisor : Professor Thomas Lukasiewicz*

- Worked on conceptual space of transformer encoder, studying the similarities between NLP architectures and the human brain

### University of Oxford, Mathematical Institute

June 2018 - Oct. 2018

*Undergraduate Researcher, Advisor : Dr. Andrey Kormilitzin*

- Competed in the n2c2 challenge on Adverse Drug Events and Medication Extraction in EHRs

- Exploited CNN architecture and a character level word embedding model to demonstrate a robust approach to concept extraction and relation extraction.

### University of Oxford, Department of Computer Science

June 2018 - Oct. 2018

*Undergraduate Researcher, Advisor : Professor Thomas Lukasiewicz*

- Worked on knowledge graph completion for ontology reasoning

## PUBLICATIONS

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“Convex Hull Analysis for solution space of label functions in weak supervision.”, Woojoo Na, Abiy Tasissa

Submitted for publication at machine learning conference, 2022

## TALKS & PRESENTATIONS

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“P2-equivariant Convolutional Networks on MNIST dataset”

May, 2022

Machine Learning Course Presentation, Tufts University

“Bounding worst case errors of Weak Supervision Algorithms”

April, 2022

Tufts University Mathematics Graduate Seminar

“Fake news detection and its impact on financial markets”

November, 2021

2021 Republic of Korean Army Start-up competition

**“Security of Cayley hash functions”***January, 2020**Invited speaker at Ewha Womens University, Cryptography and Mathematics Seminar***“Trapdoor attack on Cayley hash function parameters proposed at NutMic 2019 conference.”** *December, 2019**17th IMA International Conference on Cryptography and Coding***“A deep learning approach to concepts extraction from medical texts.”***October, 2018**Poster session at the University of Oxford, Mathematical Institute***AWARD & SCHOLARSHIPS**

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- Tufts University Full Tuition Scholarship
- Tufts University Dean's Fellowship (\$ 5,000)
- Tuft University Linda M. Abriola Graduate Fellowship
- LMH Academic Development Fund, Undergraduate summer research (£500)

**WORK EXPERIENCE**

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**Republic of Korea Army, 2nd Artillery Brigade***Feb. 2020 - Aug. 2021**Sergeant, Fire Direction Operator*

- Computed solutions to fire missions and relayed the resultant commands to cannons
- Awarded multiple awards from the brigadier general of my brigade for excellence, selected / trained to participate in the 21-1 CCPT(Combined Command Post Training) to facilitate work between the US Army and Korean Army

**Utpal Shanghvi Global School***July 2017 - Aug. 2017**Project Intern*

- Worked on economic sustainability and general health of villagers in Wada, Maharashtra, India
- Initiated multiple long term projects, including water purification, flower ornament sales aimed at religious ceremonies. Helped villagers borrow 20 acres of unused farmland and farming resources free of charge.

**LEADERSHIP AND SERVICES**

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**Oxford Invariants (Oxford Mathematics Society)***April 2018 - April 2019**Treasurer***Oxford Energy Society***April 2018 - April 2019**Events Officer***Oxford Mathematical Institute***June 2018 - Oct. 2018**Mentor (Problem Solving Matters program)***St.Nicholas Primary School, (Oxford, UK)***Oct.2016 - April 2018**Volunteer Teacher***Dun-nae Primary School, (Hoengsung, Korea)***Aug.2013 - Dec.2015**After school Mathematics & Science Volunteer Teacher*