

# BRIAN ZHANG

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## EDUCATION

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**William Henry Harrison High School, class of 2023, Distinguished Honor Roll (4.0 GPA) Aug 2019 - present**

- AP Computer Science (5), AP Biology (5), AP Chemistry (5), AP Physics C Mechanics (5), AP Physics C Electricity and Magnetism (5), AP Calculus BC (5), AP Statistics (5), AP Physics AB (5)
- Taking AP English Literature and Composition, AP English Language and Composition, AP Government
- SAT (1570)

**Purdue University Jun 2020 - Aug 2020, Aug 2022 - present**

- Took CS 251 Data Structures and Algorithms (A), MA 265 Linear Algebra (A)
- Sat in for CS 180 Intro to Computer Science, CS 290-CP1 Competitive Programming I, CS 290-CP2 Competitive Programming II
- Taking CS 240 Programming in C, MA 366 Ordinary Differential Equations Honors
- Plan to take CS 252 System Programming, and MA 375 Intro to Discrete Mathematics in Spring 2023

## EXTRACURRICULARS

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### Computer Science

- USACO (Aug 2018 - Mar 2022), High School Competitive Programming Club Founder (Aug 2021 - present)

### Research

- Code4rena competition for auditing for virtual business applications (Jun 2022 - present), Immunefi bounty program for issues in virtual business applications (Jun 2022 - present)

### Mathematics

- Indiana Math League (Aug 2019 - present), Mathcounts (Dec 2017 - Mar 2019), AMC (Nov 2017 - present), AIME (Feb 2019 - present), Academic Super Bowl Math (Jan 2021 - May 2022)

### Science

- Academic Super Bowl Science (Jan 2022 - May 2022), National Science Bowl (Jan 2022 - May 2022)

### Athletics

- High School Track (Nov 2020 - May 2022), High School Cross-Country (Jun 2022 - present), High School Soccer (Jun 2020 - Oct 2020)

### Other

- National Honors Society (Aug 2022 - present), Piano Lessons (Jan 2010 - present)

## SKILLS

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### Programming languages

- Python, Java, JavaScript, C, and Solidity

### Other

- OverLeaf, LaTeX

## VOLUNTEER EXPERIENCE

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### Mathcounts Coach

- Coached Mathcounts Team Members for Battleground Middle School

Sep 2019 - Jan 2020

### High School Competitive Programming Club Founder and Coach

- Coached students on programming at a competitive stage

Sep 2021 - Apr 2022

## RESEARCH EXPERIENCE

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**Contributing Author of: *Achieving Both Model Accuracy and Robustness by Adversarial Training with Batch Norm Shaping*** *Jul 2022*

- Studied deep learning image recognition and various training methods to correctly identify images along with malicious small modifications that can be applied so that images are miss-classified
- Developed a new training method for deep learning image recognition using batch normalization to improve accuracy and robustness against the aforementioned acts
- Achieved 0.94 model accuracy and 0.81 robustness against malicious attacks that cause image miss-classification in standard training methods where well known methods such as TRADES yields 0.88 model accuracy and 0.47 robustness
- Gained experience with using OverLeaf, LaTeX
- Researched under the guidance of Shiqing Ma (sm2283@rutgers.edu)

**Co-First Author of : *A Systematic Study of Recent Smart Contract Vulnerabilities*** *Jul 2022 - Aug 2022*

- Studied vulnerabilities in 500+ Smart Contracts, or virtual financial products and services, and provided a new categorization of these issues along with typical symptoms and remedies
- Applied findings to existing Smart Contracts through auditing platforms such as Immunefi and Code4rena
- Received a combined total of over \$100k dollars and a personal share of over \$15k dollars through locating 15 issues spanning 10 Smart Contracts that placed an aggregated total of \$22.52 million dollars at risk
- Researched with Zhuo Zhang (zhan3299@purdue.edu), Wen Xu (wen@pwnednomore.org), and Zhiqing Lin (zlin@cse.ohio-state.edu)

## PUBLICATIONS

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***Achieving Both Model Accuracy and Robustness by Adversarial Training with Batch Norm Shaping*** *Jul 2022*

- Authors: Shiqing Ma (First), Brian Zhang -
- [https://github.com/NioTheFirst/Research/blob/main/ICTAI22\\_paper\\_6076.pdf](https://github.com/NioTheFirst/Research/blob/main/ICTAI22_paper_6076.pdf)

***A Systematic Study of Recent Smart Contract Vulnerabilities*** *Aug 2022*

- Authors: Zhuo Zhang (Co-first), Brian Zhang (Co-first), Wen Xu, Zhiqing Lin -
- <https://github.com/NioTheFirst/Research/blob/main/cesc22-paper145.pdf>

## WORK EXPERIENCE

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N/A

## AWARDS

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**USACO Silver Qualifier** *Dec 2019*

**USACO Gold Qualifier** *Dec 2019*

**AIME Qualifier** *2019, 2020, 2021, 2022*

**Mathcounts Indiana State 8th place Individual** *Mar 2019*

**Mathcounts Indiana State 6th place Team** *Mar 2019*

**Mathcounts Chapter 3rd place Team** *Dec 2017, Dec 2019*

**Mathcounts Chapter 2nd place Individual** *Dec 2018, Dec 2019*

**Mathcounts Chapter 2nd place Team** *Dec 2018*

**Mathcounts Chapter 2nd place Countdown** *Dec 2018, 2019*

**Mathcounts Chapter 2nd place Team Coach** *Dec 2020*

**Code4rena 1st place Audit 7.19.22** *Jul 2022*

- Out of 209 teams, worth \$7,659.99

**Code4rena 13th place Audit 6.24.22** *Jun 2022*

**Code4rena 23rd place Audit 7.29.22** *Jul 2022*

<b>ISSMA State Solo Silver</b> - Piano	<i>Mar 2019</i>
<b>ISSMA County Solo Gold</b> - Piano	<i>Mar 2019</i>
<b>ISSMA County Ensemble Gold</b> - Brass Quintuplet	<i>Mar 2019</i>
<b>Academic Super Bowl Math Indiana State 2nd place</b>	<b>May 2022</b>
<b>Academic Super Bowl Science Indiana State 1st place</b>	<b>May 2022</b>
<b>National Science Bowl Indiana Regional 2nd place</b>	<b>Feb 2022</b>
<b>Distinguished Honorl Roll</b>	<b>2019, 2020, 2021</b>
<b>Purdue Half-Marathon Division Runner 10th place</b> - 76th place out of 900 runners	<b>Oct 2021</b>