



# MY HIGH SCHOOL RESEARCH EXPERIENCE

Nicholas Wei  
July 15, 2022

 **MOMENTUM  
LEARNING**

# My Science Research Journey



**Nicholas Wei**

MIT '26

**July 15 (Friday) 7-8PM CT**

**My Science Research Journey**

ISEF Grand Prize Winner

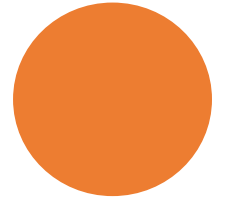
CSEF Project of Year

USABO Finalist

Research Intern at Stanford

# About me :)

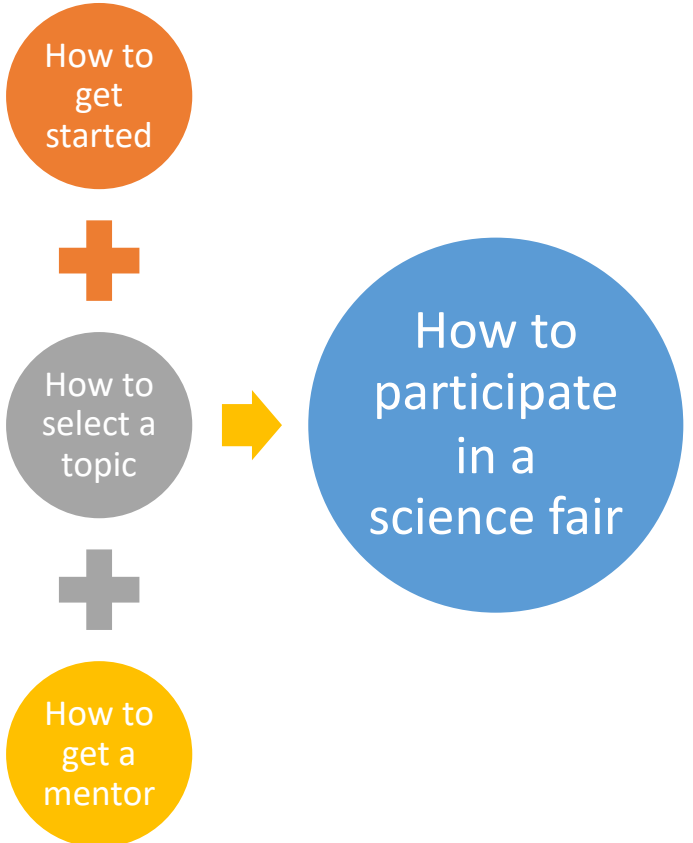
- USA Biology Olympiad
- Science Research
- Plants and iNaturalist
- Science Bowl



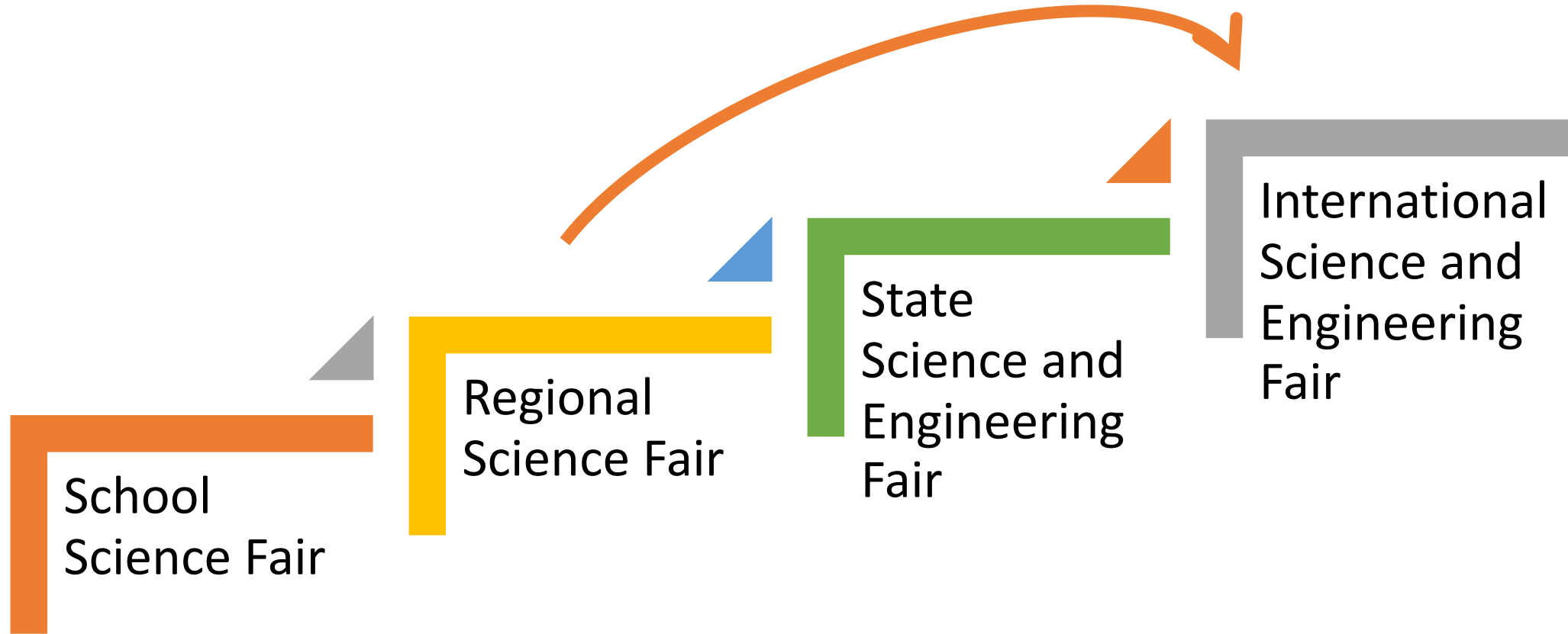
# Other interests...

- Latin: National Exam, NJCL, CAJCL
- Writing: Scholastic Arts and Writing Awards, IYWS
- Journalism
- Historical Research
- Varsity Swimming and Water Polo

# My High School Research Experience



# Science Fairs





# Getting Started – Middle School

- Explore your interests
  - Scientific question
  - Engineering goal
- Sample Projects
  - [Science Buddies](#)
  - Previous Science Fair Projects
    - [Synopsys Science Fair](#)
    - [California Science and Engineering Fair Reference Library](#)
    - [International Science and Engineering Fair \(ISEF\)](#)

# Choosing a Research Topic

- Choose something you're interested in already!
  - Personal experiences
  - Prior knowledge
- Find a topic of significant value
  - Impact on society or academia
- Browsing through research journals
  - High impact factor: [Nature](#), [Cell](#), [Science](#), [The New England Journal of Medicine](#), [The Lancet](#), other more specialized publications
  - Highly-cited papers



# Research Categories

## ISEF

- Animal Sciences (ANIM)
- Behavioral and Social Sciences (BEHA)
- Biochemistry (BCHM)
- Biomedical and Health Sciences (BMED)
- Biomedical Engineering (ENBM)
- Cellular and Molecular Biology (CELL)
- Chemistry (CHEM)
- Computational Biology and Bioinformatics (CBIO)
- Earth and Environmental Sciences (EAEV)
- Embedded Systems (EBED)
- Energy: Sustainable Materials and Design (EGSD)
- Engineering Technology: Statics and Dynamics (ETSD)
- Environmental Engineering (ENEV)
- Materials Science (MATS)
- Mathematics (MATH)
- Microbiology (MCRO)
- Physics and Astronomy (PHYS)
- Plant Sciences (PLNT)
- Robotics and Intelligent Machines (ROBO)
- Systems Software (SOFT)
- Translational Medical Science (TMED)

## CSEF

- **Life Science Categories**
- 05. Biochemistry/ Molecular Biology
- 12. Mammalian Biology
- 15. Microbiology (General)
- 16. Microbiology (Medical)
- 18. Plant Biology
- 22. Zoology
- **Physical Science Categories**
- 01. Aerodynamics/ Hydrodynamics
- 02. Alternative Energy
- 03. Applied Mechanics & Structures
- 06. Chemistry
- 10. Electronics & Electromagnetics
- 13. Materials Science
- 17. Physics & Astronomy
- **Mathematical/ Computational Categories**
- 08. Computational Systems & Analysis
- 14. Mathematical Sciences
- **Environmental Categories**
- 09. Earth & Environmental Sciences
- 11. Environmental Engineering
- 21. Toxicology
- **Behavioral/ Cognitive Categories**
- 04. Behavioral & Social Sciences
- 07. Cognitive Science
- Product Testing Categories
- 19. Product Science (Biological)
- 20. Product Science (Physical)

# Moving onto the Next Level – High School

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- Finding a Mentor
  - Cold Emails
  - Networking
- Applying for a Research Summer Camp
  - [SIP](#) – UC (Santa Cruz/ Davis) Summer Intern Program
  - [SIP](#) – NIH Summer Internship Program in Biomedical Research
  - [HSMC](#) - Mathworks Honor Summer Math Camp
  - [UCSB Mentorship Program](#)
  - [Garcia Summer Scholars](#)
  - [Simons Summer Research Program](#)
  - [SIMR](#) - Stanford Institutes of Medicine Summer Research Program
  - [SSP](#) - Summer Science Program
  - [RSI](#) – Research Science Institute



**Stanford**  
MEDICINE



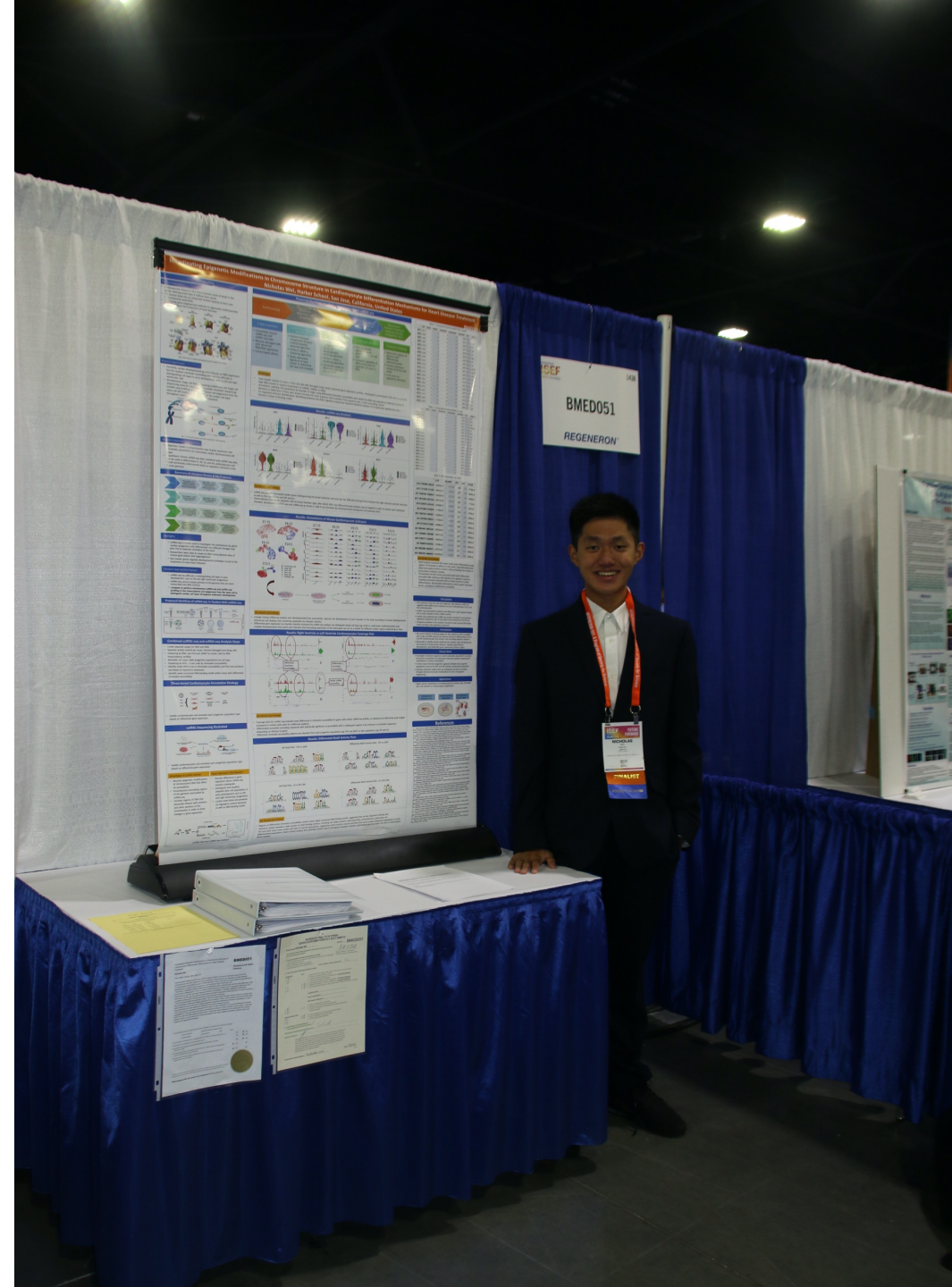
# Research Proposal

- Hypothesis/Engineering Goal and Constraints
- Methods
- Detailed Experimental Procedure
  - General Workflow
  - Detailed Workflow
    - Include tables and diagrams
- Methods of Data Collection
- Engineering Testing Plan/Criteria
- References



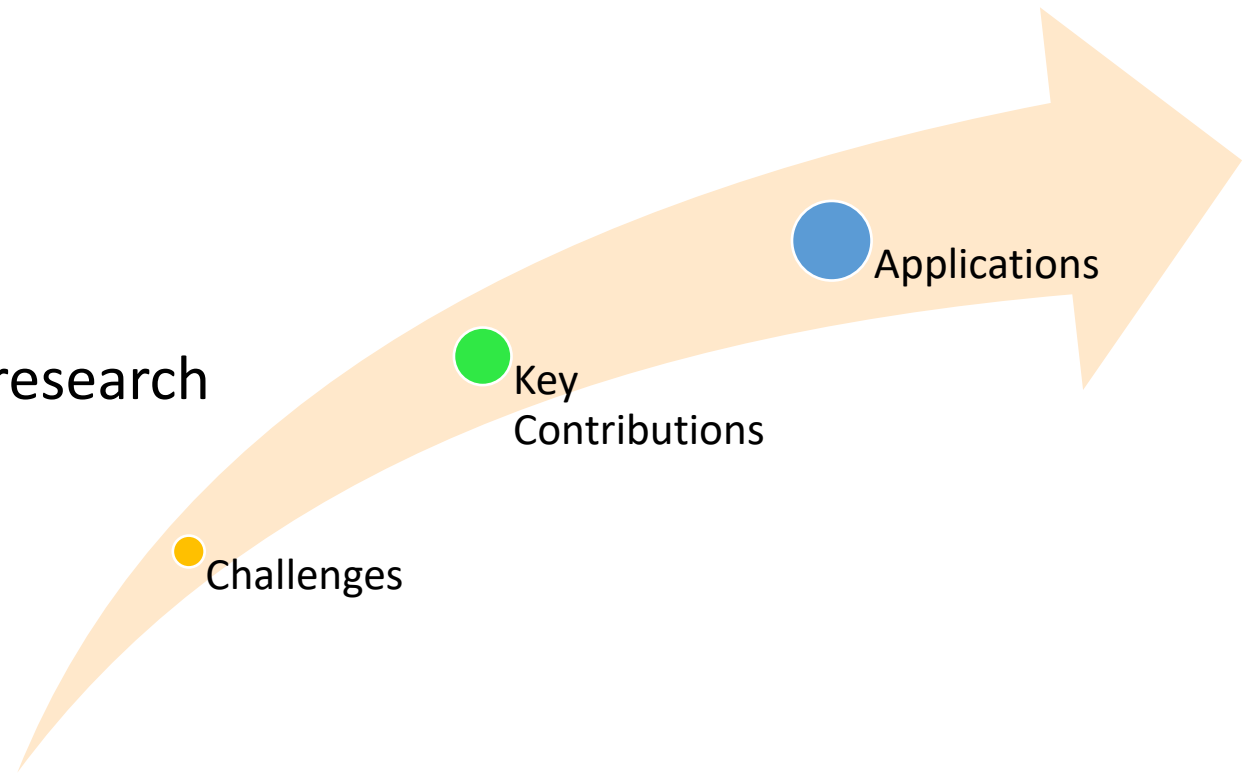
# Presentation Board

- Introduction
  - Problem Statement
  - Literature Review
  - Research Objective and Hypothesis
- Research Method
  - Workflow
  - Key Components
- Results
- Analysis
- Conclusions



# Interview Process

- Prepare a script
- Technical Questions
  - Know your research
  - Be familiar with background research
- General Questions
  - Challenges
  - Applications



# Publishing Papers

- Publishing a paper provides a huge boost to your credentials
- Two options:
  - Conference Paper
    - Pros: Quick turnaround, not as much editing, can be first author more easily
    - Cons: No impact factor
  - Journal Paper
    - Pros: Higher impact factor, more prestigious, greater experience with peer review process and rigorous scientific writing
    - Cons: Long publication process
- Research journals with lower entry barriers include:
  - [Columbia Junior Science Journal](#)
  - [PLOS1](#)

# Final tips and just having fun!

- Research is rewarding!
- Manage your time
  - Create a timeline for your project
  - Adjust as necessary
- Take advantage of summer break
- Enjoy research!!



Q&A

# Momentum Learning Wechat Group



All seminar recordings and slides can be found at: <https://www.momentumlearning.org/open-house>

Join Momentum Learning Wechat groups



# MOMENTUM LEARNING

www.momentumlearning.org

info@momentumlearning.org



- ◆ **Best** contest math and coding competition (USACO) preparation classes
- ◆ **Structured curriculum** from the elementary level to the highest Olympiad Math (IMO/USAMO)
- ◆ We use **Zoom** to live-stream classes. **Recordings** are available
- ◆ Over **200** students receive **Distinguished Honor Roll** (top 1%) and **Honor Roll** (top 5%) on AMC8, including **15-20 perfect scores** each year
- ◆ **MATHCOUNTS National** individual round **winner, runner-up**, and multiple students who made **count down** (top12). Team round **National Champion** 3 years in a row
- ◆ Each year, over **260** students qualify for **AIME**, over **60** qualify for **USAMO & USAJMO**, and **4-8** qualify for MOP
- ◆ Team Sweepstake Winner for **CMIMC, HMMT, and PUMaC**
- ◆ Over **50** students qualified for USACO **Gold/Platinum** in last 2-3 years
- ◆ Trained the **2nd place** team in **National Science Bowl** and students who made **USABO Finalists** (Top 20 in the country)

## MOMENTUM LEARNING

www.momentumlearning.org  
info@momentumlearning.org



Scan me to register

### Senior Seminars

Register here:  
https://www.momentumlearning.org/open-house



**Jarvis Xie**  
Yale '26

#### June 17 (Friday) 7-8PM CT

How to become a top debater

Peak at Rank #1 among all LD debaters on multiple national metrics  
USAMO Qualifier  
USACO Platinum Qualifier

#### June 18 (Saturday) 7-8PM CT

USACO Practice and Strategy

2-time USACO Finalist  
USAMO Qualifier  
Competitive Programming Initiative Founder



**Daniel Guan**  
MIT '26



**Rowechen Zhong**  
MIT '26

#### June 19 (Sunday) 7-8PM CT

Learning to Learn: How to Master three Arts

US Physics Team '22  
Blue MOP '21  
USAMO HM '21  
USACO Platinum

#### June 24 (Friday) 7-8PM CT

Science Olympiad and Social Impact

RSI Scholar  
Coca-Cola Scholar  
3-time Science Olympiad National Champion  
3-time USABO Semifinalist



**Stephanie Wang**  
Harvard '26



**Russell Li**  
Harvard '26

#### June 25 (Saturday) 7-8PM CT

Crafting a Productive & Enjoyable HS Career

RSI Scholar  
5-time Scholastic National Gold/Silver Medalist  
Editor-In-Chief of School Newspaper  
Captain of Varsity Cross Country & Tennis Teams

#### July 2 (Saturday) 7-8PM CT

ASK ME ANYTHING!

3-time IMO Gold Medalist  
USA IOL Team Member  
Regeneron Science Talent Search 10th Place  
2-time MATHCOUNTS champ



**Luke Robitaille**  
MIT '26

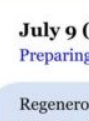


**Isabella Quan**  
MIT '26

#### July 3 (Sunday) 7-8PM CT

Girls in Contest Math

RSI Scholar and Rickoid of the Year  
MOP Qualifier  
8-time AIME Qualifier/7-time MPfG Qualifier  
IEEE CCWC Best Paper Awardee



**Amber Luo**  
MIT '26

#### July 9 (Saturday) 7-8PM CT

Preparing for USABO and Regeneron

Regeneron STS 3rd Place Winner  
RSI Scholar, Top 5 Paper & Presentation  
2-time USABO National Finalist  
ISEF Grand Prize Winner



**Nicholas Wei**  
MIT '26

#### July 15 (Friday) 7-8PM CT

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#### August 13 (Saturday) 7-8PM CT

Balancing Academics and Athletics

4-time AIME/MPfG Qualifier  
Maryam Mirzakhani AMC10 Winner  
Speedo Sectionals Qualifier  
UIL Swimming District Champion



**Christine Huang**  
MIT '26

2442 Settlers Way Blvd  
Sugar Land, TX 77479

281-277-9075

**Thank You!**