CHLOE NG

cng8000@gmail.com

EDUCATION

MONTE VISTA HIGH SCHOOL, Danville, CA *2018-Present*
GPA: 4.63, ACT: 36, 10 APs (all 5s), AP Scholar with Distinction, AP International Diploma, National Merit Commended, TA
Current Classes: AP Physics 2, AP Env Science, AP Comp Gov, AP Macroeconomics, AP Statistics, Sci-Fi & Fantasy Literature

SCIENCE FOR YOUTH INTENSIVE PROGRAM, College of Chemistry, UC Berkeley, CA *2020 - 2021*
Researched, designed, grew, and tested genetically engineered cells in the lab to enable environmentally friendly production processes

COSMOS (California State Summer School for Mathematics and Science), UC Santa Cruz, CA *Summer 2021*
Microbiology and Environmental Toxicology
Conducted lab experiments on the impact of microbes and chemical toxins on human health and the environment

WHARTON GLOBAL YOUTH PROGRAM, The Wharton School, University of Pennsylvania, PA *Summer 2020 & 2021*
Future of the Business World (2020), Wharton Business Leadership Academy (2021)
Developed leadership, teamwork, and communications skills through business education, case competitions, and simulations

STANFORD PRE-COLLEGIATE STUDIES, Stanford University *Summer 2019*
Bioscience and Biotechnology
Studied biochemistry and molecular biology and tools used to manipulate biochemical/genetic systems and their application in research

ACTIVITIES

TAEKWONDO, TeamUSA, M-Team CPP, and Koo's Taekwondo *2012-Present*
USA National Team (2020), M-Team CPP Member (since 2017), Lead Instructor & Demo Coach at Koo's (since 2017)
- International: 2020 TeamUSA Taekwondo National Team; Represented USA and won Gold at 2020 Pan American Championship.
- National: 2021 USA Taekwondo Nationals - Freestyle Team (Silver), Freestyle Pair (Bronze). Ranked No 2 and No 3 nationally.
- M-Team Community Poomsae Program: Trained and competed nationally and internationally. Performed at ~20 community events.
- Koo's Taekwondo: Head coach for black belts. Led Koo's demo team. Created inaugural seminar and online poomsae competition (50+).

LIVING CRANES, Danville, CA *2018-Present*
Founder and President
- Raised more than $2,000 for local needs through crane crafts; sent out more than 1,000 crane care packages to support network partners.

CRANES FOR HOPE, Monte Vista High School *2018-Present*
Founder and President
- Founded a student organization with 40+ members to support mental health through origami cranes and crafts.
- Conducted crane folding and craft demo and lessons at local senior living and retirement communities and wellness centers.

SCIYOUTH (SCIENCE FOR YOUTH), Dublin, CA *2018-Present*
Co-founder and President
- Started an after-school community program to demonstrate scientific experiments and encourage students to compete in science fairs.
- Due to Covid, pivoted from hands-on experiments to online experiments focusing on critical scientific skills and network curriculum.

ACS CHEMISTRY CLUB, Monte Vista High School *2018-Present*
President, Vice President (19-20), Member (18-19)
- Led a team of 5 officers to organize activities including chemistry demonstrations, experiments, and career discussion for 40+ members.
- Created activities introducing concepts and goals of Green Chemistry; started tutoring for members needing Hons and AP Chem help.

MATHCOUNTS, Diablo Vista Middle School *2015-Present*
Vice President, Deputy Vice President (20-21), Mentor (18-20), School Competition Team (2016-2018)
- VP of a 200+ middle-school organization. Led 8 mentors to coach a class of 30 students math competition techniques and approaches.
- Competed and represented the school in 2017 and 2018. School teams qualified for state finals from 2017 to 2021.

SCIENCE ALLIANCE, Monte Vista High School, San Ramon Unified School District *2018-Present*
Mentor Trainer, Mentor (18-21)
-Trained 8 HS mentors to guide fifth-graders in district-wide science fair competition (200+ participants). Mentee won awards in '19 - '21.

TEEN ADVISORY BOARD, Danville Library *2018-Present*
Senior Board Member
- Organized teen programs including We Need Diverse Books, Music & Books, Game Nights, Petpalooza, and Hunger Awareness.

AWARDS, HONORS, AND OTHER INTERESTS

CTY Study of Exceptional Talent (SET), Duke TIP, Mensa, Piano, President's Volunteer Service Award - Gold, CSF, NHS, NSHS
Drawing blobs, Earth-friendly diet, Green Chemistry, *senbazuru* (thousand cranes), Author of Green Chemistry for Me

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ADDITIONAL INFORMATION

ADVANCED PLACEMENT AND OUTSIDE COURSEWORK

2022 (planned): AP Physics 2, AP Env Science, AP Biology, AP Comp Gov, AP Macroeconomics, AP Microeconomics, AP Statistics
2021: AP Calculus BC (5), AP Computer Science A (5), AP English Lang and Comp (5), AP US History (5), AP Psychology (5)
2020: AP Chemistry (5), AP Calculus AB (5), AP Computer Science Principles (5), AP World History (5)
2019: AP Chinese (5)

Center for Talented Youth (CTY), Johns Hopkins University, MD
Study of Exceptional Talent (SET), AP Psychology (2020), AP Biology (2021), Multivariable Calculus (2021)

SELECT TAEKWONDO COMPETITIONS

2021:
USA Taekwondo Nationals: Freestyle Team (Silver), Freestyle Pair (Bronze)
USA Taekwondo West Regionals: Freestyle Pair (Gold), Freestyle Team (Silver)

2020:
Member of TeamUSA Taekwondo National Team / Pan American Championship: (Gold)
USA Taekwondo Online Grand Slam: Freestyle Team (Gold), Freestyle Pair (Bronze)
USA Taekwondo Grand Slam Finals: Freestyle Team (Silver), Freestyle Pair (Silver)

2019:
TeamUSA Taekwondo National Team Alternate
USA Taekwondo Nationals: Freestyle Team (Silver)
US Open: Freestyle Team (Silver), Recognized Team (Bronze)

SELECT RESEARCH AND PROJECTS

Research and Laboratory Investigation: ***Enhancing Biosynthesis through Genetically Engineered Cells (2021)***
Biosynthesis-based processes can be a greener and more sustainable alternative to traditional production processes for a range of everyday products from vitamins to jeans. To enhance biosynthesis, it is often desirable to use genetic modification to introduce cofactors or coenzymes into cells. Iron-sulfur (Fe-S) clusters assist electron transfer, gene expression, and DNA replication/repair and are a highly desirable coenzyme. Since IscA is a key protein in the biogenesis of Fe-S clusters, the goal was to prove that we can genetically design a plasmid and then heat shock yeast cells to uptake the plasmid and produce IscA. In the lab, these genetically modified cells were successfully grown and IscA was proven to have been successfully synthesized and sustained through gel electrophoresis. This demonstrates a promising avenue for incorporating cofactors into cells to improve biosynthesis.

Literature Review: ***Biosynthesis of Biotin (2021)***
Biotin is one of the essential vitamins, but its production is challenging, making biotin unaffordable for the poor. Various methods to biosynthesize biotin were explored, focusing on their potential to improve the process from the economic and sustainability point of view. Genetically engineered E.coli was found to be able to bioproduce biotin, but further research is needed to see if a cofactor molecule can further improve the process. Biotin bioproduction utilizing yeast and bacteria has shown promise with certain bacteria strains and eliminates hazardous chemicals, but additional research is needed to develop an optimal process.

Literature Review: ***Biofuels for Tomorrow (2020)***
Microalgae are seen as promising candidates as future renewable energy sources. However, their production is challenging as it's currently not cost-efficient, too energy-intensive, and not environmentally sustainable. One possible improvement is to tailor microalgae for efficient biofuel production by reducing some molecules in the antenna complex to allow more light transmission and thus increase biomass. Another initiative is to use Mg^{2+} to manipulate carboxylase to increase lipid production in microalgae cells which have seen improvements by up to 50%. While further research is still required, this suggests that there is potential to eventually make microalgae biofuels more sustainable and cost-effective and become a viable green energy source.

Published Book: ***Green Chemistry for Me (2021) ISBN: 979-8489348287***
Green Chemistry for Me is a book targeted at middle schoolers to introduce the concept of Green Chemistry, show how it can help improve the environment, and suggest actionable steps to support Green Chemistry in our daily lives. Available on Amazon.

Entrepreneurship Project: ***Green Infinity Mask™ (2020)***
The COVID-19 pandemic has demonstrated the need for improved masks that are more effective, versatile, and environmentally friendly. The *Green Infinity Mask™* was designed based on user feedback and a prototype was successfully developed to demonstrate its reusability and unique flexi-filtration system. Conducted market research and developed a business case taking into account market sizing, competition, pricing, sales channels, and initial investments to demonstrate commercial potential.