

@Stony Brook



What is iGEM?

The iGEM foundation is a nonprofit organization that provides students with an academic opportunity to formulate a project towards the advancement of synthetic biology. Through a collaborative environment, iGEM helps promote a friendly competition where teamwork is celebrated. Project from different schools are presented to a panel of judges at the annual Jamboree, the culminating event of the iGEM competition. Projects are award bronze, silver, or gold metal based on meeting certain criteria.

Why SynBio?

Synthetic Biology is a new, innovative field with multi-disiplinary benefits in medicine, environmentalism, and industry. Synthetic biology has the potential to create tumor destroying microbes, clean toxic chemicals in water, and create efficient biofuels. Besides the technological innovations, this field gives us a better understanding of the genome and how to connect a varitety of genetic components to serve our needs.



Past Successes



Plant-virus

2019

Tobacco mosaic virus (TMV) is an RNA virus that causes necrosis and stunted growth of plant tissues. It is highly infectious and attacks species of the *Solanaceae* family, such as tomatoes, potatoes, eggplant and tobacco. The 2019 team introduced a defense mechanism centered around XRN1P, a protein found in eukaryotes. This protein would recognize TMV and degrade it inside the chosen plant, *N. benthamiana*, giving plants the ability to defend themselves against TMV while building towards a pesticide-free future.



LightSwitch

2020

Genetically modified (GM) crops are used to improve crop yields and protect plants from pests and pathogens. However, the transfer of genetic information between these crops and the natural flora is of concern. The 2020 team designed a killswitch activated by UV-B light, which is absent in the indoor farms where GM crops are often grown, in the hopes that it would decrease the hesitancy around using GM crops.



2021 Project



*Algae growth in Lake Erie

Cyanobacterial harmful algal blooms (cHABs) are overgrowths of algae. They release a cyclic molecule called microcystin which is harmful for human consumption and threatens drinking and recreational water. This toxin causes severe illness or death of wildlife and humans. Thus it is important to breakdown microcystin.

Issues with Past Solutions:

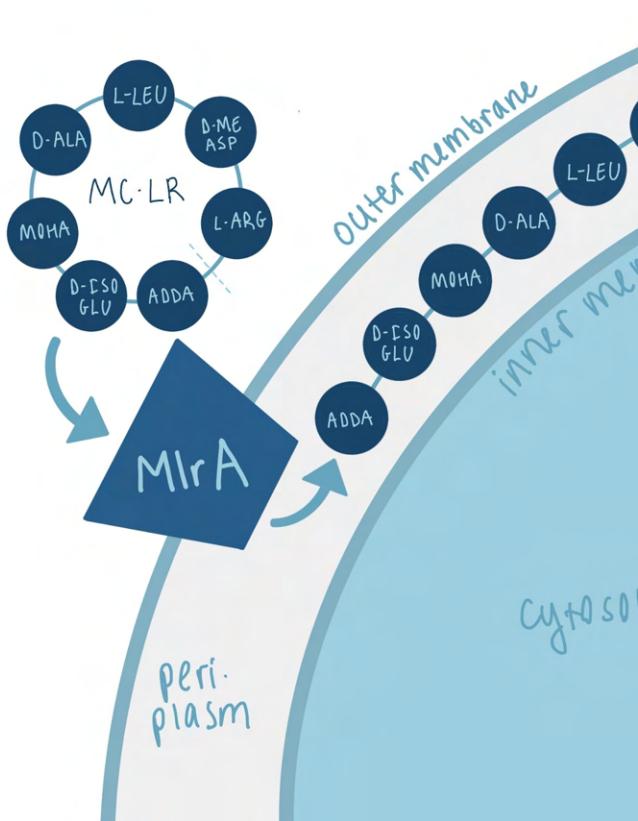
There are ways to breakdown microcystin, but they pose a problem:

- Ozonation: highly corrosive, carcinogenic products
- Chlorination: toxic residues which are bad for the environment
- - Activated Carbon Absorption: very expensive

Our Solution

MlrA (aka Microcystinase) is an outer membrane enzyme typically found in *Sphingomonas* species of *E. coli*, which linearizes microcystin to a less toxic form.

With this cheap, ecofriendly, and sustainable method, *E. coli* expressing MlrA can act as a biofilter to remove (MC-LR) in water.



Meet the Team



Abishek Cherath

Abhishek Cherath (Class of '22) is a double major in physics and mathematics. He is a member of the laser teaching center. He hopes to become a physicist.



Nghi Huynh

Nghi Huynh often goes by Emilia. She used to TA for BIO202, and another two General Chemistry courses, yet she doesn't want to become a teacher. She majors in Biochemistry, but doubts her career choice at the same time. She now owns a small press on nails business on Etsy with several sales. She's also doubt herself of being an entrepreneur. She wants to pursue higher education but also has a lot of doubt on that.



Michael Fung

Michael Fung (Class of '22) is a Biology major with a specialization in Developmental Genetics. He is a Residential Assistant on campus and is a member of the Stony Brook VIP program (The Brain Team). In the future, he hopes to continue research in the fields of genetics and microbiology.



Lamisa Musarat

Lamisa Musarat (Class of '22) is a double major in Biology and Psychology with a concentration in Neuroscience. She has been a Research Assistant at Stony Brook University Hospital under Dr. Yale and the Commack WTC Clinic. She is also an Orientation Leader, UGC Fellow and an Assistant Treasurer of the Undergraduate Student Government. In the future, Lamisa would like to pursue a career of research in the field of Learning and Memory.



Jiahan Yang

Jiahan Yang majors in Biology. He is a senior and a UGTA for some Biology courses. Outside of participating in research with the iGEM Team, he enjoys cooking and reading novels. In the future, he hopes to pursue a career in the biology field, specifically cancer/stem cell Biology or molecular Biology.



Annie Lin

Annie Lin (Class of '23) is a biochemistry major with a writing minor. She is a University Scholars Fellow and enjoys teaching violin lessons in her free time. She hopes to pursue a career as physician, and would love to continue involvement in research as well.



Asad Nabi

Asad Nabi (Class of '24) is a Chemical Engineering major with a Physics minor. He is an avid programmer and helps to maintain the Unmasked mental health project app at Stony Brook. In the future, Asad hopes to be a part of the energy or aerospace field as a Chemical Engineer.



Heera Bandi

Heera Bandi (Class of '24) is a biology major. She is part of the University Scholars program and a licensed EMT in the state of New Jersey. Her future plans include wanting to pursue a career as an ophthalmologist while continuing to participate in research.



Joelle El Hamouche*

Joelle El Hamouche (Class of '22) is a chemistry major. She is a peer assistant leader for the University Scholars Program and a mentor for the HS Women in Science and Engineering Program. In the future, she hopes to pursue a career in medicine or research.



Nabeel Farrukh*

Nabeel Farrukh (Class of '23) is a Chemistry major and on the Pre-Med track. He is a tutor for general chemistry courses and was a former paraprofessional at James E. Allen Elementary School for special education. He hopes to pursue a career as a physician, specifically Neurology. On his free time, he enjoys painting and drawing.



Elizabeth Tulchinsky

Elizabeth Tulchinsky (Class of '23) is a Chemistry major, and is on the pre-med track. She is the co-founder of the American Medical Women's Association undergraduate chapter at Stony Brook, a TA for CHE 132, and a volunteer at the national runaway safeline. She is passionate about STEM, and is excited to pursue a career in the medical field in her future.



Nicole Gladstein

Nicole Gladstein (Class of '23) is pursuing a major in Biology and a minor in Health, Medicine, and Society on the premed track. She is a member of the Honors College, a UGTA for CHE331, a volunteer EMT with the Stony Brook Volunteer Ambulance Corps, and an editor for the Stony Brook Young Investigator Review journal. In the future, she hopes to pursue a career in medicine.

* Team Leaders

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