



CADSTI-NE

Newsletter

Empowering Caribbean youth through science & engineering experiences

November 2021

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President's Message

Dear Friends and Supporters of CADSTI-NE,



Dinah Sah - President

It's especially a pleasure to share with you the highlights of the 2021 CADSTI-NE summer internship program which was a great success despite the challenges of the pandemic! We persevered through multiple hurdles created by COVID-19 and organized eight student internships in biotech and high

tech. Our SPISE graduates from the Caribbean were hosted by seven organizations in Massachusetts, Texas, Barbados and Jamaica. In total, CADSTI-NE has now organized 54 internships for Caribbean youth since 2014! The CADSTI-NE organizing committee worked tirelessly throughout the year, meeting on-line nearly every Sunday morning to plan, coordinate and implement this program. We could not have done any of this without your support and the support of the host organizations, both financial and in-kind. A very heartfelt thank you for sharing in our vision to provide these amazing opportunities in STEM for our very gifted Caribbean students!

Sincerely yours,

Dinah Sah, PhD

President, CADSTI-New England, Inc.

About CADSTI-NE

CADSTI-NE is a U.S.-based 501(c)(3) non-profit organization launched in 2014 that focuses on empowering Caribbean youth through science and engineering experiences. Our major projects are to:

1. **Coordinate and finance the summer internship program for graduates of the Student Program for Innovation in Science and Engineering (SPISE).** SPISE is an annual intensive residential (or virtual) summer program launched in 2012 by the Caribbean Science Foundation for gifted Caribbean high-school students 16-17 years of age who are interested in studying and exploring careers in science and engineering. SPISE is modeled after MIT's MITES Program, and a major goal is to help groom the next generation of science, engineering, and business leaders in the Caribbean. CADSTI-NE's student internship program provides opportunities for SPISE graduates to experience first-hand the application of STEM to research and development within biotech, high tech and other organizations in the U.S., Canada, UK and Caribbean.

2. Support SPISE

CADSTI-NE Leadership Team

Karen-Leigh Edwards, PhD, MBA

Richard Fauconier, PhD

Lori Fitz, PhD

George Marecheau

Paul McLean, PhD

Dinah Sah, PhD

Joshua Sheldon, MBA

Cardinal Warde, PhD

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Jenalyn Weekes

Jenalyn Weekes (Montserrat)

- Third year Biology major at Bard College at Simon's Rock | MA, USA
- CAMP4 Therapeutics, Cambridge MA, USA

CAMP4 Therapeutics is focused on a novel approach to addressing genetic diseases: programmable therapeutics that upregulate gene expression by targeting regulatory RNA.

Jenalyn's 12-week summer internship at CAMP4 Therapeutics was a multi-faceted experience filled with many opportunities that included learning about the biotech industry, participating in cutting-edge drug discovery research, and experiencing the culture at a small biotech company and best operational practices. She learned multiple new molecular and cellular methodologies in

the lab, attended a variety of company and team meetings and events, and networked with colleagues throughout the company.

Through the internship, Jenalyn gained familiarity with a wide variety of laboratory methodologies. She acquired lab skills that were extensions of the theoretical concepts she had learned about in class and became proficient in these techniques. These lab techniques included mammalian cell culture, tissue homogenization, RNA isolation, cDNA synthesis, quantitative real-time Polymerase Chain Reaction and ELISAs. Importantly, she learned the principles behind these techniques and acquired an understanding of each technique's advantages as well as limitations. In addition, Jenalyn was introduced to multiple other methodologies, assays and systems including immunohistochemistry, immunocytochemistry, homogeneous time resolved fluorescence and induced pluripotent stem cell cultures. On multiple occasions, Jenalyn had the opportunity to present her data, analyses, and results to colleagues in the context of small as well as large group meetings, all of which were good practice for giving a talk in a scientific setting.

Jenalyn expanded her network significantly, through interactions with her supervisors and co-workers during team, department and company-wide meetings and events, as well as in the lab and in the office. She especially enjoyed CAMP4's culture and small size which gave her the opportunity to get to know many colleagues throughout the organization.

In summary, Jenalyn's internship provided her with important, first-hand experience in working in the biotech industry.



Athena Pagon

Athena Pagon (Jamaica)

- Second Year Biomedical Engineering major at Columbia University | NY, USA
- Lenstec – Barbados

Lenstec, Inc. is a Florida-based medical device corporation serving the global ophthalmic surgical market, with products currently marketed in more than 60 countries. They design, manufacture, and distribute a wide range of intraocular lens implants and lens injection systems, and have an established reputation for rapid prototype design and development and high quality/low-cost manufacturing. Athena was motivated to intern with a biomedical engineering firm to help her gain an anchor within this vast field and be able to pivot accordingly based on the knowledge and insight gained from the experience.

During her two-month internship, Athena gained valuable hands-on experience which included experiments, preparation of regulatory documents, and process design changes with associated considerations including risk assessments. She had the opportunity to participate in laboratory studies to evaluate endotoxin and bioburden levels, coat materials for injection, learn about lens materials, and test the mechanical impact of new lens injection systems. Athena noted that these experiments reminded her of concepts learned in her university classes and illustrated applications of these theories. An interesting nuance was that the listening and observing aspects were equally as important as her own hands-on activities. Athena was able to rotate through multiple departments which helped her hone her flexibility and quick-learning skills, in addition to exposing her to multiple aspects of the business. The scientific and soft skills gained together with friendships formed at Lenstec have made this opportunity a formative experience in Athena's development as a biomedical engineer.





**Shyamaleeswari
Dayanandan**

Shyamaleeswari Dayanandan (Jamaica)

- Second year Nanotechnology Engineering major at University of Waterloo | Ontario, Canada
- University of Technology, Jamaica

Shyamaleeswari's project was on the design of a catalytic reactor for ammonia synthesis to create fertilizer using the nitrogen present in the atmosphere and reacting it with gases obtained from electrolysis.

For the first five weeks of the internship, she spent a lot of time collecting information from research papers to assist in her design. Specifically, Shyamaleeswari assembled relevant information about catalysts and the best materials for the pressure vessel with regards to safety and cost. Once she narrowed down the options, she presented that information to her supervisors

to make a final decision. Shyamaleeswari then used SolidWorks to simulate the reactor and ChemCad to experiment with the configuration of components to maximize the yield.

Finally, as the internship wrapped up, Shyamaleeswari created documentation of all of her efforts so that her research data and results could be passed on to the next person picking up from where she left off. This project required Shyamaleeswari to leverage some tools that she had previous experience with like SolidWorks, ChemCad and Excel and provided her with exposure to MATLAB.

She got to work in a collaborative environment both remotely and in-person. Shyamaleeswari stated that this gave her an experience where she got to "explore what it is to start something from scratch." She witnessed that "it takes failing and learning and trying different paths to solve a problem." She summarized the experience as "an amazing experience working with a team of engineering students who brought their own experience and expertise to the project."



Chemical Engineering



Liyan Moralez

Liyan Moralez (Belize)

- Third and final year Chemical Engineering major at University of the West Indies | St. Augustine, Trinidad
- Aphios, Woburn MA, USA

Aphios Corporation is a biotechnology company working on sustainable nanotechnologies and therapeutics for health maintenance and disease treatment. In particular, CFI™ is a pathogen inactivation technology platform that is being developed for eliminating virus from human plasma. In addition, the company has natural product drug discovery efforts as well as research on drug delivery.

Liyan's eight-week internship at Aphios provided a comprehensive introduction to research as related to drug discovery. During the internship, considerable time was invested in understanding the various approaches and analytical techniques being employed in the company's pathogen inactivation technology platform and in its chemical manufacturing department. In this regard, the underlying principles were learned in detail, as related not only to on-going applications but also to several other potential applications. In addition to exposure to laboratory techniques for assessing viral titer and blood clotting parameters, and for purifying and characterizing a compound of interest, the internship highlighted the importance of great attention to detail to ensure reproducibility, accuracy and precision in experiment execution. Furthermore, the weekly staff and technical meetings attended during the internship provided Liyan with invaluable experience in a group setting.

This group experience included the opportunity to engage in meaningful discussions where all were encouraged to offer ideas and suggestions for addressing technical issues and challenges. Through the group meetings, Liyan also had the opportunity to give technical presentations and discuss multiple aspects of his work with colleagues. Liyan states that his internship experience was incredibly memorable and enjoyable particularly due to Aphios' culture of encouraging teamwork and promoting multidisciplinary skill development.



Chemical Engineering



Daniel Reckord

Daniel Reckord (Barbados)

- Second year Mechanical Engineering major at Howard University | Washington DC, USA
- Foursquare Rum Distillery, Barbados

Foursquare Rum Distillery manufactures rum with state-of-the-art equipment and systems. It also bottles distilled water and recovers CO₂ produced by yeast during the fermentation of molasses for production of rum. The CO₂ is converted to dry ice by a standard industrial process for sale locally.

Daniel completed a four-week internship in which he divided his time, alternating between working with the chemist technician in the laboratory and working with the engineer. His activities with the chemist involved collecting samples daily from cane juice fermentation tanks, vacuum water, and mash tanks for chemical analysis. He learned multiple methods for analysis of alcohol content as well as acidity and sugar content.

With the engineer, he observed installation of a new compressor for the carbon dioxide plant and assisted in some of the manipulations. In another situation, in which he disassembled a broken compressor, Daniel gained valuable experience troubleshooting a technical problem, and determining how to fix it. Working in the fermentation operation, Daniel had the opportunity to use the potstill by controlling pumps and valves to feed in fermented mash and cane juice and then monitor temperature and pressure levels to determine when the distillation was complete. He was also responsible for monitoring the brix and temperature of the mash as it fermented. His final assignment was in the barreling area, recording the volume of rum placed in each barrel and checking the labels.

Daniel noted that he learned how to manage situations using available resources when items broke, in order to keep the operation going uninterrupted. Overall, Daniel found his time at Foursquare to be very enriching and educational.



Electrical Engineering



Shane Maughn

Shane Maughn (Barbados)

- Third year Electrical Engineering major at Columbia University | NY, USA
- Precisyx, Danvers MA, USA

Precisyx is a consulting company based in Massachusetts that specializes in robotics, digital signal processing, image understanding & machine vision algorithms, radar signal processing, communication system design, fiber optic sensing & electro-optics, and logistics. Shane's internship at Precisyx involved him in the development of a prototype radar using a novel technique to precisely track objects.

This internship provided Shane the opportunity to gain hands-on experience with a variety of industry-standard laboratory instruments and tools for the microwave part of the electromagnetic spectrum. These radiofrequency (RF) instruments and components included RF digital storage oscilloscopes, spectrum analyzers, signal generators, mixers, antennas, etc. In addition, Shane was able to see many electrical engineering topics such as electromagnetic wave theory, digital signal processing and transmission line theory applied to real world situations. Another milestone was the opportunity to use PCB software (not typical in university courses) for printed circuit board design.

These experiences together with the many discussions held with key stakeholders and mentors opened a wider world of electrical engineering to Shane which is extremely valuable as he builds his future career strategy.



Mechanical Engineering



Jason Salmon

Jason Salmon (Jamaica)

- Third year Mechanical Engineering major at MIT | MA, USA
- University of Technology, Jamaica

Jason interned in a mechanical engineer role on a project to create fertilizer using the nitrogen present in the atmosphere and reacting it with gases obtained from electrolysis. He was tasked with the design of electrolysis cells, as well as piping and containers for the collection of gases from the electrolysis of water. His tasks required him to pay attention to the sizes and shapes of the electrodes needed to provide enough current to electrolyze the water in the cells, as well as vessels to contain the hydrogen and oxygen gas produced during the process. Throughout the internship, Jason developed hypotheses for his design then had to be agile when the design change of other components

impacted his design. He got to be part of the decision process when deciding whether to use completely off-the-shelf ("COTS") components (sourced locally and internationally) or develop custom-designed components. Finally, he was tasked with gathering and creating documentation so that any successor would be able to seamlessly start where he left off. Jason did all of this while navigating through the obstacles of a hybrid work environment combining both remote and in-person interactions. Jason stated that his internship provided him with some inside perspective on issues facing the Caribbean and felt empowered by the responsibilities that were given to him.



Computer and Data Sciences



Dion Recai

Dion Recai (St. Lucia)

- 2021 Computer Science graduate from University of the West Indies | St. Augustine, Trinidad
- HealthPointe Solutions, Austin TX, USA

HealthPointe Solutions is developing a cognitive artificial intelligence (AI) platform that merges data science and cognitive science to provide personalized, actionable insights aligned with clinical pathways to improve consumer health.

Dion was fortunate to work on 3 different projects during his 13-week internship that comprised: 1) deployment of operating environments into the cloud, 2) creation of an automation system script, and 3) enhancement of a machine

learning pipeline. This progression was a valuable research experience that also provided an in-depth understanding of business needs. Dion had the opportunity to learn several cloud technologies, participate in principles of agile development, and learn techniques and methodologies to address problems in machine learning. These projects gave him the opportunity to build on his understanding of cloud technologies and important principles in software development involving agility, good design and communication. Although Dion traveled to the company's location in Austin TX, he experienced a hybrid work experience that combined going to the office and working from his local accommodations. The company had excellent communication practices of 'daily scrums' and 'pair programming', as well as regular but time-effective meetings. This close communication and trust with colleagues led to quick problem solving.

The 3-month internship period gave Dion time to see his contributions be put into use at the company, and time to gain a thorough understanding of the challenges and best practices of how companies work toward goals. Dion was given an employee spotlight in which the CEO introduced him and his contributions at a company-wide meeting. Throughout the internship, Dion met with teams and individuals from across the company, learning from each of them. He also gave a final company-wide presentation, demonstrating what he had achieved during the internship. This was an excellent opportunity for Dion to broaden his network in his field of interest. Overall, the internship gave Dion invaluable experience for working in a research company in the same area that he is planning to pursue for graduate school. The experience of seeing how a company must balance both the critical business needs that must be met, and innovative research to create new possibilities to improve health care systems will be useful as he continues in his academic and career journey.



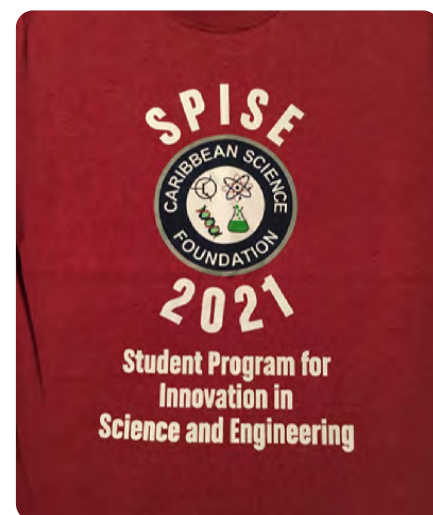
SPISE 2021



The SPISE 2021 Class

The Student Program for Innovation in Science and Engineering (SPISE)

is an annual 5-week summer program for Caribbean high-school students who are gifted in Science, Technology, Engineering and Mathematics (STEM), and interested in studying and exploring careers in these disciplines. SPISE is modeled after the well-known and successful MITES program at MIT for which Professor Cardinal Warde serves as the Faculty Director. SPISE students are totally immersed (24/7) in university-level calculus, physics, biochemistry, entrepreneurship, and hands-on projects in electronics and computer programming. The SPISE environment discourages rote learning and teaches students how to focus on understanding and applying the fundamentals to achieve proficiency in the material, and thus be able to solve complex problems. The value of teamwork (learned in the hands-on projects) is yet another essential skill that is emphasized, along with proactive time-management skills. Instructors in the SPISE include university professors from the Caribbean and the Diaspora (including MIT), and senior management professionals from leading biotechnology and pharmaceutical companies in the Diaspora. The program culminates with student project competitions in which each team first gives an oral presentation of their hands-on project before demonstrating the workings of their project to the public.



To date, SPISE has served 191 students from 16 Caribbean countries. SPISE graduates from the 2012-2020 classes are now enrolled at the world's top science and engineering universities including MIT, Stanford, Harvard, Princeton, Yale, Columbia, Cornell, Dartmouth, U Penn, Carleton, McMaster, Ryerson and UWI. Most of these students have substantial financial aid packages, and some have full scholarships.

Further details can be found at <http://caribbeanscience.org/projects/spise.php>.

Where are the Interns Now?

From time to time, we highlight several former interns. Others will be highlighted in future newsletters.



Avery Barnett

SPISE 2016 Linda Su-Nan Chang Sah Scholar

Internship: Emera Caribbean (2019)

PhD student at Princeton University, Public Affairs
(Science, Technology and Environmental Policy),
Princeton NJ, USA



Terrikia Benjamin

SPISE 2015 Caribbean Development Bank Scholar

Internship: VML (2017), Voyager Therapeutics (2018),
CAMP4 Therapeutics (2019)

Associate Scientist, Atalanta Therapeutics, Boston MA,
USA



Quilee Simeon

SPISE 2015 LUCELEC Scholar

Internship: Foursquare Rum Distillery (2016),
Sagikor (2017)

PhD student at MIT, Brain and Cognitive Sciences,
Cambridge MA, USA



Benedict Sukra

SPISE 2014 Guyana Ministry of Education Scholar

Internship: UCSD STARS (2017)

PhD student at Northwestern University, Physics,
Evanston IL, USA

2021 Internship Hosts and Sponsors

Sincere thanks to our partner organizations, who devoted time and resources to plan for, on-board and mentor the student interns.

Host Organization	Location	Company Focus	Student Intern
	Woburn MA, USA	Small biotech company developing sustainable, earth-friendly nanotechnologies and therapeutics for health maintenance and disease treatment.	Liyan Moralez
	Cambridge MA, USA	Small biotech company focused on discovering programmable therapeutics that upregulate gene expression by targeting regulatory RNA, for treating genetic diseases.	Jenilyn Weekes
	Barbados	Small company that manufactures rum with state-of-the-art equipment and systems.	Daniel Reckord
	Austin TX, USA	A data science company that develops Cognitive AI based products and services for the digital health and wellness marketplace.	Dion Recai
	Barbados	Biotech company that designs, manufactures and distributes a wide range of intraocular lens implants and lens injection systems.	Athena Pagon
	Danvers MA, USA	An electronics consulting and logistics firm.	Shane Maughn
	Jamaica	A top tertiary education institution in Jamaica with eight colleges and faculties.	Shyamaleeswari Dayanandan, Jason Salmon

Caribbean Diaspora for Science Technology & Innovation New England



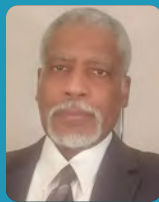
*Empowering Caribbean youth through science
& engineering experiences*

Thank You!

CADSTI-NE Leadership Team



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