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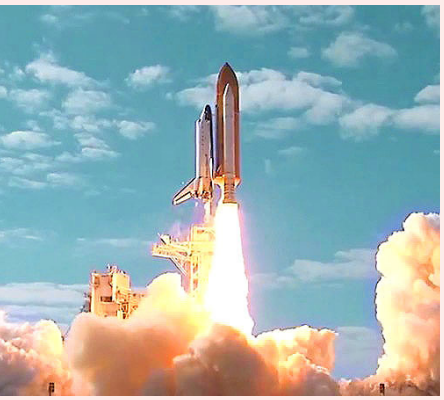
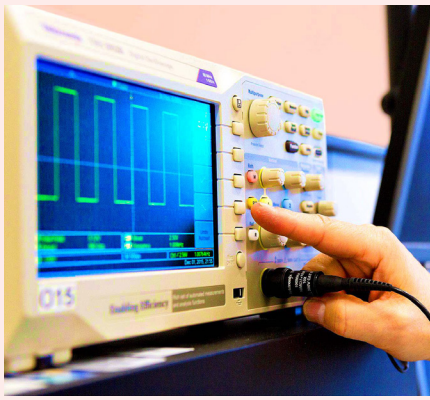
THE PULSE OF LONG ISLAND

IEEE | LONG ISLAND SECTION





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PRODUCED BY THE LONG ISLAND SECTION OF THE INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS

Happy Summer Solstice, Everyone! The Section has made gallant efforts to stay engaged by getting connected and getting involved. Some shining examples include the newest ExCom leaders, Gabriella Carini, Nuclear and Plasma Sciences (NPS) Chair, and Srinivas Sridhar, Vice Chair of Microwave Theory and Techniques (MTT).

The month of May yielded many successful events at New York Tech, such as the **Long Island Systems, Applications, and Technology (LISAT) Conference**. Attendees included distinguished lecturers, industry professionals, faculty, researchers, students, and exhibitors. Next was our outstanding **Micromouse of Long Island competition**. Each student team made a technical presentation to IEEE judges, fully describing their robot. Trophies for "Presentation" and "Unique Robot" were awarded independent of the Maze Run outcomes. In addition, Women in Engineering awards were given to teams with female members. I want to thank and congratulate the organizing committees for both stellar events. Finally, we hosted our first ExCom meeting at Zebra Technologies, and this hybrid gathering had excellent attendance. Zebra Engineers welcomed ExCom during the meet-n-greet, and many stayed on to attend the meeting.

A few notable **RAS workshops** held in June were *"Artificial General Intelligence"* at the Huntington Senior Citizens Center and *"Intro to Robotics for Tweens"* at the Harborfields Public Library. In addition, we celebrated "PELS" Day at Chilis; an informal social with great food and conversation.

In conclusion, as we look forward to the next series of events, please consider submitting your abstract for the November 2, 2023 **Power Electronics Society (PELS) Symposium** or contact the organizers to volunteer to help. Don't forget to mark your calendars on March 21st, 2024 for the **2024 Long Island Section Awards Banquet** at the Crest Hollow Country Club. **As always, please continue to get connected and get involved and enjoy the summer!**

Warm Regards,

Rhonda Green
2023 IEEE Long Island Section Chair
chair@ieee.li

THE PULSE OF LONG ISLAND

IEEE LONG ISLAND SECTION

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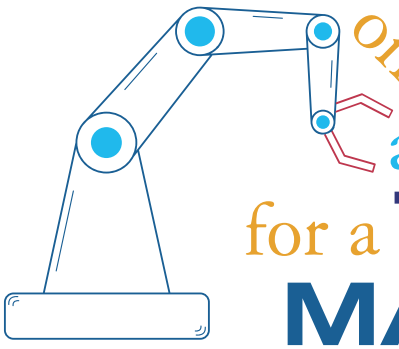

On Writing and Editing for a TECHNOLOGY MAGAZINE

Andrew Ritter
Pulse Editor, IEEE LI Section

Since taking over the editor role at the beginning of 2023, I have been considering how I can help ***Pulse*** to be a valuable resource for others. Most of my focus has been on creating repeatable features, like chapter spotlights, which I plan to start in the next edition. Promoting upcoming events and augmenting their reach seems a worthy goal as well.

Recently, the question was posed to me by our esteemed chair, *"What can an editor do for a scientist or technologist looking to publish?"* Her question came in the context of Zebra Technologies hosting the latest ExComm meeting, the query being a way of exploring what the Long Island Section of IEEE offers potential new members.

This is a great question.

An editor is a specialist in the forms of writing; therefore, it stands to reason that an editor can help to produce quality publications. So I think, to answer the question best, we need to step back and question, "Why is writing important to science & technology"? After all, what is the reason to desire good writing?

Writing is a multidimensional tool for communication. It can reference many things in a single corpus and be revisited as often as necessary. Writing can explain complicated concepts and even be geared for different audiences to better understand those concepts. One of the most essential emergents of writing is the story. A well-designed story successfully delivers a message within a context with a consistent voice to an audience whose capacity to understand is the writer's target. These four elements: context, message, voice & audience are essential for a story to connect.

One of the things an editor can do is to help the writer to find the story. This means identifying those story elements and co-developing their writing to address the needs of each. The editor can also help to program the many interacting elements that make a written work function as intended.

A story follows a form.

Typically, that form is of a bell curve; the beginning is an introduction, the middle addresses the problem, and the end sums it all up. Writing, forming the pipelines of the story, must be clear and concise and follow grammar rules for syntax, morphology and semantics.

An editor can help a writer improve these aspects of their writing, which will enhance the efficacy of the goal of communication. In a way, an editor (and a writer) is an engineer of ideas. The story can be seen as an interface. An interface between ideas and the audience. Writing, then, is a layer wherein the elements coalesce and are delivered to the reader.

An engineering editor functions by removing noise and refining the signal through editing techniques, thereby creating a coherent interface for the ideas to be transmitted to the reader. The task of improving the clearness of a story is paralleled well by Claude Shannon's Information theory, wherein he ascribes the Shannon Limit to indicate a relationship between entropy and clarity in the information signal.

Through feedback, the editor can assist the writer with message and content development & correct errors in grammar and form, which might lead to greater entropy and thus dampen the interface that is the story.

Writing, just like science and technology, is a seemingly never-ending journey. Perhaps that's why we like them so much.

I hope you enjoy this and future editions of ***Pulse***.

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2024 awards banquet

IEEE LONG ISLAND SECTION

MARK YOUR CALENDAR: MARCH 21, 2024

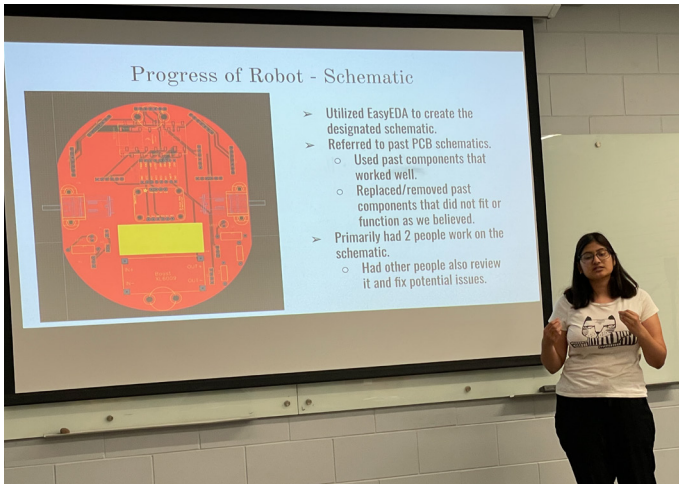
MICROMOUSE OF LONG ISLAND COMPETITION 2023

Dr. Andrew R. Sass, *Vice Chair, IEEE LI Robotics & Automation Society*

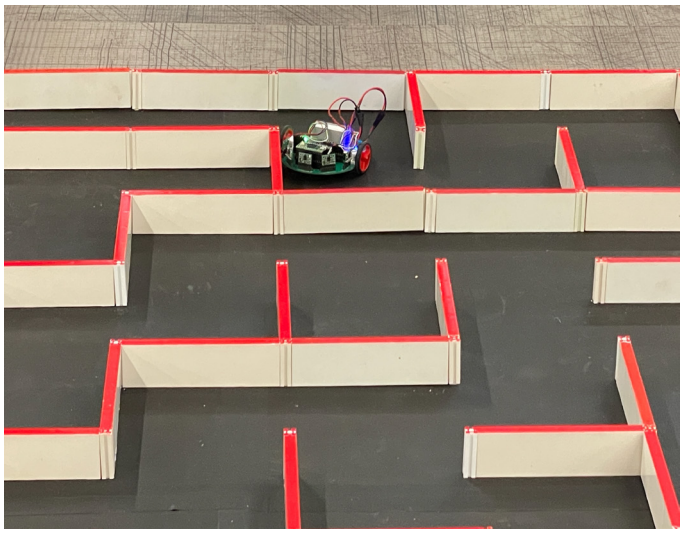
The **MICROMOUSE OF LONG ISLAND** project was conceived as a way to bring an important technology challenge to college students on Long Island. This STEM opportunity extended to the Greater New York area, including New Jersey and Connecticut.

Inherent in the IEEE charter is a mission to encourage and educate aspiring electrical engineering students in the art and science of this important technical discipline. It was this tenet of support that inspired me to pursue instituting the Micromouse Competition as a natural way of accomplishing this mission.

Those readers unfamiliar with the history and details of Micromouse Competition are referred to extensive Internet literature on the subject. Briefly, the Competition, was conceived by the Editor of IEEE's Spectrum in the 1970's. It consists of a palm-size robot which has to autonomously navigate through a 16 x 16 maze from a Start at one



corner to a Goal in the Maze center with no foregoing knowledge of the labyrinthian pattern.



The Long Island Micromouse event was a major challenge in that it was conceived, designed and implemented within a six-month period. The experience, capability, and assistance of Student Activities, Region 1, under the able leadership of Gim Soon Wan was invaluable. This assistance included the loan of the Maze itself, which Soon hand- delivered to the competition venue at NYIT in Old Westbury, LI. Without Soon's active participation, I could not have brought this project to fruition.

New York Institute of Technology, Old Westbury campus provided a wonderful venue for the Competition. The complex support provided by Dr. Milan Toma and assistance of the Dean of College of Engineering and Computing Sciences, Dr. Babak Beheshti was invaluable to the successful completion of the project.

I mounted an extensive publicity campaign early in the project with the help of Andrew Ritter, Pulse Editor and RAS Chapter Webmaster. This resulted in 5 teams from

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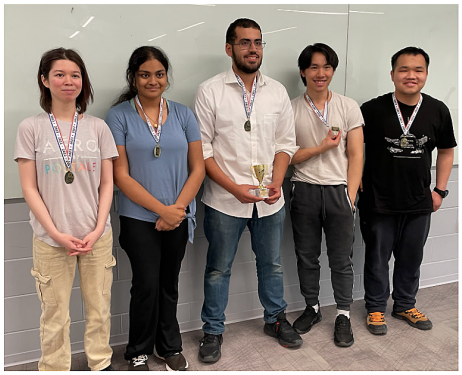

colleges in the Greater New York Area responding. Considering the number of engineering colleges in the area, the response was quite gratifying. A parallel publicity campaign was aimed at secondary schools on Long Island.

While only one high school responded, we are developing a strategy to continue to encourage high schools to participate in this and similar robot activities in the 2024 season of Micromouse of Long Island.

On the day of Competition, May 12, 2023, Dr. Milan Toma, Shel Lipsky (RAS Chapter Treasurer), and I assisted Soon in unloading and carrying the Maze into the competition venue. Following Soon's training, Shel became quite proficient in wall setup according to the "Practice Design" and my "Competition Design"; both of which included the "MM LI 2023" logo as part of the maze.

Each robot in the 2023 Competition combined complex hardware and software design and implementation. I set up a series of team presentations by individual teams to a panel of Judges prior to the maze runs. This gave students the opportunity to show their presentation skills and to showcase their individual robots. Presentation skills are so very important to future engineering students, so this was a worthwhile feature of the competition.

The overall participation of students in Micromouse of Long Island exceeded our expectations, as did the quality of students, their knowledge, and their robot entries. Micromouse Maze, being designed such that some walls are not connected to the outside wall, is known to be a significant challenge for both engineering students and practicing engineers with years of experience. It is no surprise that few if any entries in Regional Competitions, are 100% successful in reaching the Competition Center Goal. Relative success is the keynote of most competitions; this was the case in Micromouse of Long Island and there was great excitement as robot entries attempted to outdo each other.

STONY BROOK UNIVERSITY IEEE STUDENT BRANCH: 2023 IEEE LI MICROMOUSE COMPETITION EXPERIENCE

Rachel Leong, Christopher Lobato,
Thomas Montchal, Ryuichi Lin
Stony Brook University IEEE Student Branch

The Stony Brook University IEEE Student Branch (IEEE at SBU) had first heard about Micromouse while organizing a workshop series called the OPS Program whose capstone project was creating a palm-sized, maze-solving robot, inspired by the decades-old competition. However, it was not until we attended the IEEE Micromouse Competition at MIT in Oct. 2022 that we were hooked and decided to compete at the next competition. Thomas and Ryuichi were more experienced in PCB Design through coursework and took care of the hardware, while Christopher and Rachel had a stronger programming background and focused on the software.

Through working on our OPS Program, we got an idea of the necessary components needed to create a functional mouse. Thomas and Ryuichi became familiar with IR sensors, H-bridges, and encoders and incorporated these into the PCB. The PCB design underwent several changes to optimize different aspects of the mouse's design like motor placement, sensor placement, and pin routing on the microcontroller.

During the design phase, Thomas and Ryuichi learned how to utilize Fusion 360 to create custom motor mounts while also grappling with the limitations of our hardware.

With help from IEEE at SBU's faculty advisor, Alex Doboli, they came up with ways to incorporate a switch on the mouse for switching between algorithms after running out of pins to use on the microcontroller. The last few weeks before the competition involved retesting the hardware prior to ordering the final. Components were hand-soldered onto the PCB, and the hardware was then handed off to Christopher to program the movement and PID contro

Initially, we thought that it would be possible to move the mouse without implementing a PID controller. However, we soon determined that it was crucial to prevent the mouse from getting stuck. We were not very familiar with PID, but after reading about how line-following robots utilize PID Controllers to move in a straight line, Christopher decided to use the motor's encoders and the IR

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sensors to develop a PID controller for distance and angle control. In the final two days, through trial and error and some energy drinks, we were able to implement smoother movement on the mouse.

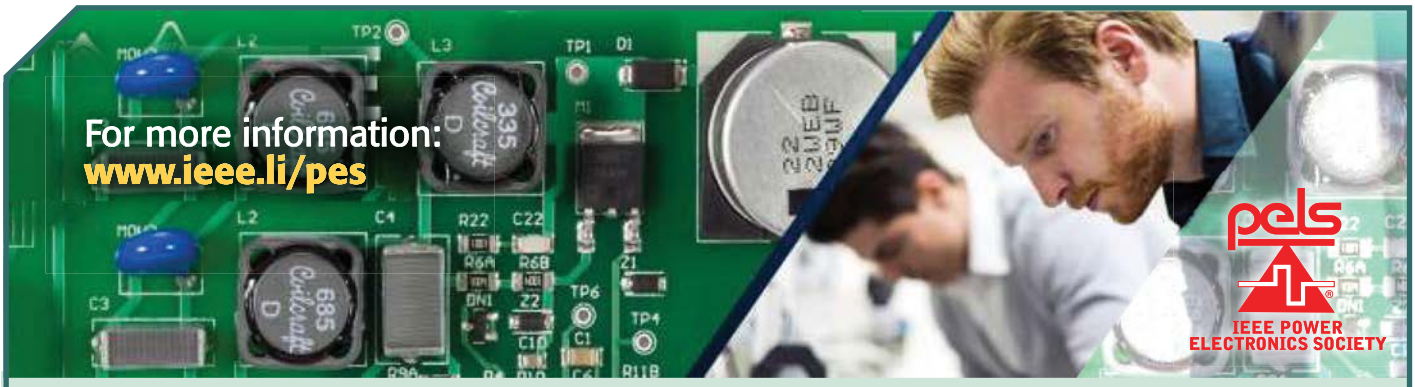
While all the hardware was being developed, Rachel worked on coding the abstract elements of the software, including how to store information about the maze, maze traversal, and maze-solving algorithms. The programming language of choice was C++, selected for its similarity to Arduino and easier portability into the microcontroller. The software was broken down into several smaller tasks.

The first task was determining how to store information about the maze. Next was creating and testing abstract functions for moving forward, turning, and checking for walls which could easily be adjusted for the actual hardware-tested functions that Christopher was working on. Finally, the maze-solving algorithm would be selected and written. Trémaux's algorithm was used to do the initial traversal of the maze and A* was used to find the shortest path to the goal. The program was coded using Visual Studio Code and tested using a Micromouse simulator found on GitHub.

Attending the competition was a fun, rewarding experience. The drive to NYIT's Old Westbury Campus was much shorter than the one to MIT given its proximity to Stony Brook. When we got there, we refined our mouse before presenting it to a panel of judges. We were initially unsure of how our own mouse would hold up against the competition since ours still had issues detecting walls, but we were confident that we could win. It was suspenseful watching the mice slowly approach the goal, but there was great sportsmanship as everyone celebrated when any of them got close, regardless of whose team it belonged to. While our mouse did not reach the goal, we were overjoyed to find out that it got the closest and that we won first place.

In addition to competing, our team and other spectating members of IEEE at SBU were also able to meet and talk with the other competing teams from Region 1. Hearing and seeing how other teams designed and programmed their mice gave us valuable insight and ideas for how to differently approach and improve our mouse for future competitions which we will definitely try to compete at.

This experience would not have been possible without the support of the IEEE Long Island Section and, especially, Gim Soon Wan, who was generous enough to drive the maze from Massachusetts to SBU for our own internal Micromouse Competition, before driving it to NYIT for the Region 1 Competition. He provided us valuable insight from his experience as a world champion in Micromouse. Thank you all for a truly unforgettable experience and we hope to see it continue next year.



THURSDAY, NOVEMBER 2, 2023 • **RADISSON HOTEL**, 110 MOTOR PKWY, HAUPPAUGE LI • NOON TO 8 PM

IEEE LI SECTION POWER ELECTRONICS SYMPOSIUM 2023

The Long Island Power Electronics Symposium & Exhibits is the area's premier annual event that brings together the power electronics community. All professionals (engineers, managers, etc.) involved in the use, design, qualification, test, procurement or manufacture of power supplies, power converters, power management, servos or energy storage are invited. All sectors of power electronics are represented including military, industrial, medical, space, consumer & automotive. **This event is free for attendees** but please register in advance to maximize your experience. Registered attendees will receive admission to the exhibit floor, technical lectures, complimentary lunch, and the complimentary dinner. The first 200 registered attendees will also receive a complimentary swag bag with gifts from our exhibitors.

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Abstract, viewgraphs, speaker bios and speaker contact information are due **October 6, 2023**. Scheduling of qualified papers is accomplished on a first-come/first-served basis. Notification of acceptance by **October 17, 2023**.

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Send your article to: **pulse@ieee.li**

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The **IEEE Long Island Section** has held meetings with many of our Life Members and Senior Engineers, in recent months. Your stories and histories in engineering are interesting, inspiring and should be recorded for future generations. You have served your profession for many years, many have served our country in the military, many as engineers fighting the Cold War. The many contributions are the legacy to this new digital age, space age, environmental age and beyond.

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