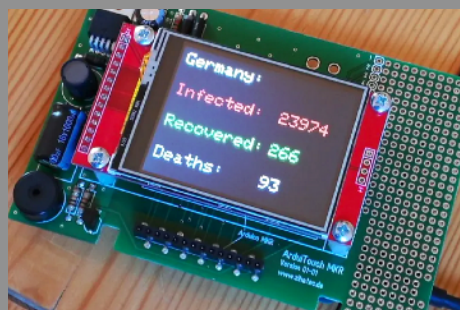


The TISP Canada Courier #17



October 15, 2020


COVID-19 and Distant Learning Across Canada

The Coronavirus (COVID-19) pandemic put many face-to-face education activities on hold. IEEE and TISP in Canada promoted online learning. We report on preparations and plans.

Lockdown! School closures sweeping the globe as a result of public health measures to fight the coronavirus outbreak. By the time of this writing it had affected more than 38 million people worldwide according to the *John Hopkins University Coronavirus Resource Center*. Learners and educators faced immediate and continuing challenges in many different settings. Yet, for those

fortunate enough to be connected online, distant learning and teaching as well as digital communication tools offered opportunities beyond any conventional measures and means.

For those of us here in Canada connected to IEEE education activities and the Teacher In-Service Program (TISP), there was an obvious opportunity to promote the tryengineering.org lesson plan offerings. They appeal to teachers and parents alike while adjusting to online learning tools. They encourage home-schooling activities with relatively accessible means and instruction material. But at the same time, other TISP Canada plans for interacting with teachers and students were put on hold by COVID-19. Throughout this final issue of the *TISP Canada Courier* we touch base on some of these challenges and opportunities.

As the saying goes: "... always learning!" 

The Editors

TISP Canada Courier

October 2020

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Final Issue #17

October 15, 2020



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TISP Reports from the Regions

These short columns summarize recent work, upcoming events as well as trials and accomplishments of TISP volunteers from across Canada.

IEEE Canada Education Activities

IEEE Canada now has an active Education Activities Committee. The Committee holds monthly meetings via teleconference. The IEEE Region 7 (Canada) Education Activities chair is Rossitza Marinova of Edmonton. TISP Canada Chair Murray MacDonald reported that TISP-

outreach saw 700 students and teachers before COVID restrictions put plans on hold.

For information contact Rossitza at marinova@ieee.org.

Ontario

TISP champion Dave Hepburn has taken on a review task of major proportion. He assisted IEEE HQ Education staff to check all existing lesson plans at tryengineering.org for necessary STEM materials. At the last count the number of lesson plans stood at 135 in total. This task kept Dave busy during the pandemic. He also has several new lesson plan ideas of his own. They include a discussion paper on the “Pros and Cons of Nuclear Power Generation”. Dave would

welcome any assistance for drafting simple graphics and diagrams! Any volunteers?

For information contact Dave at dehepburn@sympatico.ca.

In London, Ontario, TISP champion Murray MacDonald had scheduled a virtual presentation – albeit without activity– for a Grade 12 class at a local school. This may be a beta trial for activities in the fall.

For an update contact Murray at murraymacdonald@ieee.org.

Northern Canada

TISP champion Rossitza Marinova (Concordia University, Edmonton, AB) has taken up the challenge as well during the COVID-19 pandemic restrictions. Canadian Math Kangaroo offered free and low cost online math classes for Grades 1 to 8 during the lockdown and spring, summer, and fall of 2020. They reached more than 2500 students. Plans include the production of a series of videos to be published on the [Math Kangaroo eLearning Youtube Channel](#). More than a dozen videos cover important math concepts for school students

For information contact Rossitza at marinova@ieee.org.



Photo courtesy BIRS 2012

While Rossitza Marinova has organized many Canadian *Math Kangaroo* meetings in the past, the pandemic of 2020 required new online approaches for this competition.

Arduino Kits and TISP Canada Collaborations

In this feature article we highlight an exciting TISP Canada project. It was planned as a major activity for 2020 involving 150 Arduino kits. Then COVID-19 hit. But the story will continue.

The plans and purchase of 150 Arduino kits started out as a wonderful opportunity for TISP Canada volunteers in late 2019 to engage in a hands-on way with STEM teachers and students.

For those who are not plugged into boards or hardwired into the world of electronic circuits, **Arduino** stands for an open-source hardware and software company, a project and a user community. As the Wikipedia entry notes, it designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Hardware products are licensed under a **CC-BY-SA** license, while software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL). This permits the manufacture of Arduino boards and software distribution by anyone. The Arduino project started in 2005 as a tool for students in Ivrea, Italy, offering a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for students and beginner hobbyists include simple robots, thermostats and motion detectors.

During December 2019, TISP Canada volunteers realized an opportunity to apply for some funds earmarked to engage industry members in IEEE education activities. A small program outline emerged based on the utilization of Arduino kits and dedicated workshop activities involving teachers, students and IEEE members in different parts of the country throughout the year 2020. Funding requests for 150 Arduino kits and logistical support were drawn up to meet stringent

proposal criteria and looming deadlines. Under the leadership of TISP Canada Committee chair Murray MacDonald, the documentation was submitted just under the wire for consideration by IEEE Member and Geographic Activities (MGA). Our proposal, with the help of our IEEE industry members, was able to meet the criteria for funding. A few days after the submission deadline, we received word that the requested funds were approved to purchase the Arduino kits and we set into motion our well laid plans.

Our purpose was clear. With the kits in hand, we set out a plan to create travelling pre-university Arduino workshop curriculums for STEM students. These workshops – initially be held in various parts of Canada – are intended to spark or reinforce interest and self-confidence in engineering and technology with the target audience of students and teachers. In order to implement the workshops at the Section level, local IEEE teams of industry and academic members would bring their expertise and experience together to prepare and deliver the workshops. Industry members would bring application and implementation experience with real world problems and academic members would bring teaching experience and student volunteers to assist workshop participants.

Our program is designed to have three phases: procurement, development, and implementation. Phase 1 procured the Arduino resources for the workshop kits to initially support five travelling workshops across Canada. This step is completed by Dec 31, 2019.

(continued on page 4)



Assorted Arduino kit content, spread out on Murray's office floor, ready for use in 2020, but sidelined by COVID, for now..

Arduino Kits *(continued from page 3)*

During Phase 2, which was started in early 2020, the Arduino materials were received and inventoried by Murray MacDonald in London, Ontario, with the intent of distributing them to five volunteer groups in London, Halifax, Vancouver, Winnipeg, and Toronto. The London volunteers were to take the lead to develop an initial workshop. The London group would in effect be the forerunners with a Beta trial to refine and improve the documentation for use by other groups. A Beta workshop was scheduled with Thames Valley District School Board for early May 2020, but this was cancelled due to COVID-19 restrictions.

In parallel with the review of the workshop documentation and outcomes, the TISP Canada Committee would develop an implementation plan and schedule. Each workshop is planned to be 6 hours long on a weekend day or two 3-hour sessions on weekday evenings. The first half would involve some instruction and simulations.

The second half of the workshop is the really exciting one. It involves building the Arduino based solution

and of course testing and troubleshooting to get it working. The workshops will enable participants to use their own laptops or computers at school to actually get to design and build small projects, for instance seeing motors move and lights flash; taking temperature measurements and display the fluctuations and changes on an LCD screen; or sending data back and forth between the laptop and Arduino via serial connection.

Following the trials and evaluations, Phase 3 involves broader implementation of Arduino workshops. It involves shipping the workshop kits to the other 4 identified IEEE Sections within Canada who would gather volunteer groups of local industry and academic members to provide the documented Arduino. Costs for venue and logistics for each workshop would be carried by the local section, with possible assistance from the TISP Canada budget. After the initial event, each participating Section is encouraged to develop their own workshops, to document the results, and to share their experience.

The detail of workshop design and implementation would be up to the teams in the local Sections, leveraging the experience and skills of industry members to demonstrate relevance. They may be stand-alone events or held in conjunction with local competitions or science fairs. We also anticipate some of the workshops be organized in conjunction with local organizations such as Go Eng Girls or local Women in Engineering (WIE) groups.

Initially TISP volunteers within the Sections could help set up local workshops. There are currently 10 out of 21 IEEE Sections in Canada with active TISP volunteers. Our plans for 2020 involved an ambitious schedule for 16 or more workshops, with 500 students and teachers participating.

We also consider the possibility to organize an even larger number of events in future years. Through continued refinement and improvement one could reasonably expect the workshops to continue for several years with small education-related investments on the part of IEEE and local Sections.

Phase 4 of the Arduino workshop projects involves documenting and updating all of the plans and instruction manuals, along with producing train-the-trainer guides. This will allow other IEEE Regions and STEM education efforts worldwide to access the materials and gain from our experience. However, they would need to procure their own kits as shipping kits across borders often entails logistics challenges that are difficult and costly due to import and export fees.

Who, then, would be the participants of the Arduino workshops? We are considering secondary students, that is to say Grades 9 to 12, ages 14 to 18, and their teachers as our main audience and collaborators. It would be up to local Section volunteers to expand the activities to younger ages if desired. The program is also targeted at interested industry IEEE members to encourage them to get involved in STEM outreach activities and to develop informal local relationships that can lead to other engagements.

Why have we selected the Arduino kits? There are certainly other equipment options that we considered, such as Lego Mindstorm and Raspberry Pi. However, after consultation with several experienced IEEE experts, we selected the Arduino starter kit as a low-cost option with a lot of flexibility. The Arduino kits are running on de facto industry standard hardware and software, and have several free simulation tools such as ***AutoDesk TinkerCAD***.



Photo credit: Murray MacDonald

Sets of Arduino kits are being readied for shipment and trials with IEEE Canada educators and TISP volunteers.

What is the likely course of action now? The COVID-19 restrictions cancelled our well-laid plans for an initial round of face-to-face educational Arduino workshop sessions by IEEE Canada and TISP across the country. More than 100 Arduino kits are awaiting shipment to various destinations. Now that schools are open again, the London team is working on pivoting to offer the workshop virtually and are in contact with local school boards to see how this can be implemented within their protocols addressing Covid-19. Eventually we hope to return to face-to-face workshops once the public health restrictions are lifted. Meanwhile, we encourage all interested IEEE Section members, TISP volunteers and educators to consider co-organizing an Arduino workshop event. 📌

For further information on TISP's Arduino project contact Murray MacDonald at ***murraymacdonald@ieee.org***.


Have you tried the new www.tryengineering.org?

IEEE's web site for engineering education and training resources not only received a facelift, but the site is also equipped with more intuitive tools to access many categories. Give them a try!

As schools closed across the country, many teachers are looking for options to transition their curriculums to home learning. Many parents and guardians are also looking for online activities to keep their children educated and entertained.

TryEngineering.org has curated free resources available to support teachers and parents during the COVID-19 pandemic. IEEE staff and volunteers are working on additional **TryEngineering** features. A new STEM Portal will allow volunteers to post details on successful activities so other volunteers and teachers can access them online.

Here, we want to draw attention to numerous links. They include a wide range of topics, such as *NASA STEM @ home*, *First Robotics @ home*, *Innovation Families*, teacher resources of the *Dyson Foundation*, the *Kids Discover* modules, *Maths Chase*, Virtual field trips, Girls Who Code, Disney's take on *Imagineering in a Box*, as well as a STEM@home's *Ecosystems Resource Library*.

Stay tuned, learn more about the full details, and visit tryengineering.org! 



The TISP Canada Courier #1



December 14, 2011

The TISP Canada Courier #2



April 15, 2012

The TISP Canada Courier #3



July 28, 2012

The TISP Canada Courier #4



October 16, 2012

The TISP Canada Courier #5



January 28, 2013

The TISP Canada Courier #6



June 19, 2013

The TISP Canada Courier #7



October 15, 2013

The TISP Canada Courier #8



April 30, 2014

The TISP Canada Courier #9



September 30, 2014

The TISP Canada Courier #10



April 7, 2015

The TISP Canada Courier #11



October 14, 2015

The TISP Canada Courier #12



February 14, 2016

The TISP Canada Courier #13



September 28, 2016

The TISP Canada Courier #14



April 25, 2017

The TISP Canada Courier #15



December 15, 2017

The TISP Canada Courier #16



August 15, 2019

TISP Canada Courier

For more than a decade, the IEEE Teacher In-Service Program, TISP, provided a forum for IEEE volunteers to demonstrate engineering, science and mathematics concepts by sharing their real-world experiences with local pre-university educators, students, and parents.

The *TISP Canada Courier* was issued as an electronic newsletter by the TISP Canada Committee of IEEE Region 7. A total of 17 issues dates from 2011 to 2020. The collection of back issues is accessible online at <https://tisp.ieee.ca/publications/>.

Current information of IEEE Canada's education activities may be accessed <https://www.ieee.ca/en/activities/education-activities/>.

Putting out the *TISP Canada Courier* newsletter has been labour intensive and some news appeared dated by the time it reached the readers. The TISP Canada Committee decided to move our news distribution to a blog format. The *TISP Canada Blog* will appear on our updated website, which is still a work in process. Therefore, *Courier Issue #17* is the final edition. Thank you to our hardworking editor, Dirk Werle, who has been responsible for all 17 issues.

Murray MacDonald
TISP Canada Committee Chair

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Editorial Note

The editorial content of the *TISP Canada Courier* newsletter does not represent official positions of the IEEE or its organizational units.

