

The TISP Canada Courier #14



April 25, 2017

First Electric City “Hackathon” at Trent University

On November 4 to 6, 2016, 350 of the most out-of-the-box student thinkers from across Canada descended on Peterborough in Ontario for Trent University’s first ever Hackathon.

Hands up! Who has ever heard of a “Hackathon” before? Well, you may be forgiven if you don’t crack that question right away. So, here’s the story. Last November some 350 highly motivated participants from across Canada descended on Peterborough, home of Trent University, for the first ever Electric City Hackathon. Research in

Motion and the Greater Peterborough Innovation Cluster were the major sponsors for the event, among several others. The IEEE Peterborough Section was also a sponsor of what turned out to be an illustrious and most exciting event.

Electric City Hacks is the official name of the event. Hacks partnered with Major League Hacking to organize and put up this 36 hour happening from November 4th to 6th. It took place at Gzowski College, the First Peoples House of Learning, on the Symons Campus of Trent University. This Hackathon challenged student innovators to design, build, and demonstrate their developments of various different kinds. Details were posted at <http://www.innovationcluster.ca/2016/10/innovation-cluster-sponsors-first-ever-hackathon-trent-university/> and 2016.echaks.xyz.

Through the good offices of Sabine McConnell, who chaired the Annual Peterborough Regional Science Fair at Trent University in 2016, the IEEE

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TISP Reports from the Regions

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

British Columbia

Derek Ho and Aareet Shermon of the Vancouver Section made their first joint presentation as TISP volunteers at Brookside Elementary School in March. Their lavishly illustrated talk on “Engineering - A Choice for the Future” was very well received.

TISP volunteer Mark Isaak made a presentation on engineering and STEM outreach during the professional development day of his school district in the BC interior.

Elroys Switlshoff reported from the West Kootenay in BC. He helped organize the very popular popsicle bridge and robotic competitions. Both events were attended by more than 200 enthusiastic students.

For information contact Derek at derek.j.w.ho@gmail.com and Aareet at aareet@ieee.org; Mark at m.f.isaak@gmail.com; and Elroy at elroy@jetson.biz.

Alberta

TISP volunteer Rossitza Marinova of the Northern Canada Section organized student CODE workshops and played a leading role in preparing the very successful national Math Kangaroo contest. She and her colleagues in Alberta also took on various judging activities during regional science fairs and delivered workshops with students and teachers involving lesson plans.

For further details contact Rossitza at rossitza.marinova@concordia.ab.ca.

Manitoba

Withold Kinsner and Jillian Seniuk- Cicek of the Winnipeg Section organized two events. In March they delivered a Teaching-Teachers Arduino Workshop for 23 K12 STEM teachers. In early April they delivered a Maker Robotics Workshop for 25 high-school students. The events were collaborative efforts with the IEEE University of Manitoba Student Branch, the Manitoba Teachers’ Association, the University of Manitoba Satellite Applications and Technology Society (UMSATS), and the University of Manitoba Engineering Society (UMES).

For further information you may contact Witold at Witold.Kinsner@umanitoba.ca and Jillian at umseniuk@myumanitoba.ca.

Ontario

TISP volunteer Wolf Lunscher of the Ottawa Section is gearing up for the summer camp season in Ontario involving the Christie Lake Kids youth group and Ciena Cares. Wolf was also involved in organizing school events featuring the treyengineering.org lesson plans. The lesson plan on “Building a Robotic Arm” proved to be very popular.

For information contact Wolfram at wlunscher@gmail.com.

Quebec

During the month of March, TISP volunteer Geoffrey Alleyne of the Montreal Section acted as a judge for the McGill University Design Days. This event was organized by the Faculty of Engineering, featuring posters and demos from more than 80 student teams who presented the outcomes of their final design project for their undergraduate programs in Mechanical, Electrical, Computer and Software Engineering.

For information contact Geoffrey at geoffreyalleyne@yahoo.com.

Presenting TISP and Tall Tower Challenge at STAO

TISP-Canada is a “regular” at this annual conference, operating a booth and giving workshops. Our reporter Wolf Lunscher followed TISP Champion Patrick Finnigan to one of the workshops.

Patrick began by introducing himself to the participants as a member of the IEEE Toronto Section and an electrical engineer. He started by telling his Sputnik story when, as a 9 year old boy in 1957, a neighbour took him to a tall hill at night in Sudbury to watch *Sputnik* pass overhead as a barely visible dot in the night sky. “It changed my outlook on the world,” he recounted, “and encouraged me to drift into engineering.”

He then outlined the engineering profession, the goals of IEEE and its commitment to the advancement of humanity. Next he introduced TISP, the Teacher in Service Program, as a volunteer program. It encourages K-12 students to pursue an education and career in science and engineering. Patrick recounted how teachers began to ask for lesson plans that could assist them to teach young people the basic principles behind science and engineering using inexpensive and readily available material. Initially, IEEE TISP partnered with IBM to develop the website ***TryEngineering.org*** as a repository for these lesson plans. Last year there were over 19 million downloads worldwide.

To make his point, Patrick was well prepared. He had brought along all the necessary materials for today's lesson plan, which is called The Tall Tower Challenge. But before he proceeded with the Challenge, Patrick introduced the engineering design process: define the problem; identify external constraints; brainstorm ideas; develop some solutions; check that they meet the requirements; and collaborate as a team to complete the project

One of the challenges is meeting the time constraint to both design and build the project. Today the challenge is to build the tallest tower with the materials provided in half an hour. He noted that in the real world towers must be able to support a weight, for example hydro towers or bridges. The towers of this challenge must support a golf ball for two minutes.

Twelve kits were prepared. The 22 workshop participants were encouraged to work in teams, with one person per team acting as a project manager. The program ran for an entire hour. In the end, four tall towers were built with a handful of very simple materials by four very enthusiastic teams. 🏗️

For further information about TISP and the Science Teachers Association of Ontario conference, contact Patrick Finnigan at pjfinnigan@gmail.com

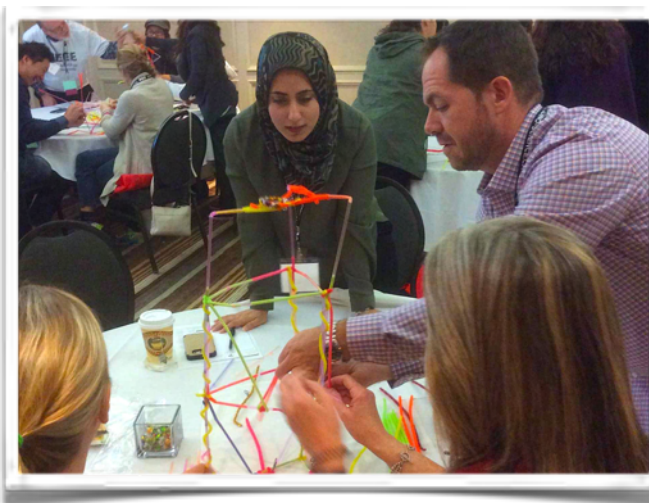


Photo: Wolf Lunscher

Storey by storey, a Tall Tower is growing closer toward the ceiling of the TISP workshop venue at the STAO conference.

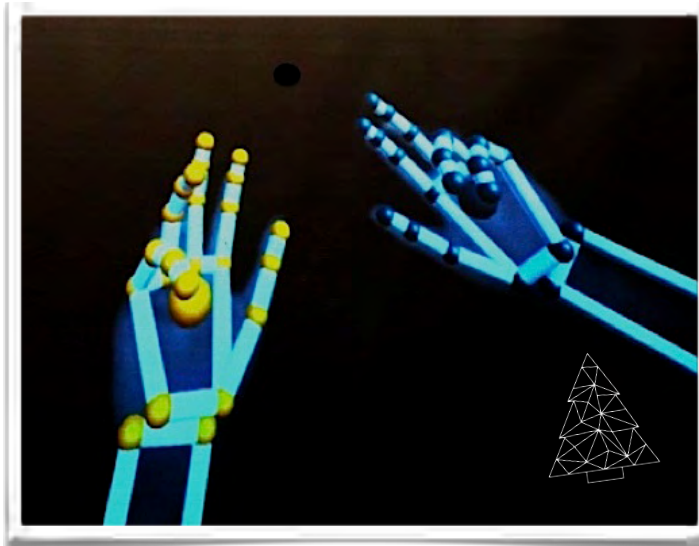


Photo credit: S. Dunne

Screen display of two cameras modeling of fingers movements and configurations for storing sign language patterns.

“Hackathon at Trent University” *(continued from page 1)*

Peterborough Section established contact initially with the Trent Computer Science Department during the spring of 2016. Then, during the summer, Helder Pinheiro met with Matthew Barnes and Dexter Fichuk of the Trent Computer Science department to explore how a mutually beneficial relationship could be developed. There the matter languished until late September when they approached the Section to support the First annual Trent “Electric City Hackathon.” Sean Dunne, Helder and Luc Matteau met with Matthew, Dexter and Yashar Morabbi Heravi. It was arranged to provide financial support for two prizes, one for the “Most Innovative Project” and one for the “Best Hardware Hack.”

To make a long story short, “Speech to text for sign language” was the goal of the project, which won the prize for the most innovative design. The students used two cameras to model the fingers of the speaker as a structure of vectors and then tried to equate the vector configurations to stored sign language patterns. In their presentation the team



Photo credit: S. Dunne

The award-winning automated sandwich maker set-up generated considerable interest among the U20 crowd.

admitted to being totally dismayed when they realized the complexity of the task they had undertaken. But to their credit they analyzed it and developed a minimum functional subset of the system that demonstrates the feasibility of their proposal. And they succeeded in doing so brilliantly.

The winners of the “Best Hardware Hack” award developed an automatic sandwich maker. This rather innovative design generated a lot of interest. It involved several elements, which, by the way, were all servo operated: a tilting toaster, a revolving filling dispenser turret and slice control gates. While its operation ultimately lacked in some ways certain mechanical precision and tidiness of delivery, it was very ingenious and a real crowd pleaser in operation. Sean Dunne and Helder Pinheiro, both from the IEEE Peterborough Section, did the judging for the two awards.

For further information of the First Electric City Hackathon contact Sean Dunne at the IEEE Peterborough Section at sean.dunne@ieee.org.

Engineering Challenge 2017 in Peterborough

This year's event was co-hosted by IEEE Peterborough's TISP and the Peterborough chapters of Professional Engineers Ontario and the Ontario Association of Certified Engineering Technicians and Technologists.

The Engineering Challenge is an annual event and highlight for students in the Peterborough area of Ontario. This year, students were tasked with building a crane. Each team was given a wooden block and a budget. They used their funds to purchase materials such as popsicle sticks, glue, dowels and string. Cranes were tested to see how much weight they could lift.

The amount of money spent on materials was also factored into the win. Those who spent less were awarded more points. Thirty-two teams from nine schools (125 students) participated in this year's event, drawing the biggest crowd the challenge has

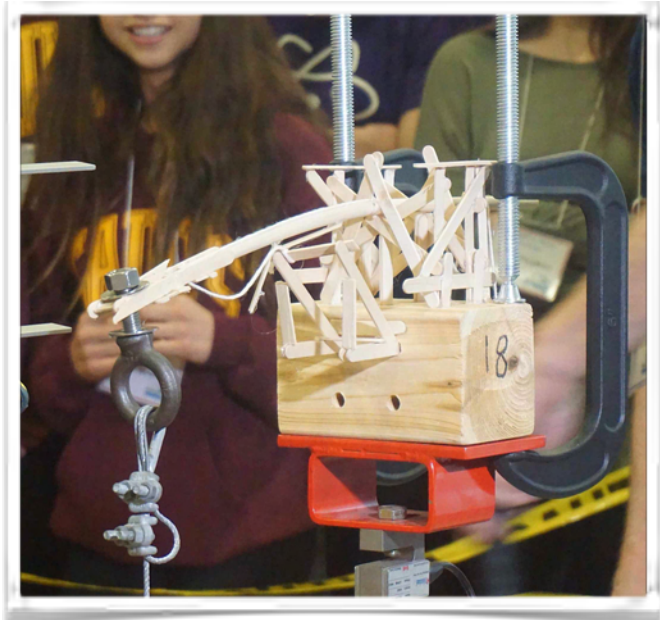


Photo credit: S. Dunne

The stress test involved some serious hardware to reveal how much weight the crane structures were able to lift.

seen to date. Peterborough IEEE section provided the trophies for 1st, 2nd and 3rd. places. 🏆

For further information of the Engineering Challenge contact Sean Dunne at the IEEE Peterborough Section at sean.dunne@ieee.org.



Photo credit: S. Dunne

The engineering challenge event in Peterborough has generated a lot of interest among teachers, students and parents alike.

On this photo the participants are gathering on the day of the event to plot their strategies and to plan their designs.

Have you tried www.tryengineering.org yet?

IEEE's web site for engineering education and training resources has a wealth of resources for teachers, students and parents. There are new activities and lesson plans. Check them out!

Over the past months a number of exciting lesson plans have been added to the roster of tryengineering.org site for free access and download. The folder now includes 135 different lesson plans. Here are three recent examples:

Public Keys, One Way Functions and Hard Problems introduces two important concepts: public key encryption and one-way functions.

Virtual Reality and Anaglyph Stereoscopic Technology enables students to use the scientific method and study 'anaglyph' (movie 3D)

technologies to model computer science design and learn how stereo images create the illusion of 3D.

last but not least, **Smart Buildings and the Internet of Things** explores the practical, scientific, ethical, and environmental issues that emerge in building 'smart buildings' that rely on 'the internet of things'.

Learn more about the full details and visit TryEngineering.org! 



London, Ontario, Sparking with STEM Activities

Murray MacDonald of IEEE's London Section had a busy couple of months organizing and delivering a series of joint outreach events in southern Ontario. He filed this report.

Toward the end of last year, the IEEE's London Section worked with Thames Valley District School Board's Melissa Golan-Wills to create a *SPARK!*. *SPARK!* stands for Specialized Programming Activating Rich Kinds of Experiences and Discoveries.

Last December, I led several volunteers for a full day event at Medway Secondary School. Over 80 students from 19 secondary schools attended the full day conference. They were interested and curious and participated with lots of enthusiasm in the Tall Tower Design Challenge (see also page 3 in this issue). What came next was a "real world challenge" in which the students were charged with critically examining and building a comprehensive and sustainable action plan for one of four "real world communications challenge" hubs. These included a historic downtown building redesigned for office use; a newly constructed condo building; an older school building repurposed to become a "super school", and a rural agri-business. The level of engagement and creativity with this challenge was inspiring!

Several volunteers helped to develop and facilitate the activities: IEEE members and PhD students Elena Uchiteleva and Amr Gaballah, and OACETT member and retired TELUS executive Daniel Zaluski. Thames Valley District School Board Superintendent Sheila Builder subsequently sent a recognition letter thanking the representatives from the Institute of IEEE, the Professional Engineers of Ontario (PEO), and Ontario Association of Certified Technologists

and Technicians (OACETT) who "volunteered their time to provide rich and authentic learning experiences to the students .. and shared their knowledge and expertise in this dynamic and truly fascinating field."

Earlier, in October of 2016, I provided a presentation and a follow-on activity to Bachelor of Education students at Althouse College at Western University. This activity also covered the resources available on the *TryEngineering.org* site and how to access local volunteers such as those with the London IEEE Section and Professional Engineers Ontario (PEO) London Chapter. The 25 would-be teachers said that they enjoyed the lesson plan challenge, commented on how engaging it was, and valued the evaluation phase at the end of the hands-on activity.

In total the presentation and activity lasted about two hours and the pre-service teachers indicated their appreciation for the information provided. This has become an annual event with different activities that Althouse staff feels are of practical value. An encouraging comment from a participant in the prior year was "I had a 2P science class that was very apathetic towards the subject. In between units, I introduced them to the Ship-the-Chip engineering exercise we did in class. The feedback was phenomenal and engagement was higher than any other lesson I had planned for them." 

For further information contact Murray MacDonald at the IEEE London Section at murray@mmconsulting.ca.

Some Guidelines for Contributors

Articles and news items are welcome and should be sent by email to the Editors.

The *TISP Canada Courier* accepts feature articles up to a length of 1000 words with suitable illustration material. Smaller news items should not exceed 500 words in length. Notices for upcoming events should be submitted in a timely fashion keeping in mind the semi-annual publication schedule of the *Courier*.

Although the editors will usually consult with contributors regarding any significant change to material submitted, the *TISP Canada Courier* reserves the right to publish such material with any change(s) necessary to meet space requirements, or as otherwise deemed necessary.

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The editorial content of this newsletter does not represent official positions of the IEEE or its organizational units.



IEEE and TISP

The Teacher In-Service Program provides a forum for IEEE volunteers to demonstrate engineering, science and mathematics concepts by sharing their real-world experiences with local pre-university educators. IEEE offers workshops for its volunteers on how to provide in-service programs.

Part of the IEEE mandate is to address declining interest of students in engineering. IEEE needs to help raise everybody's awareness of technology. The "TryEngineering" initiative involves IEEE, IBM and the New York Hall of Science. To-date, **TryEngineering.org** lesson plans have been downloaded more than 15 million times. The site has various great features, including a search for accredited university and college programs in many countries, including Canada. Portals on **TryComputing.org** and **TryNano.org** have also been launched.

More information is available at www.ieee.org/education_careers/education/preuniversity/tisp