The TISP Canada Courier #10

April 7, 2015

(9 x STAO) = 2014 You check it!

This past year, long-time TISP-Canada volunteer Dave Hepburn participated in the Science Teachers Association of Ontario conference for the ninth time. Read on to check his math!

2014 marked our ninth participation in the annual conference of the Science Teachers Association of Ontario (STAO). It was also our most successful from several points of view. The conference lasted three full days, from November 13 to15. The total attendance is believed to have been about 1,400 teachers. There were about 80 booths, and a total of 202 (count them) seminars and other types of presentations. As many of our readers will know already, most of the booths are put on by commercial interests, selling text books and classroom materials, and so forth. Therefore, since STAO itself is a not-for-profit organization, the IEEE and TISP-Canada are given a warm welcome because we too are not-for-profit. Here are some highlights of our 2014 STAO experience.

The total number "visitors" to our booth was 268, as compared with 250 last year. On our very conservative estimate that each science teacher has 100 students, that represents over 26,000 "equivalent" student contacts. Some folks say that in Ontario the average student/teacher ratio is about 180, so that would put our total at a good deal higher. But you can do the math on that.

We were fortunate to have two "star out-of-town" guests, Elizabeth Kurzawa, Education Outreach Project Manager from IEEE's Operations Center in

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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. Reports are also filed with the minutes of the TISP-Canada Committee at *www.tisp.ieee.ca*.

Ontario

Wolfram Lunscher of the IEEE Ottawa Section organized and ran a TISP session at the Summer Institute for Elementary Teachers, held at the Canadian Science and Technology Museum. He worked with 40 teachers on the "Ups and Downs" lesson plan to construct an elevator with simple materials.

Wolfram also took part in a "Finding Your Pathway" information exhibition for 500 students, where he assisted those in Grade 8 in planning their high school curriculum for a desired career path.

For information contact Wolfram at ***wlunscher@gmail.com***

In Toronto, TISP-Canada champion Pat Finnegan co-organized a break-out session on educational goals and community needs at the IEEE Canada International Humanitarian Technology Conference 2014. He was also involved in a STEM consultant teacher workshop and introduced the "Faraday Generator" lesson plan.

For more information contact pat at ***pjfinnigan@gmail.com.***

TISP-Champion Murray MacDonald of the London, Ontario IEEE Section made presentations on engineering and standards at the Itinerant Gifted Programs at Valleyview School of the Thames Valley District School Board. Grade 5 to 8 students were involved primarily. Murray also made a presentation on TISP activities at the Althouse College of Education, University of Western Ontario, and led a "Ship the Chip" lesson plan activity for 55 pre-university science teachers.

Murray was invited as a judge at the First Lego League Tournament, organized by the Western WEFIRST Club. About 200 students participated in the event.

Ken MacDonald of the IEEE London, Ontario, Section made a presentation on "Binary Numbers" at the IGNITE Math Day for Grade 6 students at Thames DSB. More than 110 students were involved.

For information contact Murray at ***murraymacdonald@rogers.com***

Alberta

Jointly with AASEE, TISP Champion Anis Haque introduced more than 70 Grade 5 students at Grande Prairie to the "Making Electricity" learning module. They learned about how electricity is generated at power stations, environmental impact of burning coal, and renewable energy sources.

In his role as Chair of the TISP-Canada Committee, Anis also gave a presentation on TISP at the IEEE Canada International Humanitarian Technology Conference 2014 in Toronto.

For further information contact Anis at ***anis@ucalgary.ca***.

Nova Scotia

TISP champion Dirk Werle of the IEEE Canadian Atlantic Section co-organized with Engineers Nova Scotia the 4th Annual High School Engineering Design Competition as part of National Engineering Month 2015.

For further information contact Dirk at ***dwerle@ca.inter.net***.

Photo credit:Dave Hepburn

TISP-Canada volunteer Pat Finnigan meeting with teachers at the IEEE TISP-Canada booth at the STAO 2014 conference.

Photo credit:Dave Hepburn

The panel discussion on the future of math and science teaching in Canada was well attended and provided food for thought.

(**9 x STAO) = 2014**, *continued from page 1*)

Piscataway, New Jersey, and Dr. Anis Haque from the University of Calgary in Alberta, and current Chair of TISP-Canada.

This year the conference organizers were kind enough to allow us two one-hour time slots, both of which were dedicated to panel discussions, both of which were on the topic of "*What is the Future of Math & Science Teaching in Canada?*" The objective being, of course, to find out from the teachers what TISP can do to help improve the interest in science and math among all levels of school students. Each panel comprised two Science Teachers, a representative of STAO, plus Elizabeth Kurzawa from the IEEE. Moderator on the Thursday was Pat Finnigan and on the Friday it was Murray MacDonald. "Reporter" on both days was Wolfram Lunscher from Ottawa. Even when his notes were reduced to a small #10 font and narrow margins, they extend to four pages! So, our next challenge will be to sift through them and extract the many helpful ideas therein. Anis Haque elected to sit incognito in the audience, but with his iPad going full out. Both days saw 20 visitors who, with the panelists and note-takers, made for a comfortably full impression for the size of the rooms. Post-conference discussion has also centered on the suggestion that STAO and TISP-Canada add links into their respective websites.

Feed-back after the conference has also been encouraging. A number of teachers copied us on messages distributed amongst themselves and to STAO organizers, making repeated reference to the ***www.tryengineering.org*** / ***www.trycomputing.org*** web sites. They also mentioned our 116 free lesson plans and the fact that we have now had 15 million downloads since 2005.

Dave Hepburn

For further information on the STAO conference visit ***http://stao.ca/cms/conference-home***. You can contact the author at ***dehepburn@sympatico.ca***.

Celebrating National Engineering Month - NEM 2015

IEEE and TISP volunteers in Halifax have organized the NEM High School Engineering Design Competition for four years in the row. Here is how the 2015 competition literally wound up.

In a now time-honoured tradition, a group of volunteers started their monthly meetings last October to prepare and host a series of events in March, also known as National Engineering Month. Over the past three years, TISP-Canada supported a High School Engineering Design Competition as part of NEM. Students from local schools were invited to rise to the challenge of designing and building a specific project. The event takes place usually on the last Saturday of Engineering Month.

This year, our organizing committee decided to take the whole event to a different level, and so the format, the scope, and the location of the High School Competition tested new and exciting directions as well. For one, we were offered to hold the entire NEM event at the new Central Library, right in the middle of downtown Halifax. Next, we planned to expand the competition way beyond the limits of Halifax and issue the 2015 NEM challenge to all the high schools in Nova Scotia. However, we couldn't realistically expect student teams from across the Province to travel to Halifax. Hence we decided to think of a *challenging* enough, an *inexpensive* enough, and a *small* enough project that they could prepare at their own school at their own pace. They could enter into competition by mailing us their projects prior to the NEM event, with a modest reimbursement of expenses for material and postage guaranteed.

Photo credit: Halifax Central Library

The new Central Library in Halifax was a wonderful venue for the National Engineering Month 2015 student competitions.

The question then arose what suitable project, or challenge, we could match with the transformative new NEM location and the expanded scope of not only including local high schools but *all* high schools in the Province. Well, the answer "wound" up to be fairly simple – a transformer! The avid reader of the *TISP Canada Courier* will recall the ingenious lesson plan and coil-winding exercise by IEEE Hamilton Section's Dave Hepburn on *How to build a transformer*. It was featured in issue #2, and it has since been added to a large roster of lesson plans at the ***www.tryengineering.org*** web site, where it can be accessed online by teachers and students alike. Conceptual design and building a transformer fits well with the physics high school curriculum on electromagnetism.

The cost of materials for the transformer amounts to $20. Assembly and testing procedures are safe. The trick is to make it work as efficiently as possible, and therein lay the challenge for the

Photo credit:Dirk Werle

Test set-ups for the transformers were done under the watchful eye of Dr. Mae Seto of Dalhousie's Engineering Department.

Photo credit: Mae Seto

Students of Cole Harbour District High School with their proud teacher, their certificates of achievement, and their transformer.

NEM competition: Which team could build the most efficient transformer with the material at hand? To find out, Dr. Mae Seto, professor at Dalhousie University's Engineering Department, had built a small test bed and measuring device, whereby the transformer can be powered up to levitate a small disk, similar to a hover-board, along a vertical rod (see photo above for detail).

In preparation for the competition, we printed a poster and a detailed set of instructions, with material lists and resource documents for students and teachers. We mailed the posters to the schools and had the documentation posted at the web site of our host organization, Engineers Nova Scotia. TISP-Canada generously supported the preparations of our High School Engineering Design Competition for NEM 2015.

The day of the competition at the Halifax Central Library was a complete success and enjoyed by all. The setting was fabulous, and public interest in the students' activities and displays was high. Library-goers young and old, and everybody in between, came by with a curious mind to check out the projects and live video displays of the various competitions. In the end, a group of International Baccalaureate students from Cole Harbour District High School took this year's prize. Well done!

The students had an excellent project mentor in their physics teacher who came along for the occasion. He complimented the organizers of the competition and volunteered to promote the event among other high school physics departments. At the same time, we learned some valuable lessons on how to improve our game plan for next year: Inform the schools about NEM as early as possible; send the competition posters directly to the teachers; and avoid the busy March Break and exam periods, as student and teachers are very preoccupied. It looks like our preparations for NEM 2016 will be under way sooner than later!

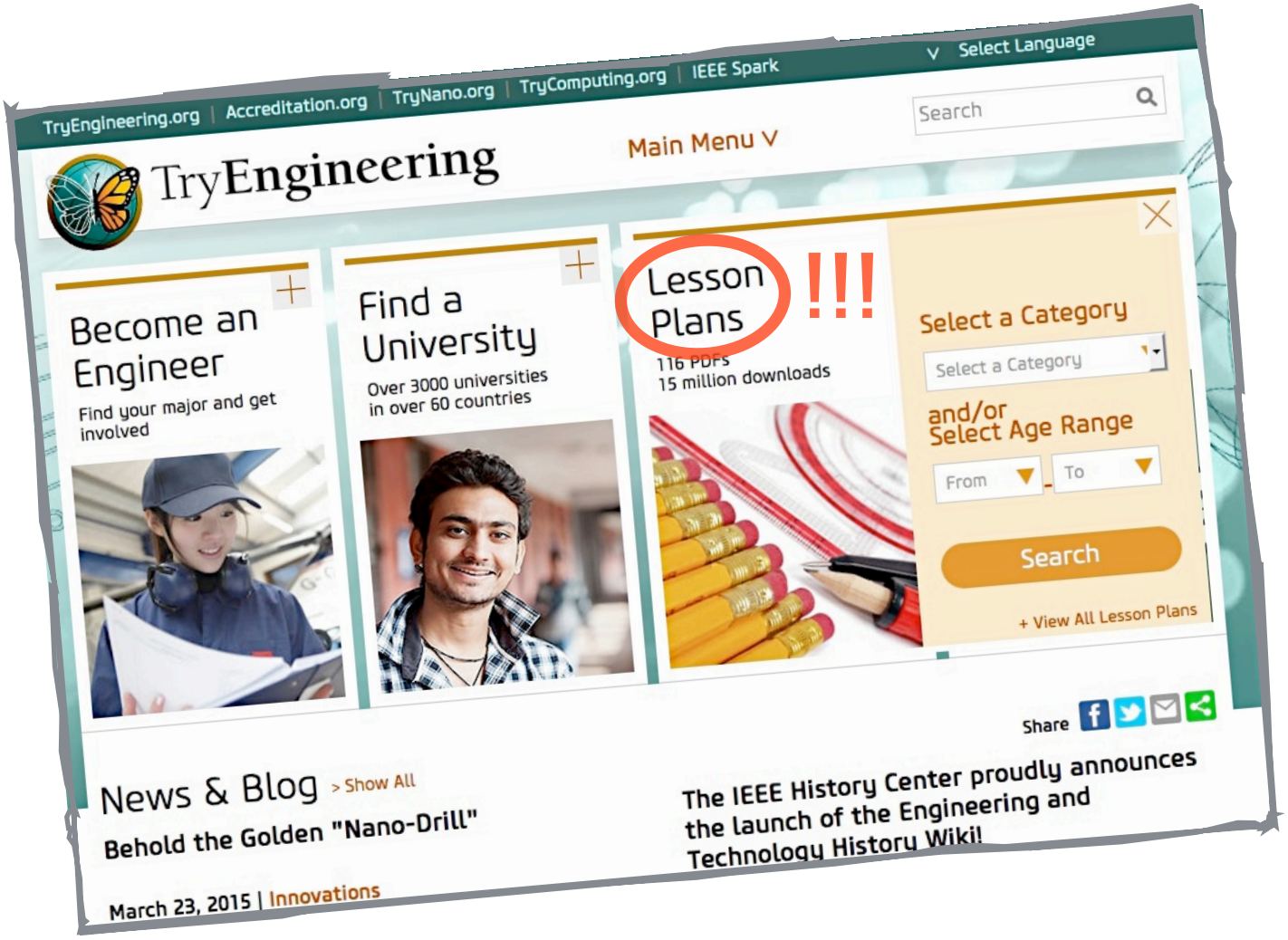
Dirk Werle

For further information about this NEM project, contact Dirk at ***dwerle@ca.inter.net***.

Have you tried the www. tryengineering.org yet?

IEEE's web site for engineering education and training resources has received a recent facelift. Its content is expanding and as useful as ever for students, parents and teachers alike. Check it out!

IEEE's ***TryEngineering.org*** has been an indispensable "go-to" resource for pre-university students, teachers, parents, and school counselors around the world. Overall, the lesson plans have been downloaded 15 million times worldwide. Take "*Making Sense of Sensors*" as an example. This is among the latest additions to more than 100 lesson plans, explaining how sensors are used in many applications to gather information about our environment. The lesson focuses on the hygrometer, a sensor used to measure humidity. Through this lesson, students work in teams to design a hygrometer out of simple materials to measure humidity levels. The student hygrometers are not meant to be exact, but are expected to indicate a change. Students select from everyday items to build their hygrometer, test their machine using a spray bottle to increase humidity, evaluate the effectiveness of their system and those of other teams, and present their findings to the class.



TISP-Canada Chair Promotes TISP in Bangladesh

Dr. Anis Haque had a packed schedule and audience at a recent conference in Dhaka, relaying our K-12 science and engineering experience. Here is Anis' exclusive report for the *Courier*.

Last December, I received an invitation that I couldn't possibly refuse. I was asked to give a keynote speech and deliver a seminar talk on a topic I feel very passionate about: Advancing K-12 education in science and engineering. I am happy to say that I received a warm reception at the17th International Conference on Computer and Information Technology (ICCIT), which took place at one of Bangladesh's premier universities, Daffodil International University in Dhaka.

Overall, it was all about what we are doing at TISP in Canada for advancing science and engineering at the K-12 level and what our colleagues could do in Bangladesh. I am pleased to report that I had a very successful mission.

On December 18, I held a seminar on "*Science and Engineering Outreach: Giving Back to the Community*" for engineering professors. Hosted by the Dean of Applied Sciences & Engineering, the seminar was attended by more than 30 academics. The same day, I held a seminar on "*Leadership and Effective Communications for Higher Education*" for the engineering undergraduate students. It was attended by more than 50 students. The first part of this seminar covered science and engineering outreach aspects.

Anis Haque, Chair of TISP-Canada, discussing K-12 science and engineering outreach with colleagues in Bangladesh.

December 22 was the big day, when I delivered the keynote talk on "*Science and Engineering Outreach*" at the ICCIT. Needless to say that I relayed to our colleagues in Bangladesh some of the TISP experience we had gained in Canada. Some 240 conference participants were in attendance. The next day I followed-up with more concrete suggestions during a workshop on "*How to Begin Science and Engineering Outreach in Bangladesh.*"

The Secretary in the Ministry of Education in Bangladesh was present at the closing ceremony, and he became very interested in what TISP is doing in Canada. He wants to launch a small pilot program. I then engaged in lively discussions with the team of the Bangladesh National Commission of UNESCO. They will likely conduct the pilot on behalf of the Ministry of Education. I will contribute to the project plan and have committed TISP Canada's support with lesson plans and sharing more experience with our colleagues in Bangladesh.

Anis Haque
anis@ucalgary.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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Newsletter Editors

Editor-in-chief:

Dirk Werle
dwerle@ca.inter.net

Associate Editors:

David Hepburn
dehepburn@sympatico.ca

Murray MacDonald
murraymacdonald@rogers.com

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/tispt***