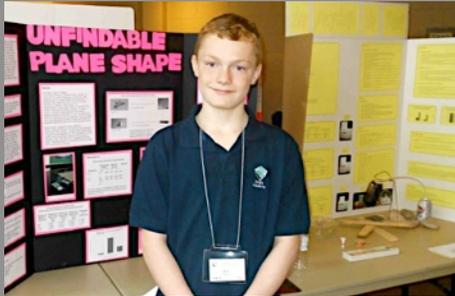


The TISP Canada Courier #8



April 30, 2014

Taking Stock of IEEE Education and TISP Activities

Liz Burd, Chair of the IEEE Pre-University Education Coordinating Committee presented an insightful review, including TISP activities worldwide. Here is a summary of her presentation.

As the world's largest professional association for the advancement of technology, the Institute of Electrical and Electronics Engineers has engaged in a number of educational outreach programs. The IEEE pre-university education coordinating committee has recently reviewed four of them. They include the following: the Informal Education Programs Engineering Projects in Community Service (EPICS); the Teacher In-Service Program (TISP), and last, but not least, the IEEE online

portals, namely *TryEngineering.org*, *TryNano.org* and *TryComputing.org* that average close to 700,000 hits per month.

The focus of this article is on the Teacher In-Service Program. In a nutshell, TISP is encouraging IEEE volunteers to utilize their technical expertise and demonstrate the application of engineering and engineering design for teaching in pre-university schools. The main idea is that IEEE Section volunteers present engineering-related subject matter to local pre-university educators in an in-service or professional development setting. The main goal of the Program is to empower TISP champions with tools and strategies to ultimately enhance the level of technological literacy of teachers and students.

The list of key TISP activities is an ambitious one. It includes the following: promotion; train-the-trainer workshops; volunteer recruitment; in-service presentations; publicity; lesson plan development; websites; staff and lead volunteers;

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TISP Reports from the Regions

TISP-Canada relies on active participation from all regions of the country. These columns report on recent work and upcoming events as well as trials and accomplishments of TISP volunteers across Canada.

Southern Alberta

In collaboration with AASEE (<http://www.aasee.ca/>), TISP organized a visit to the University of Calgary's Rothney Astrophysical Observatory (RAO) and conducted five sessions of *Making electricity* at three schools in the past months.

At the observatory, 21 Grade 6 students took part in a two RAO programs: *The Earth is a Ball* and *The One, the Only, the Original, the Moon*. The students

also constructed a working telescope and observed the Rocky Mountains through their creation.

In *Making Electricity*, the students learned about how electricity is generated at power stations, the environmental impact of burning coal, and renewable energy sources. More than 200 Grade 5 students participated. The students also made a prototype generator by coiling magnet wire around a container with permanent magnets inside and shook it to turn on a LED.

Both the program were a hit with the students and their teachers. TISP would like to thank AASEE and the hardworking volunteers from both TISP and AASEE.

For further information contact TISP Champion Kartik Murari at kmurari@ucalgary.ca.

Nova Scotia

As part of National Engineering Month, TISP organized the Third Annual High School Design Competition in cooperation with Engineers Nova Scotia and Dalhousie University.

For further information on the various activities contact TISP Champion Dirk Werle at dwerle@ca.inter.net.



Photo credit: Dirk Werle

Photo credit: Antony Francis

The public took a lively interest in the National Engineering Month activities at Nova Scotia's Mic Mac Mall.



The Grade 6 students – and their teachers, too – had an exciting visit at the Rothney Astrophysical Observatory this winter. The event was co-organized by TISP Champion Kartik Murari of IEEE's Southern Alberta Section and AASEE.

(Taking Stock, continued from page 1)

and the development of training materials. Key partners include schools and school districts; ministries of education; and local IEEE Sections.

The overall achievements of TISP since 2005 are quite impressive. Here are some metrics: more than 30 train-the-trainer workshops have been held with 2500 participants from 122 IEEE Sections in 10 Regions; well over 200 TISP presentations have been reported by IEEE volunteers, having reached more than 5600 pre-university educators. This outreach can potentially benefit more than 615,000 students in 20 countries each year!

Formal feedback in 2012 from almost 2000 teachers has been very encouraging. Consider the following statistics: 94% of questionnaire respondents felt that the program added to their technical knowledge base; 93% stated that they will use the concepts presented in their classroom instruction in the next 6 months; 95% agreed that the “hands-on” portions of the presentation were helpful in understanding the concepts discussed; 92% agreed that the presentations increased their level of technological literacy, and 94% agreed that

the hands-on activities will increase their students’ level technological literacy. With such glowing reviews, IEEE may consider its annual expenses of \$150,000 (2013) well spent.

The current strategy is focusing to expand the reach of TISP in several ways: by promoting the program to the IEEE sections; by organizing training workshops where requested; and by gathering feedback data. The near term goal is to develop a virtual community for TISP champions and educators to foster networking, mentoring and support. Over the medium to long term – that is to say beyond the next three years – TISP may want to conduct independent research with educators on the actual impact of lesson plan integration and teaching effectiveness and develop an action plan to enhance training and improve resources, as appropriate.

The path forward in 2014 and beyond can be summarized as follows. High up on the list are a number of activities: formal assessment concerning the TISP lesson plans effectiveness in classroom instruction; continued development of TISP Section champions to work with schools and schools districts to deliver professional development training for teachers; where feasible, obtain recognition or endorsements as a provider of professional development; encouragement of volunteers to conceptualize and create new lesson activities to support STEM education; and seeking further opportunities to partner with other associations and with industry to collaborate.

All told IEEE’s Teacher In-Service Program has an ambitious work plan for the next years! 🚀

For further information on TISP go to the IEEE web site at http://www.ieee.org/education_careers/education/preuniversity/tispt/index.html

Photo credit: IEEE TISP Kerala Section



TISP has been successful in many countries. This photo shows volunteers at work in an IEEE TISP workshop in Kerala, India.

Decisions, Decisions – A Day at the Science Fair

Veteran *Courier* contributor and co-editor Dave Hepburn reports on his recent experience – and predicament – as a judge at the Niagara Region Science and Engineering Fair in St. Catharines, ON.

On March 29, Dave Hepburn of the Hamilton Section was one of 80 judges at the Niagara Region Science and Engineering Fair (NRSEF), which this year was held at Brock University in St. Catharines. There were 187 projects from 277 students and 48 schools on display, ranging from Grade 6 to Grade 12. As usual, the Hamilton Section had donated two prizes of \$50.00 each plus a framed certificate, to be awarded to what might best be described as "Basic Electricity".

This fair was just one of many held across the country at this time of year. Winners from each fair are invited to a national run off later in the year, and to ensure a uniform standard of judging, each exhibit is assessed by eight judges. This is tough on the kids, because it means that they have to go through their patten eight times. But by golly, are the good ones ever really good! Poised, relaxed, articulate and obviously well researched in their material. But the process is also tough on the judges, because they find they spend more time completing the grading sheet for each candidate, to ensure fairness.

Insofar as the award of the two IEEE Hamilton prizes were concerned, it was pretty much a Slam Dunk. First up in the Juvenile category (Grade 5-6) was the young fellow you see in the photo on the right. His project was "Hydro Electricity". It was really very innovative. Although he didn't know it until Dave enlightened him, he had built a Pelton Turbine. The center of the runner was a large cork – nice and soft and easy to manipulate. For the so-called "buckets" of his turbine he had

used plastic spoons. The rotor comprised four 1/2 inch "button magnets". From experience, Dave confirms that these are demons to deal with because they are SO strong. Once they stick together, they are almost impossible to separate. The stator comprised four coils of magnet wire. The whole ensemble was mounted in an empty plastic jug (Chlorox or similar) with the bottom cut off. His "Test Stand" was simple. He stood in his parents bath tub and held the neck of the bottle under the tap. (Presumably he removed his shoes, but Dave forgot to ask). The 4-bucket runner produced 0.5 volts, the 6-bucket job produced 1.0 volts, and the 8-bucket one a whopping 1.5 volts. And, get this, the designer was at pains to explain that they were producing ac and not dc. So that's where \$50.00 went.

For the "Junior" level, (Grades 7-8) the prize went to the young lady you see in the photograph

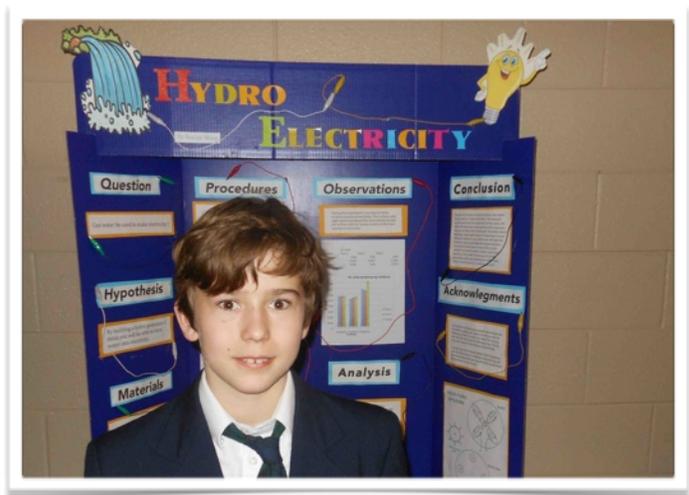


Photo credit: Dave Hepburn

Proud recipient of the IEEE Hamilton Section prize for Grade 5-6 students for his innovative "Hydro Electricity" project.

below. Get the perfect gender balance here! Her topic was "Conductors and Insulators". The exhibit was very neatly set out, with samples of her test materials clipped down on a board. For conductors she had a short length of copper water pipe, a steel bolt and a length of aluminum foil. For insulators she had a length of rubber pipe, a length of plastic pipe and a small glass bottle. Also on hand was a breadboard containing a 1.5V flashlight battery, a small push button switch and an LED. The length of aluminum foil initiated a discussion between Exhibitor and Judge on the characteristics of aluminum conductors: (a) that it oxidizes very quickly; (b) that aluminum oxide has a relatively high resistance; and (c) that it is very soft and has a tendency to "flow" even under moderate pressure. This makes it difficult to join. So Exhibitor and Judge parted on friendly terms, and there went the second \$50.00. Although she didn't know that until later.

And then came the hard part. Among the exhibits assigned to Dave was one dealing with how it is that some aircraft can be built so that they are invisible to RADAR. The American B1 bomber is



Proud recipient of the IEEE Hamilton Section prize for Grade 7-8 students for her neat "Conductors and Insulators" project.

Photo credit: Dave Hepburn

an example, with its strange angular profile. In the case at NRSEF, this young fellow – again about 11 of 12 years old – had selected three specific shapes: a pyramid with a square base; a pyramid with a triangular base; and a sphere. Material uncertain, but probably styrofoam. He had placed his equipment on a polished terrazo floor, with his "emitter" at one end and the targets at the other. Each target was then pulled gradually on a length of string, until it was detected by the emitter. The pyramid with a triangular base came within 1.5 m before it was detected. The others at a greater distance. The whole sequence was carefully documented and neatly presented. But uncertainty crept in when Dave asked about the "emitter" and was told that it was a motion detector. Dave gagged a little about that because, so far as he could tell, it was of the infra red type and was in fact a "sensor" and not an "emitter". When pressed, the exhibitor said he didn't know what infra red was. That put Dave on the spot. He was the last judge of that exhibit, and none of the other judges had picked up on that point. So what to do? Above all, the object of a science fair is to foster self confidence and an inquiring attitude. It seemed a shame to deflate this fellow so late in the day. So Dave passed over the matter. No doubt he will learn of his mistake in due course.

Before submitting the grading sheet, Dave asked some of the organizers for advice. Alas, none of them were too clear as to what he was getting at. Not for nothing has TISP-Canada chosen for the STAO 2014 panel discussion, the title "*The Future of Math and Science Education in Canada.*" 

Readers are earnestly invited to write in to the Editor with their views on did Dave make the right decision?

Famous Last Words on Humble TISP Beginnings

A message from the TISP-Canada Committee's outgoing Chair, Dr. Anader Benyamin-Seeyar, looking back on the beginnings of TISP-Canada since 2009 and the accomplishments to-date.

It was at the IEEE Section Congress in 2008, when Ferial El-Hawary, then IEEE Canada President, asked me to initiate the Canadian Teacher In-Service Program, TISP Canada for short. At the time, we had no idea where to start and how far we could advance with the TISP Canada mission. Infact, Jennifer Ng was present as well. We discussed the idea and thought about action plans. Jennifer helped me with initiating the first TISP action plan with her highly motivated volunteers from IEEE's Ottawa Section. In parallel, Dave Hepburn, Patrick Finnegan, Murray McDonald, and Maike Luiken were other pioneers who gave a big boost to the launch of TISP in Canada.

We were generously supported by the TISP leaders Doug Gorham and Yvonne Pelham at IEEE's headquarter; they helped us organize the

first TISP Canada Workshop in Montreal in May of 2009. This Workshop attracted more than 100 participants and volunteers who have since played an important role in the development of TIPS in our country. A number of them are still members of today's TISP Canada Committee.

Since May 2009, TISP Champions have organized many activities within their local communities and schools and highlighted numerous TISP Lesson Plans in close cooperation with school teachers and their students. Moreover, TISP Champions were involved in running programs in cooperation with large provincial teachers associations, such as Scientific Teachers Association of Ontario (STAO) and organized local events in Montreal, Halifax, Winnipeg, Edmonton, Calgary, Ottawa, Vancouver. Financial support was provided through IEEE Canada and from the local sections.

Our TISP Canada coordination activities took place monthly by way of official teleconference calls involving all active TISP Members. At these TISP Committee meetings we learned what had been accomplished and what plans and events were in the offing and what difficulties we might have to face. I am happy to report that tremendous contributions were made by all the TISP members, making this journey such an enjoyable one!

TISP Canada received financial and logistical support from Ms. Pelham and her IEEE team to run two more workshops in Mississauga, Ontario, and Vancouver, BC in 2011 and 2013,



Anader Benyamin-Seeyar of IEEE's Montreal Section and Chair of the IEEE TISP Canada Committee from 2009 to 2013.



Photo credit: Murray MacDonald

Anader, seen here at centre, cheerfully leading the Canadian delegation at the International TISP meeting, Tampa, Florida.

respectively. Again, these workshops attracted more than 100 participants who will carry forward the TISP momentum in the coming years.

The progress of TISP Canada would not have been possible without the dedicated volunteer work by many individuals across the country. Let me just mention a few: Dave Hepburn, Patrick Finnegan, Jennifer Ng, Murray MacDonald, Hamadou Saliah-Hassane, Anis Haque, Dirk Werle, Witold Kinsner, Rossitza Marinova, Mooney Sharma, Zahra Ahmadian, Steven McClain, Kouros Goodarzi, Geoffrey Alleyne, and Samir Kherraf.

We are also thankful to have website masters like Youness Fareh and Davy Zou who have helped us along the way and connected us to the cyber-world. Bruce Van Lane, IEEE Canada Review managing director, has been inspirational for the TISP Canada; he has provided professional support for our publication and outreach

activities. I would also like to sincerely thank Ferial El-Hawary, Yvonne Pelham, Cathie Lowell, Keith Brown, Amir Aghdam, and Om Malik for their continuous support and encouragement of TISP Canada. Thank you all!

Our newsletter, the *TISP Canada Courier*, is covering our major activities and programs. Two years after its launch and now starting its eighth issue, the *Courier* is going remarkably strong thanks to a skilful editorial team of Dirk, Patrick, David, Murray, and Bruce. The newsletter is a tremendous success for our committee, and I encourage you to peruse past and current issues at our website <http://tisp.ieee.ca/home>. We are continuously approached from individuals and educators within Canada and from abroad who want to learn more about our work, programs and achievements.

As chair of TISP-Canada Committee over the past four years, I had the honour of leading the TISP mission here as we informed and supported pre-university teachers and school boards with our outreach activities mission and encourage students to come to the field of engineering. We have gone far on the TISP road, but our mission must not relent. With Anis Haque at the helm, the committee will continue to carry the TISP flag across Canada. Under his leadership we will bring all 20 IEEE Region 7 Sections closer together in playing an active role in the TISP program and engage new TISP Champions. Anis, welcome on-board and good luck! 📧

Anader Benyamin-Seeyar

Anader continues to be involved in TISP-Canada as a Committee member. You can contact him at anader.benyamin@gmail.com.

Some Guidelines for Contributors

Articles and news items are welcome and should be sent via 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 quarterly publication schedule of the Newsletter.

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.

This electronic newsletter is issued quarterly by TISP Canada of IEEE Region 7. Current issues and back issues are available free of charge and may be retrieved at www.ieee.ca/tisp.

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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 3 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