

Research News

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SET Day takes students into the future

BY SEAN MOORE
Research Promotion

On February 22, the University hosted its second annual SET Day, assembling over 100 students and teachers from across the province to learn about the future of research.

SET Day – Science, Engineering and Technology Day – is the only event of its kind in Manitoba and 30 high schools participated. The day featured presentations by leading researchers in six fields: high-energy astrophysics, physiology, wireless communications, plant science, robotics and civionics.

“The topics are cool,” said Erica Robertson, a Grade 12 student from Strathclair Community School, “so it makes me feel less nerdy for liking science.”

Indeed, SET Day is meant to invigorate student interest in the sciences.

“The event’s goal is to get students excited about present day research and fascinate them with what research we, or I should say they, might be doing twenty-five years from now,” said Digvir Jayas, associate vice-president (research) at the University of Manitoba.

The first presenter of the day was Canada Research Chair in Supernova Astrophysics, Samar Safi-Harb, whose presentation *Space: The Final Frontier* dealt with how supernova and the gaseous remnants they leave behind are essential to life.

The topic dealt with nearly unfathomable quantities of energies and distances that often drew gasps of awe from the audience. One difficult-to-dispense but interesting fact learned was that the CasA supernova remnant has an amount of calcium in it equivalent to 2 to the 10³¹ glasses of milk.

Safi-Harb told would-be astrophysicists they will be working on understanding the origin of high-energy cosmic rays, mapping the insides of neutron stars, hunting for magnetars (a type of neutron star), and, of course, trying to solve the mysteries surrounding Dark Matter and Dark Energy.

Peter Cattini, associate vice-president (research) at the University and a professor of physiology spoke next. His presentation was titled *Text “T” for Treatment* and in it he outlined how our expanding knowledge of gene regulation may one day allow us to trick immune systems into accepting donor organs.

Cattini also suggested the future will see the advent of a wallet-friendly card that holds person’s genetic information. The gizmos won’t stop



Photo by Sean Moore

Chad Klowak, civil engineering, was one of six researchers who took part in Science, Engineering and Technology Day. Klowak described the growing field of civionics.

there though. Cattini speculated that diagnostic equipment may one day be in everyone’s home, allowing a patient to step into a full-body scanner and send the results to a doctor via the internet. If surgery is needed, this scanner can help surgeons to pre-map

their route into the body before robotic arms manipulated by them, perhaps a continent away, make the incisions.

The ability to send such vast amount of information, however, will require new

methods of communication, and the next speaker covered that area.

Electrical and computer engineer Lotfollah Shafai presented *Signaling the Future*, which dealt with his research on antennas and wireless communication.

The only way to send information is through electromagnetic waves, so our ability to control them is correlated to our ability to send information. The better we understand the spectrum, the better we can manipulate it so that sensors can be placed in buildings or other objects to monitor just about anything, or be used to change the colour of nearly any material on demand.

After Shafai, plant scientist Jane Froese asked a pertinent question in her lecture’s title, *What’s for Supper!?*

In 2033, the world population will have climbed from the six or so billion people alive today to 8.5 billion people.

Since current food production is unsustainable, Froese speculated that future meals will consist of genetically modified organisms produced in farms

adept in multi-cropping or companion cropping.

But since nitrogen is the most limited element in the soil, and a crop’s yield is proportional to the amount of the most limiting nutrient, finding new ways – other than the energy-intensive fertilizing process – to deliver nitrogen to crops will be a focus of research in years to come.

The day then stepped out of the organic realm and into the inorganic, specifically, robots.

In his presentation titled *Robotics – Now and Into the Future*, mechanical and manufacturing engineer Nariman Sepehri informed the audience that future robots will be smaller, softer to the touch, able to shape-shift, and

be able to teach themselves. But as it stands, there are many problems for future engineers to grapple with, mainly the fact that the best robots still lack the simplest abilities, like distinguishing a shadow from a hole in the ground.

The final presentation was *Getting Bridges to Talk*, which civil engineer Chad Klowak delivered. In it he spoke about how structural health monitoring has been around for thousands of years, but recent technology has allowed engineers to gather richer sources of data by embedding sensors into the capital projects.

This branch of engineering is called civionics, and, Klowak noted, the future labour market will likely demand more engineers specialized in civionics since many infrastructure projects are, in human terms, geriatrics in need of constant monitoring.

But the future will not just be about monitoring past projects like steel reinforced bridges, Klowak said, but about developing new composite materials that will make it possible to build bridges where none could span before.

SET Day was sponsored by the Prairies Office of the Natural Sciences and Engineering Research Council of Canada (NSERC), the Association of Professional Engineers and Geoscientists of Manitoba (APEGM), Manitoba Hydro, the Province of Manitoba and the Office of the Vice-President (Research) at the University of Manitoba.

The Office of the Vice-President (Research) is currently developing a SET Day Website, which will include audio recordings of the day’s presentations. Check back soon at: www.umanitoba.ca/research/set



Photo by Mya Kraft

Plant scientist Jane Froese spoke about the future role plants will play in feeding and clothing the world in 2033.

Bringing Research To Life

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