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The Kitchener-Waterloo Section of the Institute of Electrical and Electronics Engineers serves members whose mailing address is in Bruce, Grey, Perth, Waterloo or Wellington counties. It collects news relevant to local engineers and is published bimonthly.

Editor: Jameson Hyde

Contributors: Amir Khatibzadeh, Amin Mobasher, Leah Hilts, and others

<http://kw.ieee.ca>

IEEE KW Section, c/o Electrical & Computer Engineering (EIT 3028)  
University of Waterloo  
Waterloo, ON  
N2L 3G1

## KW Section Executives

<http://www.ieeekw.com/executive.php>

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University of Guelph Student Branch	Vacant
University of Waterloo Student Branch - Stream A	Mr. Haosen Cai
University of Waterloo Student Branch - Stream B	Ms. Joanna Ma

## Upcoming Events

Updated information can be found at <http://www.ieeekw.com/activities.php>.

### Computer Society Invites Distinguished Speaker to Waterloo

August 5, 2010  
University of Waterloo

The IEEE Computer Society – KW Section has invited Dr. Sandeep K. Shukla to speak at the University of Waterloo next month. Dr. Shukla is an Associate Professor of Computer and Electrical Engineering at Virginia Polytechnic. He is also a founder and deputy director of the Center for Embedded Systems for Critical Applications (CESCA), and director of the FERMAT research lab. He is a senior member of the IEEE, and of ACM, and he has published more than 100 articles in journals, books and conference proceedings. He has been involved in the writing of four textbooks.

He has been invited under the IEEE Computer Society Distinguished Visitors Program, which encourages distinguished speakers to foster interest in a variety of interesting topics. The likely topic of Dr. Shukla will be Formal Model Driven Embedded Software Synthesis.

Information will be made available once firm details are established.  
<http://www.ieeekw.com/activities.php>

### Conestoga Tech Showcase

August 17, 2010, 12:30 – 5:00 PM  
Conestoga College – Doon Campus

Student demonstrations are displayed in a tradeshow fashion in which industry professionals and peers may view the project results. The event is open to academics, employers, industry professionals, and the general public.

<http://techatwork.conestogac.on.ca>

### IEEE EPEC 2010

August 25 – 27, 2010  
Halifax, NS

The objective of the IEEE Electrical Power and Energy Conference (EPEC 2010) is to provide a forum for experts in Electrical Power and Energy to disseminate their recent research outcomes and exchange views on future research directions of these fields, and to seek direct cross-fertilization in these areas. Special sessions will be organized, and renowned experts will be invited to give keynote speeches.

<http://www.ieee.ca/epec10/>

### IEEE UW Guest Speakers

IEEE UW Student Branch

Keep an eye on the IEEE UW Student Branch website for further details on two very exciting guest speakers that will be visiting in the fall.

Canadian astronaut, Dr. Robert Thirsk will be sharing his experiences with the American and Russian space programs and his recent involvement on the International Space Station.

A representative from Blizzard Entertainment will be returning to Waterloo for the second year to talk about products and career opportunities.

[http://ieee-sb.uwaterloo.ca/upcoming\\_events.aspx](http://ieee-sb.uwaterloo.ca/upcoming_events.aspx)

## IEEE International Symposium on Antennas and Propagation and CNC/USNC/URSI Radio Science Meeting

July 11 – 17, 2010

Toronto, ON

The 2010 APS/URSI Symposium is the premier international forum for the exchange of information on state-of-the-art research in antennas, electromagnetic wave propagation, radio science, and electromagnetic engineering. The symposium and meeting are co-sponsored by the IEEE Antennas and Propagation Society (AP-S) and CNC/USNC/URSI. The symposium generally attracts over 1,500 attendees from around the world.

<http://www.apsursi2010.org/>

## Recent Events

### Astronomer Hawking Pays a Visit to IQC

June 25, 2010

University of Waterloo Bulletin

Three days after making his big public appearance at the Perimeter Institute, celebrity physicist Stephen Hawking visited the university itself and was presented with... a boomerang.

"A wooden boomerang might seem like a peculiar gift to give the world's most famous scientist," writes Colin Hunter of the Institute for Quantum Computing, which entertained Hawking on Wednesday at its temporary quarters in the north campus Research Advancement Centre. "But Hawking immediately understood the significance of the gift he received from his former doctoral student, IQC director Raymond Laflamme."

Hunter explains: "A couple of decades have passed since Laflamme proved to Hawking — his PhD supervisor at the University of Cambridge — that time behaves more like an arrow than a boomerang in a contracting universe. But Hawking's visit to IQC demonstrated that the arrow of time can sometimes bring longtime friends and colleagues full-circle.

"In the 1980s, when Hawking was writing his best-seller *A Brief History of Time*, Laflamme's job was to mathematically demonstrate his mentor's theory about what happens to time in a contracting universe. Trouble was, the math just didn't add up. Laflamme instead proved that Hawking's theory — that time reverses direction — could not be true.

"Hawking conceded the math was correct, and personalized Laflamme's copy of the book with the inscription: 'To Raymond, who showed me that the arrow of time is not a boomerang.'"

On Wednesday, Laflamme gave his former mentor the grand tour of IQC's labs, introducing him to the faculty, students, and staff of the institute. "These are the people that allow great science to happen," Laflamme said. UW president David Johnston and provost Feridun Hamdullahpur stopped by to meet the renowned astrophysicist.



## Students and Grads Sweep Start-Up Pitch Awards

May 27th, 2010

University of Waterloo Bulletin

Entrepreneurs made up of primarily of Waterloo MBET, mechatronics, software, and electrical and computer engineering students and alumni took the top awards at Ontario's Next Top Young Entrepreneur Start-Up Pitch Competition held recently. The first prize winner was Avenir Medical, a company that has developed a technology to greatly enhance hip replacement surgery.

## Engineers and the World

### Waterloo Engineers Inducted as CAE Fellows

June 10th, 2010

University of Waterloo Bulletin

Four Waterloo Engineering faculty members were recently honoured as Fellows of the Canadian Academy of Engineering. Raafat Mansour, an electrical and computer engineering professor, Mike Worswick, a mechanical and mechatronics engineering professor, Allan Plumtree, distinguished professor emeritus also of mechanical and mechatronics engineering, and Peter Silveston, distinguished professor emeritus of chemical engineering, were among the 48 new fellows inducted on June 4.

[http://www.acad-eng-gen.ca/e/home\\_cfm](http://www.acad-eng-gen.ca/e/home_cfm)

## First Nano Engineering Class to Graduate

June 10th, 2010

University of Waterloo Bulletin

The inaugural class of Waterloo nanotechnology engineering undergraduate students will graduate on June 19. The 63 students include 11 women. Launched in 2005, the innovative program teaches how to use the special properties that arise when materials are fabricated on the nano-size scale.

## UWAFT Team Receives Honours in EcoCAR Challenge

June 14th, 2010

University of Waterloo Bulletin

The University of Waterloo Alternative Fuels Team won the Best Mechanical Integration Award and the National Science Foundation Outstanding Long Term Faculty Advisor Award in the recent EcoCAR Challenge held in San Diego. The team is supervised by professors Roydon Fraser of mechanical and mechatronics engineering and Mike Fowler of chemical engineering.

<http://www.ecocarchallenge.org>

## Senate Asked to Close Informatics Institute

June 21, 2010

University of Waterloo Bulletin

The university senate will see a report today that says "all activities" of the Waterloo Institute for Health Informatics Research should "cease until such time as a strategic assessment of HI activities at UW be undertaken".

The recommendation comes from a committee, chaired by associate vice-president (academic) Geoff McBoyle, that was asked to do a review of the centre after its first five years of operation. The committee is recommending to senate "that WIHIR not be renewed in its present form".

The WIHIR report is on the agenda for senate's monthly meeting today (4:00, Needles Hall room 3001) along with such diverse items as a revised policy statement on graduate student funding and a report from the provost on what was discussed at last month's executive council retreat.

"WIHIR has been very successful," says the report, "in promoting awareness of the role and importance of HI in health matters through its seminars, symposia and bootcamps. Through these activities WIHIR has broadened understanding of HI issues by members of health related organizations, the private sector and students." It adds that external reviewers "were unanimous in their praise" of these activities, and it notes the "enthusiasm and commitment" of WIHIR director Dominic Covvey in building connections and a profile for Waterloo in the world of HI.

But the institute has been much less successful in reaching the "ambitious" goal, stated when it was begun in 2003, of generating "a high level of research output" and "major partnerships with industry" through connecting health informatics researchers into teams.

"The level of team research projects under the auspices of WIHIR appears to be considerably less than that aimed for," say McBoyle and his colleagues. "WIHIR did create a community of those with an interest in HI although not as extensive as originally envisioned from a research perspective. The high quality of research that existed in 2003 remains largely a result of each individual's own research. . . .

"The research hub of WIHIR is not only very small but, perhaps more importantly, is not representative of the wider community of regular faculty members in HI related fields. While most HI researchers across campus know of WIHIR, few chose to involve WIHIR in their scholarly pursuits."

The report also says that even the seminars and bootcamps have been "conducted without reference to academic units at UW that offer HI-related programs. . . . No structure or culture of linkage has been formed between WIHIR and HI related academic programs."

Waterloo does need "a clearly defined primary contact point for external groups" for health informatics research, says the report, hinting at conflict between WIHIR's director and the executive director of university health research, who is based in the research office in Needles Hall. "Without smooth collegial communication, the problems of overlapping activities will continue."

Rather than keep WIHIR going, says the report, senate should ask the vice-president (university research) to start "a strategic planning process to determine how UW might systematically position itself to create more impact and synergy in the field of health informatics through research, training and knowledge transfer".

## Mr. Universe: Stephen Hawking Has Arrived in Waterloo Region

June 05, 2010

Greg Mercer, Waterloo Record

Most of us bet on things like hockey or horses. Stephen Hawking bets on black holes, the Big Bang and the world's largest atom-smasher.

But Hawking of course, isn't like most of us. His 68-year-old mind is focused on infinitely bigger things, like where the universe came from, what time is and if it will it ever come to an end. That's why Hawking is the kind of person that physics institutes around the world would love to have criticizing the equations on their blackboards.

So you can wager his arrival here via private jet yesterday is a major coup for the Perimeter Institute for Theoretical Physics, an institution that less than ten years ago was based out of an old nightclub in uptown Waterloo. After two years of rumours, one cancelled visit and a tug of war with Cambridge University, Hawking is finally here.

This summer, Perimeter can boast that it's hosting the one theoretical physicist that most people on the street could probably name. And that's part of Hawking's appeal – he's a genius whose work is admired by the brightest of scientists, and he's also the guy who's been on The Simpsons, Star Trek: The Next Generation and Late Night with Conan O'Brien.

Oh, and he has a funny habit of placing bets on the greatest mysteries of the cosmos, a habit that has cost him in one case a year's subscription to Penthouse for a California scientist, and another cases, a few hundred bucks.

He even has a bet with his old Cambridge colleague Neil Turok, now director of the Perimeter Institute, that it's possible to see gravitational waves that echo the expansion of the universe. Those bets, Turok said, are great, because they draw attention to the big ideas behind them.

"He's lost a few bets, but that doesn't put him off. He's both kind of fearless and bold and he's not afraid to be wrong," Turok said. "And when he is wrong, he's quite happy to admit it. That's one of the great things about him. It encourages younger people to also be bold and not to be afraid of making mistakes."

It's bold thinking that has helped Hawking push the boundaries of physics. He's theorized there is no edge to the universe. He's shown how black holes can emit radiation and eventually evaporate and disappear – once thought a radical idea. In the 1990s, he and Turok proposed that the universe began from virtually nothing, creating the idea of an "instanton" that is the birthplace of everything.

"He's always explored ideas at the very frontier of physics and the question of where the laws of physics we know might break down," Turok said. "It's almost that he combines physics with philosophy. If the theories he's developed turn out to be true, we'll advance physics into the realm of philosophy."

This will be the first visit of what may become annual visits to PI for Hawking. For him, it's chance to work at an institute full of brilliant young minds that has become the largest of its kind in the world. Hawking's eyes "lit up" when told about a place where everybody is studying the mysteries of space, time and quantum theory – all questions close to his heart.

For researchers at Perimeter, it's a chance to collaborate with the most famous living scientist on the planet.

"He pioneered many of the ideas we're exploring at Perimeter," Turok said.

But working with Hawking will not be easy. He's paralyzed and unable to speak, and requires 24-hour care. Talking to him is a long, drawn-out exercise. He communicates through a voice synthesizer that reads sentences on a screen, which he "types" through an infrared sensor that picks up on twitches in his cheek.

"It's a very labourious, frustrating process which for many people would make them pretty bad-tempered," Turok said. "But Stephen puts up with all these inconveniences in good humour and he really enjoys discussing with people."

And if you're patient, the pay-off is huge. Theoretical physics relies heavily on interaction between its experts, and the best way to do that is to get those people in the same room, jotting down notes and scratching out complex mathematical equations on the blackboard. Few people are better at that kind of intellectual exercise than Hawking.

Hawking is equally famous for his ability to communicate the importance of all those complex ideas to the average person. His book, *A Brief History of Time*, has sold over 9 million copies and helped the common man better understand phenomenon like black holes, the Big Bang and light cones. He's the closest thing physics has to a celebrity, and has devoted much of his career explaining high-level physics through books, essays, and television.

As part of his visit at Perimeter, he'll appear on stage on June 20 at Perimeter for a national TV broadcast on TVO. Hawking will talk about his life in science and his

favourite topics of time, space and matter – ideas he’s explored before with viewers of his Discovery Channel and Masters of Science Fiction specials. Chances are, a few future physicists will be in the crowd. Hawking has that effect on young people.

“I think it gives them a sense that Waterloo is getting a name for physics. Having the Perimeter Institute here and then having Stephen Hawking here, it gives them a sense that they’re not in a small town. This place is world-renowned. It’s exciting,” said Sheldon Valeda, who teaches physics at Bluevale Collegiate Institute. He already expects enrolment in next fall’s physics classes will be higher as a result. Hawking himself knows you’re never too young to start thinking about the universe. Even as a boy at private school north of London, he already knew he wanted to be a scientist.

His bookish family could hardly be surprised. He had a knack for taking apart clocks and radios, trying to figure out how things worked. By the time he was 14, Hawking knew he wanted to be a physicist.

But his father, a tropical disease researcher, worried his eldest son would never find work and tried to talk him out of it. And Hawking’s success was never guaranteed. His marks were bad enough his parents worried he wouldn’t get into Oxford.

They didn’t need to worry. He nearly aced his physics exam, though, and there was no question he’d be admitted. At university, he grew his hair long, got into classical music and breezed through his undergrad physics classes. Though he never excelled at sports, Hawking was a coxswain on the rowing team.

By his third year at university, he was starting to notice that he was becoming more clumsy. A few times, he simply fell over for no reason, and on one occasion fell down a flight of stairs and hit his head. It wasn’t until he was at the University of Cambridge that doctors told him he had the incurable wasting disease ALS, (amyotrophic lateral sclerosis), a type of motor neuron disease.

“Not knowing what was going to happen to me, or how rapidly the disease would progress, I was at a loose end. The doctors told me to go back to Cambridge and carry on with the research I had just started in general relativity and cosmology. But I was not making much progress... anyway, I might not live long enough to finish my PhD. I felt somewhat of a tragic character,” he wrote in his biography.

He was given only a few years to live, sending him into a deep depression. He hid out in his room and drank for long periods and didn’t emerge from this funk until his condition stabilized and he met his future wife Jane Wilde at a party.

Inspired again, Hawking resumed his work, and his mind began to show its true brilliance. He could pour out finished equations that awed his colleagues. He could remember the slightest mistake after reciting 40 pages of complex math. His memory, said University of Alberta cosmologist Werner Israel, is like Mozart composing an entire symphony in his head.

Just don’t expect Hawking to get caught up in those comparisons. When he’s been called the Einstein of his generation, Hawking bristles, and dismisses the compliment.

"You shouldn't believe everything you read," he said.

For Fun...

### Brain Teaser

There were once three men who were in competition for the hand of a young woman. So they decided to have a three person duel to see which of them would have to marry her.

I forgot their names, so we'll call them Alex, Bob, and Chris. Alex was an expert swordsman, which was really too bad, since by tradition this was going to be a pistol duel. As a pistol shot, he was third-rate. Alex hits his target only 30% of the time. Chris was quite a bit better, hitting his target 50% of the time. And Bob was the best of all, never missing a shot.

To compensate for the obvious inequities in their marksmanship skills, they would fire in turns, beginning with Alex, followed by Bob and then Chris. The cycle would repeat until there was but one man standing (with breaks to reload if necessary).

I don't recall the outcome of the duel, but assuming each knew the others' ability and used the optimum strategy, what are the odds of each gunslinger?

### Engineering Humour

I would love to change the world, but they won't give me the source code.