



CORS TIMES

W E L C O M E T O E D M O N T O N

Today's CORS Events

Plenary & Public Lecture

Data by Nando de Freitas, University of British Columbia | ☉ 9:00

Mathematics and Counterterrorism: How Terrorists Can Use Mathematics to Build Cells That Are Provably the Most Difficult for Law Enforcement to Disrupt by Dr. Jonathan D. Farley, | ☉ 17:30

Tutorials & Workshops

Teaching Operational Research by Peter Bell | ☉ 10:30 @ Salon 5

Column Generation by Guy Desaulniers | ☉ 1:30 @ Salon 5

Benders Decomposition by Jean-François Cordeau | ☉ 3:15 @ Salon 5

CORS Meetings

CORS Constitution | ☉ 1:30 @ Salon 19

Social Events

Student Social | ☉ 19:00 @ Grant MacEwan Residence



Edmonton looking south across the North Saskatchewan River.

([Vahid Zahedzadeh](#))



MITACS and OR – MITACS CEO Arvind Gupta speaks with Editors Mohammad Delasay and Amir Rastpour

What is MITACS' mission?

Originally, the idea was to figure out mechanisms for practicing mathematicians in our universities to interact with each other, to breakdown the silo between academia and industry, for mathematics. And the impetus for that was that our students didn't have a lot of different job opportunities, especially in Canada. So if we could figure out how to interact with society, the hope is that they would want to hire our students. As we developed MITACS we realized that the problem that we were seeing with mathematics was not isolated. It cuts across almost all the university disciplines, and you can't really solve it in isolation. We then expanded our mission to start developing programs where we could get university professors and students to interact with society broadly, because that's what we believe is the right way to help university.

Where did the idea of holding a joint MITACS/CORS meeting come from?

I think that 20% of MITACS's projects are

directly in OR. And if we consider the broader definition of optimization, I'd say that 50% of MITACS are in OR. There is a big overlap. Also, I've been a proponent of CORS looking outside the big OR areas into new and emerging areas like techniques in continuous optimization, dynamical systems, artificial intelligence. It's slowly happening, but if I go to INFORMS I see it a little bit more than I see at CORS. Hopefully people here will come to some of the talks that MITACS has and see those relationships. The flip side is that MITACS will finish its major funding in 2012. But I think that combinatorics, discrete math, and OR are big strengths in this country, and if that community could come together and build something like its own MITACS there would be huge benefits.

In your opinion, what are the main barriers for OR students entering industry?

I think that OR has a slightly easier time than other areas in mathematics because it is much easier to explain to industry the benefits of optimization. But still the main thing I see,

From the Editors

We would like to welcome you to Edmonton for the 52nd Annual Conference of CORS held jointly with the MITACS Conference. CORS Times was established to help provide context for the 50th anniversary of CORS during the 2008's annual conference. The continuing positive response from the members to the newsletter prompted us to keep it going.

CORS Times will also be providing coverage of the CORS events and competitions at this conference. We hope that you have a great stay in Edmonton and enjoy the joint conference.

INTERVIEW WITH ARVIND GUPTA CONT'D

especially in Canada, is that companies do not necessarily want to develop new techniques. They want short-term solutions to problems. I think in some sense the real challenge for OR is how to develop a culture in the industry where they understand that by doing new things and seeing problems in new ways they might get much better solutions, even though it takes a longer time.

For example, financial optimization should be a very interesting thing to OR, and we have such big banks in Canada. But for the most part they buy their research from the big US or European banks. They don't do as much research in Canada as one would hope. The question to answer for banks is: why would they do the research themselves instead of buying it from someone else? And the advantage is that you developed the solution and you have a tool that a) makes you more efficient, since it was developed for you, and b) you can sell. You now have expertise that you can market. And this is something that I think is a little foreign to Canadian companies; that it is actually useful to have people with certain types of expertise in the company.

What are your recommendations for students who want to get closer to the industry?

One thing that many people said to me 10 years ago is that our professors and our students are not interested in talking to the industry, and vice-versa. I found both are false. It looks like they're not interested because they don't know how to find the right partners. We have to recognize that it's very hard for them to do it. Canada is a big place. So if you have a company here in Edmonton whose best academic partner would be at Queen's, how would they find each other? If you are in Silicon Valley, you have 10 universities close by and you can find people very quickly. That's

the first thing: you have to create mechanisms for people to find each other. The second thing is that we have to make the business case for these interactions, both for professors and for companies. Professors have to see that by working with the industry they can find really intellectually challenging problems. Companies have to see that doing research is going to help them make profits. We need to work on this. And we've spent so much time not doing it, that now it's going to take us time to fix it.

What programs does MITACS offer to graduate students?

I'd argue that most of our programs are for graduate students. The big one that will hopefully survive beyond MITACS is our graduate internship program, where we research problems from companies and students work on them, I'd say usually $\frac{3}{4}$ of the time towards their theses. We have a whole team of professional people who go to companies and find these kinds of problems, which I think is something really unique in the world. We have about 1000 of those every year across the country.

This morning there was a STEP workshop, which is a new program designed to expand professional skills for graduate students, so that they satisfy industry needs. We're also launching a new post-doc program. Currently we have a problem in this country that we are graduating far more PhD students than are jobs in universities. Our strategy so far has been to create post-docs. We have about 5000 post-docs, 1800 faculty positions, and we'll graduate another 4000 students this year. We have to create alternative career paths for students. In our new post-doc program we introduce post-docs to companies, so that they have two possible career paths: either academia or industry. We also have other smaller programs such as summer schools and mobility funds for student travel.

What's good nearby?

ARTS DISTRICT

Centred on Churchill Square, this area is located just two blocks north west of the Shaw Conference Centre. Around the square you will find City Hall, the newly renovated Art Gallery of Alberta, the Winspear Centre, Citadel Theatre, Edmonton Public Library and City Centre mall (home to CBC Edmonton).

RIVER VALLEY

The River Valley forms a "Ribbon of Green" that winds its way along the North Saskatchewan River and through the heart of the city, featuring natural areas, paved and natural trails and amenities. The closest access to the River Valley is right across the street from the Shaw Conference Centre, through Louise McKinney Park.

OLD STRATHCONA

An historic district located on the south side of the North Saskatchewan River, Old Strathcona is home to many shops, live theatre, repertoire cinema, restaurants and bars along with is a year-round farmer's market on Saturdays. The historic High Level Bridge Streetcar is in operation for the summer – you can ride it between the Alberta Legislature and Old Strathcona.

124TH STREET

At the west end of Jasper Avenue, this area is home to many shops, galleries and restaurants. Seven art galleries along started the Gallery Walk here in 1981 to promote both the community and art and artists.

OR in the Blogosphere

*Today's Featured Blog is
Michael Trick's Operations
Research Blog*

<http://mat.gsia.cmu.edu/blog/>
*He gets first mention for his post
on the final Olympics results. It
seems we owned 45.25% of the*

NOTES

Vous cherchez une version française? Michael Morin et Daniel Kreeft travaillons dur pour fournir un. Il devrait sortir plus tard aujourd'hui.

Send feedback, story leads, photos or comments about the newsletter to CORSTimes@gmail.com



CORS TIMES

THE PENULTIMATE ISSUE OF 2010



Mohammad & Amir catch up with our first plenary speaker on Wednesday

Nando de Freitas follows his passion

Would you tell us a bit more about your PhD background & what you did during your PhD?

For my PhD, I went to Cambridge in the UK and I studied Information Engineering. I had to learn a lot of statistics and signal processing. I was very much interested in cognitive models, so I also was looking at neural architectures. Soon it became a PhD in statistics & probability theory & simulation. That's where I got interested in Monte Carlo (MC) simulation and in particular MC simulation in dealing with time series data, data which changes over time & planning problems. I did a lot of work on sequential MC simulation which I started trying to bring to people's attention. I helped edit a book on the topic that ended up becoming very popular and spread a very useful method to a lot of people.

My first degrees, BSc & MSc were in electrical engineering and control theory. When I went to Cambridge my intent was to do machine learning. At the time, however, there were no professors in that area. So I started working with a computer vision (CV) professor mainly because I had scholarships to go to Cambridge and he didn't want me not to be accepted. He asked me if I wanted to try a computer vision project and I decided to give it a go. So, I spent about 4 months researching CV. This was in 1996. In those days the field of CV was dominated by geometry and I just could not see a way in which you would ever be able to recognize different kinds of trees and mushrooms and many other things using geometry in that way. I felt that what was needed was statistical theory, a theory of learning about what images are really about. So, just a few months before my proposal defence, I decided to change topics, which is very risky, and was very stressful. I did not know if I was doing the right thing then. I was certainly very anxious about it, but I spoke to a professor – the machine learning professor who had been on sabbatical when I first started – and he presented a problem to me. He said it would be interesting to see if I

could come up with a solution to this. That was 2 months before my proposal defence and I was just lucky I came up with a solution in a month that ended up being published. That was my first paper, and at one of the main conferences in machine learning - Neural Information Processing Systems (NIPS). And that's how my research started. It was kind of a fluke - there just being the right people around me. Actually, one thing I've become used to is the idea that in life a lot of the decisions are made for you.

When you started your PhD Program in Cambridge, did you expect that you'd be in your current position today? Was this always your goal?

No, I've never been able to predict my life five years ahead. While this wasn't my goal, I have a passion for the subject and I'm very interested in cognitive science and still in studying lots of data. My primary interest is still in trying to understand cognition & mind & the brain. The fact is that the brain is the best structure in understanding vast data sets. None of our computers are as good as a child or a dog or a cat or a dolphin at being able to process images and video. We are so far from having the capabilities of any mammal of processing smells and audio and visual signals. That's always fascinated me. I don't think I planned my career, but I always planned to research in what I felt was interesting.

You'll be receiving the MITACS Young Researcher Award on Thursday. What do you think is the main reason why one person's work is so successful and able to influence society or practice, when another person's isn't? Opportunity. I was lucky to get some scholarships that took me from one place to another. I was lucky with the right supervisors. Environmental factors help a lot. You do have to search for them; I'm not saying you should just go through life like a leaf in the wind going from one place to another, you need to have some goals. But usually if you have a passion for something you can make things happen. But it also depends



Today's CORS Events

Plenary

A Proof of the Queuing Formula: $L = \lambda W$ by John D.C. Little, MIT | ☎ 9:00

Tutorials & Workshops

Robust Optimization by Aurelie Thiele | ☎ 10:30 @ Salon 5

Matheuristics by Vittorio Maniezzo | ☎ 1:30 @ Salon 5

Adaptive Large Neighbourhood Search by Stefan Ropke | ☎ 3:15 @ Salon 5

CORS Meetings

AGM | ☎ 12:00 @ Salon 20

Practice Prize Competition | ☎ 10:30 @ Salon 18

Student Paper Competition | ☎ 1:30 @ Salon 18 | ☎ 3:15 @ Salon 19

Social Events

Awards Reception | ☎ 18:00 @ Salon 12

Banquet | ☎ 19:00 @ Salon 10/11

We're leaving a little space free for your thoughts or doodles. Remember, if you want to share any of your thoughts send us email. CORSTimes@gmail.com

The Editors.

INTERVIEW WITH NANDO DE FREITAS CONT'D

on where you're from. If you're from an underprivileged background, it will always be harder to achieve anything. You should always follow your passion.

How do you evaluate the opportunities for cooperation between OR and Computing science?

There are very, very strong reasons to collaborate. We do very similar things; information technology for example. We all work in areas like advertising, auctions, computational problems which interest both communities (IP, LP, MDP, etc). We use very similar structures and models. We're interested in very similar data problems & the same sort of computational & algorithmic issues arise in each context. We might have slightly different cultures, but there is enough overlap there that it would be wrong not to pay attention in all areas. In fact, nowadays it's so easy to find papers on the web, that it's not justifiable to read only the papers in your field.

Can you talk a bit about the work you presented on today (Wednesday)?

Today I was talking about big data. Joe Hellerstein of Berkley has recently called the huge expanse of data the "Industrial Revolution of Data." I think we are all aware that data is increasing at a vast pace. Young people get used to using all these social networking tools, taking photos all the time, taking videos at every party and they almost assume that this has always been here. But it hasn't. For example, we'll soon be able to acquire data about the galaxy and the stars in the universe and those data sets will be larger than anything we've ever been able to build; & it will only take 5 days to collect all that data. Huge data sets are part of every major company; Wal-Mart has terabytes of data on all the customers and transactions. The same is true for eBay. Huge data sets are also appearing in medical applications because people are finally digitizing people's records because it doesn't make sense that I cannot look at the record of every medical exam that I've had in my life and every X-ray because all that information could be potentially useful to diagnose whether I will develop a disease. Then, if you start to consider the data of other people, other people like me, who might have genetic trees similar to mine. We do live in the world of exploding data and it's important to understand that with that come many opportunities. We've seen how companies like Google & Amazon have appeared and they're basically data centres that manage data. It is

important to start noticing the importance of data and preparing people who can handle these large data sets.

This is not something that just pertains to computer scientists or engineers, but it really affects everyone. It affects the people in Mathematics because they have to develop new mathematical theories on how these very large data sets affect the quality of the model. They have to develop all sorts of concentration of measure bounds & so on. It affects statisticians. It obviously affects computer scientists who have to come up with the right architectures to deal with large data sets. It affects people in commerce & economics because they have to deal with changing environments for supply chain management. And where very large companies these days are making money out of data, it cannot be ignored by anyone in OR. It affects sociology as well because the proliferation of data in social networks and people working with such abundance of data change the way people behave. It also affects ethics, opening up many new issues. There are also many legal aspects to it. As we are outsourcing our services to clouds, then we'll have a scenario where some American company may have all the data of a university in Canada. Of course we try to solve that problem with encryption, but still there is this huge leak with IP. I think data is affecting all these fields and it's important that we teach this, especially in our undergraduate programs.

Do you have any suggestions for organizing these kinds of conferences?

From what I've seen so far, they've done a pretty good job. Although, coffee at 8.a.m. before I gave my talk would have been great. ☺ It's been great bringing together people from different communities, to have the chance to go to sessions in areas where often you don't go to, to have the chance to interact with academics and also people from industry and some of the granting agencies. For students it's also wonderful because they get to talk to many different people and be exposed to new ideas. I don't know what I'd do differently; it was really well organized. [*We agree – eds.*] ■

What's good to eat?

Edmonton has many wonderful places to eat, many within walking distance of the Shaw Conference Centre & hotels. Here are a few that you might not have noticed.

BLUE PLATE DINER

Eat Local First at this independent eatery featuring upscale versions of classic diner fare such. Try the nut loaf – a vegetarian take on meatloaf. Located on 104th Street north of Jasper. \$\$

L'AZIA

Asian and Mediterranean influenced cuisine in a funky setting. L'Azia was the consumer's choice award winner in 2009 for best fusion restaurant. Located in City Centre Mall at 102 Ave and 102 St. \$\$

SABOR DIVINO

Fine dining at an affordable price. The maitre d' Christian Mena is a singer who has been known to take the mic on Friday & Saturday nights. Enjoy food with a Portuguese influence. Located in the Boardwalk Building on 103rd St north of 102nd Ave. \$\$

Traducteurs pour la version française de CORS Times:

MICHAEL MORIN
DAAN KREEFT

OR in the Blogosphere

Today's Featured Blog is

ThinkOR

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

Written by two former UBC students, Dawen & Aleksey



CORS TIMES

THANKS FOR COMING! SEE YOU IN ST. JOHN'S



Art Gallery of Alberta

(photo: Amir Rastpour)

Fernanda talks with the UW professor & Chair of the Department of Management Sciences

Beth Jewkes talks O.R. & Health Care



Can you talk a bit about your current research projects?

I'll talk about the projects that are related to the MITACS/CORS conference. Two other faculty members in the department of Management Sciences and I are engaged with a sequence of projects associated with the EMS providers in the Kitchener/Waterloo area. The underlying trigger for the project was the fact that about a year ago the province of Ontario came out with a new set of response time standards which moved away from the "one size fits all" 10min30s for 90% of the calls, to a tiered response time set of performance plans. The EMS provider was looking for guidance on what the impact on their resources would be and whether or not they would be able to actually fulfill the provincial mandate. That started us on the project that we're reporting on in this conference. The project had three major parts. The first part was to clean up 10 years of Emergency Call data and understand it. It became clear that what we needed to build a

model of where to place their ambulances and whether or not the city was going to be able to respond to the provincial mandate. For that, we needed to have a reasonable response time model. One of the papers I'm presenting at this conference is about this response time model with the new metrics as compared to what has been used in the past. But the purpose of this was to provide input for the ultimate goal which is to build a new optimization model to help the region estimate where they should locate their ambulances at different times of the day and what their response time metrics were going to look like. We're now in the process of merging the results of the response time models with the optimization model. The second model is more theoretical in nature and it has to do with modeling the offload delays (where they can't unload a patient into the emergency room because the beds are full) for the region of Waterloo. So we're looking at the impact of different ambulance

(CONT'D ON P.2)

Today's CORS Events

Plenary

Cluster-Based Computation of Relational Joins by Jeffrey D. Ullman, Stanford University | @ 9:00 @ Salon 4

AWARD OF MERIT

Bernard Gendron

HAROLD LARNDER

AWARD

John D. C. Little

SERVICE AWARDS

Neil Barnes

Vinh Quan

Neil Robinson

STUDENT PAPER AWARDS

UNDERGRADUATE

Brent Ouwerkerk, Jimmie Tom, Felicia Ng, Sean Tomilin, Erin Hrycyszyn, University of Alberta

OPEN CATEGORY

1st Prize

Ramon Alanis
University of Alberta

Honourable Mention

Yang Li
McMaster University

Bissan Ghaddar
University of Waterloo

CORS PRACTICE PRIZE:

1st prize.

Burcin Bozkaya, Erhan Erkut, Dan Haight, Gilbert Laporte.

2nd prize.

Kent J. Kostuk, Keith A. Willoughby

Applause to...

The editors would like to extend their gratitude to a number of people for their support during the planning and production of this year's newsletter – CORS executives Armann Ingolfsson and Bill Simms for providing encouragement and Award recipient information, former editor Ali Vahit Esensoy for ideas and templates. We especially want to thank our French edition translators, Michael Morin and Daan Kreeft, who had to work under less than ideal conditions.

Fernanda, Mohammad, Amir, & Lisa



St. John's Basilica (photo: D. Tulett)

CORS 2011 – ST. JOHN'S

May 30 – June 1

CORS travels to NFLD for the first time in 2011. Consider staying for a visit after the conference. You won't be disappointed.

"St. John's offers an enticing combination of old world charm, unique architectural, historic and natural attractions, top notch facilities and services, and is located in close proximity to spectacular coastlines, historic villages and a diverse selection of wildlife." (<http://www.stjohns.ca>)

Mark your calendars now!

OR in the Blogosphere

Today's Featured Blog is

The Operations Room

operationsroom.wordpress.com

The Canadian connection? A post on Sears Canada & the rising Loonie.

INTERVIEW WITH BETH JEWKES CONT'D

dispatching strategies, looking at the capacity of the hospitals, the frequency of calls, etc., to try to predict what might be better dispatching policies.

There have been many applications of existing OR techniques to healthcare problems. Do you think this type of research has also been motivating the development of more theoretical contributions to OR?

I think one of the key things when you're working with research is to ensure that you're using the tools and methodologies that form the foundation of your "tool kit". You have to be very much aware of the kinds of models that have been solved before, either in healthcare or in other areas. So one needs to be very careful not to reinvent the wheel, to make sure that new scientific knowledge is being created. So you have to ask yourself if you're simply applying existing models to a new area or whether you're actually creating new models to deal with problems with different characteristics. So I think the opportunities in applying OR within healthcare are that the problems themselves can have different characteristics than in telecommunications and manufacturing, for example. And the key thing for whether it's going to be of value for the OR community is being able to identify what value, or what new scientific knowledge the research is providing in the healthcare application area. We went through an industrial revolution more than 100 years ago where subsequently we learned a lot about models to manufacturing systems. I think healthcare is just starting to go through that revolution.

Do you think partnerships with healthcare

institutions are essential in developing healthcare related research?

I think relevant research requires these partnerships. It's a more challenging kind of research to do because you get your hands really dirty with data issues and people with conflicting objectives. But unless you really understand the problem setting from where the models you're using arise, you can't really claim to have developed models that are appropriate to the real world. It is easier to sit at your office and to look at what is happening from a distance. Your models are simplified, you're not necessarily aware of all the details involved. That kind of research tends to be faster but it can also be less relevant from the point of view of solving real problems. As part of my personal research agenda, I decided a number of years ago that I was not going to do anymore research that was sort of theoretical in nature and did not have a basis on an empirical study. As a result of that I feel that the work I'm doing has the potential for much more impact, and I'm taking a lot more personal satisfaction out of it. It's had a good impact.

What advice can you give for researchers who want to start developing these partnerships?

That's a hard one. Not being afraid to knock on doors, not being afraid to admit that you're maybe not that familiar with how an organization works, and being willing to do a project without any research money attached to it, in order to increase your knowledge base. But above all, you've got to have the basic tool kit and the analysis methods under your belt to apply to this new setting. So, you have to be willing to ask a lot of questions, to work for free in order to establish yourself, and to be willing to deal with the messy reality that healthcare is.

What's Nice in Alberta?

JASPER

Located a 4 hour drive west of Edmonton in majestic Jasper is less crowded than Banff but no less beautiful. There's a cable car to the top of one mountain, many beautiful day hikes, a world-class golf course, and even hot springs at Miette.

BANFF

Probably the most popular of the mountain parks, there is something for everyone. Located just 1 hour west of Calgary, you can find hiking, biking, hot springs, golfing, and many more activities.

GLACIERS

If you have a few days, consider driving to Jasper on day 1 then taking the Icefields Parkway to Banff with a stop-off at the Columbia Icefields. For those from Waterloo, it's a bit different from UW's Columbia Icefield.

CALGARY

If you insist on leaving Edmonton, you should probably stop by Calgary to poke around. You can visit Canada Olympic Park but you're too early for Stampede.