

LOCAL SPACES

UBC Department of Mathematics

January 2003

Message from the Head



Let me begin by saying that I am honored that you selected me to be Head of this wonderful department. I began the term with excitement, and I am happy to say that I am still excited.

As I said at the first faculty meeting I attended, I am on a very steep learning curve. For one thing, I had to learn what all of the three-letter acronyms mean: DTO, CRC, CFI, UFA, ETA, LOA, FTE, IAM . . . Well, I suppose that was the easiest part of the job so far. Being Head of a department with such a broad array of important activities is very demanding, but you have made it so much easier by providing such high quality help and advice. I thank you for this.

When I first saw the ad for the Headship in Math at UBC, I asked myself: why would I want such a job? I knew that it would require long hours, stressful situations and difficult decisions. But then I began to think about the possible rewards: I hoped that I would find it stimulating to interact with interesting colleagues in a great department, and I hoped that I would enjoy having the privilege to act as an advocate for mathematics research and education. I have not been disappointed! Although I am working longer hours, I find this job very rewarding.

The UBC Math Department excels in a wide range of activities: from outreach to education at the undergraduate and graduate levels to research at the frontiers of mathematics. We are a strong department growing in quality and quantity. There are many things that we would all like to do as we continue our growth: expand our graduate offerings, strengthen our existing research groups, branch out into new research areas, broaden our relations with other departments, increase resources for teaching support and improve the quality of our facilities. Doing all of these things presents many challenges, but I think that we should be ambitious. With the help of the many federal and provincial initiatives and the resulting high quality affiliated math programs on campus, such as PIMS and IAM, I believe we can make substantial progress in all of these areas.

I want to wish all of you, faculty, staff, students and your families, the very best wishes for a happy, healthy and productive 2003!

Brian Marcus

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*Please send your questions,
comments or submissions to
newsletter@math.ubc.ca*

*Department of Mathematics
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MATH JOKE

Question:
Where do you publish a
superb grant proposal?

Answer:
InTentiones Mathematicae



**Happy New Year
from the Staff at
Math!**

(back row- left to right)
Mary-Margaret Daisley,
Thi Nguyen, Yvonne
Diamond, Gord Slade,
Brian Marcus, Tia Tran,
Sharon Chan, Joseph
Tam, Mar Ness
(front row - left to right)
Marlowe Dirkson, Verni
Brown, Lee Tran,
Vanessa Ha and The Ha
Missing: Ann Artuso

CAUTIONARY TALE

by Richard Anstee

My job as president of the Faculty Association (Union Boss!) has been unexpectedly busy this Fall. We have had 5 arbitrations when typically we have 1 arbitration every 2 years. Sigh. And there always seems to be a new unexpected development to attract attention. As a result I have spent too much time over in the FA office. It closes Dec 17 until Jan 6. The problem in my estimation is lack of staffing on the administration side. It would be more productive to have settlement talks in a timely fashion before the arbitration is set.

One thing I am continually reminded about is the need to have fair, consistent procedures and adequate record keeping. I was particularly pleased to see consistent teaching dossiers brought forward by Philip Loewen this term. In the past very different record keeping and formats had been used even in similar sorts of cases. Besides allowing easier comparisons, it also is fair. On the record keeping front, you never know when you'll need that old email. Idle notes taken during a meeting became important evidence in an arbitration.

I was struck by the professionalism of Charles Lamb in describing how to handle cheating episodes. In particular, he pointed out the need to protect the rights of the students and that they have an appropriate place to defend themselves. I can easily imagine foolishly trampling on their rights only to find that it means my complaint is dismissed or, worse, some lawsuit is undertaken.

A separate issue is the notion of a conflict of interest. We all know that a Faculty member sitting on the Faculty of Science Dacopat does not vote in the department on promotion and tenure cases since they get to vote at Dacopat. But there are other cases of conflict that Faculty should be concerned about and that most of us don't usually think about. Imagine a graduate student putting a grade appeal forward. At each of the levels, the student should be presenting in front of new people. At the Faculty association we have the Personnel Services Committee. In some instances we have had as many as four people disqualified over potential conflicts.

Many of us might need a refresher course on some of these points and I recommend the department consider preparing a workshop or at the very least a lot of this needs to be written down. It is simply the current state of the world that forces us to be so careful. With luck it won't involve much extra work, just consistency and a small amount of extra care.

Curiosities

By Greg Martin

Let's define a sequence of real numbers $\{x_n\}$ recursively as follows: we set $x_1 = \tan 1$ (that's 1 radian, of course), and for $n \geq 1$ we define

$$x_{n+1} = \frac{2x_n}{1-x_n^2}$$

With a pocket calculator, we can work out that the first five terms of this sequence are $x_1 = 1.55741$, and $x_2 = 2.18504$, $x_3 = 1.15782$, and $x_4 = -6.79971$, and $x_5 = 0.300632$. It's a bit tricky to see that x_n never equals 1 or -1 , so that this infinite sequence is well-defined. It follows, however, from the fact that $\tan 1$ is a transcendental number, from which we can prove by induction that all the x_n are transcendental.

But in fact, we only really care about whether these real numbers are positive or negative. Define d_n to equal 0 if x_n is positive, or 1 if x_n is negative. (It's easy to see that x_n can never equal zero: what would the value of x_{n-1} have been?) This gives us an infinite sequence of 0s and 1s:

$$\{d_n\} = \{0, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1, 0, 0, 1, 1, 0, 0, \dots\}$$

All this is very well and good, but why do we care about these d_n ? If our pocket calculator is fancy enough and can compute in base 2, we will be able to notice something very interesting about the binary "decimal" expansion of $1/\pi$:

$$1/\pi = (.01010001011111001100\dots)_{\text{base}2}$$

What's going on here? Do the numbers d_n keep on agreeing with the n th binary digits (bits) in the binary expansion of $1/\pi$? If so, does this give us a way to compute the binary expansion of $1/\pi$ quickly?

CUPE 2278 UPDATE

by Ben Young, Math Department Representative

In recent months, there has been a dispute between UBC's central administration and CUPE 2278 over contract negotiations. The union negotiates the Teaching Assistants' (TAs) collective agreement and assists with work-related disputes with the University. Our contract expired on August 31, 2002 so we have been working without a contract for the past term.

The main point of contention between the union and the administration, as one might expect, is money. Tuition for 2002-2003 has increased for most students by about \$400 over last year, and next year it will probably increase by almost \$800. The union would like to see TA wages raised to compensate the tuition increase: TAs are living from paycheque to paycheque currently; the tuition increase will make it even more difficult for us to survive (and much more difficult for UBC to attract the calibre of graduate students that it wants).

Unfortunately, the UBC administration is unwilling to increase TA wages at all for the next three years. In fact, the administration is unwilling to provide any new money to TAs at all: all of the union's money-related demands were categorically denied (including the request that the rent for the CUPE 2278 office be reduced by a few hundred dollars per month).

Their explanation is that the Public Service Employers Council, a government body, must approve any increase in funding. Because of this impasse, CUPE 2278 held a strike vote in late November. 87% of the votes were in favour of a strike. Approximately 50% of the TAs voted. Compared with other similar strike votes in other

Canadian universities, this is a very strong show of support for the Union's position. It seems likely that any job action will be actively supported by UBC TAs.

The Union served 72 hours strike notice on the university on December 16, 2002. As a result, an external mediator has been appointed by the Labour Relations Board of British Columbia. The union and the administration will be meeting with the mediator at some point before January 8, in the hopes that a fair settlement can be achieved. If no settlement is reached through mediation, however, it seems likely that the union will once again be in a legal strike position in mid-January. If a strike does occur, the union has suggested that smaller-scale job action (such as picketing of individual buildings, or refusal to grade papers) would be taken first. An all-out strike would only occur if more subtle forms of job action proved ineffective.

In a recent email, the UBC Faculty Association recommended that professors respect TA picket lines if a strike does occur: "The Faculty Association certainly sympathizes with the difficult situation the TAs are in and the unreasonable PSEC guidelines. What should Faculty do? We urge all our members not to perform the duties that would have been performed by striking employees. While it is true that others such as students may be affected, it is best to respect the right of members of a Union to strike. Faculty may also choose to respect picket lines and should follow UBC Policy 64 listed below (UBC policies found at <http://www.universitycounsel.ubc.ca/policies/>)." (from an email to all faculty, from the UBC Faculty Association, Dec 17, 2002)

More information about the contract dispute, the strike vote and job action can be found at www.cupe2278.ca.

WALKING FOR FUN, FITNESS, AND FRIENDSHIP

by Verni Brown, Undergraduate Secretary

When asked what I do in my non-working life, I usually reply, "I'm involved with a walking club." The person who asked the question thinks that means I go on a lot of organized walks, but I know my answer means more than that. I would like to do more walking, but I'm involved with organizing and promoting the events, and as a club president, I have to deal with "behind-the-scenes" paperwork.

I belong to an international organization called Volkssporting ("sports for everyone") which promotes non-competitive events, usually 10-km walks. The five local Volkssport clubs put together a yearly schedule so that there are events every Saturday, Sunday, and holiday -- rain or shine.

After almost ten years, I still enjoy my involvement with Volkssporting. I've met many interesting people and have made some good friends. I've accumulated almost 12,000 km by walking locally and in seven provinces and five states. I've completed two walking marathons (42 km) and two long-distance events (240 km over eight days). I dream of walking in some of the other 25 countries which are part of the IVV organization. If you would like to experience a Volkssport event, why not participate in the 5- or 10-km walk in the **University Endowment Lands** planned for Saturday, January 11. We'll be starting at 10 am from the lobby of the UBC Student Union Building. (Newcomers walk for free!)

Success in Facilitated Group Problem Solving Workshops for Math 180

by Roger Donaldson

This past fall term, the Department of Mathematics, in cooperation with the Dean of Science, ran weekly workshops for students in Math 180, a course in differential calculus aimed at students with little or no calculus experience, in order to raise students' abilities and confidence in solving university-level mathematics problems. This initiative was in response to last year's relatively high failure rate of Math 180 students over those in mainstream Math 100. The workshops were coordinated by myself, Charles Lamb, with partial financial support from the Dean's office, and support from Joanne Nakonechny, an anthropologist specialising in group learning strategies from SKYLIGHT, the Faculty of Science Centre for Learning and Teaching. The individual workshops themselves were led by undergraduate teaching assistants (UTAs).

During each workshop, attended weekly by interested Math 180 students, the UTA facilitators presented problems prepared by myself, whereupon students retreated to groups of 4-5 to not only solve the problems, but to discuss their methods of solution. These difficult problems, going beyond the formula-manipulation of high school mathematics, addressed all areas of the course curriculum, and tended to guide students to see connections between seemingly disparate course topics. Students practiced a variety of graphical, analytic and estimating problem solving techniques, all in an environment where the UTAs guided students by discussing ideas, rather than giving away answers, such that students learned with their peers in an exploratory manner.

Early feedback on the workshop program, not previously attempted in the UBC Department of Mathematics in this format, shows that students benefited from the hands-off, group work approach to problem solving. While a direct correlation analysis is yet to be completed, it is noteworthy that this year's Math 180 pass rate was markedly higher than that in previous years.

63rd Annual William Lowell Putnam Mathematical Competition

by Lee Tran

Fourteen UBC undergraduates participated in this renowned mathematical competition held on December 6, 2002. The six-hour exam consisted of twelve problems.

"UBC typically places in the top twenty schools in North America. Altogether about 3,000 students from 200 universities compete. As an indication of how challenging the problems are, last year the median score was 1 out of a possible 120," says Lon Rosen, Putnam Advisor. Prizes will be awarded to the mathematics departments of the institutions with the five winning teams. The five highest ranking individuals are designated Putnam Fellows by the Mathematical Association of America (MAA), a mark of great distinction in the mathematics community. A high ranking in the competition also enhances a student's prospects of admission to graduate schools and to winning a graduate fellowship. Last year the UBC Mathematics Department awarded prizes to the three UBC students who finished in the top 200, in memory of Professor Larry Roberts.

Students compete on a voluntary basis, not for the prizes but primarily for fun. Richard Liang, 3rd year undergraduate student, believes "(the) contest is very difficult." He also adds, "Ever since I was in first year, my goal was to write the exam and get 1 out of 12. This is a big challenge for me -- more than half of the students who enter usually get zero." Richard hopes to write the exam again next year.

Dr. Rosen who has been coaching the UBC Putnam exam since 1979 says, "the problems are unlike those in a regular math exam; there is a great emphasis placed on cleverness and creativity." The competition is administered by the MAA and is open only to regularly enrolled undergraduates, in colleges and universities of the United States and Canada (who have not yet received a college degree).

WELCOME ABOARD!

New Graduate Students and Visitors beginning in January 2003:

Neville Dubash, Kamyar Hazaveh Hesarmaskan, Raphael Ibhahebhomen, Olivier Rousseau, Yuri Skrynnikov, and Nadine Wolff

FAREWELL

Nathan Krislock, Sheng Liu, Eva-Marie Nosal, Yan-Xia Ren, Bradley Safnuk, R. Sahadevan and Akira Sakai