

THE BRITISH COLUMBIA COMMITTEE ON THE UNDERGRADUATE PROGRAM IN MATHEMATICS AND STATISTICS

MINUTES OF THE 89th MEETING, MAY 17 – 18th, 2011

TUESDAY, MAY 17, 2011

1. WELCOME

Douglas MacLeod, the Associate Dean of Science, Technology, and Health, welcomed the BCcupms to its 89th meeting at the Vernon Campus of Okanagan College.

2. ADOPTION OF THE AGENDA FOR THE 89th MEETING OF THE BCcupms

The Agenda for the 89th Meeting was approved by consensus after agreeing to move Ian Affleck's report on the website and discussion of the exam exchange to item 4.6.

3. ADOPTION OF THE MINUTES OF THE 88th MEETING, HELD AT SIMON FRASER UNIVERSITY

Motion: (moved by Len Bergren and seconded by Wesley Snider)

That the Minutes of the 88th Meeting be approved.

Carried unanimously.

4. ANNOUNCEMENTS

4.1 Introduction of representatives

4.2 Attendance Lists: Nora Franzova circulated the attendance lists.

4.3 Announcements from the host, Clint Lee: Clint provided information on internet access and logistics for the meeting.

4.4 Notice of Election: At this meeting elections for the Vice-Chair and Secretary of the BCcupms will be held. These positions have two-year terms. Jean McLeod and Gary McGillivray volunteered to form the nominating committee.

4.5 Conferences: Members of the committee shared information about upcoming conferences that might be of interest to the group. These included: the 3rd biennial Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM) to be held on May 31-June 3, at the University of Victoria; the International Conference on Applied Harmonic Analysis, to be held July 25-28, at the University of Alberta in Edmonton; the Sharing Math Conference to be held at Okanagan College Vernon on Thursday, May 19; and the BCAMT Fall Conference on October 19 at Cariboo Hill Secondary in Burnaby, which will also feature a leadership summit to be held the day before. Members were reminded to let Ian Affleck know about upcoming events so that he can keep the information up-to-date on the BCcupms website.

4.6 BCcupms Website and Exam Exchange—Ian Affleck, Webmaster

Ian introduced himself and gave an on-line tour of the BCcupms website. In particular he pointed out the Course Transfer link which leads to important articulation information, including a new link to BCCAT which provides a list of outstanding transfer requests. Also new this year is the WNCP Information link on the right-hand side of the page. This leads to further links to access the new curriculum and lists information on how the new grade 11 and 12 mathematics courses are being treated as prerequisites by those post-secondary institutions who have submitted this information.

ACTION (all members): Verify contact information on the BCcupms website and contact Ian Affleck at affleck.ufv.ca with any updates. Also send in a photo for posting on the website.

ACTION (all members who have not already done so): Provide Ian with links to relevant sites which will explain how the new WNCP Mathematics courses will be interpreted by your institution.

There was discussion about using the website to facilitate sharing of final exams. It was noted that the sharing of exams is an important initiative of the BCcupms that helps us to ensure uniformity of standards, one of the components of our mandate as an articulation committee. Given the current technology available, it may be more practical and environmentally friendly to make exams available on-line, however participation is essential and members were asked to speak out if they believed that sharing exams in this way would be problematic. There was some concern about confidentiality; however as with past practice with paper exams, all exams that are not already publicly available should be treated as confidential. No other concerns were raised. Ian requested that all members who have not already done so send him information about how they wish to make their final exams available. Options include providing the web address for publicly available past final exams or providing information on who to contact to obtain copies. This information will be listed on each member's page on the website.

ACTION (all members): Contact Ian to provide or update information on how other members of the committee may access past final exams at your institution.

The committee commended and thanked Ian for the excellent work he is doing in organising and keeping the information on the website up-to-date.

Mathematics and Statistics Subcommittee Sessions (held concurrently)

MATHEMATICS SESSION

Math1. Precalculus Courses—Justin Gray, Simon Fraser University

Justin explained the new approach being taken in Math 100 Precalculus at SFU. They have decided to make this one-semester course more concise: they have trimmed down the material to include only what is essential in order to prepare students for Calculus and have adopted a leaner textbook. The intent is to cover less material, but with more depth. The change was made in response to finding that their Precalculus students were not very successful in Calculus. He noted that these students seemed to be doing better (as well as students entering Calculus directly from high school) now that the Precalculus course had been changed, though this improvement may be due to more than one factor. He was interested in knowing if other institutions were also taking this approach. Although other institutions may have been considering this, cutting material in a course that transfers to a major university is not an option unless the university makes the change first.

With respect to the textbook, several people agreed that Precalculus textbooks often contain too much material. Douglas College (Wes Snider) uses a custom published version of Stewart in order to cut unnecessary material, and make the book more affordable for their students. Justin noted that in their search for a text they wanted a book whose original intent was a one-semester course. They are using Axler, but have looked at others.

There was much interest in knowing exactly what was cut from the old Precalculus course. Justin described the new course as being focussed on functions, with less algebra and equation solving. The syllabus is available on-line, although Justin warned that it is not too detailed. Justin recommended that members also consult the 1999 Calculus Proficiencies Report, available on the BCcupms website, to see what topics should be considered as essential.

There was a great deal of discussion about the level of algebra skills that students typically have when they enter the Precalculus course at institutions across the province, and concern that a "lean" precalculus course may not equip students with the algebra they need to be successful in Calculus. Many institutions offer a sequence of two Precalculus courses, with weaker students having to take both. In response to questions, Justin clarified that the target audience for Math 100 is students who have at least 70% in Principles of Math 11 but who do not have a high enough Math 12 grade to access Calculus. He added that most of the students have taken Math 12, and that even some students who have As in Math 12 take the Precalculus course, although they don't need to. SFU administers a diagnostic test in week 1 of the Calculus course that identifies those whose weak algebra skills put them at risk. They schedule Calculus and Precalculus at the same time to allow students to switch more easily if they choose to.

Given that the success of SFU's new Precalculus format is currently based on anecdotal reports, it was suggested that it would be useful to see hard data on the success rates in Calculus for the students who take it. In particular, members were interested in knowing whether the new version of the course would be effective for students who had not previously taken Math 12.

Justin also clarified that Math 100 can be taken for credit towards a degree, unless it is taken by a student in a math major/minor/honours program. Their pre-Precalculus course, FAN X99 does not count for credit toward a degree but does count towards their GPA.

Math2. Report from the Calculus Readiness Test Subcommittee—Justin Gray for David Feldman

Since David was unable to attend the BCcupms meeting this year, Justin reported on the progress of the Calculus Readiness Test Subcommittee in his place. Justin reminded the group that the mandate of the committee is to develop an on-line placement test for Calculus Readiness that could be used by mathematics departments across the province. The committee is not as far along as it had hoped to be. At this point they have agreed on a list of topics for a 30 question test, developed with reference to the 1999 Calculus Proficiencies Report. Once specific (free-response) questions are formulated, the committee would like to pilot the questions at a few institutions, and use the results to refine the test. In particular they wish to use students' actual errors to create distracters for a multiple-choice computer-graded version of the test. Justin will set up the test on an SFU server, using LON-CAPA.

On behalf of the committee, Justin requested a renewed mandate. It was agreed that work on this project should continue. Justin also asked for additional volunteers for the committee, noting that some of the original volunteers have dropped out. Tim Topper (Yukon), Mike Nyenhuis (Kwantlen Polytechnic University), David Feldman (Selkirk) and Justin Gray (SFU) will continue. Nora Franzova (Langara), Jennifer Hyndman (UNBC), Rick Sutcliffe (TWU), and Lorraine Dame (UVic) offered to take part. Rick Brewster (TRU) volunteered someone from his institution to be involved. Langara (Nora Franzova) and UFV (Susan Milner) offered their institutions for the piloting.

Justin invited all members to contribute potential questions. Both Wayne Nagata (UBC-Vancouver) and Rick Sutcliffe (TWU) suggested that the subcommittee take a look at the placement tests that they currently use.

ACTION (Justin Gray or alternative representative of the Calculus Readiness Test Subcommittee): Contact members of the BCcupms via the listserve to solicit questions for specific exam topics.

The subcommittee will report on their progress at next year's meeting.

Math3. International Baccalaureate—Wesley Snider, Douglas College

Wes reminded the group about the ongoing problems with the information on the BCCAT site with respect to International Baccalaureate mathematics courses. The names of the courses in the Transfer Guide (Mathematics SL, Mathematics HL, Mathematics, and Further Mathematics) do not match the courses listed on the IB site (only Mathematics SL, Mathematics HL, and Mathematics Studies). Furthermore, the awarding of transfer credit for the IB courses is extremely inconsistent, with the same course receiving 9 credits from some institutions and 0 from others. This creates a very confusing situation for students. Several people commented that they had experienced difficulties in the past in determining exactly what the various IB courses entail. It was noted that the information is now much easier to find on the IB website.

ACTION (all members): Check the IB Mathematics course transfer information on the BCCAT website and update as appropriate, based on the course outlines provided on the IB website.

Math4. Report from the Mathematics Flexible Pre-Major Committee—David Leeming and Leo Neufeld

Leo distributed the report that he and David had prepared based on last year's discussion of suggested changes to the Mathematics Flexible Pre-Major. He reminded the group of the history of the Flexible Pre-Major, an initiative originally promoted by BCCAT that was intended to provide a clear program that students could follow in order to transfer directly into 3rd year at any BC university. The report generated by the initial Mathematics Flexible Pre-Major Analysis Committee did not completely fulfill this objective. The final recommendation described a core of courses, but also included additional courses that would be needed to enter 3rd year at the various receiving institutions. Although the work of the Committee went well beyond the analysis expectations of BCCAT, it did not recommend proceeding with a Full Project. The information together with the approved recommendations have been found to be useful for students, as well as for institutions planning program changes. The report was approved and the information has been posted on the BCCAT website, with the requirement that the information be kept up-to-date.

At last year's meeting, it was suggested by David Feldman (Selkirk College) that a change be made to the list of Core courses. It was proposed that Ordinary Differential Equations replace Introduction to Analysis, given that smaller institutions are more likely to be able to offer the ODE course. Leo and David Leeming agreed to make the proposed changes and seek feedback

from the universities on the impact that such a change would have. They received a complete set of responses, which are recorded in the report (see http://www.bccupms.ca/projects_reports.shtml). David walked the committee through the report, noting that along with the proposed revision, other small changes such as updated course names and numbers had been made. It was noted that the definition of core courses as those required by “6 or more institutions” (at the bottom of p. 3) will need to be updated if ODEs are included in the core. Jennifer Hyndman’s name as the UNBC contact was omitted in error. Leo and David invited the group to consider the proposed major revision and decide whether or not we wish to follow through with it.

Discussion of the report followed. Concerns were raised that the current Mathematics Flexible Pre-Major does not meet all of the objectives that BCCAT desires for full flexible pre-majors. It was acknowledged that meeting such objectives for Mathematics would be extremely challenging: many of the smaller institutions are not even able to offer all of the core courses as is. Flexibility is essential. The current system allows students to plot a clear course if they know which institution they plan to transfer to. Ideally there should be a contact person at each receiving institution to work with students individually to address gaps they may have when they transfer.

As reflected in the report, none of the universities objected to having Ordinary Differential Equations as part of the core. However, some, including UNBC (Jennifer Hyndman) would like to see a “proof techniques” course in the core which might be satisfied by one of several different courses. Jennifer expressed concern that under the proposed change there would no longer be a proofs course in the core. It was reiterated that many of the smaller institutions are not able to offer a proofs course since these courses are normally only taken by mathematics majors and their numbers cannot support such a course. Even larger universities often only offer these courses once per year. Students who do not have a proofs course would need to find a way to catch up at the university. It was noted that several institutions, including Trinity Western University (Rick Sutcliffe) and Camosun College (George Ballinger) include proofs as part of their Discrete Math and/or Linear Algebra courses.

There was some discussion about adding ODEs to the core, but leaving the Intro Analysis or a “proofs course” in, or changing the wording to indicate a student should have ODEs **or** a proofs course. Wayne Nagata (UBC-Vancouver) warned that there is no guarantee that a general proofs course would transfer, especially given that their proofs course is the only course UBC requires for promotion into 3rd year mathematics. Others agreed that including a generic “proofs course” in the core might lead to confusion. It was observed that ODEs is not currently included as required by SFU on the grid in the Flexible Pre-Major Report, and it was confirmed that this is because the ODE course is offered in 3rd year at SFU. It was noted that since SFU accepts transfer from sending institutions for their 3rd year ODE course, the ODE course could thus legitimately be included as a core course based on the initial criteria of being required by 6 or more institutions.

There was discussion about how the core of the Flexible Pre-Major is being interpreted, and whether sending institutions felt that they needed to offer the full suite of core courses to their students. It appeared that many institutions felt they should try to offer the full core, though the reality is that even if the core is offered students will still need to take a couple of extra courses at the university in order to enter 3rd year. Smaller institutions would like to be able to keep their students for their first two years. There was a reluctance to include a course in the core that very few institutions can offer.

The need for universities to have a plan in place to help students catch up was reiterated. Personalised plans can be devised based on the strength of the student coming in.

Motion: (moved by David Leeming and seconded by Leo Neufeld)

That the BCcupms accept the proposed changes to the Mathematics Flexible Pre-Major program as defined on page 3 of the report (which moves Introduction to Analysis from the Core to the Additional Courses List, and Ordinary Differential Equations from the Additional Courses List to the Core), and that contact information for each receiving institution be added to the information on the BCCAT Flexible Pre-Major site.

Carried unanimously.

ACTION (Ian Affleck): A link to the Mathematics Flexible Pre-Major will be added to the website.

STATISTICS SESSION (please see the complete Minutes of the Statistics Session on pages 33 – 36)

Stats1. Approval of Agenda

Stats2. Approval of Minutes of the Statistics Subcommittee Session at 88th Meeting

Stats3. Matters Arising from the Minutes

Stats4. Institutional Reports

Stats5. Other Business

Stats6. Motion to Adjourn

Plenary Session

5. Demonstration of the Transfer Credit Evaluation System—Deborah Davis and Lynn Grahame

Deborah Davis, the Institutional Contact Person (ICP) for transfer issues, and Lynne Grahame, a Senior Admissions officer, both from Okanagan College, walked the committee through the transfer system from their perspective. They cautioned that the process could be slightly different at each institution, however is as follows at Okanagan College: An instructor or department designs a course and completes a transfer-friendly course outline form; this goes to Education Council for approval. If a “request for transfer” has been indicated, then the form comes to them. They enter the course on a BCCAT website where they check off all potential receiving institutions, attach the course outline, and enter the requested start date for transfer credit. It is possible to add notes to the submission, including such things as what course equivalencies are hoped for, or who has already been consulted at the receiving institution. Then the College waits for a response. The institution is provided with a list of outstanding requests annually. When requests for transfer are received by Okanagan College from other institutions, the practice at Okanagan College is to send the course outline to the respective departmental chair for decision. Once their office is informed, they complete the response online, so awarding of transfer credit is very quick once a decision has been made. They noted that Okanagan College’s role as a receiving institution is quite new. In response to questions from the floor, they commented that no transfer credit is being awarded for courses automatically—each course must be approved, and also that if they receive a request for transfer for a mathematics course that comes from another area (such as business or psychology) it would still be sent to the Mathematics Chair for approval.

6. Reports from Mathematics and Statistics Sessions

Mathematics Session

Nora Franzova summarised the discussions of the Mathematics Session.

Statistics Subcommittee Session

Bruce Dunham summarised the discussions of the Statistics Session.

7. Report from the Ministry of Education—Richard DeMerchant

Richard distributed copies of the Grade 10 Numbers report which “lists the distribution of letter grades for the school mark, provincial exam mark, and final mark for each provincially examinable course. Specifically, the proportion of students achieving various letter grades, the number of participating students, the average score, and the standard deviation are listed.” He noted that 77% of students were registered in Foundations of Math and Precalculus 10 this year (with the remainder in Apprenticeship and Workplace Math). This 77% (perhaps a bit less) will be split between Foundations of Math 11 and Precalculus Math 11 next year, as some students will switch to AWM and a few will switch the other way.

He also distributed a report which gave the distribution of grades for all of the Grade 11 and 12 mathematics courses for the last three years, broken down by gender. Richard responded to questions about the optional Math 12 final exam. He was uncertain about what percentage of students will be taking the final this year, but believes it is quite small. It will be dependent on teachers’ promotion of it. He encouraged members of the committee to get in touch with the Ministry to voice any opinions or concerns they have about the Math 12 final.

Richard also informed the committee about the Ministry of Education’s poster project: Posters have been created which display the progression of learning outcomes for the K – 12 curriculum. These are available for purchase at www.crownpubs.ca.

The committee was sad to learn that this will be Richard's last year. Richard warned that there are projected cut-backs in Ministry staff in his department and that the BCcupms will need to make a point of inviting the new Ministry representative to attend the next meeting. Richard is looking forward to getting back to teaching and is currently particularly interested in finding ways to bring mathematicians into the classroom. He invited members who had any ideas to get in touch with him.

8. Outreach Activities

Since at this point the meeting was running ahead of schedule, the committee moved on to discussion of the Correspondence, and also invited David Leeming to give his report on PIMS activities (see items 2.1 – 2.4, and item 3.2 in Wednesday's minutes, respectively). The PIMS report led to a general discussion of outreach activities. Susan Milner (UFV) asked what was being done by other institutions across the province. Some of the activities reported included:

College of the Rockies: Jim Bailey does Scientists-in-the-Schools visits.

UNBC: Jennifer Hyndman described a number of activities including: visits to a grade 8 class, having Girl Guides come to campus, Year of Science activities, an Origami in the Schools project, and an undergraduate conference, to which they added a day for high school teachers.

Langara: Nora Franzova described the Math Fair that they run in their Math for Teachers course, Year of Science talks, and a math puzzles presentation given at a Spring Break Camp for school children. They also celebrated Pi Day with pie this year. Veda Abu-Bakare added that Langara also runs a well-attended lecture series at the Vancouver Library at which she has given a couple of mathematics talks.

Nicola Valley Institute of Technology: Al Fukushima commented that their Recruitment people bring students in who attend mini-lessons and tour their facilities.

Capilano University: Wendy Lynn described their Math Fair which is run as part of their Math for Teachers course, their high school enrichment events, and their participation in the provincial math contest. She also talked about their efforts at "in-reach": they have decided to run a math movie night once per term for current students.

BCIT: Winona Cordua-von Specht described their Building Better Math Project which facilitates collaboration with industry to find relevant problems.

Okanagan College: Along with the math contest and other activities similar to those already mentioned, Clint Lee described their Experience of OC program which brings Grade 11 students into the college for a day. Satoshi Tomoda added that they have also been giving mathematics talks for seniors.

SFU: Justin Gray described the High School Math Camp for Grade 8 – 10 students who have been nominated by their teachers that will take place at the end of June, which involves problems solving sessions, contests and prizes. They will also be running a Math Camp for High School Teachers at the same time. He reminded the committee about the Taste of Pi Lecture series, held several times per year, aimed at Grade 10 – 12 students, which involves a lecture and a problem-solving session. SFU also runs a "meet and greet/open house" where high school students have an opportunity to sit in on first year classes.

Thompson Rivers University: Rick Brewster does school visits and mentioned that TRU is also doing "in-reach" activities. High school students are also invited to attend "U-days" during which 8 – 10 high school students attend several university classes.

University of Victoria: Gary McGillivray shared that for Pi Day UVic hosted three 14-minute talks and then served pie.

University of the Fraser Valley: Ian Affleck mentioned their participation in the provincial math contest and Math Mania. He described the Science Rocks Summer Camps which host 30 students for one week, during a 6 – 7 week period.

Originally there was one week dedicated to mathematics, but now the math isn't separated, and the topics are more integrated.

As a tie-in with Richard DeMerchant's interest in bringing mathematicians into the classroom there was some discussion about how to provide experiences for teachers that will help them see how mathematics is used in the real world. Information is available on the internet, but personal interaction is better. Jim Bailey suggested that building a Speakers' List of people willing to give mathematically-themed talks might be a good start. Gary McGillivray (UVic) mentioned that Math Central is a good resource, and that it might be good to have grad students speak at high schools.

There was also some discussion about effective outreach to teachers. Dave Van Bergyk spoke about the Lesson Study activities that are being organised by Melania Alvarez through PIMS which provide teachers with opportunities for collaborative lesson planning with a team that includes mathematicians and mathematics educators. He recommended this as a good option. It was observed that it would be more appropriate if colleges and universities were invited by teachers to be involved with such activities, as opposed to initiating them themselves.

It was suggested that as part of next year's agenda, members could be invited to bring and share their favourite outreach activity. Ian Affleck reminded the committee that there is a page for Outreach on the BCcupms website. The information on this site could be indexed by activity and location.

ACTION (all members): Send Ian Affleck information on the outreach activities that your institution is involved with, including contact information.

ACTION (Jim Bailey): Send an email to the BCcupms listserv to remind representatives to send outreach information to Ian.

9. Student Preparation vs. Outcomes in Mathematics—Lorraine Dame, University of Victoria

Lorraine presented some results from her research towards her PhD in Mathematics Education. Her talk was entitled: "Student Readiness and Success in Entry Level Undergraduate Mathematics." The abstract is included here:

Which elements of a student's preparation are predictors of success in entry level undergraduate math (ELUM) courses? This presentation describes recent research at the University of Victoria, which includes studies of the relationships between ELUM course outcomes, high school grades, and diagnostic test scores. It shows that higher grades in secondary school English and Math go together with a greater probability of success and higher grades in ELUM courses. The results of an in-house developed diagnostic test show that students identified as at-risk were significantly more likely to fail or drop an ELUM course.

Following her talk Lorraine entertained questions about the results and the parameters of the study, and there was speculation about some of the underlying reasons for the results. Jennifer Hyndman (UNBC) informed members about a formal study done by herself and two colleagues recently at UNBC to assess the effect of having taken Calculus 12 in high school on later performance in Calculus at university. The resulting article is entitled: *Assessment on Previous Course Work in Calculus and Subsequent Achievement in Calculus at the Post-Secondary Level*, and is published in the Canadian Journal of Science, Mathematics and Technology Education (Volume 9(1), pp. 49 – 57). The article is available at: <http://www.informaworld.com/smpp/content~db=all?content=10.1080/14926150902853204> . She would be pleased to email the results upon request.

Lorraine invited anyone who had further questions to contact her at lfdpanda@uvic.ca

The Tuesday Session of the BCcupms adjourned at 4:30 p.m.

BCcupms and Secondary School Teachers Session

1. Introductions and Opening Remarks

We welcomed Lorraine Baron (from School District 23), Paul Kelly and Pat Hayden (both from Heritage Christian School in Kelowna), and Bob Mack (from Immaculata Regional High School, Kelowna).

2. Reports

2.1 BC Secondary Schools Math Contest—Clint Lee (see attached report, page 31)

2.2 BCAMT – Dave Van Bergyk

Dave began his report by expressing his appreciation for being able to be part of the articulation group, and complimented the committee's work and their openness to change. He then moved on to discuss the following topics:

Optional Math 12 Final Exams: The Ministry website <http://www.bced.gov.bc.ca/reporting/> provides provincial reports on a number of educational matters including the optional final exams. About 29% of Principles 12 students wrote the final exam last year. With respect to concerns about grade inflation to compensate for a potentially lower blended grade if students write the final, the reports indicate a higher percent of students now get better grades on the final exam than in

the course. Dave suggested that one reason for this may be that those opting to write it may be going for scholarships, while weaker students opt out.

Calculus Readiness Test Subcommittee: At last year's meeting there was discussion about inviting high school teachers to participate in the Calculus Readiness Test Subcommittee work. This was discussed with his colleagues at the BCAMT and it was decided that although they are interested in what is developed, formal involvement would be inappropriate for a number of ideological and pragmatic reasons.

The New Math 11 Courses: Dave commented on the breakdown of students registering in Precalculus 11 versus Foundations of Math 11 based on course selections completed this Spring. He observed that the closer a school is to UBC (Vancouver) geographically, the more likely it is that all of their course offerings will be Precalculus 11. There are no more than three FOM11 classes being offered in any Vancouver schools. Slightly more sections of FOM 11 are being offered in Burnaby and Richmond, with one Richmond school offering more FOM. In Surrey a split of 5 Precalculus to 4 FOM is typical, although a few schools are reversed. The split is more even in the Interior: roughly 41% of the Math students are in each of Precalculus and FOM, with the rest in Apprenticeship and Workplace Math. It is a challenge for small rural schools in small districts. They will run an AWM11, but are unsure of which one of the others they can or should do. Overall the new FOM course is achieving more buy-in than Applications of Math did. This is a consequence of universities accepting FOM for some programs. There was further discussion of this in item 2.3 below.

Assessment Project: Dave described a BCAMT initiative that seeks to support teachers in understanding new assessment practices. Stories about innovative assessment practices have been collected and the resulting book, which is currently in press, will soon also be digitally accessible. Members will be able to get a print copy at the Fall Conference. Since the book includes some university stories, it may also be of interest to post-secondary instructors.

Leadership Summit: Dave reminded the committee about the previously announced leadership summit which will be attached to the BCAMT Fall Conference. They will be inviting numeracy coordinators to come together in order to help create opportunities for them to work together more collaboratively.

E-exams: All grade 10 exams will be online next year. There are numerous concerns about validity, student learning, and potentially insurmountable logistics issues around networking and staggered starts.

2.3 Implementation of the New WNCP Curriculum—Susan Oesterle, Douglas College

Susan asked Dave Van Bergyk and the other secondary teachers about their impressions of how well the implementation of the new curriculum is proceeding. Discussion touched on a number of topics.

The new grade 10 courses were taught for the first time this year. The main pathway was good, but teachers are less comfortable with the AWM course. The resources for the AWM course were not as strong, and some schools felt the need to build their own materials. The exam results reflected these challenges.

Schools are on-track to begin the new grade 11 courses this Fall. There were some mixed comments about the FOM11 course. Some see the FOM11 material as interesting and fun, but the Precalculus material is more familiar. There are concerns that weaker students may be directed into the FOM course, but given that FOM does allow access to post-secondary programs there is hope that there will be some strong students opting for it as well. There was speculation about whether counsellors will base their advice on the interests of students, or on perceptions about students' abilities and the difficulty of the courses. It was observed that with this new curriculum there is a need for a shift from a hierarchical view of the courses, to a more topics-based view. A question was raised about whether students are being counselled to take both math streams. Indications are that some, but not many, students will do this. It is a challenge to convince staff and counsellors that taking both courses would be a good idea. Taking an extra math course would reduce the number of other electives a student can take.

The resources for both Precalculus 11 and FOM11 seem pretty good, although the cost of textbooks is an issue. Many schools are choosing not to buy the recommended texts because of the expense. It is difficult to know what the effect of this will be on delivery of the curriculum. Some schools are looking at using workbooks as a way to pass on some costs to students. As mentioned in Dave's report, small schools are struggling because they don't have enough students to offer all three streams.

It was noted that it would be useful to track students who are taking the new courses to see what effect they have on future performance.

3. Adjourn to Reception. The session adjourned at 5:35 p.m.

Many thanks to the textbook representatives, Bijhan Shariff (Nelson Education), Jennifer Cawsey (Bedford, Freeman & Worth Publishers), and Lauren Smith (Pearson Education), who generously hosted a lovely reception.

WEDNESDAY, MAY 18, 2011

Plenary Session

1. OPENING REMARKS

1.1 Introduction of representatives

1.2 Attendance lists

Nora Franzova circulated the attendance lists.

1.3 Announcements from the host: Clint made announcements about the location for the hosted lunch, and for the afternoon key-note address.

2. CORRESPONDENCE

2.1 Letter to Athabasca University

A letter was sent to Athabasca University, reminding them of their obligation to send a representative. There was no reply. Jim sought advice from the committee to decide whether or not another attempt should be made. Bruce Dunham noted that he had also sent a letter on behalf of the Statistics Subcommittee, but also had no response. It was agreed that Jim should try again, but that this time BCCAT should be copied on the letter so that they are aware of our concerns. This matter is discussed further under item 3.1 below, under the report from John FitzGibbon, the representative from BCCAT.

2.2 Letters to UBC Okanagan and Vancouver Island University

Letters were sent to UBC Okanagan and Vancouver Island University expressing concern that representatives did not attend last year's BCcupms meeting. It was noted that this year, representatives from both institutions were in attendance.

2.3 Letter to Northern Lights College

A letter was sent to Northern Lights College, expressing concern that no representative attended last year's meeting and reminding them of their obligations to send someone. The committee was pleased that Hongbin Cui was able to join us once again this year.

2.4 Letter to BCCAT and the Vice Presidents Academic

Although the Chair had been directed to send a letter to BCCAT and the Vice Presidents Academic to communicate last year's motion of the committee in favour of removing "sending" and "receiving" designations from institutions involved in transfer agreements, this was not done. Jim explained that given later information, sending the letter no longer seemed necessary. In particular, any institution who wishes to be designated a "receiving" institution may apply for this status, and provided that they can demonstrate that they have the resources to handle transfer requests, this status will not be withheld.

Discussion followed. There seemed to be some confusion about what removal of the designations might mean. It was pointed out that transfer arrangements are not necessarily symmetric, and also cannot be assumed to be transitive. It was acknowledged that becoming a "receiving" institution would create a tremendous amount of initial extra work, as each course from all other institutions would need to be looked at. Bruce Dunham (UBC-Statistics) reported that at the Joint Annual Meeting there was concern about whether a "receiver" can choose to accept a course for transfer unilaterally, or if the "sender" needs to initiate, or at least authorise, the request for transfer. Members were encouraged to raise questions with John FitzGibbon during his report.

3. REPORTS

3.1 BCCAT— John FitzGibbon

John introduced himself as the new Associate Director for Transfer and Articulation, replacing Finola Findlay. He circulated a handout that provided an update on BCCAT activities as well as a diagram that illustrated Student Mobility in the BC Public System. In his report he touched on the following topics. Quotations are taken from the handout.

Joint Annual Meeting: This annual meeting brings together Chairs of all of the provincial articulation committees in order to share concerns about management of committees. “The 2011 meeting will be held at the River Rock Casino Resort on Friday, November 4, 2011. See: <http://www.bccat.ca/articulation/jam/>”

New Members: John discussed a helpful resource that BCCAT has produced for new member institutions. “The New Members Resource Book is a reference for private institutions admitted to the BC Transfer System...It describes the culture and norms of the BC Transfer System, the rights and obligations of membership and provides an overview of articulation tools, resources and process; www.bccat.ca/pubs/newmembersbook.pdf .”

Institutional Contact Persons: John sent around a list of the articulation contact people at each institution so that members could take note of the resource person at their institution.

Senders/Receivers: Many institutions are now listed as both sending and receiving institutions. BCIT was the first, with Okanagan College doing a pilot as a new receiving institution over the last year. As well, “the Research Universities (SFU, UBC, UBCO, UNBC and UVIC) are acting as senders amongst themselves. First year equivalencies are currently listed amongst the research universities only in the BC Transfer Guide. Depending on progress, this will be expanded in the coming year. Other institutions taking on both sending and receiving roles are OC, KPU, UFV, TRU (both), VIU, and Athabasca. Douglas will start in September.” Managing workload is an issue for those becoming receiving institutions.

Block Transfer, Advanced Placement and International Baccalaureate Transfer Guides: “BCCAT is adapting the Transfer Credit Evaluation System (TCES) to allow for the creation and maintenance of Block Transfer agreements and AP and IB equivalencies. Once complete, institutions will be able to update their listings electronically through the TCES. In addition, BCCAT will be expanding the search capabilities of the Block, AP and IB guides to allow for easier access. This project is scheduled for completion in June 2011. ICP’s have been asked to confirm block transfer agreements by May 16.”

Flexible Pre-Majors: A number of other disciplines are at various stages in establishing Flexible Pre-Majors including English, Sociology/Anthropology, and Computing Science. John commented on the uniqueness of the Mathematics Flexible Pre-Major, noting that it is beneficial, however it would be ideal if students would not need to do any make-up courses before being able to access third year.

Other Transfer Innovation Projects: A number of projects are underway, including a report on ESL assessment and placement of students, a report on block transfer updating for Tourism Management, development of a descriptive pathways transfer grid for the Medical Office Assistant program, and incorporating private institutions into the Early Childhood Education course transfer matrices.

Guidebook: Because admissions practices can be quite different from institution to institution, BCCAT has come out with a new guidebook: *An Overview of Admissions Practices at BC Institutions*, which is available at <http://www.bccat.ca/publications/publication/?pub=4137> . “This resource document provides an overview of admission practices at BC post-secondary institutions and describes a number of Issues and Challenges that admissions staff may encounter on a range of topics plus some Practices to Consider. It is hoped that it will be of value to those who regularly work in the admissions field along with others who would like a better understanding of admission process and practice.”

Research: John described several interesting BCCAT supported research projects. The titles and web-links are as follows:

- *English Proficiency Requirements at BC Post-Secondary Institutions: Challenges Posed for Students* at <http://www.bccat.ca/publications/publication/?pub=4121>
- *Student Transitions Project: February 2011 Highlights. Movers and Transfers in the BC Public Post-Secondary System* at http://www.aved.gov.bc.ca/studentn_transitions/documents/PSM-Newsletter-2011.pdf . The Student Mobility Diagram which John had circulated is an excerpt from the Student Transitions Project. The use

of Personal Education Numbers allows tracking of students as they move from institution to institution. The diagram shows a large number of students moving between the BC Colleges and Institutes, the Teaching Intensive Universities and the Research Intensive Universities, in all possible directions. Information about movement to/from particular institutions is available.

- *Credits to Graduation* at <http://www.bccat.ca/publications/publication/?pub=4091> or for the full report, see <http://bccat.ca/pubs/creditstograduation.pdf>. “The most significant finding in this study is that the transfer route does not seem to disadvantage transfer students and in fact transfer students are able to graduate with approximately the same number of credits as secondary school students, accounting for both total credits awarded at sending institutions as well as credits completed at receiving institutions.” Transfer students did take longer to complete their degrees.
- *Eligible Transfer Student Cohort Study* (soon to be released). This study tracked a cohort of students who were eligible to transfer to research universities in Fall 2003. Six years later, 72.6% had earned a post-secondary credential. “Of the 10,886 Bachelor’s degrees or higher earned by the ETR (eligible-to-transfer) cohort between 2004/05 and 2009/10, 55% were awarded by research-intensive universities, 39% by teaching-intensive universities, and 6% by colleges and institutes.”

The committee informed John about their concerns that Athabasca University, although it is both a sending and a receiving institution, has still not sent a representative to the BCcupms meetings and did not respond to Jim Bailey’s correspondence. BCCAT is aware that this is an issue. The Instructional Contact Person at Athabasca has been asked to ensure that someone is at least sent to the largest articulation groups. John encouraged Jim to send another letter to the VP Academic and to cc him. It was noted that Quest has also not yet sent a representative, although their situation may be somewhat different given the interdisciplinary nature of their programs. Royal Roads has also not sent a representative. Jim will send invitations to all new institutions who articulate Math courses. There was some discussion about actions that the committee could take if there is on-going non-attendance at the meetings, including possibly boycotting transfer arrangements, or designating the member (on the website?) as being “not in good standing”.

ACTION (Jim Bailey): Jim will invite all new institutions who articulate Mathematics courses within the BC system to attend the next meeting of the BCcupms.

3.2 PIMS—David Leeming, PIMS Education Associates Coordinator

PIMS Education Associates

Currently there are six PIMS Education Associates in BC and four in Alberta. Each site decides on what kind of math outreach suits their region and uses their \$500 annual fee to support their initiatives. Some examples of math outreach are:

- (i) the purchase and construction of items that demonstrate a particular math principle by Camosun College. These materials can be borrowed by the local secondary math teachers for use in their classroom;
- (ii) support for the Math Kangaroo program www.mathkangarocanada.com by Concordia College; and
- (iii) a Math Mania outreach program by Douglas College at École Glen (K-5) in Feb 2011. This Math Mania event attracted around three hundred students, teachers and parents. Many Douglas College students from the Math for Elementary Teachers classes devised and presented activities. Congratulations to Natasha Davidson and her many volunteers for putting on an amazingly successful Math Mania event. UFV also hosted three very successful Math Mania events, drawing on many student volunteers, including a group of grade 8 students for one of the events.

PIMS Outreach in BC

David reported on a selection of PIMS Math outreach activities that have been ongoing from 2005 to the present time.

- **haahuupayak** school – Port Alberni – September 2010 (Math Mania) – This followed eight 1-2 day training sessions held between Aug. 2007 and Feb. 2010. An average of 8 teachers and 4 teaching assistants attended these sessions.
- Sk’elep School of Excellence (Kamloops) – Four 2-day teacher training workshops (2006-2008).
- Mentorship Programs using three volunteer undergrads from TRU to assist teachers during regular school hours (2005-2008).
- Homework Club – 2 TRU undergrads helping students with math homework after school (2007-2009). An average of 23 kids attended the Club.
- Math Family Night – Dinner and an evening of fun games and entertainment after which parents took away math care packages to continue math fun at home (2008). Twenty seven families attended the Math Family Night.

- Summer Camp – A six week summer camp for students making the transition from elementary to secondary school (2008). Their day consisted of 75 minutes of math, 75 minutes of English and two hours of sports. 10 attended.
- Other PIMS Aboriginal Math Outreach initiatives were held in Lytton (Nlakapamux School), Barriere (Simpew First Nations School), Lower Nicola Band TTW and Summer Camp, Mount Currie (Xit'olaew School) SC. Also, at Seabird Island School (Agassiz), Gitanyou School, Kispiox School, Holly Smith School and Anspayaxw School (Hazelton and Houston areas), Haisla School in Kitimat; also in Bella Bella and Shearwater on the Central Coast. At Bella Bella, Math Mania was held in 2007 and professional development workshops in 2010.

Changing the Culture

This conference is held (annually in April since 1998) at the SFU Downtown Campus. Malgorzata Dubiel (SFU) has worked tirelessly to put together this unique one-day event which includes math teachers of all levels from elementary to post-secondary. PIMS has sponsored CTC for several years now. The 2011 PIMS Education Prize was awarded to Veselin Jungic (SFU) at CTC this April.

Sharing Mathematics

This annual event (one day) is now sponsored by PIMS. This year it will be held at Okanagan College (Vernon) following the BCcupms meetings.

BC Math Challengers

Travel support is provided for Victoria Teams travelling to SFU for the Provincial Round (if required).

Elmacon (Vancouver)

This event had 250 participants at UBC (Grades 5-7) on Saturday, April 30, 2011.

PI in the Sky

Issue #14 came out in October 2010. Some copies are available at the BCcupms meetings. Articles submitted to PI in the Sky from anyone at the Meetings would be welcome.

3.3 ABE—Jean McLeod (Report prepared by Costa Caravas), Vancouver Community College

Funding was finally formally approved for the math project applied for last year. The Committee was gratified to hear of the approval. The project is to research the implications of the new Western and Northern Canadian Protocol (WNCP) math pathways and curricula on student transitions to and within post-secondary institutions, and how these changes affect current ABE learning outcomes and course content. The subcommittee will also make recommendations to the ABE Math Working Committee regarding a list of outcomes for an ABE mathematics course which would articulate with the WNCP Foundations of Math.

There was discussion around some institutes not allowing representatives to attend the articulation meeting due to budget constraints. We were unanimous in believing that all institutes should send representatives to the working committee meeting. These meetings are valuable for purposes of networking, sharing of resources, and forming consensus on new learning outcome changes. By coming together there is more effective sharing of ideas and this affects the bottom line for the institutes. Money is saved by sharing and not having to reinvent things.

There were several presentations: Wii gadget, the making of a “Smartboard” out of a Wii remote and some other low-cost supplies; study guides for math and an introduction to Solaro, a new online resource; and educational technology used to teach math at Capilano University.

3.4 Math Challengers—Leo Neufeld

Math Challengers is a wonderful opportunity for students in Grade 8 or 9 who love Math to spend part of a day doing math problems individually and in teams with the prospect of trophies, medals and prizes when it's over. Brief talks or other math-related activities are also part of the experience.

This year over 570 students participated at the Regional level. This is about 120 more students than last year. Grade 8 teams came from 36 different schools and Grade 9, from 37 schools. Students may also compete as individuals.

Top teams then advance to compete at the Provincial level and, this year, 237 students were at the Math Challengers Provincials held at SFU. Besides trophies and medals for top competitors, there were also cash prizes for the top 3

students in each grade. The various stages of Math Challengers are punctuated by refreshment breaks and by short talks on interesting math topics. It's a really fun day for all!

There is a third round for the top Grade 8 students. It's called the Intramurals. In this competition two teams each from BC, Washington and Oregon square off. This year's Intramurals were held at BCIT.

All this is possible because of dedicated volunteers and committed teacher coaches, as well as financial assistance from organizations like PIMS, BCAMT, BHydro, IBM, APEGBC and Year of Science. UBC, SFU, BCIT and Camosun College provide generous competition site hosting support. The kids love the events and everyone senses accomplishment when the day is done. Our wish is to have even more participation particularly from across the Province.

After last year's report, I was contacted by Clint Lee, who put me in touch with Satoshi Tomoda. The result was that a first-time MC Regional was held in the Okanagan area.

For information about MC: <http://www.apeg.bc.ca/mathchallengers/index.html>
For previous competition problems: <http://www.math.ubc.ca/~adler/challengers/>

3.5 Changing the Culture—Susan Milner, University of the Fraser Valley

Susan gave a brief summary of this year's Changing the Culture Conference, the annual free, PIMS-sponsored event, which took place on April 27 at SFU's Harbour Centre campus. Approximately 60 – 70 teachers from all levels of mathematics education took part in the event. Walter Whitely, from York University, gave a plenary talk via video-link on what is being lost as we lose geometry from our curriculum. The second plenary was delivered by Sharon Friesen, who spoke about how to make math more accessible, while at the same time raising standards. Parallel workshops addressed new approaches to homework at SFU, mathematics knowledge for teaching, using cognitive load theory for construction of calculus exams, and the use of symbolic computation software in teaching calculus. The panel discussion addressed the question of "How to convince our students that you cannot learn mathematics by just watching somebody else do it?" During the day, the 2011 PIMS Education Prize was awarded to Dr. Veselin Jungic of SFU. Dates for next year's conference have not yet been set.

4. Publishers' Representatives

Publishers' representatives gave brief presentations on some of their new textbooks and the electronic resources offered by their companies. Lauren Smith, from Pearson Education introduced the special features of two new textbooks: a Canadian Edition of De Veaux's Data and Models introductory statistics book, and Briggs and Cochran's Early Transcendentals Calculus text. Jen Cawsey and Krista Mann, representatives from Bedford, Freeman, & Worth, described the e-book, and the video tool kit that are available for their texts, including the 5th edition of Moore's Basic Practice of Statistics, and Rogowski's latest edition of his Calculus text. Jen described the new LearningCurve formative assessment tool that is now available in the Math Portal. Bijhan Shariff, from Nelson Publishing, gave a brief sketch of the history of Nelson Publishing, and described the features of Stewart's Calculus which is out in a new edition. He mentioned that stewartcalculus.com has free resources that might be of interest to instructors. He also demonstrated a new feature within Enhanced WebAssign: a customisable interactive e-book, named YouBook.

5. Keynote Address: Aboriginal Perspectives in Mathematics Teaching—Javad Tavakoli and Lyle Mueller

Javad shared his experiences teaching Calculus to Aboriginal students. A lively discussion followed. Video of the presentation is viewable at <http://vimeo.com/24486295>.

6. BUSINESS ARISING FROM THE MINUTES OF THE 88th MEETING

6.1 UBC Changes in Calculus II—Susan Milner

During his institutional report (see section 8 below) Wayne Nagata announced that UBC-Vancouver intends to make changes to MATH 101, their Calculus II for science and engineering students, to increase the time spent on sequences and series (to approximately 8 hours). Once this revision takes place they will be revisiting transfer agreements, and courses that do not cover a sufficient amount of sequences and series will no longer receive transfer credit for MATH 101, although they will still receive transfer to some of the other flavours of Calculus II courses offered at UBC. All of their

other versions of Calculus II provide access to Calculus III. MATH 101 is only specifically required for a 4th year Differential Equations course for physics and engineering.

Susan Milner (UFV) voiced the concern that these changes are not consistent with the Calculus Core Curriculum agreement, since sequences and series are not included in the list of “core topics”. The intent of the Calculus Core Curriculum agreement is that institutions who offer the core topics in their Calculus I and Calculus II courses will be guaranteed transfer to the Calculus for Science first-year courses at all of the universities. The changes announced by UBC represent a deviation from the agreed upon Calculus Core, and revoking transfer to MATH 101 would violate the current agreement. Although the committee appreciated the advance warning, it was noted that the announcement represented a flawed process. UBC should have made a request to the BCcupms to revise the Calculus Core Curriculum agreement in order to accommodate the intended changes.

From the general discussion it appeared that most institutions already do incorporate sequences and series in their Calculus II courses.

Motion: (moved by Susan Milner and seconded by Bevan Ferreira)

That “sequences and series” be included in the Core Topics for first-year Calculus for Science students in the Calculus Core Curriculum Agreement.

During further discussion, some representatives indicated that they were unsure of the effect that such a change might have for their institution and requested more time. There were also further concerns expressed about the deeper issues surrounding process and the purpose of the Core Calculus agreement.

Motion: (moved by Wendy Lynn and seconded by Jean McLeod)

That the motion regarding changes to the Calculus Core Curriculum Agreement be tabled to the next meeting of the BCcupms.

Carried (with 1 abstention).

ACTION (Jim Bailey): Jim will add this item to the agenda of the 90th meeting.

6.2 Collaborative Offering of Second Year Math and Science Courses at Okanagan College and College of the Rockies—Jim Bailey, College of the Rockies

Jim gave a short report on a pilot project involving collaborative offerings of 2nd year math and science courses, undertaken by the College of the Rockies and Okanagan College. This past year, students at CotR were able to participate in an Ordinary Differential Equations course offered at OC, and OC students were able to participate in a Calculus IV course offered at CotR. Students registered locally and their transcripts will show transfer credit from the institution that offered the course. Jim noted that although this works, dual registration would be preferable.

The ODE course was taught by Norm Corbett and had 6 students from OC and 2 from CotR. Blackboard was used for course information, lecture notes, and assignments, while lectures were delivered synchronously using Elluminate. Maple Labs were done by the students at their home institution and had local support. All assignments and exams were scanned and sent to Norm for marking.

Jim taught the Calculus IV course for 4 students at CotR including one distance education student (but no students from OC). MOODLE was used for course information, posting of lecture notes, and uploading of scanned assignments and exams for marking. NCast was used to record lectures which were made available on MOODLE for students to view at their convenience.

Jim observed that there are a number of workload issues that need to be considered for institutions planning on attempting this type of collaboration. Technical support is needed at both institutions. As well, the institution that is not delivering the lectures still needs to have someone in the room to trouble-shoot and answer questions, as well as provide local support for tutorials, labs, and invigilating and scanning exams. Although face-to-face offerings of courses is ideal, he advocated this collaborative approach as a way to offer courses that would have insufficient enrolment if only offered at one institution. He suggested that it would be helpful for someone, such as BCcampus, to facilitate collaborative

offerings by helping institutions coordinate. Synchronous or asynchronous lectures would be possible, depending on scheduling compatibility.

He offered a number of guiding principles for collaborative offerings: the process needs to be transparent for students; teaching needs to be distributed equitably; and that the BCcampus model be followed, under which the college that registers the student collects the tuition fees, while the one that delivers the lectures earns the FTE. The biggest advantage of these collaborative offerings is that they would allow every institution to offer every course every year, which could lead to an increase in enrolments. The inter-college collaboration would also be beneficial to instructors. Challenges include the perception that such offerings may erode workload, and the reluctance of some instructors to have their lectures made available online.

After the meeting of the BC Deans of Arts and Science Programs on April 12, 2011, the following colleges agreed to draft a MOU to pursue collaboration: Camosun College, College of New Caledonia, College of the Rockies, North Island College, Northern Lights College, Northwest Community College, and Okanagan College. Jim proposed that representatives from the colleges who are going to participate in the MOU (and anyone else who is interested) form a subcommittee of the BCcupms to explore the use of technology with the objective of eventually collaboratively offering low enrolment courses. He proposed that the subcommittee select a few courses to determine if they are suitable for collaboration, the outlines are compatible, and if there are any implications for articulation. He also suggested that the subcommittee try to run a 1-hour per week Math Club collaboratively as a trial. He invited interested members to sign up on the sign-up sheet that he provided.

6.3 Travel Pool Used by ABE—Jean McLeod, Vancouver Community College

Following up on last year's discussion of the burden on small institutions of the expense of sending a representative to articulation meetings, Jean reported on her investigation into ABE's practice of using a "travel pool". She found that ABE has, in fact, not been using a travel pool for 10 years. Jean discussed the issue with her Dean, who agreed that it would be a good idea. John FitzGibbon commented that BCCAT is aware there is concern about travel costs, but reiterated the importance of attendance at articulation meetings. He noted that there are efforts within the system to make things more efficient such as, holding some meetings with common interests at the same time, and moving the location of meetings to help distribute travel costs. There have been some suggestions to hold an annual Articulation Conference, perhaps attached to the Joint Annual Meeting, which may allow for some economies of scale. The discussion did not move towards any resolution.

6.4 Report from the Nominating Committee—Gary McGillivray and Jean McLeod

Gary McGillivray and Jean McLeod nominated the incumbents, Nora Franzova (Vice-Chair) and Susan Oesterle (Secretary). After three calls for further nominations from the floor with no response, Nora and Susan were acclaimed and will continue in their respective positions for a further two years.

7. NEW BUSINESS

7.1 Revisiting Transfer Agreements for Mathematics for Elementary Teachers Courses—Susan Milner, UFV

Susan opened by reminding the group of the important role the Mathematics for Elementary Teachers courses play in the preparation of elementary teachers in our province. It is the only aspect of teacher preparation in mathematics that we exert any influence over. The experiences that prospective teachers have in these courses have a ripple effect throughout all levels of mathematics education. She reminded the committee about the report submitted by the Mathematics for Elementary Education Subcommittee that was approved at last year's meeting and noted that it is now available on the BCcupms website. This report took several years to develop as the committee worked to build consensus through extensive consultation with mathematicians, math educators, and teachers. It consists of three parts: the "Manifesto" (which outlines the ideals and goals), a list of core topics, and a section on appropriate and effective sample activities. She stressed the importance of the Manifesto, noting that the list of core topics is not sufficient on its own to convey the spirit of the course. Ongoing work is being done on evaluating textbooks.

The purpose of the report is to facilitate development of transferable Math for Teachers courses at institutions who do not yet have one, and also to promote renewed discussion of current offerings since much has changed since the original Math for Teachers courses were developed. She commented on two instances within the past year of institutions (Thompson Rivers University Open Learning and College of the Rockies) that had developed Math for Teachers courses

that did not reflect the recommendations of the report. In both instances the requests for transfer for the new courses were denied by both SFU and UFV. It was noted that the course at the College of the Rockies was designed to satisfy requirements at UVic, which has a requirement for two semesters of mathematics for their elementary education students. Course revisions are currently being made to the proposed course at Thompson Rivers University Open Learning.

Susan announced that both SFU and UFV are planning to update and revise their current Math for Teachers courses. Once this is done they will be revisiting current transfer arrangements. Changes that they make will be consistent with the recommendations of the report. In particular, she warned that courses that do not offer at least 4 hours of instruction per week, may not receive transfer status. Depth of knowledge will also be an important consideration. Given that the mathematics community has not been successful in persuading the College of Teachers to increase their requirement to two mathematics courses, it is important that we ensure that the only mathematics course elementary teachers may take is sufficiently rigorous. Susan anticipated that it will take about two years to implement changes at UFV and encouraged other institutions to examine their own courses in light of the MFEE Report.

7.2 Instructor Qualifications—Jim Bailey, Chair, for Nicholas Buck, College of New Caledonia

Since Nicholas was unable to attend the meeting this year, Jim read from an email Nicholas had sent, asking about whether or not the BC system prescribes requirements for instructor qualifications. A potential concern is that economic pressures might result in institutions hiring instructors with less than the conventional requirements to teach university-transfer mathematics courses. In his email, Nicholas stressed that his raising of this issue is not about particular individuals, but rather about the principle of respecting and maintaining minimal standards when participating in the provincial articulation process.

Jim explained that instructor qualifications are covered under Section 23 of the College and Institute Act, where it states that Education Councils are responsible for advising Boards on policy regarding instructor qualification. Despite this mention in the Act, most institutions don't have a policy. John Fitzgibbon read the section on Instructor Qualifications for Transferable Courses from the BCCAT website (<http://www.bccat.bc.ca/system/qualification/>) which offers a position statement, not an enforceable policy. It states:

- Based on long-standing precedents in the BC Transfer System, BCCAT expects that instructors who teach academic, degree-level transfer courses will usually possess, at a minimum, a master's degree or equivalent in the discipline or in a closely related area.
- Instructors teaching in other transferable programs (e.g. diploma programs) will usually possess, at a minimum, credentials consistent with the normative requirements for that program in the BC Transfer System.
- It is recognized that there may be programs in which other qualifications are equally, or more, appropriate. (Examples of alternately qualified instructors: First Nations elders, practising artists, acknowledged or renowned experts or practitioners.)
- When, for legitimate reasons, it is not possible to engage faculty who meet the standards described above, institutions should provide appropriate mentoring and supervision.

In the case of a fully qualified individual being turned down for work in favour of someone with lower qualifications, it was thought that there may be a case for legal complaint, or possibly a grievance, depending on the individual's status and the collective agreement in place. There was discussion about whether transfer agreements still hold if the sending institution does not maintain a certain standard of instructor qualifications. John Fitzgibbon observed that it is reasonable for receiving institutions to question credentials from time to time, and that decisions on transfer requests could be affected. Discussion of these issues at meetings like this is useful as it helps to protect the established norms.

8. INSTITUTIONAL REPORTS

Before beginning the reports, the Chair (Jim Bailey) asked if there had been any course changes in the past year that could affect the agreement among sending institutions to accept each others' Calculus courses. There were none.

ALEXANDER COLLEGE – Len Berggren

We have just completed the syllabus for a new course, Math 099, which will replace our previous Math 099 (which was essentially a less in-depth, non-transferrable version of Math 100). Our new MATH 099 will be a bridging course between high school and precalculus for students with weak/no math backgrounds. It will cover material from Math 10 and 11, and prepare them for the Math 12 material to be covered in our pre-calculus course, Math 100. We have also revised our requirements for admission to Math 100 and the calculus courses, and have written a math placement exam for students who do not meet our requirement for entry into a calculus course, namely a B in Principles of Math. 12.

BC INSTITUTE OF TECHNOLOGY – Winona Cordua-von Specht

- No changes to courses that affect transfer agreements.
- Bachelor programs coming on-line in Engineering with higher level math courses that we might want to articulate in the future.
- Big focus in math department on the Building Better Math project.

CAMOSUN COLLEGE – George Ballinger (for Peggy Tilley)

Enrolment in mathematics at Camosun was up a bit this year in both precalculus and first year courses. Due to the cancellation of second year physics and computing science a year ago, our second year math numbers are now below 20 but not yet on the VP's hit list! However, we did have to cancel our second year Modern Algebra offering (CAMO MATH 230, UVIC MATH 212) but UVic came to the rescue and mounted a section in the summer term so that our second year students will be able to successfully transition to third year in the fall at UVic.

Our big change for this upcoming year is at the pre-pre-calculus level (i.e. Math 11). Due to budget cuts we are moving to tuitionable courses at this level and are introducing two new courses, MATH 135 and 137, for these students. We will not be seeking university transfer for these courses and if they accidentally make their way to your institutions, please let us know.

We hosted the Vancouver Island Regional Competition for Math Challengers in February but were unable to run the BC Secondary School Mathematics Contest this year because it conflicted with Camosun College's Open House.

We welcomed a new Dean of Arts and Science in September and he is working hard trying to find more money!

CAPILANO UNIVERSITY – Wendy Lynn

1. Enrolments: Slight increases from last year, but there was a noticeable drop in Math for Elementary Teachers in both Fall 2010 and Spring 2011 compared to the corresponding terms in the previous academic year.
2. Personnel: Wendy Lynn is reducing to half-time. Lily Yen and Deanna Baxter are increasing their workloads. Next summer, Andrew Roberts will return to teach a couple of courses.
3. Administration: Our new President is Kris Bulcroft. There have been several changes in the senior administration; we now have only 3 vice-presidents.
4. There is a move to one, or possibly two, grading profiles for the entire university. A decision is expected to be made in June, 2011, effective Fall 2012.
5. A new degree in liberal studies has been approved with the first intake of students for Fall 2011. The Math and Stat Dept has developed two new third year mathematics courses for this program.

COLLEGE OF NEW CALEDONIA – Tracey Wall

1. No new courses or course changes which would ramify on articulation agreements or enrolments.
2. Enrolment in university credit courses for the 2011-2012 academic year is up slightly at this stage.

COLLEGE OF THE ROCKIES – Jim Bailey

- Okanagan College and College of the Rockies collaboratively offered the Ordinary Differential Equations course. Norm Corbett (Okanagan College) taught the classes. We scheduled College of the Rockies to teach Calculus 4 but Okanagan College did not have any students, so I taught it as a distance course. Details were in my presentation.
- We offered Mathematical Structures and Proofs for the first time. I based our course on the one which is taught at Okanagan College.
- We have a new Mathematics for Elementary Education course. Unfortunately I did not have a part in its development, will not be teaching it, and do not know anything about it.

COLUMBIA COLLEGE – No representative was sent.

COQUITLAM COLLEGE – Gera Belchev

No course changes to report.

DOUGLAS COLLEGE – Wesley Snider

Enrolments have been improving gradually and we are at, or near, capacity this summer.

Our post-baccalaureate diploma in mathematics and science teaching will commence this fall. Susan Oesterle will be teaching the first course entitled "Teaching Mathematics".

We participated in a Math Mania event for the first time. Six faculty members and about 20 students from our Math for Elementary Teachers course, along with David Leeming and Melania Alvarez from PIMS, descended on an elementary school in Coquitlam for a fun evening.

Our dual enrolment agreement with SFU now applies to Math and Science students as well as Humanities and Social Science students. This agreement allows students who meet the SFU admission requirements to register there as dual enrolment students. Students can then freely take courses at either institution with up to 60 credits from Douglas.

KWANTLEN POLYTECHNIC UNIVERSITY – Michael Nyenhuis

One new course, Math 1135, Problems and Concepts, has been developed. The calendar description is: “Students will develop skills in solving mathematical problems. They will study propositional and quantifier logic and apply this knowledge to solving problems and to elementary set theory, including relations and functions. The focus is on propositional and quantifier logic.”

The B.Sc. in Math has been shelved after a lot of work had been done on it. The B.A. Minor has 14 students nominally enrolled, with about 5 or 6 in third and fourth year. It is not clear how much longer it will run because we have been forced to offer the higher level courses as reading courses, even when they have had 5 or 6 students. This results in exhausted faculty.

In terms of administration, Graham Rankin continues as acting dean of science for at least another year. Kwantlen’s president has quit, effective in August, to become the president of Grant McEwan University in Alberta, and several vice presidents have retired or left Kwantlen and are being replaced.

LANGARA – Nora Franzova

Registration:

Registration was up all three terms. Waitlists were in many cases longer than the actual class size. For budgeting reasons only few sections were added each term. Main interest is in Introductory Stats courses and Business courses. (In business courses it is mainly for the Calculus based ones but because of the BBA program also for the non-calculus based courses the interest is rising.) Two new instructors were hired on temporary bases for mat-leave replacement and retirement replacement. Alan Cooper retired at the end of the Summer.

New/ Old:

We offered CalcIV in the Spring after many years of not being able to fill-up that course. There was interest in having both CalcIV and Numerical Analysis, but we could offer only one of these. Real Analysis had 22 students in the Fall term and the physics department after several years yet again was able to offer second year courses. Let’s see how long will the trends last.

We are working on changing or at least shaking up our placement test – at Langara it is called the Math Diagnostic Test. We would like to take part in the province wide attempt initiated by BCcupms in 2010 to create a Calculus readiness test. Our MDT places students to all levels of Langara Math Courses. (Highest score of course means the possibility for placement in Calculus for sciences.)

Transfer Agreements:

There have been no new transfer arrangements established this year. We are still hoping (for the past 2 years) to get transfer of our Math1153/1253 (Intro to Calculus I (Part 1&2)) to transfer to Math 110 at UBC. It seems to be almost done.

NICOLA VALLEY INSTITUTE OF TECHNOLOGY—Al Fukushima

NVIT has no changes in their math course delivery.

- Delivery of Math 040, 050, 051, 060 at the College Readiness level;
- Business Math, BUSM 200 (Finite) and Intro Statistics (BUSM 207), Intro Stats for the Social Sciences (Stat 203) are currently offered;
- Math 100 (Pre-Calculus), Math 110 (Finite), and Math 120 (Intro Statistics) are not subscribed to.

NVIT is currently in the process of developing a “Pre- Pre-Calculus” or related course for all students who register for NVIT that do not take other required math courses.

NVIT is using Accuplacer for entrance math diagnostics.

NVIT has a satellite campus in Burnaby.

NVIT has a new president – Ken Tourand started September 2010.

NVIT has a new Dean of Instruction – Warren Weir started November 2010.

NORTH ISLAND COLLEGE – Jason Diemer

After a hiatus of several years, Math 102 (Calculus for the Biological and Social Sciences) and Math 151 (Finite Mathematics) will be offered in the fall and winter terms, respectively, and will be targeted at biology majors.

Math 181 and 182 (Calc. I and II) will be delivered by ITV to the Port Alberni campus from the Campbell River campus. We continue to incorporate Maple-based labs.

For the first time, Math 181/182 are being offered in an "intensive" format over the Spring/Summer terms. This offering is popular with international students who were completing prerequisite work in fall and winter.

The new engineering transfer agreement between NIC and UVic has boosted our first year enrolments in calculus, physics, and computer science, but largely only at the Comox Valley campus. Math/Science enrolment at the Port Alberni and Campbell River campuses continues to lag behind.

NORTHERN LIGHTS COLLEGE – Hongbin Cui

Enrolment has been up because of our increased number of international students.

We offered a new math course: Math 121 - Calculus for Geomatics. It is offered only to the students in our new Geomatics Program. (Note: NLC Geomatics Program = First Year of BCIT Geomatics Program)

NORTHWEST COMMUNITY COLLEGE – Mona Izumi

There were lots of changes in senior management at NWCC this year.

Enrolments in Calculus I and II were down this year in both Terrace and Prince Rupert.

Introductory Statistics numbers continue to be strong. Considered a "service" course, it is fed by the Nursing program in Terrace and the Applied Coastal Ecology program in Prince Rupert.

Math for Elementary Teachers continues to be offered online but only once per academic year.

The Finite Math course that I developed for online delivery of the NCIT program was not offered this past year as it is no longer a requirement. When the course was first offered, it was part of the second year of the diploma.

The math/physics instructor in Terrace retired at the end of the academic year and the position will soon be posted. Initially it will be a full-time temporary position.

OKANAGAN COLLEGE – Dave Murray

- New courses are Math 134 (Mathematics for Sustainable Construction Management Technology) and Math 149 (Mathematics for Network and Telecommunications Engineering Technology – currently in the approval process). These courses are specific to two Okanagan College diploma programs, so there should be no articulation implications.
- Course enrolments were stable.
- There are no cuts planned to OC's math and stat programming for 2011-2012. No growth either.
- One of our long-standing term faculty members, Claude Hurtubise, became a continuing member of the department early this year.
- We continue to be primarily a service department, offering courses for the OC BBA program and for seven technology diploma programs.
- We continue to offer first-year "university transfer" at Kelowna, Vernon, Penticton and Salmon Arm and to offer selected second-year mathematics and statistics courses at Kelowna. Low enrolment in second-year courses continues to be a major concern.

- As part of a pilot project, Norm Corbett delivered OC Math 225 (ODEs) via videoconference to two students at College of the Rockies.
- Once again, Clint Lee organized the BC Secondary Schools Math Contest, both provincially and locally. About half the department participated in final round activities held at the Kelowna campus of OC on May 6.
- Shawn Desaulniers and Satoshi Tomoda organized SNAP Math Fairs in Penticton and Kelowna (<http://www.mathfair.com/>). Funding was provided by PIMS through their Education Associates program.
- Satoshi Tomoda organized a Math Challengers event in Kelowna for about sixty Grade 8 and Grade 9 students. (<http://www.apeg.bc.ca/mathchallengers/>)
- Each month from October to May, the department circulates a Math Problem of the Month to secondary and middle schools in the college region. Students may submit solutions to the department and may earn small prizes for correct solutions. The response has been poor at the secondary school level, but better at the middle school level. Leslie Corbett is the chief organizer of this activity.
- Dave Murray will be stepping down as department Chair on June 30, 2011 after a six-year stint. Clint Lee is the Chair-elect. Clint's term runs from 2011 to 2014.

SELKIRK COLLEGE – Bevin Ferriera

There is not much to report this year. We have found that Stat 105 is not working well for our Business Administration students. Other than that we are in a state of change around prerequisites, though nothing has been finalized at this point.

SIMON FRASER UNIVERSITY – Justin Gray (also for Ladislav Stacho and David Muraki)

1. Our Industrial Mathematics program currently has three streams:
 - a. Operations Research and Applied Statistics (Surrey)
 - b. Scientific Computing (Burnaby)
 - c. Discrete Mathematics (Burnaby)

Most likely the program will be discontinued at Burnaby and we will only offer the Operations Research and Applied Statistics option in future.

2. For 2010/2011, we continued the offering of themed special topics courses at the 3rd year level that target math minors in science and technology majors. This year's two offerings were well populated with math-minors and majors from other programs.
 - Game Theory (MATH 304, Prof. M. Devos): <https://aisg.sfu.ca/cos/wcOutlineView.aspx?crsOutId=9905>
Offered Fall 2010 to 55 students
 - Adventures in Group Theory: Rubiks Cube and Other Mathematical Toys (MATH 302, Prof. J. Mulholland):
<https://aisg.sfu.ca/cos/wcOutlineView.aspx?crsOutId=10424>
Offered Spring 2011 to 52 students
3. A new course, Commutative Algebra and Algebraic Geometry (MATH 441), was created as an upper-division course that can be offered as a particular choice for the biennial Selected Topics in Algebra (MATH 439). This syllabus has already been offered in 2008 and 2010.
4. Following a directive to streamline their degree programs, the Faculty of Arts and Social Sciences (FASS) decided unilaterally to discontinue their offering of a Mathematics BA and Minor. Despite our protestations, it was suggested by FASS that Arts and Social Sciences students would be better served by Mathematics Programs for Arts and Social Sciences students as administered within the Faculty of Science. The Mathematics Department was invited to create such programs.

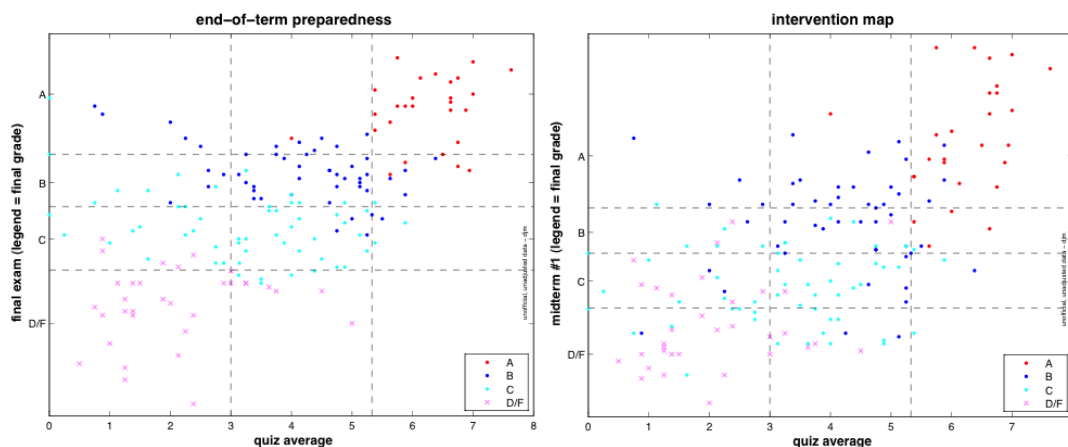
We are now planning a redesigned Minor program for FASS students that is especially aimed at Economics, Psychology and PDP-bound students -- who are currently the bulk of FASS students that enrol in our upper-division courses.

5. In Spring 2009, a two-course experiment was begun whose goal was to change the "culture" of student assignments. Instead of collecting weekly problem sets, students were encouraged to compile their work on assigned questions into a "homework portfolio". Weekly quizzes set an effective due date for the assigned work. The primary aim is to get students to see that the assigned work is for their learning benefit, not for getting some grade credit. It was found that quiz scores were much more correlated with exams and final grades, hence students received highly-correlated feedback on their progress and efforts (in contrast to graded homework, which often tended to reflect the knowledge-level of friends, TAs and cramster.com).

The experiment was continued (with fine-tuning) for a full academic year, and included the lower-division courses of the main Faculty of Science Mathematics courses: MATH 150/151, 152, 251, 232 and MACM 201. In January, the absolute success of this change was made a permanent practice in these workshop-based classes. In Linear Algebra (MATH 240), a hybrid version of quizzes and written proofs was successfully designed, and the practice will be continued for the Summer 2011 offering.

Typical of the results that were observed across these course are shown in the scatterplots below. The data shown are the quiz average (out of 8; low values contaminated by students who chose not to write at least 9 quizzes), final exam and first midterm (as stratified by letter grade ranges), and final letter grade (shown as coloured markers, see legend).

The left plot shows final exam against quiz average, and the right plot shows first midterm against (full term) quiz average. The coloured markers indicate the final letter grade for each student. Vertical scales, while only labelled with letter equivalents, are uniform with percent score.



Brief notes on these results are listed below:

- red dots indicate that A grades strongly reflect consistent quiz scores (> 5.3)
- magenta Xs indicate high likelihood of passing with earnest quiz effort (>3.0)
- A and B students are being well-served by the quiz/portfolio policy
- there is a noticeable decrease of score variance in the final exam relative to the first midterm, that might be interpreted as correlated increase of skill with consistent success in quiz performance
- the right plot suggests that a significant number of “at risk” students can be identified earlier in the term for a “study-habits intervention”

SIMON FRASER UNIVERSITY (Statistics) – Richard Lockhart

Enrolment has continued to rise, largely in courses for non-majors students. We are up 60% roughly since 2008/09. A great deal of this new enrolment comes from students registered in the Faculty of Health Sciences. There has also been growth in the second year calculus probability and statistics course STAT 270.

We have created a new course, STAT 305 Introduction to Biostatistical Methods for Health Sciences, which is a second non-calculus course for health sciences students -- particularly BA students. This course is nearly equivalent to STAT 302 which is still offered and which is focused on life sciences students.

The revision of our undergraduate program which I told BCcupms about 2 years ago is finally moving along and I hope it will be finalized this year. I do not expect the plan to change any first or second year courses -- or any course which is currently listed on the BCCAT site as articulated to someone else's course.

We have hired one new faculty member, Barbara Sanders, an actuary. We lost two faculty members: Leilei Zeng has moved to Waterloo and Charmaine Dean has moved to be Dean of Science at the University of Western Ontario.

SFU has been designated a Center of Excellence by the Society of Actuaries.

SPROTT-SHAW DEGREE COLLEGE – No representative was sent.

THOMPSON RIVERS UNIVERSITY – Rick Brewster

Enrolment:

- Enrolments down slightly from last year, but relatively stable.
- Strong international numbers, mainly business courses. Institution wants to increase international enrolments from the current 1500 to 2500 over the next few years. Growth in the Science students likely.

People:

- Fae DeBeck is retiring.
- We have a 3 year term certain replacement with a focus in Mathematics Education.
- Dennis Acreman is in year one of four as Associate Dean of Science.

Department:

- We have moved from our 40 year old trailer to a brand new building on campus.
- We have moved from the now defunct School of Advanced Technologies and Mathematics to the Faculty of Science.

Curriculum:

- No changes this past year.
- Just completed an external program review. Curriculum unlikely to change much but some updates are likely over the next two years.
- Two directed studies offered this year: Introduction to Differential Geometry and Combinatorics
- One honours graduate Jon Noel (Thesis: The invariant subspace problem.)

THOMPSON RIVERS UNIVERSITY (OPEN LEARNING) – Veda Abu-Bakare

Led by our liaison, Chris Morgan, we continue the initiative of aligning our offerings with those of TRU-K. In particular we are taking the opportunity of revising our Calc I and II sequence to a new edition of the textbook to align with that of the TRU-K sequence. Also our Math 1901 (Principles of Math for Elementary Teachers) is being revised in an attempt to reverse the decision of SFU to no longer accept our course for admission in the PDP program as well as to secure transfer credit at UFV.

TRINITY WESTERN UNIVERSITY – Rick Sutcliffe

Introduction: Trinity Western is a fully AUCC-accredited privately funded public Christian University offering a variety of graduate and undergraduate programs in the arts, humanities, fine arts, sciences, education, theology, and professional studies. It has operated in Fort Langley, British Columbia since 1962. There is no public funding, so the budget is driven by tuition and donations. Student head count reached 3500 in 2003, declined to about 2700, by 2008, and has now begun to increase. Trinity Western University is the only Canadian university to get an A+ ranking for overall quality of education in the National Post survey for each of the last five years.

Structure: The Mathematical Sciences department lives in the Faculty of Natural and Applied Sciences and encompasses Mathematics, Statistics, Computing Systems and Informatics, Physics, and Engineering.

Faculty: The Mathematics group consists of: Professor Rick Sutcliffe (Chair), Professor Don Ariel, Assistant Professor Sean Ho (resigned as of Aug 15, 2011), Associate Professor Richard Atkins, and Associate Professor Arnold Sikkema (also Physics & Engineering).

We have a vacancy for a full time tenure track position for a person with an established track record in teaching and research, most likely in applied math. An engineering credential and/or grant funding would be an asset.

Programs: The degree program in Mathematics with Computing Science is now in its twenty-ninth year, that in Mathematics in its twenty-fifth year, and have numerous successful graduates in a wide variety of Mathematical and IT fields. The department is responsible for computing degree programs and also for the first two years (transferable to UBC) of Engineering.

The math major has suffered because of the changes in requirements for education (a degree in a subject is no longer required for secondary teaching), but many courses are still doing well as other science students are now more commonly taking a concentration in Mathematics to go along with a Chemistry or Biology major.

Courses:

Analysis: Now a third year 4-credit Analysis and Topology course
Number Theory: Moved from fourth year to third
Abstract Algebra: moved from third year to fourth
Differential Equations: changed from two courses to one 4-hour course (300 level)
Numerical Analysis: changed from two courses to one 4-hour course (300 level)

Enrolment: Following many years of steady increases, and in accord with changing BC demographics, TWU saw enrolment declines after 2003 but this has apparently bottomed out, and we anticipate a growth in total numbers next year. Meanwhile, computing enrolments are substantially down across North America, and our department shares in this pain. There are signs, however, that this general decline may also be ending.

Facilities: The faculty of Natural and Applied Sciences will open the \$4M Jack VanDyke research centre this fall (named after our recently retired dean). It seems unlikely that the Math department will offer courses at the Bellingham campus (degree completion), the Ottawa campus (leadership program) or the soon-to-be-built-but-postponed Richmond campus (targeted non-science programs).

Research & Grads: Rick Sutcliffe has interests in combinatorics, and has been heavily involved in standards work for computing languages. He writes books, articles, and columns, and gives talks on a variety of social and ethical issues in technology. Don Ariel publishes a steady stream of papers on modeling laminar flow of viscous fluids. Richard Atkins' work is in the differential geometry of multi-dimensional manifolds. Arnold Sikkema has research interests in synchronization in biophysical phenomena; the character of physical law; reductionism and emergence. Senior students usually produce an undergraduate thesis and several have gone on to graduate schools with considerable success at SFU, U of A, McGill, Trent, Western Ontario, and other schools. Many others have become high school math teachers or work for government or industry.

UNIVERSITY OF BRITISH COLUMBIA-OKANAGAN (Mathematics) – Qiduan Yang

Changes of First Year Courses: None.

Enrolment: The enrolment of two Calculus 1 courses, MATH 100 for Science and MATH 116 for management and economics, is up from 2009 academic year to 2010 academic year. The numbers are shown in the following table.

Course	Term 1 (Sep2009)	Term 2 (Jan2010)	TOTAL	Term 1 (Sep2010)	Term 2 (Jan2011)	TOTAL	% +
MATH 100	595			720			21
MATH 100	595	122	717	720	160	880	22.7
MATH 116	136			160			17.6
MATH 116	136	131	267	160	160	320	19.9

Hours: MATH 100 (Calculus 1 with applications to physical sciences and engineering) has three lectures (50 minutes each) per week plus 1 hour of computer lab work and tutorial. MATH 116 (Calculus 1 for management and economics) has 3 lecture hours (50 minutes each) plus one tutorial session (50 minutes) per week.

Calculator Policy: The only model of calculator allowed in tests and exams is Sharp 510.

UNIVERSITY OF BRITISH COLUMBIA-OKANAGAN (Statistics) – Paramjit Gill

We have had healthy enrolments in the first and second year courses. We are planning to start a BSc in Statistics in a year or two. A bunch of new courses at the 2nd and 3rd year level are being developed for this programme. We hope to hire an additional assistant professor for a three year limited term position.

UNIVERSITY OF BRITISH COLUMBIA-VANCOUVER (Mathematics) – Wayne Nagata

Several new undergraduate courses were created this past year: MATH 264 (Vector Calculus for Electrical Engineering), MATH 358 (Engineering Analysis), MATH 360 (Mathematical Modeling in Science), MATH 406 (Variational and Approximate Methods in Applied Mathematics), MATH 444 (Mathematical Research and Writing). The first three

courses already appear in the UBC Calendar at <http://www.calendar.ubc.ca/vancouver/courses.cfm?code=MATH> and the last two should appear soon.

Several post-docs have been hired with funds provided by the Carl Wieman Science Education Initiative (CWSEI) to revise undergraduate math courses. Projects include the development of workshops for the Calc 1 courses, MATH 180 and 184 (prerequisite Principles of Math 12 but not Calculus 12), and the development of the "Basic Skills Test", a test on precalculus material to assist in placing students into appropriate Calc 1 courses. See <http://www.cwsei.ubc.ca/departments/math.htm> for more.

A reminder that MATH 110 was introduced a few years ago. This is a 2-term, 6-credit course that combines precalculus and differential calculus. At UBC the course has about 250 students, uses the book Just-In-Time Algebra and Trigonometry for Calculus, by Mueller and Brent for precalculus material, and Calculus, by Stewart for differential calculus material. Students with 3 credits of precalculus and 3 credits of differential calculus should in most cases be able to transfer their 6 credits as UBC MATH 110.

MATH 101, a 3-credit Calc 2 course for physical science and engineering, is being revised so that it includes about 3 weeks of material on sequences and series. MATH 101 will be a prerequisite for certain 300-level MATH courses (DE 2, complex variables, probability). It is intended that Calc 2 courses that include similar material on sequences and series will transfer to UBC as MATH 101, while Calc 2 courses without the material on sequences and series will transfer to UBC as MATH 103 (Calc 2 for life sciences) or MATH 105 (Calc 2 for business) which will still allow students to proceed with Calc 3 and DE 1 courses at UBC.

MATH 220 (Mathematical Proof) has been revised so that it now contains very little if any material on "traditional" mathematical analysis. Existing course transfer agreements will be revisited in view of these revisions.

UNIVERSITY OF BRITISH COLUMBIA-VANCOUVER (Statistics) – Bruce Dunham

Another busy year for Statistics at UBC, with plans being finalized for the new Earth Systems Building. The department is expected to move into this new building during Fall 2012.

Graduations from specialist degrees within the department dipped to a recent low, with only 20 students graduating since May 2009. This figure excludes those obtaining a minor in Statistics and also those on the BA Combined Major with Economics. Increased enrolment in this combined major, and the resulting reduction in those opting for the BSc version, largely accounts for the apparent decrease in graduations. Overall though, enrolments on our courses was very healthy, with many sections being full.

Work continued on the re-vamping of our undergraduate curriculum, with some specific proposals agreed for the coming academic year. Historically MATH/STAT 302 have been considered equivalent courses, the code changing depending on which department taught a particular section. The aim now is to teach STAT 302 in a more empirical fashion with the hope of helping students better appreciate the interplay between probabilistic models, data and statistics. Going forward it could be that STAT 302 is replaced by a similar course at the 200 level. The course STAT 300 is planned to be revived in 2012/13. This course will in effect be created as new, being a second course in Statistics for non-specialists as well as Statistics majors. It is anticipated that on-going improvements to our courses will be guided and supported over the next two years by the Carl Wieman Science Education Initiative.

The department recently undertook a review of STAT 100. Although enrolment on the course has been healthy, it has failed to attract Science students at the levels hoped for, nor has the course had any appreciable impact on the number or quality of students opting to specialize in Statistics. No decision about the course was reached apart from that it will be offered during 2011/12.

It has been agreed in principle to change the software in STAT 200 from MS Excel to R. A trial is being run this Summer in which one lab section will use R, the other Excel. In term 2 this year STAT 203 used the MathXL on-line software for student homework.

Over the past three years the department has hosted occasional meetings for those involved in teaching introductory Statistics on the UBC-V campus. The objectives have been to share ideas and disseminate good practice. A wide range of topics have been discussed, including software, learning outcomes and textbooks. Details of the discussions can be found at <https://slate.stat.ubc.ca/slate/Slate/Misc/IntroStats/>

The pilot run of SCIE 300, Communicating Science, was co-taught by faculty from Statistics and the Marine Mammal research unit, along with a lecturer. Only 26 students completed the pilot section. Six sections of SCIE 300 will be offered during 2011/12.

Further details on any of the above can be obtained by either visiting www.stat.ubc.ca or contacting Dr. Bruce Dunham at b.dunham@stat.ubc.ca.

UNIVERSITY OF THE FRASER VALLEY – Susan Milner

WNCP: Much energy was spent this year badgering other departments at UFV into revising the mathematics requirements of their programs or courses in light of the new WNCP curriculum. We had decisions made and a publication out to the high schools just in time to advise students making their choices for fall 2011.

We encouraged the departments to take the “Foundations” curriculum seriously, and many took our advice, provided a “Foundations” route into their programs and courses (e.g. Business, Nursing, CIS). Most of our first-year courses are also accessible via Foundations, with the exception of the standard science calculus sequence 111/112.

However recent feedback from teachers (accompanying their students at our math contest) indicates that many parents/students seem to be taking the “keeping-the-doors-open” route, and choosing pre-calculus, even when they are unsure about what post-secondary programs they will pursue. In the worst-case scenario, we’ll end up in the same situation we are now with Principles serving far too broad a market.

How the upgrading courses (<100 level) will be changed in light of the WNCP program has yet to be decided.

Enrolment: Enrolments in first-year courses continue to increase over previous years especially in courses which serve the business programs, such as Math 141 (Calculus for Business) and Math 106 (Statistics I). Enrolment at second year and above is stable.

Revisions to Statistics: The statistics program above first year is being radically revised. The existing minors have failed to attract students, and very useful and attractive upper level applied statistics courses have low enrolments in part due to the traditional route of entry: a second-year calculus-based “Probability and Statistics course” (our Math 270). The calculus requirement greatly restricts what could be a much broader audience.

Two new courses, Math 271 “Introduction to Data Analysis and Statistical Modeling” and Math 272 “Statistical Languages and Graphics” will soon be submitted for approval. Both courses will have a first-year statistics prerequisite, but not a calculus prerequisite, and thus will have a large pool of potential students; over 600 students take an introductory statistics course each year.

Math 271 is meant to be an “invitation” to upper-level statistics for those students who, having seen the usefulness of statistics in their first-year course, want to sample what more can be done, and possibly attach some statistical expertise to their program of choice. The course consists of some data analysis, some linear regression, some experimental design, some survival time analysis and some time series. Subsequent upper level courses pick up these topics in much greater depth.

Math 272 has the following calendar description: “Statistical graphics are important for analyzing patterns and relationships of data sets in many disciplines. This course introduces statistical graphics generated by powerful yet flexible statistical programming languages such as SAS and R. Students will learn the codes and procedures of these languages to write computer programs for producing these graphics. They will also learn how to manipulate data, compute summary statistics and present results in simple reports.”

It is unclear if we will continue offering Math 270 (our current standard calculus-based probability and statistics course.) There may be enough of a market from engineering students to offer it from time to time. There would remain a proper calculus-based probability course at the third year level, with a Calculus 3 prerequisite, namely Math 370. Our math majors/minors will be the primary market there.

These two new courses 271 and 272 will support a new “Certificate in Data Analysis” Certificate which is currently almost ready for submission. A “Minor in Applied Statistics” is a little further down the road. The existing statistics minor will be discontinued.

UNIVERSITY OF NORTHERN BRITISH COLUMBIA – Jennifer Hyndman

UNBC

- Enrolment is flat
- Now a member of PIMS

Departmental

- Program of Mathematics renamed Department of Mathematics and Statistics
- An external review was completed

Mathematics

- MATH 226 Advanced Linear Algebra moved to MATH 326
- A number of upper division changes made
- 17 students enrolled in Mathematics Major
- 13 students enrolled in Mathematics Minor
- 4 Master's students with mathematical focus
- During the Fall 2010, Winter 2011, Spring 2011 season
 - 210 students took MATH 100 Calculus I
 - 123 students took MATH 101 Calculus II
 - 115 students took MATH 115 Precalculus
 - 179 students took MATH 150 Finite Math for Business and Economics
 - 205 students took MATH 152 Calculus for Non-majors
 - 31 students took MATH 190 Math for Elementary Educators

Statistics

- New STAT label for all statistics courses taught by the department
- 2 students enrolled in Statistics Minor
- 2 Master's students with statistical focus

UNIVERSITY OF VICTORIA – Gary MacGillivray

Really there is nothing new to report. In this upcoming curriculum cycle, we may undertake a realignment of topics, and change in prerequisites, in an effort to address the high drop / fail rates in Calculus. At this time it is not clear what direction, if any, such changes would take.

VANCOUVER COMMUNITY COLLEGE – Jean McLeod

There have been no changes that would affect transfer agreements.

We began offering UT courses about 8 years ago, and our class sizes were limited by the existing rooms at our campus, which had a capacity of 25. Since our Heath Science building opened, there are now rooms that accommodate 40, and starting this January, we have been told to book all UT courses except Biology, Chemistry and Physics in those rooms. Although this class size is common in the BC college system, it was a major shift for our instructors.

Our department has increased the number of sections of Introductory Statistics we teach for the Nursing program.

VANCOUVER ISLAND UNIVERSITY – Glen Pugh

1. There are no major course changes (to Calc I & II, or otherwise) which would affect transfer agreements.
2. The funding cuts and related four week strike this spring have introduced a degree of uncertainty into course and programme planning. In the short term, the effect of labour uncertainty on current year enrolment is still unclear. For the longer term, the eventual impact to math offerings of cuts in other programmes is difficult to gauge.
3. Enrolment numbers are strong. First year courses are mostly full, while second and third year courses have stronger numbers compared to past years. The minor degree continues to be popular with 15 or so students progressing through the programme.
4. Our first year Mathematics for Forestry Technology course was cut this past year, ostensibly for pedagogical reasons though the original stated reason was budget based. We have some concern that this represents a continued erosion of math content in other programmes.
5. Our introductory Finite Math course at our satellite Duncan campus is now offered only every second year due to low enrolment.
6. Cobus Swarts (UVic) is new this year and will be handling some of the statistics load. He is developing a new second year calculus-based statistics course for Fall 2011.
7. We had a successful sitting of the Putnam math competition this year. Ten students from our third year Problem Solving course wrote the exam; six solved at least one problem and two students scored in the top 20% of all those writing.
8. The no-calculator policy for Calculus I & II implemented in Fall 2008 has been quite successful. Students appear much more comfortable and capable working with exact, non-decimal figures. Despite initial misgivings at the start of Calculus I, informal show-of-hand polls conducted at the end of Calculus II indicate strong support from students.

9. We will be hosting the 2011 Pacific Northwest Numerical Analysis Seminar on October 1 this fall.

YUKON COLLEGE – Tim Topper
No report submitted.

9. COMMITTEE BUSINESS

9.1 Theme for our 90th Meeting

A number of topics for discussion at our 90th meeting were suggested, including: the use of mobile technology (Nora Franzova); Calculus-based Statistics courses—what type of 2nd year Statistics course do students need? (Parmajeet); culturally responsive education (Veda Abu-Bakare); evidence-based results about learning (Bruce Dunham); “proof courses”—what are they? What should they be? How does this affect the Flexible Pre-Major? (Mike Nyenhuis, Bevin Ferreira); and proposed changes in the Mathematics for Teachers Course at SFU and UFV (Susan Milner).

9.2 Date and Location of the 90th Meeting

The 90th meeting will be hosted by Vancouver Community College. Dates will still need to be confirmed, but are tentatively set as May 15 – 17, 2012. Some concern was expressed that this week is the same week as the FPSE annual conference and the NVIT graduation ceremonies.

In 2013, the 91st meeting will be held at College of New Caledonia, in Prince George.

9.3 List Updates: E-mail, Member Contacts & Listserves

Members were asked to ensure that addresses on the circulated email list are correct and that names of representatives on the website are up-to-date. Contact Ian Affleck for web information updates. The names of any new department chairs should be sent to Ian as well. Leo Neufeld can be contacted for changes to the listserv. The Statistics listserv and the MFEE listserv are both maintained by Geoffrey Salloum.

To send a message to the listserv, send the email to: bccupms@lists.bccampus.ca.

10. Adjournment of the Wednesday session

The Wednesday Session of the 89th meeting of the BCcupms adjourned at 5:10 p.m.

Many, many thanks to Clint Lee and the Mathematics Department at Okanagan College Vernon for all their excellent work in hosting us for this meeting.

List of Committee Members Present
Concurrent Math/Stats – Tuesday, May 17, 2011 (a.m.); Plenary Session – Tuesday, May 17, 2011 (p.m.); Secondary Teachers Session – Tuesday, May 17, 2011; Plenary Session – Wednesday, May 18, 2011 (a.m./p.m.)

Name	Institution	MATH	STATS	TUES	TEACHER	WED
Veda Abu-Bakare	Langara College/ Thompson Rivers University (Open Learning Division)		X	X	X	X
Ian Affleck	University of the Fraser Valley		X	X	X	
Peter Anderson	University of British Columbia—Okanagan					a.m.
Jim Bailey	College of the Rockies (Chair)	X		X	X	X
George Ballinger	Camosun College	X		X	X	X
Lorraine Baron	School District 23 and UBC—Okanagan				X	
Gera Belchev	Coquitlam College	X		X	X	X
Len Berggren	Alexander College	X				X
Rick Brewster	Thompson Rivers University	X		X	X	X
Norm Corbett	Okanagan College	X				
Leslie Corbett	Okanagan College		X			
Winona Cordua-von Specht	British Columbia Institute of Technology	X		X	X	X
Hongbin Cui	Northern Lights College	X		X	X	X
Lorraine Dame	University of Victoria	X		X	X	a.m.
Richard DeMerchant	BC Ministry of Education	X		X	X	
Jason Diemer	North Island College	X		X	X	X
Bruce Dunham	University of British Columbia—Statistics (Chair of Statistics Subcommittee)		X	X	X	a.m.
Bevan Ferreira	Selkirk College		X	X	X	X
John FitzGibbon	BC Council on Admissions and Transfer					p.m.
Nora Franzova	Langara College (Vice Chair)	X		X	X	X
Al Fukushima	Nicola Valley Institute of Technology		X	X	X	X
Paramjit Gill	University of British Columbia—Okanagan		X	X		X
Justin Gray	Simon Fraser University	X		X	X	a.m.
Pat Hayden	Heritage Christian School (Kelowna)				X	
Scott Heard	Okanagan College	X		X	X	X
Joe Hoback	Okanagan College					a.m.
Jennifer Hyndman	University of Northern British Columbia	X		X	X	X
Mona Izumi	Northwest Community College	X		X	X	X
Gabriela Kakushkin	Vancouver Community College		X	X	X	X
Paul Kelly	Heritage Christian School (Kelowna)				X	
Clint Lee	Okanagan College (Vernon)	X		X	X	X
David Leeming	Pacific Institute for the Mathematical Sciences	X		X	X	a.m.
Richard Lockhart	Simon Fraser University (Statistics)		X	X	X	X
Wendy Lynn	Capilano University	X		X	X	X
Gary MacGillivray	University of Victoria	X		X		X
Jean MacLeod	Vancouver Community College	X		X	X	X
Bob Mack	Immaculata Regional High School (Kelowna)				X	
Susan Milner	University of the Fraser Valley	X		X	X	X
Dave Murray	Okanagan College		X	X	X	X
Wayne Nagata	University of British Columbia (Vancouver)	X		X	X	X
Leo Neufeld	Camosun College (Retired)	X		X	X	X
Nadia Nosrati	Simon Fraser University	X		X	X	a.m.
Michael Nyenhuis	Kwantlen Polytechnic University	X		X	X	X
Susan Oesterle	Douglas College (Secretary)	X		X	X	X
Glen Pugh	Vancouver Island University	X		X	X	X
Shane Rollans	Thompson Rivers University		X	X	X	X
Wesley Snider	Douglas College	X		X	X	X
Rick Sutcliffe	Trinity Western University	X		X	X	X
Satoshi Tomoda	Okanagan College	X				
Tim Topper	Yukon College	X		X	X	X

List of Committee Members Present (Continued)

Name	Institution	MATH	STATS	TUES	TEACHER	WED
David Van Bergeyk	BC Association of Mathematics Teachers and Salmon Arm Secondary	X		X	X	
Tracy Wall	College of New Caledonia	X		X	X	X
Qiduan Yang	University of British Columbia—Okanagan	X		X		X

* Columbia College and Sprott-Shaw Degree College did not send representatives this year. Quest, Royal Roads, and Athabasca University have not yet sent a representative to any of the BCcupms meetings.

BC Secondary School Mathematics Contest 2011 Report to the BCcupms

On May 6, 2011 the Final Round of the BC Secondary School Mathematics Contest was written at 9 provincial colleges and universities. Students who had performed well on an earlier preliminary round held within their own high schools were invited (together with a teacher sponsor) to attend the final round and spend a day at the local post-secondary institution with several activities involved.

This year the participating institutions were:

Capilano University	(CapU)
Douglas College	(Doug)
Langara College	(Lang)
North Island College	(NIC)
Northwest Community College	(NWCC)
Okanagan College/UBC Okanagan	(OC/UBCO)
Thompson Rivers University	(TRU)
Vancouver Island University	(VIU)
University of the Fraser Valley	(UFV)

The table below gives a summary of the number of students and the top scores (out of a possible 100) on the Final Round at each institution.

Institution	Final Round		Top Three Scores		Averages	
	Juniors	Seniors	Junior	Senior	Junior	Senior
CapU	25	20	95, 95, 94.5	88, 84, 76	65.5	57.6
Doug	22	15	98, 94, 93	94, 93, 90	70	70
Lang	32	6	92, 86, 79	61, 44, 25	54	33
NIC	14	8	83, 54, 48	41, 38, 28	33.9	27.3
NWCC	6	6	34, 32, 29	55, 44, 43	28	35.5
OC/UBCO	70	29	88, 82, 75	59, 54, 50	33.5	32.5
TRU	32	41	59, 56, 51	52, 50, 46	31.6	26.5
VIU	46	34	69, 65, 63	84, 76, 67	38.2	38.5
UFV	74	51	100, 84, 79	92, 73, 71	38.4	34.96
TOTAL	321	210				

Approximately 1350 Juniors and 775 Seniors throughout the province wrote the Preliminary Round this year. The top reported Junior and Senior Preliminary scores were both 60 out of 60. Note that not all schools report Preliminary Round scores or participation numbers, so these are not necessarily an accurate reflection of the level of participation in the Preliminary Round. A total of 531 students participated in the Final Round this year, very close to the numbers last year, even though two less institutions ran the Contest this year.

The Preliminary Round is handled in essentially the same way at all institutions. The Preliminary Round contest papers are mailed to participating schools. The contest is administered and marked at the schools and the results, including the names of the Final Round participants, are transmitted to the hosting institution. The Final Round does have variations. At all institutions the Final Round contest was administered on the morning of May 6, with some type of activity provided for the sponsoring teachers, and, after the contest is completed, lunch is provided for all participants. After lunch the activities vary. Some institutions have talks for the participating students and teachers, others combine talks with other activities, such as a math relay or scavenger hunts. During the time that the afternoon activities are taking place, the contests are marked, and later in the afternoon prizes awarded. The prizes vary among institutions. Some institutions give book prizes to all or selected participants; some institutions give cash prizes and/or scholarships to winners; many give T-shirts to all participants.

At least one institution continued the practice of separating the grade 8 contestants about half-way through the contest to do the long answer portion in teams of three. Having done this last year at OC generated a significant level of interest among local middle schools, resulting in a noticeable increase in participation among grade 8 students.

Thanks should go to those who have organized the Contest at their individual institutions and encouraged their local schools to participate in the Contest. First there are the primary organizers at each of the Colleges: Marsha Anderson at Capilano University; Dan Henschell at Douglas College; Nora Franzova at Langara College; Sherrie Wang at North Island College; Mona Izumi at Northwest Community College; Clint Lee and Leslie Corbett at Okanagan University College and Wayne Broughton at UBC

Okanagan; Sonja Hot at Thompson Rivers University; Ian Affleck at University of the Fraser Valley; and Patrick Ng at Vancouver Island University College. Although these are the primary organizers at each institution, it goes without saying that they do NOT do all the work required to make this contest a success. Indeed, they have indicated that their entire departments are involved with hosting the contest. Special thanks should go, as always, to John Grant McLoughlin, who, as a professor in Mathematics Education at the University of New Brunswick, continues his involvement with our contest even though he is at other end of the country.

Furthermore, the people who submitted problems and met at Simon Fraser University last May to put together the initial drafts of the contest papers and reviewed them as they developed are: Wayne Matthews and Chris Odgers (Cam), Jim Bailey (COTR), Nicholas Buck and Tracy Wall (CNC), Clint Lee and Satoshi Tomoda (OC), Nora Franzova (Lang), Mona Izumi (NWCC), Ian Affleck and Tariq Nuruddin (UFV), Annie Marquise (Doug), and John Grant McLouglin (UNB). Solutions were prepared and typeset by Jim Bailey (COTR), Satoshi Tomada (OC), Nicholas Buck (CNC), and Clint Lee (OC). The final compilation and typesetting of the contest papers and solutions was done by Clint Lee, who is also responsible for distributing the contest materials to all of the participating post-secondary institutions.

Funding of the province wide activities associated with the BCSSMC, in particular travel of speakers from one institution to the other for Final Round activities and by the BCSSMC Provincial Coordinator, currently Clint Lee, to the BCCUPMS meeting for Brain Storming sessions, has been generously provided by the Pacific Institute for the Mathematical Sciences, PIMS.

This report, together with information on winners from the individual institutions, will be posted on the BCSSMC web site at people.okanagan.bc.ca/2011/MathContestBCCUPMReport_2011.htm.

My apologies to anyone whose name may have been inadvertently left out.

For those planning for next year, the dates I am suggesting for the 2011 contest are:

Preliminary Round: Wednesday, April 4, 2012

Final Round: Friday, May 4, 2012

Respectfully submitted to the BCCUPMS on May 17, 2011 by

Clint Lee
Okanagan College, Vernon

**MINUTES OF THE STATISTICS SUBCOMMITTEE
89TH BCcupms MEETING, MAY 17 – 18, 2011**

Present: Bruce Dunham (UBC); Leslie Corbett (Okanagan College, Kelowna); Dave Murray (Okanagan College); Gabriela Kakushkin (VCC); Paramjit Gill (UBCO); Ai Fukushima (NVIT); Ian Affleck (UFV); Veda Abu-Bakare (Langara, TRU-OL); Richard Lockhart (SFU, Stat & Act Sci); Shane Rollans (TRU); Bevan Ferreira (Selkirk). Apologies for absence received from Susan Chen (Camosun).

Chair: Bruce Dunham

Acting Secretary: Richard Lockhart

1. Approval of Agenda

Motion of approval of agenda: Moved: Bevan Ferreira; seconded Dave Murray; carried. **Carried unanimously.**

Note: Draft agenda and final agenda were circulated via Stats mailing list; Geoff Salloum maintains the list at Camosun and relevant parties should be included. Details about the list are at <https://list.camosun.bc.ca/mailman/listinfo/stats>.

2. Approval of Minutes of the Statistics Subcommittee Session of the 88th meeting

Motion of approval of minutes: Moved: Ai Fukushima; second Gabriela Kakushkin; carried. **Carried unanimously.**

3. Matters arising from minutes

1. Software licensing: The province-wide license for Minitab proved to be untenable. Another proposal involving a combined license could not be pursued since Minitab have recently changed their licensing agreements and no longer offer combined licenses.
2. Flexible pre-major program: The Chair has been investigating the possibilities of such a program for entry into Statistics majors at UVic, SFU and UBC. Potential problems arise with the existence of requirements imposed by institutions outside of the requirements for the program, and there would be difficulties in “signing off” any pre-major as granting entitlement to enter a relevant institution. The Chair admitted to stalling for other reasons: UBC and SFU are revamping their undergraduate curricula. There will be follow up with the Mathematics committee to see what is happening with their flexible pre-major.
3. Julie Peschke at Athabasca University had been contacted and invited to these meetings. There had been no response.

4. Institutional Reports

Camosun College

Our Elementary Statistics (Math 116) enrolment went down to 3.5 sections from 5 sections in the year of 2010/11 while the enrolment of our other three statistics courses remained the same as the previous year. We are considering a switch of software from Minitab to R for the two calculus based statistics courses, Math 218 and Math 219.

Nicola Valley Institute of Technology

NVIT has no changes in their math course delivery. Business Math, BUSM 200 (Finite), Intro Statistics (BUSM 207), Intro Stats for the Social Sciences (Stat 203) are currently offered. NVIT has a new president Ken Tourand since September 2010.

Okanagan College

The college will be trying to send a Statistics representative to all future meetings. The department is titled the Department of Mathematics & Statistics. Relevant courses carry STAT codes. There are three such courses: introductory courses for social science, business and science students.

Selkirk College

The college offers a few Statistics courses because of cohort programs in, for example, applied GIS (one intro course comprising six weeks of introductory material plus six weeks of spatial statistics). The courses are intense – several hours per day. STAT 291/292 for renewable resources is two hours per week. Programs transfer to Lethbridge. There are two other statistics courses.

Simon Fraser University

- a. Two faculty have left this year: Leilei Zeng and Charmaine Dean. One actuary has been hired (Barbara Sanders).
- b. Enrolments are up about 60% since 2008/09. Growth has come from Health Sciences students, and from students taking STAT 100, a course that satisfies both the Quantitative and Breadth components of SFU's WQB system.
- c. The growth in Health Science has led to the creation of a new course, STAT 305, which is similar to STAT 302 but focused on Health Sciences students.
- d. A review of our undergraduate program is nearing completion. It is expected to provide a coherent framework for computing in our program. It is not expected to change any course that is currently articulated in BCCAT; the changes should be at the third and fourth year levels.

Thompson Rivers University

Enrolments have been steady. Upper level courses attract 12 to 20 students. External review is nearly complete (Tim Swartz, SFU, for stat rep). There is a new course for aboriginal students. The course is taken in the last year of high school by students spending time at TRU getting both high school and university credit. One Statistics course is involved. Enrolments have been of 12 to 15 from all over the school district.

Thompson Rivers University, Open Learning Division

At TRU-OL the one STAT course, STAT 102 (taught with the De Veaux *et al.*, "Intro Stats" and a graphing calculator) continues to do well.

University of British Columbia, Okanagan

We have had healthy enrolments in the first and second year courses. We are planning to start a BSc in Statistics in a year or two. A bunch of new courses at the 2nd and 3rd year level are being developed for this programme. We hope to hire an additional assistant professor for a three year limited term position.

University of British Columbia, Vancouver

Another busy year for Statistics at UBC, with plans being finalized for the new Earth Systems Building. The department is expected to move into this new building during Fall 2012.

Graduations from specialist degrees within the department dipped to a recent low, with only 20 students graduating since May 2009. This figure excludes those obtaining a minor in Statistics and also those on the BA Combined Major with Economics. Increased enrolment in this combined major, and the resulting reduction in those opting for the BSc version, largely accounts for the apparent decrease in graduations. Overall though, enrolments on our courses was very healthy, with many sections being full.

Work continued on the re-vamping of our undergraduate curriculum, with some specific proposals agreed for the coming academic year. Historically MATH/STAT 302 have been considered equivalent courses, the code changing depending on which department taught a particular section. The aim now is to teach STAT 302 in a more empirical fashion with the hope of helping students better appreciate the interplay between probabilistic models, data and statistics. Going forward it could be that STAT 302 is replaced by a similar course at the 200 level. The course STAT 300 is planned to be revived in 2012/13. This course will in effect be created as new, being a second course in Statistics for non-specialists as well as Statistics majors. It is anticipated that on-going improvements to our courses will be guided and supported over the next two years by the Carl Wieman Science Education Initiative.

The department recently undertook a review of STAT 100. Although enrolment on the course has been healthy, it has failed to attract Science students at the levels hoped for, nor has the course had any appreciable impact on the number or quality of students opting to specialize in Statistics. No decision about the course was reached apart from that it will be offered during 2011/12.

It has been agreed in principle to change the software in STAT 200 from MS Excel to R. A trial is being run this Summer in

which one lab section will use R, the other Excel. In term 2 this year STAT 203 used the MathXL on-line software for student homework.

Over the past three years the department has hosted occasional meetings for those involved in teaching introductory Statistics on the UBC-V campus. The objectives have been to share ideas and disseminate good practice. A wide range of topics have been discussed, including software, learning outcomes and textbooks. Details of the discussions can be found at <https://slate.stat.ubc.ca/slate/Slate/Misc/IntroStats/>

The pilot run of SCIE 300, Communicating Science, was co-taught by faculty from Statistics and the Marine Mammal research unit, along with a lecturer. Only 26 students completed the pilot section. Six sections of SCIE 300 will be offered during 2011/12.

Further details on any of the above can be obtained by either visiting www.stat.ubc.ca or contacting Dr. Bruce Dunham at b.dunham@stat.ubc.ca.

University of Northern British Columbia

Statistics courses now have STAT (rather than MATH) code. The department is now titled the Department of Mathematics and Statistics. There are currently two students in the minor program and two MSc students.

University of The Fraser Valley

The department has been creating a minor in applied statistics. Low enrolments in the traditional statistics program prompted the development of the minor pathway, in which students will not be held back by a second year calculus “bottleneck”. The minor will require two second-year courses plus 15 upper level credits (5 courses). A new certificate in data analysis is offered, along with a new data mining course. The only on-line course in the department is a Statistics course.

In total 25 to 30 sections per year are offered in Statistics. There have been difficulties hiring qualified statistics sessionals. One relevant person has been on leave, leading to a need to cover 8 to 10 sections. A finding is that sessionals tend to get poor reviews from students.

Vancouver Community College

The college is currently teaching two Statistics courses, a general introductory course and a Health Sciences introduction. Enrolment has rapidly increased. Class sizes have recently risen from 25 to 40, which has had some negative pedagogical consequences.

5. Software Issues

The provincial Minitab license proved not to be viable, nor were other licensing options available for that software. The Chair instigated a brief discussion about software for Statistics courses, relating his experience the previous summer teaching a preparatory course to MBA students who all had laptops. Despite being informed that all would have MS Excel, in the event about half had Excel, and not all of those had the Analysis Toolpak (which is apparently no longer to be supported in future releases of Excel). Some students had Macs, and many were using OpenOffice software. This left several of the prepared computing activities in the course working less well than had been hoped, and raised questions about the viability of using Excel on introductory courses.

UBC’s STAT 200 is to trial moving to R in place of Excel. R can now be run on a “cloud”, meaning that computation and data storage are on a distant server. Other software were mentioned briefly: there is an SPSS emulator PSPP; SOFA: Statistics Open For All; gnumeric is a bit like Excel. Those three are all free. Paramjit Gill mentioned a like for Crunchit – now packaged with statistics textbooks. This has no connection to Statcrunch but is similar. Langara uses StatGraphics; expensive but very extensive.

There are lots of on-line applets, many of which can be found via Google. Jumpstart is still free.

The Chair had trialed the on-line homework system Math XL in a recent section of UBC’s STAT 203. He found it took over a day’s work to set up, much of which was spent reviewing the questions to set. The course required weekly homeworks with twelve deadlines during the term. Overall the students participated well. A downside is that MathXL is not free, though adds only a small amount extra to the price of a new textbook (De Veaux *et al.* in this case, though over a dozen other introductory Statistics books can be used). There followed a discussion on on-line homework tools.

6. Any other business

- a. The Chair had recently been sent a list of outstanding articulation requests. Only one involved a STAT course: College of the Rockies STAT 206 for TRU, TRU-OL. Shane Rollins informed that such requests are dealt with outside his department and by the registrar at TRU.
- b. There was a short discussion on the use of clickers and the Chair volunteered to disseminate an article on his experiences using clickers. Those interested can contact the Chair at b.dunham@stat.ubc.ca.

7. Motion to adjourn

Bevan Ferreira moved to adjourn. Seconded by Al Fukushima. **Carried unanimously.**