

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

MINUTES OF THE 91<sup>ST</sup> MEETING, MAY 14 – 15<sup>TH</sup>, 2013

*TUESDAY, MAY 14, 2013*

## 1. WELCOME

Darlene McIntosh, elder of the Lheitli Tenneh, welcomed the BCcupms to its 91<sup>st</sup> meeting at the Prince George Campus of the College of New Caledonia.

## 2. ADOPTION OF THE AGENDA FOR THE 91<sup>ST</sup> MEETING OF THE BCcupms

The Agenda for the 91<sup>st</sup> Meeting was approved by consensus after agreeing to the following changes:

- Brent Munro from the Ministry of Education sent his regrets and so will not report. See item 7.1 (Tuesday).
- John FitzGibbon from BCCAT will give his report on Tuesday under item 7.3, instead of Wednesday, item 3.1.
- Dan Ryan was added under item 7.2 (Tuesday) to address 2 + 2 transfer arrangements with UNBC.
- The keynote address will be given by Bruce Allan. See item 4 (Wednesday).

## 3. APPROVAL OF THE MINUTES OF THE 90<sup>TH</sup> MEETING, HELD AT VANCOUVER COMMUNITY COLLEGE

Jean Macleod noted that her name had been spelled incorrectly. Susan will make the corrections.

**Motion:** (moved by Richard Lockhart and seconded by Jennifer Hyndman)

**That the Minutes of the 90<sup>th</sup> Meeting be approved as corrected.**

**Carried unanimously.**

## 4. ANNOUNCEMENTS

### 4.1 Introduction of representatives

**4.2 Attendance Lists:** Nora Franzova circulated the attendance lists.

**4.3 Announcements from the hosts:** Nicholas Buck 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. Deanna Baxter, Gary MacGillivray, and Wesley Snider 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: Sharing Math on May 16 at UNBC, the annual meeting of the Canadian Mathematics Education Study Group, May 23 – 28 at Brock University in Ontario, and the LSAC/ACSSA Conference, entitled “The New Face of Learning: Transforming Lives” to be held at Kwantlen Polytechnic University, May 22 – 24.

## 5. BC Open Textbook Project Led by BCcampus—Mary Burgess, Director, Curriculum Services and Applied Research (over the internet via Bridgit)

Mary described the BC Open Textbook Project, an initiative of the Ministry of Advanced Education that is being managed by BCcampus. The Ministry is funding the production of 40 open textbooks for the most popular post-secondary courses in British Columbia. These books will be instructional resources that are developed (typically as e-books) under a Creative Commons license which will enable others to further share and modify the content. The books will be available on-line and via print-on-demand. The hope is that this project will increase access to higher education by reducing student costs and give faculty more control over instructional resources. The project is being conducted in three phases. Phase 1 involves a call for reviewers to assess existing open textbooks. Mary invited members of the committee to consider putting their names forward

to review one of the mathematics or statistics texts. This phase closes May 24, with reviews due by September 3. In Phase 2 (in September) there will be a call for proposals to make adaptations to existing open textbooks. For example, a current open textbook may require additional Canadian content, or there may be a way to combine/compile materials that are already available in a more appropriate way. The final phase, which will begin in January 2014, will involve a call to create open textbooks from scratch in situations where limited or no materials are already available. Proposals involving collaboration are preferred, and technical, editing, and instructional-design support services will be provided. All books produced will be subject to peer review. The goal is to produce quality products that can be used around the world. Mary noted that the ebooks currently undergoing review are available on the website and can already be adopted. Please let her know if you decide to do this as she would like to track adoptions. Collections of additional resources will also be produced for each textbook, with solutions manuals protected via a faculty sign-in process. More information on the project and postings of the “calls for proposals” for each phase can be found at <http://open.BCcampus.ca/>.

## **Mathematics and Statistics Subcommittee Sessions (held concurrently)**

### **MATHEMATICS SESSION (Chaired by Jim Bailey)**

#### **Math1. Report from the Calculus Readiness Test Subcommittee—Justin Gray and David Feldman**

Justin reported on the progress of the Calculus Readiness Test Subcommittee and passed on regrets from David Feldman. He reminded the group of the mandate of the committee to design a shared, multiple-choice Calculus Readiness Test based in LON-CAPA. A set of topics for the test, informed by the 1999 Mathematics Proficiencies Report, has been agreed on. Questions are still being coded, but it is hoped that the test will be complete by this time next year. Questions still need to be tested on students in an open format to generate appropriate distracters for the multiple-choice responses. There will be algorithmically-generated, randomised versions of the test, which will help with test security. LON-CAPA will generate statistics on discriminatory power and difficulty of the questions. This will help build a test that can be a good predictor of success/failure. Given the legal issues around storing student personal information on US servers, Justin offered support from SFU for automatic grading. This would require one person at each institution to work with Justin to enter students, after which LON-CAPA can grade and store the scores on an SFU server. Nora Franzova (Langara) mentioned that EduCog will provide hosting on their server for \$400/year for 40 students, providing another possible option.

Committee members can email Justin if they would like to have a copy of the current questions. Eventually all will have access to the final LON-CAPA version. There will be no cost for this as SFU already uses LON-CAPA. The code base is XML and institutions will be able to have the code if they wish to translate the test into other delivery formats. Some institutions may choose not to use an on-line version at all. There was some further discussion of whether the test is meant to be prescriptive or advisory. Ultimately, this decision and the setting of a “passing” score will be up to individual institutions. Jennifer Hyndman commented that this readiness test will be a huge help at UNBC, as they currently have no assessment in place.

**ACTION (Justin Gray): Justin will call a meeting of the subcommittee by the end of today. The subcommittee will report back at next year’s meeting, if not sooner.**

#### **Math2. The Mandate/Philosophy of Colleges and the College Transfer System—Nicholas Buck**

Nicholas opened this discussion on the mandate/philosophy of colleges by reminding the group of the original vision for the college transfer system, dating back to 1986, which included such features as continuous assessment, no supplemental final exams, and a desire to be harmonious. He invited members to consider to what extent the mandate has changed. With respect to supplemental exams, most institutions reported that they are not common practice in mathematics, though they might occur in exceptional circumstances, perhaps in a closed program where a student needs one course to complete a credential. It was observed that the landscape has changed considerably over the years: there are now teaching universities and polytechnics, and the notion of a “community” college no longer exists. With all of these changes, hope was expressed that we not lose the role of the college in British Columbia as a bridge to allow students to access post-secondary studies who might not otherwise have that opportunity. John FitzGibbon noted that the BC system is being held up as a model in other provinces. While harmony may no longer be a goal, future success for our students is, and in that respect our model seems to be working.

#### **Math3. The Value of Maple (or other Computer Algebra Systems)—George Ballinger and Peggy Tilley**

George (on behalf of Peggy Tilley and the mathematics department at Camosun) asked the committee for advice on the use of Maple in 1<sup>st</sup> and 2<sup>nd</sup> year calculus courses. Looking back through previous minutes, he observed that in 2007, eight institutions reported using Maple in Calculus I, but only a couple offered a lab. Camosun has been discussing whether or not they should

continue offering their Maple labs. In response to the question of what other institutions are doing now with respect to Maple, members reported from each institution as follows:

- **College of New Caledonia** (Tracey Wall/Nicholas Buck): Maple Labs have been discontinued. They had adopted Labs in 1997 that were scheduled for half an hour per week, which became one hour every second week. They started to have reservations about the challenges of the syntax and the time involved, given how much students already struggle with Calculus and the relatively small number of engineering-bound students they have. They were also concerned about fees, as Maple added an additional encumbrance. In the end, they decided to drop the labs. Nicholas suggested that perhaps it could be introduced as a course after first year, once students have a context in which to use it.
- **Okanagan College** (Clint Lee): Has run Maple Labs since 1994. They are reasonably happy with them. The labs have evolved significantly; in particular, they have modified them to make them more accessible.
- **UBC (Okanagan)** (Wayne Broughton): Uses labs that have evolved from the labs offered at the former Okanagan University College. They are now more accessible and take advantage of the more user-friendly interface which allows students to get to the mathematics more quickly. The labs continue to evolve. They intend to continue using them for Calc I, II and III, and Linear Algebra, although there is diversity of opinion on their value within the department. Some would prefer to revert to tutorials. Maple assignments are given by some in higher level courses. Wayne noted that expectations for Maple have changed. While Maple tests formerly evaluated knowledge of Maple procedures, now Maple is simply used as a tool for the mathematics. He also observed that student evaluations of the labs are frequently negative—they do not see them as useful. However, some do like the visualization.
- **College of the Rockies** (Jim Bailey): Offers 1-hour Maple Labs for Calc I, II and Differential Equations. Jim also brings Maple into his lectures for Calc III, IV and Linear Algebra. Students often say they don't like it, however once they go away for a year and come back, especially those in engineering say they appreciated having it.
- **Douglas College** (Wesley Snider): There are no formal Maple labs and nothing specifying the use of Maple in curriculum guidelines. Use of Maple depends on the instructor. Most math courses have weekly tutorials and some instructors will dedicate one tutorial per course to familiarise students with Maple. Higher-level calculus, linear algebra and differential equations courses may include a Maple assignment, depending on the instructor.
- **University of Northern British Columbia** (Jennifer Hyndman): Uses Maple in Calc I and II. One instructor completely integrated Maple into his course assignments. Halfway through this course students are offered the opportunity to continue using Maple or to revert to doing assignments by hand. Some continue with Maple, some don't.
- **Langara College** (Nora Franzova): Uses Maple in one of their four flavours of Calc I which requires an additional two hours for Maple each week. Their grade for the Maple portion is blended with their mark for the Calc I course. This version is offered for students whose prerequisites are not good enough for the usual Calc I course. Interest in this course is not big, as it earns no additional transfer credit. They use Matlab for their Linear Algebra course and have also been using Wolfram Alpha.
- **North Island College** (Jason Diemer): A Maple component is included in their course description (3 hours lecture / 2 hours lab / 1 hour tutorial) for Calc I and II. They find they are now free to do less with syntax, and can use the Maple time to explore topics before getting to them in class. Students are opposed initially, but by February in their Calc II course, many start to see the utility of Maple. Feedback from those going on to Engineering has been very positive. A creative project is assigned at the end of Calc II. There has been pressure to reduce hours in order to facilitate timetabling.
- **Kwantlen Polytechnic** (Jan Verster): Maple is mentioned in their course outlines. In the past they have had Maple labs in some courses, but not anymore. It is introduced in class and through assignments but doesn't get tested. One instructor does a substantial Calc I project. In Linear Algebra, there are assignments that require use of Maple.
- **Simon Fraser University** (Justin Gray): Offers two courses in 2<sup>nd</sup> year that use Maple or Matlab (depending on the instructor): MACM 202, which has Linear Algebra as a pre- or co-req, and MACM 204, Computing with Calculus, (which is taken concurrently with Calc III). Maple (or other CAS) is not used with larger service courses, although some instructors may use it sporadically. Wolfram Alpha is popular as it is syntax free. Some instructors are even creating assignments in this platform. Justin observed that the Teaching College Math site of Canvas Learning Management Systems provides some interesting ways to present integration techniques.
- **Thompson Rivers University** (Suzanne Feldberg): The curriculum guideline for Calc I says that they use Maple, but she is not sure if it is still being done. If so, it is just sporadic and there is discussion of removing it from the syllabus. The course is offered as 3 hours of lecture plus one hour of seminar, and it may be that this does not allow enough time to incorporate Maple.
- **University of the Fraser Valley** (Ian Affleck): Their first mandatory use of Maple is in Calc III. They provide an orientation document in class, post some creative files, and do explorations in class. Instructors use it as they see fit and it is not tested. It would be useful in higher level courses. Currently it is not used much in Vector Calc, though some instructors have expressed interest in using it more. Similarly for Differential Equations and Linear Algebra.

- **UBC(Vancouver)** (Wayne Nagata): Similar to SFU, they offer no Maple in first year, but have a 2<sup>nd</sup>-year course that does Maple/Matlab applications in the context of Calc I, II, III, IV, Differential Equations and Linear Algebra. It is not a required course, though it is part of the Major program.
- **Capilano University** (Deanna Baxter): They currently have no site license for Maple, although some instructors still have older versions on their computers. They use graphing calculators in all of their first-year courses. They require a TI89 in Calc III and Linear Algebra. Most exams include a “no calculator” portion.
- **Northwest Community College** (Regan Sibbald): Only currently offer Calc I and Stats. Since very few of their students are engineering-bound, he prefers not to take up course time teaching Maple. He does demonstrate different platforms, including Wolfram Alpha, to his calculus-based physics students.

A show of hands indicated that 9 institutions provided Maple Labs, while 15 do not. Some institutions were on the fence.

Gary MacGillivray (UVic) suggested that institutions consider SAGE, a free, open-source computer algebra system that runs on all platforms, originating from the University of Washington. Given all of the new options available, there was some discussion as to whether Maple is still appropriate, or if it is out-of-date. Regan Sibbald observed that he had used more powerful tools than Maple as an applied physicist. Jennifer Hyndman noted that Maple is more reliable than Wolfram Alpha, and that she has found reasons to use Maple for her work outside of the classroom. Justin Gray commented that Maple has a number of useful built-in student Calculus tools, but that he has found GeoGebra useful as a teaching tool.

There was some discussion about the provincial site license which had formerly been coordinated by Langara’s Media Centre, but is now managed by Higher Education Information Technology BC (HEITBC). Some institutions described having in-house difficulties with the installation of updates. Okanagan College is working on finding a way for students to have access from home. UNBC has arranged for students to be able to access a copy of Maple from home through a Virtual Desktop Environment. Instructors should be aware that if they send in a course outline, showing that a course requires Maple, their students can download a full version of Maple for \$85/\$90.

George thanked the group for their feedback.

#### **Math4. Calculus Challenge Exam—Wayne Nagata, UBC(Vancouver)**

Wayne reminded the group about the Calculus Challenge Exam, offered each year for high school students as an opportunity to receive a letter grade and credit for Calculus I at UBC, SFU, UVic, or UNBC. He asked whether there are any other institutions who are interested in participating. Several institutions indicated that they already accept grades on the Challenge Exam as prerequisites for their Calculus II courses. Some members were uncertain about how (or if) their institution handles scores on the exam.

Perceived obstacles to student participation in the Challenge Exam included: lack of knowledge about the exam, confusion about whether the exam must be taken in the Lower Mainland or if it can be done locally, timing of the exam (late May/early June is already a busy time of year), and students’ desire to take Calc I again, using their experience in Calculus 12 to help them earn a higher grade.

**ACTION (Jim Bailey): Jim will add discussion of the Challenge Exam as an item on the agenda for next year.**

#### **STATISTICS SESSION (please see the complete Minutes of the Statistics Session on pages 28 - 32)**

**Stats1. Approval of Agenda**

**Stats2. Approval of Minutes of the Statistics Subcommittee Session at 90<sup>th</sup> Meeting**

**Stats3. Matters Arising from the Minutes**

**Stats4. Institutional Reports**

**Stats5. The Flexible Pre-Major in Statistics (Bruce Dunham, UBC-V)**

**Stats6. The WeBWorKiR Project (Bruce Dunham, UBC-V)**

## Stats7. Other business

## Stats8. Motion to Adjourn

# Plenary Session

## 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. GUESTS

### 7.1. Report from the Ministry of Education—No representative attended this year.

Brent Munro, Manager, Curriculum and Resources, from the Ministry of Education had been scheduled to attend but had to cancel the week before the meeting. He sent an email suggesting that we check out <http://www.bced.gov.bc.ca/reports/pdfs/exams/req/prov.pdf> to see some of the data that Richard used to present to our group.

Also, [http://www.bced.gov.bc.ca/irp/transforming\\_curriculum.php](http://www.bced.gov.bc.ca/irp/transforming_curriculum.php) provides information on the new curriculum direction that is being implemented. In his email he commented that “[a]t this point we do not have much to share on the curriculum transformation as the work has just recently begun and we have not yet started work on the senior secondary grades (which is no doubt the interest of your group). It is expected that we will begin looking at the senior secondary curriculum in the fall once further work on other critical connected areas has progressed, such as our graduation program.”

### 7.2. 2 plus 2 transfer—Dan Ryan (Dean of Science and Management at UNBC)

Dr. Ryan expressed his appreciation for the work being done by the articulation committee. He took advantage of the opportunity to address this group to ask about a problem that he has come across related to the offering of different Calculus Streams (Science/Engineering, Social Sciences, Life Sciences). He asked if there would be a way to facilitate students moving between streams in case their career goals change. Members of the committee reported on how this is handled at their institution. For some, like UBC, students are able to switch streams. At several others, changing streams is possible with a sufficiently high grade. Other places handle requests to switch on a case-by-case basis. There was a sense that switching is not really ideal, and it was suggested that having an on-line module to help fill in gaps could help. No one is using this option yet.

Dr. Ryan’s main purpose in addressing the committee was to express UNBC’s desire to expand and strengthen their connections with other institutions in the province. They would like to “clean up” pathways to make it easier for students to step into Year 3 at UNBC without having to take make-up courses. They have been working with Northern Lights, Northwest, and New Caledonia. He described a new arrangement with North Island College that allows biochemistry and molecular biology students to register at both NIC and UNBC, and then seamlessly move to UNBC after 2 years. When asked what the barriers to transfer to UNBC might be, Dr. Ryan replied that while course-to-course transfer works well, there are sometimes problems at the program level. The number of students graduating with Associate Degrees has decreased. Efforts to revitalise this credential include encouraging receiving institutions to offer incentives for those who complete it (e.g., special considerations like guaranteed acceptance or lower GPA entry requirements). Dr. Ryan encouraged all members of the committee to think about transfer/articulation agreements with UNBC that could be beneficial for students.

### 7.3. BCCAT Report—John Fitzgibbon

John distributed copies of his report. The report can be viewed at [http://bccupms.ca/Documents/Meeting\\_Documents/Meeting\\_91\\_PG/BCCATupdateApril2013.pdf](http://bccupms.ca/Documents/Meeting_Documents/Meeting_91_PG/BCCATupdateApril2013.pdf)

Of particular interest was the item related to the Provincial Review of the Associate Degree. The Steering Committee has made recommendations for changes which are awaiting Ministry approval. The types of issues under consideration include: the requirements for transfer to research universities, clarification for lab sciences, concern about credential

proliferation (wide varieties of diplomas) and distinguishing which are provincially regulated, and marketing. Any changes approved by the Ministry would be implemented slowly.

Jim Bailey asked about the status of the IB transfer guide. John responded that they are working to make it more interactively searchable.

John also noted that some professional groups had attended some of the articulation committee meetings. Those involved in professional accreditation are the only groups who articulate across the country. In these areas, competency maps are handed to institutions from professional organisations. John offered this is a model to consider, in order to facilitate inter-provincial transfer.

## 8. BUSINESS ARISING FROM THE MINUTES OF THE 90<sup>th</sup> MEETING

### 8.1. Report from the Core Calculus Committee—Gary MacGillivray

The subcommittee has completed its work and had circulated its recommendations for minor changes before the meeting. Some friendly amendments were suggested to the circulated version, including:

- updating the reference text for the First-Year Social Sciences/Business Calculus to: Haeussler, Paul, and Wood, *Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences*, 13<sup>th</sup> edition, Pearson, 2011;
- the addition of “additional techniques of integration” under Additional Topics for the Science stream;
- editing of small formatting issues.

After some discussion it was also agreed that:

- removing “Newton’s Method” (but not Linear Approximations) from the Social Sciences/Business Calculus Core and moving it to Additional Topics would also be a friendly amendment.

Tim Topper observed that ultimately it would be good if the reference text for the Core Calculus Agreement would be an Open Text. This is something to consider for the future.

Approval of the proposed amendments to the agreements was broken into four parts.

**Motion 1:** (moved by Gary MacGillivray and seconded by Justin Gray)

**That the BCcupms accept the proposed housekeeping changes to the core curriculum for first-year sciences calculus which include:**

- **changing the reference text to Stewart, Calculus, Early Transcendentals, 7th edition;**
- **amending point 5, bullet 5 to delete “tables”;**
- **changing Additional Topics point 2 to “Additional applications of integration”;**

**as well as:**

- **editing of small formatting issues.**

There was some further discussion about the need to clarify what is core and what is optional with respect to applications of integration. Some recommended retaining the list of examples for the “additional” applications which was provided in the previous agreement. Others objected that the list implies that all other applications are core by default. Given that areas and average value are already explicitly listed, it was suggested that “at least one more application of integration” be added to the Core, and to leave the “additional applications” without specific examples. This was accepted as a friendly amendment.

**(Revised) Motion 1:** (moved by Gary MacGillivray and seconded by Justin Gray)

**That the BCcupms accept the proposed housekeeping changes to the core curriculum for first year sciences calculus as outlined above, with the addition of:**

- **replacing “applications of integration” with “at least one more application of integration” in point 5.**

**Carried unanimously.**

**Motion 2:** (moved by Gary MacGillivray and seconded by Justin Gray)

**That the BCcupms accept the proposed substantive changes to the core curriculum for first-year sciences calculus which include:**

- amending point 3 “Taylor polynomials and special Taylor series (sin, cos, exp, 1/(1-x))” by adding the words “plus enough sequences and series to understand the radius of convergence; in particular, the concept of series and convergence, the ratio test, and how to find the radius of convergence.”;
- clarifying which topics in Sequences and Series are optional by adding “for example, the following tests: integral, comparison, alternating series, root, and limit ratio” to point 1 under Additional Topics;
- amending bullet 1 in point 5 in the Core by adding “and approximate integration” to “Definition of the definite integral”;
- deleting point 6 (“Numerical integration (including the trapezoidal rule)”) and amending point 7 in Additional Topics by adding “and error bounds”;
- amending point 8 to become “separable differential equations”;

as well as:

- adding “additional techniques of integration” under Additional Topics.

Carried unanimously.

**Motion 3:** (moved by Wayne Broughton and seconded by Wesley Snider)

**That the BCcupms accept the corresponding changes implied by Motions 1 and 2 to the core curriculum agreement for first-year Social Sciences/Business calculus, as well as:**

- updating the reference text for the First-Year Social Sciences/Business Calculus to: Haeussler, Paul, and Wood, 13<sup>th</sup> edition;
- removing “Newton’s Method” (but not Linear Approximations) from the Core and moving it to Additional Topics.

Carried unanimously.

With respect to housekeeping, Deanna Baxter noted that the word “additional” is missing from item 4 in the Additional Topics for the Social Sciences/Business calculus list.

**Motion 4:** (moved by Gary MacGillivray and seconded by Deanna Baxter)

**That the BCcupms accept the revised Core Calculus Agreement for a period of 5 years (until May 2018).**

Carried unanimously.

**ACTION (Gary MacGillivray): Complete final editing of the Core Calculus Agreement and send it to Ian Affleck for posting on the BCcupms website. The information must also be updated at BCCAT, which has a link to the original report under “Research Reports”.**

Following acceptance of the new agreement, there was discussion about the need for a core curriculum agreement for a Life Sciences calculus stream. Five institutions indicated that they offer or will soon offer two semesters of calculus in this stream.

**Motion:** (moved by Gary MacGillivray and seconded by Justin Gray)

**That the BCcupms strike a subcommittee to look into the possibility of creating a core curriculum agreement for a Life Sciences calculus stream.**

Carried unanimously.

Representatives on the committee will come from institutions who offer the Life Sciences stream. These include: SFU, UBC, UFV, Kwantlen, and TRU. Representatives need not be members of the articulation committee, and will be named at a later date. Mike Nyenhuis (Kwantlen) was appointed to take the lead in bringing the committee together.

**ACTION (Mike Nyenhuis): Contact BCcupms members at SFU, UBC, UFV, and TRU to identify committee members to explore the possibility of creating a common curriculum agreement for the Life Sciences calculus stream.**

**ACTION (Life Sciences Calculus Curriculum Subcommittee): Report back to the BCcupms at the May 2014 meeting.**

**Motion:** (moved by Leo Neufeld and seconded by Deanna Baxter)

**That the BCcupms extend its thanks to the Core Calculus Subcommittee for their hard work on updating the agreement.**

**Carried unanimously.**

## **8.2. Open Source Textbooks (continuation of Item 5 above)—Jennifer Hyndman**

Nora Franzova (possibly together with Jean MacLeod) offered to review the open textbook for College Algebra that is identified on the BCcampus site. Jan Verster noted that someone from Kwantlen has also already volunteered. Individuals were encouraged to apply.

Last year, Jennifer Hyndman (UNBC) had asked for volunteers to contribute to the development of open source materials for Linear Algebra, but there has been no further progress on this project. There is an open source Linear Algebra book that people may find interesting, which can be found at [linear.ups.edu](http://linear.ups.edu).

## **8.3. Collaborative offering of under-enrolled Mathematics and Science courses (OC, NIC, & CotR)—Jim Bailey**

Jim reported on the collaboration between College of the Rockies and North Island College to offer Engineering Statics and Dynamics in Winter 2013. See Institutional Reports for details. They plan to include Selkirk College for the Engineering course next time around and are also considering a collaborative offering for a Linear Algebra course. Len Berggren (Alexander College) expressed interest in the idea of collaborative offerings. There is no precedent for public/private collaboration at this time.

## **8.4. Webmaster Report—Ian Affleck**

There have been no major changes to the website recently. Ian has arranged for the domain name to be hosted by GoDaddy.com for \$14/year for 10 years. Thanks to SFU's Statistics Department for covering the costs. Ian encouraged members to visit the site to ensure contact information is up-to-date and to see the information that is posted there.

Information on how to access exam info has been trickling in. Where available, this information (or relevant links) is included directly in the Members list.

Last year there was some discussion of compiling a listing of textbooks being used in our courses, however not enough responses were received to make it worthwhile. If this is to happen, there will need to be a commitment to build and maintain the list. It will be difficult to remember to continually update the Webmaster with changes. It was noted that institutions' bookstores maintain lists that are publicly accessible, although they often only list books being used in the current semester. Articulation representatives can also be contacted directly when needed information is not found through the bookstore site.

Leo Neufeld is still responsible for managing the BCcupms listserv, while Susan Chen still manages the listservs for both the Statistics Subcommittee and the Mathematics for Elementary Education group.

Ian mentioned that he would like to pass the role of Webmaster on to someone else at some point. Now would be a good opportunity to arrange for shadowing of the position for a period of time. Please let him know if you are interested.

Leo Neufeld thanked Ian, on behalf of the committee, for his hard work maintaining the website.

**ACTION (BCcupms members): Send Ian information on how to best access copies of final exams from your institution.**

**ACTION (BCcupms members): Send Ian any necessary updates with respect to members or contact information.**

The Tuesday Session of the BCcupms adjourned at 4:42 p.m.

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# **BCcupms and Secondary School Teachers Session**

## **1. Introductions and Opening Remarks**

The committee welcomed Christian Sdoutz, from Kelly Road Secondary, and Brian Hatcher, School District 57 mathematics resource teacher, to our meeting.

## 2. Reports

### 2.1 BC Secondary Schools Math Contest—Clint Lee (see attached report, page 26)

There was some discussion of the date for next year's final round, with Regan Sibbald (NWCC) expressing concern about a conflict with Physics Articulation meetings. Given other problems that moving the date would create, it was decided to leave the date as Friday, May 2, as originally proposed, and efforts will be made to see what can be done in the case of NWCC.

Clint reminded the committee that he will be stepping down from his role as coordinator of the math contest in 2 more years, so a replacement will need to be found soon. The position requires facility with TeX and some formatting skills. He invited anyone interested to speak with him for more details.

### 2.2 BCAMT—Chris Becker

Chris reported that this has been the final year of implementation for the 2008 Western and Northern Canada Protocol Curriculum. He reminded the group of the three pathways to graduation (Precalculus, Foundations, and Apprenticeship & Workplace), and commented that the current offerings do not provide a good option for students who are really struggling. The new curriculum has a greater focus on math processes, including communications, connections, reasoning, technology, and visualisation, with the express purpose of building deeper understanding. This year's grade 12 students will be the first to have gone through the entire program, however Chris warned that it always takes time for teachers to adapt to the new curriculum, and things may change more significantly as teachers get more comfortable with it. There have been comments that the new Precalculus 12 course is more difficult than the former Principles of Math 12 course.

That being said, a new math curriculum design is underway that aligns with the BC Education Plan. The Ministry of Education is intensively looking at the K- 10 curriculum of all subject areas at once. Changes could be significant. The new courses are being constructed around the notion of developing common competencies: communication, thinking, and personal and social competency. The grade 8 – 10 curriculum is in a preliminary draft stage. There will be some core topics that all students will do, particularly those aimed at building educated citizens (e.g. finance, statistics). There may be less algebra and there may be options for units based on interests and post-secondary goals. The science-stream may not be much different. The Ministry is also drafting new graduation requirements.

Open discussion followed Chris' report. Topics addressed included:

- The current (WNCP) curriculum:
  - In response to a query it was noted that some, though not many, students are taking both the Foundations and Precalculus streams. In other provinces, taking more than one math course seems to be more common. The notion of taking both could be promoted, especially for students who are unsure what to choose after grade 10.
  - Despite the availability of information on the acceptability of Foundations and Precalculus courses on college and university websites, there is still some mistrust. In many cases students are opting to “play it safe” by choosing the Precalculus stream. It is also the case that many are uncertain about their plans for the future. Chris commented that it is not good to have weaker students in the Precalculus courses as it can affect the level that the course can be taught at. More needs to be done to promote the Foundations stream as legitimate. Schools could use the support of the universities to help educate parents and counselors.
  - It is still difficult for some schools to offer all three streams.
  - The new Precalculus curriculum seems to be doing a good job of the algebra.
  - The new streams help deal with the diversity of the high school population (to a degree). Now fewer students who don't need it will be taking the Precalculus course. This is a big improvement.
  - The new curriculum tries to encourage deeper understanding instead of stressing algorithms. There is some concern that the deeper understanding isn't necessarily transferring to fluency. There needs to be a balance.
- The new curriculum under development:
  - The new K-10 curriculum will be available for feedback soon (in approximately 6 weeks). Changes to Grades 11 and 12 will not begin until September.
  - For each grade, the curriculum will be arranged on a single page with links to provide more detail. It may take some time for teachers to adapt to the new format.
  - Textbooks and resources are not expected to change with this curriculum revision.
  - Hope was expressed that it will include some probability in the Precalculus stream, especially to support students going on to study genetics in first-year biology.

- Concern was expressed that the new curriculum will be reducing learning outcomes and focussing on big ideas. Mathematics is not a subject that is well suited to this format. There was also concern that while the grade 8 – 10 curriculum used to progress in a more linear fashion, now the quantity of topics and level of difficulty seem to be increasing exponentially. Reducing expectations at the lower level will result in even more material being postponed to the higher grades. Already there is very little time spent on some topics at the grade 11 and 12 level (e.g. logarithms). Because of this it is really not surprising that students are unable to do some important things by the time they get to calculus. It may make sense to push some material down to earlier grades. Streaming from grade 8 onwards would facilitate this.
- Retention of knowledge has always been a problem. Some cyclical treatment of topics seems necessary.
- Provincial final exams:
  - Formerly, when students wrote the provincial grade 12 final exam and their exam and course grades were blended, most often, students' grades fell. Should post-secondary institutions be concerned about grade inflation, now that there is no provincial final?
  - Some schools are still giving comprehensive final exams to their grade 12 classes.
  - Grade inflation is a concern. Retaking of tests is permitted by many and teachers are strongly encouraged to allow this. There is concern about standards. There is a difference in philosophy at the high school level as compared to the post-secondary level. At the high school level it is a question of how to support kids in learning, as opposed to measuring whether they have met a particular level of mastery. There is a leaning towards assessment for learning as opposed to assessment of learning.
  - Grade 10 finals do not seem appropriate and there is a push to eliminate them.
  - Exams are sometimes seen as a barrier to success, however, preparation for final exams can be an excellent learning tool. Students also need the experience of writing comprehensive final exams to help prepare them for university studies.
- Mathematics specialists teaching math courses:
  - Very few elementary teachers are mathematics specialists; mathematics majors are hard to recruit into elementary education. Numeracy helping teachers in the district are working to support teachers.
  - Fewer specialists may be hired in secondary schools due to funding issues and shrinking school populations. The need for faculty who can be flexible in what they teach, may mean that math majors will be less competitive.

### **2.3 How the new curriculum is going**

Included in previous discussion.

The BCcupms and Secondary School Teachers' Session adjourned at 6:22 p.m.

## WEDNESDAY, MAY 15, 2013

### 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:** Tracey Wall announced the time and location for the Greek dinner.

#### 2. CORRESPONDENCE

There was no correspondence to report.

#### 3. REPORTS

##### 3.1 BCCAT— John FitzGibbon

See Tuesday, section 7.3.

##### 3.2 PIMS—David Leeming, PIMS Education Associates Coordinator

Alejandro Adem has been reappointed as PIMS Director for another five year term.

##### PIMS Education Associates

All four institutions in Alberta (Red Deer College, Mount Royal University, MacEwan University and Concordia University College) have renewed their PIMS Education Associates agreements for another three years. In British Columbia, we currently have five PIMS Education Associates. They are: Douglas College, Langara College, Okanagan College, University of the Fraser Valley and Thompson Rivers University. Each institution is engaged in its own math outreach activities ranging from supporting math competitions, to doing Math Mania events, to having MFEE students present math projects to grade five students.

##### PIMS Education Outreach

Following a successful trip to Sointula and Alert Bay in April 2012, we accepted an invitation to do Math Mania in the remote community of Tahsis on northern Vancouver Island. On April 29, 2013 we presented a Math Mania event at Captain Meares Elementary Secondary School. There are 44 students (K-12) in the school. Another 32 students joined us from Gold River and Zeballos. In the morning, we set up in the gym and trained the senior students to be presenters of the activities. The actual Math Mania event was from 1 to 3 pm and was a huge success. Four volunteers – three from UBC and one from UVic travelled to Tahsis to preside over the event. We are hoping for an invitation to travel to an isolated community to present Math Mania next year.

##### First Nations Outreach

There will be a Math Mania event at the Community Health Centre of the Pacheedaht Nation in Port Renfrew on the evening of Wednesday, June 19, 2013. Again, we will be training local students as volunteers. Port Renfrew is on the west coast of Vancouver Island – about a two-hour drive from Victoria.

##### 3.3 ABE—Jean MacLeod (Report prepared by Costa Karavas), Vancouver Community College

The report was not available at the time of posting of these minutes.

##### 3.4 Math Challengers—Leo Neufeld

*What is the smallest perfect square greater than 600 whose square root has a digit sum equal to 6?*

This was the second Face-off stage question from this year's Provincial Math Challengers competition at SFU. In the Face-off session, two students are given 45 seconds to answer the question—near the end of this stage, the first student to answer 3 questions correctly wins the round and proceeds to meet another finalist.

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 about 580 students participated at the Regional level. Just over 100 more than competed in 2012. Grade 8 teams came from 40 different schools and Grade 9, from 48 schools. Students are also permitted to register as individual competitors. Top teams and individuals then advance to the Provincial competition, which was held at SFU this year. It's a really fun day for all!

There is a third round for the top Grade 8 students. It's called the Intramurals and consists of two teams each from BC, Washington and Oregon squaring off. This year the Intramurals were held at the Boeing plant in Everett.

All this is possible because of dedicated volunteers and committed teacher coaches, as well as financial assistance from organizations like PIMS, BCAMT, BCHydro, IBM and APEGBC. UBC, SFU, BCIT, Camosun College and Okanagan College provide generous competition site hosting support.

Besides the main competition in the Lower Mainland, we also have competitions on Vancouver Island and in the Okanagan. Satoshi Tomoda coordinates the Okanagan event. The scope of Math Challengers continues to widen with an offer from Fraser Valley University to stage a regional competition in 2014. Ian Affleck is spear-heading this initiative.

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—Justin Gray**

The annual Changing the Culture Conference took place at SFU's Harbour Centre Campus on Friday, May 10. The conference featured keynote addresses by Dr. Veselin Jungic (SFU) on aboriginal students in math and science, Dr. Jamie Mulholland (SFU) on MOOCS, and Dr. Bernard Hodgson (Laval) on the role of the history of mathematics in education. Participants chose between two workshops, one on games and one on the aesthetic side of mathematics, a panel debated the question "What are we preparing our students for?", and Natalia Kouzniak (SFU) accepted the 2013 PIMS Education Prize. More details can be found at <http://www.pims.math.ca/educational/changing-culture>. Dates for next year's event are still to be determined.

#### **4. Keynote Speaker: Aboriginal Education—Bruce Allan, Instructor in First Nations Studies**

Bruce Allan of the Stellat'en Ts'umusyoo Clan addressed the committee, describing the Truth and Reconciliation sessions that had been held recently in Prince George, and sharing his own and some of his family members' experiences at the Lejac Indian Residential School. His words were very moving, and left us with much to think about.

#### **5. Early Alert Programs—Jennifer Hyndman**

Jennifer described an initiative at UNBC to address concerns about completion rates. They analysed student grades in first-year science courses and compared them to the students' first midterm results in order to see if this would be a good indicator for students-at-risk. She wondered if other institutions were engaged in similar activities. She warned that institutions need to be careful about what they use as an indicator. Their analysis showed that if the first midterm had a high enough weight, then inevitably it affected the final grade. A good first term test was positively correlated with a good final in mathematics, but this was not always the case in other disciplines. Their analysis is not complete, but they are interested in suggestions for better indicators.

Gary MacGillivray indicated that UVic has also been investigating student success. They looked at all science students and found that students who are failing math are failing other subjects as well. Students who attend classes and do assignments do better than those who do not. They have had some success with identifying students who have not completed some of the course work by a certain point (e.g. 4 weeks) into the term. These students are contacted via letter to express concern and draw their attention to resources and support that are available to them. They do not hear back from most of these students but many are still motivated to try harder. In some courses, the success rate is very good. There is some indication that if the course has a textbook that is readable this technique is more successful than for courses that have a difficult text. Students

seem reluctant to come and get help, but it does seem to matter that someone is watching them and that there is a way for them to quietly get back on track.

Justin Gray described SFU's strategy for assessing homework in the lower division math classes. Homework is not handed in for credit, but students write short in-class quizzes based on the homework. This has allowed them to give more accurate and timely feedback to students on their progress. Formerly, the correlation between hand-in homework to exam scores was random, but it is much better with homework quizzes. SFU also provides a diagnostic test to their 1<sup>st</sup> semester Calculus students in the first week. They have found a high correlation between scores on the diagnostic and final exam scores. He added that homework quizzes also act as a way to monitor attendance. All students should have three pieces of data by week 4. They pulled the transcripts of at-risk students and found that they were doing badly in all of their courses and were likely to end up on academic probation. In an effort to intervene sooner, they forwarded the names of at-risk students to advisors, who contacted them for a meeting. Only half met with the advisor. In some cases students are making poor course selections. This intervention was still not early enough to help these students.

Susan Chen commented that at Camosun, some instructors now use OneNote to record lectures and post notes. This has made it much easier for students to catch up on their own if they fall behind.

Al Fukushima described NVIT's retention alert system. This is a portal for faculty and staff that allows them to identify at-risk students and direct an official notice to academic advisors who can follow up. Many of the students at their institution have academic and personal problems. Support is provided through their Success Centre, tutoring services, academic advisors and instructors. The school is relatively small and they get to know their students well. Despite these supports, retention is a big concern. Over 50% drop out in the Business program. Mathematics courses are often a source of contention—students come in with lower than expected skills and have a difficult time as a result.

Kevin Craib discussed Langara's efforts at identifying at-risk students in their intro stats courses. They administered a survey that gathered information about demographics, math experience, and self-ratings of reading and writing, alongside a short pre-test on basic math skills. Their analysis identified several predictors of poor performance, including: employment status (the more work, the weaker the performance), basic math skills (weak skills meant students were 2-3 times more likely to perform poorly), and reading/writing ability. The math pre-test was the most consistent predictor. Intervention is dependent on the instructor. Some will inform students of how they did on the pre-test and try to encourage those with low scores to take a basic math skills course. The advice is not always taken. They would be interested to know about completion/success rates across first-year stats courses in the province. At Langara, 20 – 33% do not complete (including early withdrawals and no-shows).

Bruce Dunham talked about UBC's Early Alert system which allows faculty to log in to a site to alert academic counsellors who can follow-up with identified at-risk students. This has been used by science faculty and is being trialed in statistics. Students who fail the first midterm are invited to a targeted 1-hour, student-centred study skills workshop. Students discuss what they did to prepare, what worked and what didn't. When students haven't been working, the solution to their difficulties is clearer, but how do we help the others? Hearing the success stories of other students can be powerful. Bruce has tried to emphasise learning outcomes, finding that students do not give these enough attention. He is not sure if UBC will continue with this system.

Jennifer Hyndman added that at UNBC they have tried several strategies for supporting at-risk students, including sending out letters to remind them of available resources, particularly study skills workshops. Of 20 letters sent out, only 3 students attended a workshop. As this was ineffective, they tried to proactively go into classes to do a workshop. The result was lower failure rates in that class. However, during the workshop, students were bored and not crazy about being forced to do it. Students are required to do a workshop before being given special permission to attempt a course for the third time. Just making the workshops available isn't enough as the ones who don't come often need the most help.

Justin Gray noted that low scores on SFU's calculus diagnostic are often associated with poor study skills, though study skills can be hard to measure. They have administered a study skills inventory survey along with the diagnostic. Their diagnostic was originally merely advisory and weekly support sessions were recommended and made available, but only the keenest students attended. Now the diagnostic is worth 5% of the course grade, with scores of 0 or 5 awarded. The 5% can be made up by attending the weekly review sessions and doing additional homework. They are incorporating more training in study skills in the review sessions. Math Success Seminars are also advertised before the first midterm, offering a one-hour session in which 5 faculty members give advice for 10 minutes each. Attendance at these sessions has been better than expected.

Jennifer thanked the committee for their feedback.

## 6. Report from the Nominating Committee

The nominating committee reported that Nora Franzova was willing to continue as Vice-Chair, but they were unable to find candidates for the position of Secretary. Jennifer Hyndman and Al Fukushima nominated Deanna Baxter for Secretary.

Following three calls, no further nominations were heard for Vice-Chair or for Secretary.

**Nora Franzova (Langara) was acclaimed as Vice-Chair of the BCcupms for another two-year term, and Deanna Baxter (Capilano) was acclaimed as Secretary of the BCcupms for a two-year term.**

## 7. NEW BUSINESS

### 7.1 Switching our listserv provider—Jim Bailey

Jim was notified that as of May 1, BCcampus would no longer support our listserv. BCCAT recommended that we switch to Google Groups. Leo Neufeld has been investigating options. Some members have serious concerns about Google Groups because the information is stored on a server outside of Canada. In his role as chair of the Academic Governance Council, Jim wanted to set up a listserv and was referred to BCcampus. This suggests that BCcampus may, in fact, still be able to support our listserv. Gary MacGillivray offered to host it at UVic and to run it. Some discussion followed about logistics, specifically the challenges of moving the listserv and what the capabilities and security features of the UVic list would be. In the BCCAT notification, they had warned against housing the listserv with a particular educational institution, as list management can be inconsistent or even vanish with little notice. There was discussion about whether we should try to stay with BCcampus or to accept Gary's offer.

**Motion:** (moved by Leo Neufeld and seconded by Gary MacGillivray)

**That the BCcupms listserv be moved to UVic to be managed by Gary MacGillivray, pending confirmation of a few technical details (i.e. to see whether information is accessible without being a subscriber).**

After clarification that the motion implies that the listserv will move, regardless of whether BCcampus' services are still available, the motion was:

**Carried** (with 1 abstention).

### 7.2 The government's Green Paper on the Quality Assurance Framework—Jim Bailey

Jim gave a short presentation on this proposed legislation regarding the establishment of a framework for assuring the quality of post-secondary institutions in British Columbia. This may be motivated, in part, by the recent growth in the number of private institutions and the desire to provide clarity for international students hoping to study here. The Framework is expected to be completed this summer and passed into legislation in the Fall, followed by a phased implementation. He encouraged members of the committee to make themselves familiar with the proposal and to consider its implications, particularly with respect to institutional expansion opportunities. Jim's slides can be viewed at [http://bccupms.ca/Documents/Meeting\\_Documents/Meeting\\_91\\_PG/QualityAssuranceFramework.pdf](http://bccupms.ca/Documents/Meeting_Documents/Meeting_91_PG/QualityAssuranceFramework.pdf).

## 8. INSTITUTIONAL REPORTS

Before beginning the reports, the Chair (Jim Bailey) noted that since all institutions are now both "sending" and "receiving", there is no longer a need for the College-to-College Transfer of Calculus I and II information to be updated annually.

Regrets were received from Northern Lights College, BCIT and Athabasca. The Athabasca representative was not able to attend due to budget cuts.

Justin Gray (SFU) asked about Fraser International College, wanting to know if it is listed on the BCCAT website. Deanna Baxter (Capilano) commented that she had had difficulty tracking down a transfer request from FIC. Given that FIC's courses are an exact match to Simon Fraser's courses, it would be possible (and appropriate) for them to designate the SFU representative to be their representative.

### ALEXANDER COLLEGE – Len Berggren

In the autumn of this year we will introduce a Calculus III course, partly in response to student demand and partly because the college is introducing a pre-engineering option. We have also shifted the emphasis in our introductory linear algebra class to less theory and more applications – although we have kept the topics covered to the standard ones for that level. Finally, in terms of new/changed courses we are introducing an introductory statistics course which, of course, will be circulated for articulation – probably later this year.

In order to increase the level of commitment to the college from our best instructors we have created the position of 'Regular Instructor' in certain subject areas. This two-year appointment (with the possibility of renewal) carries some extra salary and responsibilities along with a guarantee that the person selected will be given eight courses to teach for each of the next two years. In turn, the person accepting the position agrees that he/she will be available to teach those courses. At the end of two years the person's performance will be reviewed. The college has just chosen its first Regular Instructor in Mathematics.

The college is moving towards an approach to teaching that emphasizes 'learning objectives.' I'd be very interested to talk to any of my colleagues here to find out if their institutions have taken such an approach and what 'learning objectives' mean in terms of their institution.

This past term we have begun requiring that instructors teaching different sections of the same course collaborate on writing a common final for that course. We hope this will address some problems that have appeared with significant differences in the distribution of final marks in some sections of our courses.

**BC INSTITUTE OF TECHNOLOGY** – No representative sent (Regrets sent)

**CAMOSUN COLLEGE** – George Ballinger (for Peggy Tilley)

#### **Articulation**

- We are replacing our two semester linear algebra sequence MATH 110/111 with a single semester course, MATH 125, starting September 2013. Most of you have already articulated this new course for us. Thank you!
- We have removed all the prerequisites from our "first" math course, MATH 135 Career Algebra. We are recommending that students complete a short self assessment ([http://camosun.ca/learn/programs/math/ass\\_math135.pdf](http://camosun.ca/learn/programs/math/ass_math135.pdf)) to check their readiness before registering for the course. We have sent out an articulation request to Langara who has a similar course.
- We have just finished reviewing all the academic 100-level and 200-level mathematics and statistics courses in the province and the articulations are now up on the BC Transfer Guide. We used online course descriptions, online course outlines (where available) and articulation agreements you had with other institutions to guide us. If you or your students find that we have made a mistake, please let us know.

#### **Personnel**

- Nick Marsden and Wayne Matthews, long-time members of the math department, retired last year.
- Peggy Tilley, the current chair, is retiring from Camosun at the end of June. Susan Chen will be the new chair as of June 1. We are in the process of hiring a full-time continuing replacement for Peggy/Susan.
- On the administrative front, Camosun is once more undergoing a search for a new Dean of Arts and Science. Really, we are a great bunch of faculty to work with!

#### **Research**

The department is not active in research but last June, Dan Bergerud did a fine piece of mathematics. Here is an excerpt from his report:

*"I spent some time on the problem of constant width solids. These are geometric shapes which roll between two planes as a sphere does. The most interesting example is made starting with a tetrahedron. The flat faces are replaced with patches of spheres having their centres at the opposite vertex. This shape works fine as long as it does not roll onto an edge. The distance between the edges is slightly larger than the sphere radii. In 1911, a Swiss mathematician, Meissner, showed how to "fix" the edge problem by altering three of the six edges. This made the shape a true solid of constant diameter. His solution, however, is slightly distasteful as it lacks symmetry. For over 100 years, many have tried to find a symmetric solution: a way to round all six edges. Believing that there was a solution, I took on the problem. I happened upon a website where a graphic artist conjectured that an envelope of small spheres would work. Thinking that his conjecture was false, I found the formula for the envelope of the spheres. Instead, however, of proving that the surface would not work, I proved it did work! So, after, 100 years, the classic symmetric problem has been solved."*

**CAPILANO UNIVERSITY** – Deanna Baxter

**Course changes:** In Fall 2013 we are offering Math 300: "Mathematics and Creative Arts" for the first time as a part of our Liberal Studies Bachelor of Arts program. Lisa Lajeunesse developed the course and will be teaching it. No changes to report in our other courses.

**Enrolment trends:** We have had a slight decreasing trend in Math course enrolment.

**New Hire:** A new faculty member, Dr. Chien-Hsun Chang, PhD in Statistics, was hired for an RPT-4 position and just finished her first year teaching at Capilano.

**Cuts:** In order to balance the 2013/14 operational budget at Capilano, the administration decided to implement “vertical cuts”. Included among the cuts proposed was the “suspension” of the Commerce and the Computer Science Departments. Both of these cuts would have implications in the Math and Stat Department. Both Commerce and Computer Science have very healthy enrolment levels and proposed cuts were not made based on enrolment nor with any consultation with faculty. Computer Science courses needed for our Engineering Transition program would still be offered. Implications for math would include a likely decrease in enrolments in Calculus for the Social Sciences and Discrete Mathematics. Capilano University’s senate did not recommend the budget to the Board and on May 14, the Board met and passed a motion to postpone the decision on the budget until the next meeting in June so the senate can attempt to balance the budget without any program cuts.

#### **COLLEGE OF NEW CALEDONIA – Nicholas Buck**

1. No new courses or course changes which would ramify on articulation agreements.
2. No personnel changes. Many part-timers are being used these days, where a full-time work load is present.
3. Reduction in the total number of sections.
4. Mathematical Statistics (Math 205) running for the first time in decades, and with decent enrolment, too.
5. New Dean (actually Associate Dean) of Arts and Science. Mitch Verde (Psychology background).
6. President resigned and took a new position at NIC. No new one appointed, as yet.

#### **COLLEGE OF THE ROCKIES – Jim Bailey**

- The College of the Rockies and North Island College collaboratively offered Engineering Statics and Dynamics in the winter semester. The University of Victoria requires PHYS 141 while UBC requires PHYS 170. They use the same textbook and are identical for the first half. Then UVic continues with Statics while UBC changes to Dynamics.

##### Details:

- students registered locally; FTEs and fees were collected locally.
- the common (first) half was taught locally.
- after the reading break North Island College teleconferenced their lectures (synchronous delivery); College of the Rockies NCasted their lectures (asynchronous delivery).
- the assignments, midterms, final exam, grading and tutorials were done locally.

##### Challenges:

- North Island College started the week before College of the Rockies so their reading break and final exam weeks were the week before ours. This meant that our students had to attend classes during their break. The North Island student wrote the final exam the week after his other exams were scheduled.
- there was a mix-up with scheduling: our students had a Chemistry lecture partly overlapping North Island’s Engineering lecture. Our Chemistry instructor had trouble recording his lectures so North Island recorded theirs.
- The following courses have been canceled starting Fall 2013: MATH 202 (Calculus 4), MATH 205 (Calculus 3 and 4 for Engineers), MATH 220 (Mathematical Structures and Proofs), PHYS 202 (Modern Physics), STAT 206 (Calculus Based Statistics). I have been teaching these courses as directed studies with no workload consideration so they were not cut for budgetary reasons. ASTR 100 (Introductory Astronomy) has been resurrected, requiring a new hiring. I have a new dean. . .

#### **COLUMBIA COLLEGE – Ana Culibrk**

- Columbia College has been awarding Associate Degree in Arts and Science since September 2005.
- In Mathematics, we are offering at least one second year course every semester to facilitate students’ accumulation of more credits to qualify for an Associate Degree in Science at Columbia College.
- This summer we are offering Math 213 - Calculus 3 and Math 252 -Linear Algebra and Differential equations. Students majoring in Science and Engineering take this course.
- In late spring 2012 we articulated the new course Precalculus Plus - an intensive version of the precalculus course for weaker students who are identified by our Math Placement Test. The content includes the precalculus topics as well as a review of intermediate algebra and trigonometry. To cover this enriched content the course has 8 hours per week.
- The transfer credit for Precalculus Plus has been granted in the majority of colleges and universities in BC.
- In winter 2013 we articulated the other new course Math 230 – Introduction to Ordinary Differential Equations.
- Some of the colleges and universities have already accepted this course for transfer credit, and we are still waiting for the rest of the responses.
- We are pleased to announce that Columbia College has moved to its new and very own building on April 24<sup>th</sup>, 2013. Our new address is: 438 Terminal Avenue, Vancouver BC.
- We will be happy to host the Articulation meeting in 2016.

**COQUITLAM COLLEGE** – Gera Belchev

No changes to report.

**DOUGLAS COLLEGE** – Wesley Snider

Enrolments are steadily increasing with demand sections having been added each of the last few terms. As a result, we have hired a probationary faculty member, Alan Meichsner, and a contract faculty member, Rob Miller.

Our Graduate Diploma in Mathematics and Science Teaching is accepting its second in-take of students and the initial response has been good.

**KWANTLEN POLYTECHNIC UNIVERSITY** – Jan Verster

Kwantlen's mathematics enrolment remains strong, with numbers slightly higher than last year. Kwantlen continues to transition into a university. A few degrees in science have been approved, and others are pending. New courses have been developed, but are currently sitting in limbo. These will be submitted for articulation when approved.

We are in the process of re-vamping our precalculus stream. The changed courses may need to be re-articulated.

We have a new dean, Betty Worobec.

**LANGARA** – Nora Franzova

**College and department news**

Registration was strong all 3 terms. There were courses where the waitlists were not taking any more students. Still we got no new sections in the Spring. We did receive 9 new sections (per year) for the introductory stats courses, because those are required by the nursing program. Some new sections for math were also promised for the Fall 2013 and for the Spring 2014.

Former College President – David Ross resigned (moving to somewhere in Alberta). The search for a new president has started and it is expected to last up to 18 months.

For those who know David Lidstone – he is retiring (after 30 years) at the end of this Summer. He has done a lot of work in course design - especially the Math for Elementary Ed. at Langara was developed by him.

**New/ Old**

Math 2485 – Numerical Analysis ran for the first time this past Fall term with only about 8 students. We also offered Calc IV in the Spring with only 6 students. Usually we can offer only one of these small courses a year.

Math 1252 – Linear Systems with Applications has been developed and approved. This course is designed as the engineering version of Linear Algebra – to be transferred to UBC Math 152. The engineering program at Langara is also now being formally developed and approved.

Mixed mode instruction has been tried for some sections of business math (non-calculus) and statistics.

**Transfer Agreements**

Math 1252 – Linear Systems with Applications received transfer credit from VIU and UVIC. We are waiting for UBC, SFU and others.

**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 using *Accuplacer* for entrance math diagnostics.

NVIT has a satellite campus in Burnaby.

**NORTH ISLAND COLLEGE** – Jason Diemer

There are no changes to our courses that have implications for articulation agreements. We will continue to use interactive television (ITV) to enable greater access to our courses. Enrolment in engineering service courses is strong. Enrolment in other courses is stable.

John Bowman is our new President, and Tony Bellavia is our new Dean.

**NORTHERN LIGHTS COLLEGE** – No representative sent (Regrets were sent)

**NORTHWEST COMMUNITY COLLEGE** – Regan Sibbald

There were many cuts to academic programs at NWCC in 2012/13. The most impacted program was the high school equivalent program which tends to feed our UC courses especially in Prince Rupert. The UC union was able to fight back and get many of the instructors their positions back, however many upgrading students have been turned away (due to a low number of sections) so our future enrolment in UC will be heavily impacted.

Enrolments in Calculus I and II (math 101 & 102) were up this year in Terrace and Prince Rupert. Introductory Statistics (math 131) numbers continue to be strong but the students coming in have very low skills. Considered a “service” course, it is fed by the Nursing program in Terrace and the Applied Coastal Ecology program in Prince Rupert. A statistics course from the business administration program is being cut in Prince Rupert, so our enrolment in Math 131 should increase at that campus next year. Math for Elementary Teachers was discontinued due to faculty cuts. Several courses were cut as Mona Izumi was not replaced when she retired. Other faculty had to cover the most important math courses, cancelling some sections of math and some of their own courses. For the Math contest, the total participation was 19: 12(Jr) and 7(Sr) from different regions in the Northwest (Terrace, Prince Rupert, and Smithers).

**OKANAGAN COLLEGE** – Clint Lee

There have been some changes in the Math/Stats department at OC over the last year.

- A new program in Sustainable Construction Management Technology at the Penticton campus includes a one-semester technology mathematics course.
- Due to incremental increases in enrolments in university transfer science courses over the last several years, a third section of calculus I has been added at the Kelowna campus.
- Except for minor adjustments in lab sections and capacities, there have been no other changes in offerings.
- Course enrolments in Mathematics and Statistics increased by about 10% last year, with even larger increases in Vernon and Salmon Arm.
- We continue to be primarily a service department, offering courses for the OC BBA and BCIS degree programs and for seven two-year technology and business diploma programs.
- We continue to offer first-year university transfer mathematics and statistics courses at the Kelowna, Vernon, Penticton and Salmon Arm campuses and to offer selected second-year mathematics and statistics courses in Kelowna, and the second-year linear algebra course in Vernon and Salmon Arm. We plan to offer the calculus-based statistics course at the Vernon campus in Winter 2014 and in alternate years thereafter. With the increase in first year enrolment, second-year enrolments have started to increase somewhat.
- Satoshi Tomoda and Shawn Desaulniers have continued the SNAP Math Fairs at the Kelowna, Vernon and Penticton campuses. The events have been very successful. At all three campuses, students from OC MATH 160 – Math for Elementary School Teachers – are involved.
- Satoshi Tomoda has organized a Math Challengers event for the Okanagan Region for the last three years, and this will continue.
- Each month from October to April, the department publishes a Math Problem of the Month on the department website. Students in secondary and middle schools in the college region are invited to submit solutions. Small prizes are awarded for correct solutions. Over the past couple of years, the response to the POTM has declined. However, the department is continuing the program for now, since we do get positive comments about it from teachers, mainly through the Math Contest.
- Two members of the Math/Stats department are going on Extended Study Leave (sabbatical) next year. In addition, Dave Murray is retiring as of January 2014. As a result, the department has posted several positions, including a full-time continuing position in Penticton and a one year full-time term position in Vernon. The postings for all of these positions have expired and interviewing is in progress.

**SELKIRK COLLEGE** – Doug Henderson

This was our first year without our ‘suspended’ second-year math classes (we lost our linear algebra, calculus III, and ODE courses). We did, however, keep our second-year statistics course as an elective for our business programme. Numbers in our first-year offerings remained steady but low. We also offer courses for our business and environmental programmes.

This year we offered our calculus course for the social sciences for the first time in nearly a decade (primarily for the environmental programme, although it was open to all students to register). A small number of students took it, but it was successful.

In order to re-launch our engineering transfer programme (cancelled last year when we lost the second-year science courses) we are investigating synchronous learning options with College of the Rockies and North Island College.

Our offerings for the 2013-14 year should be the same as this year (with the probable addition of linear algebra taught off-site).

#### **SIMON FRASER UNIVERSITY – Justin Gray**

SFU is considering the establishment of learning outcomes and their assessment across all courses, programs, Faculties, and the University. This is an effort to communicate transparently the purposes of all degree, program, and course requirements. This is also an effort to gain NWCCU accreditation.

#### **Program Changes**

Minor changes to the upper division requirements for the Operations Research major and honours programs

- Reduction in the number of 400-division courses required for the OR honours program from 8 to 6
- Housekeeping changes to the upper division requirements for the OR major and honours programs to reflect current course offerings

Minor changes to the upper division requirements for the Mathematics major and honours programs to reflect changes to course offerings by the Department of Statistics

#### **Course Changes**

MATH 402 (Industrial Mathematics Project) has been deleted. However, MATH 402W (Operations Research Clinic) still exists.

MATH 308 (Linear Optimization) is now a corequisite for MATH 348 (Probabilistic Models in Operations Research) instead of a prerequisite in OR program requirements.

The course description for MATH 380W (History of Mathematics) has changed and a second semester calculus course (MATH 152/155/158) has been added as a prerequisite to better reflect the level of preparation required by the course.

The prerequisites for our entry-level courses have been revised to reflect the new high school curriculum. The high school prerequisites for these courses are listed below.

#### Precalculus/Calculus:

MATH 100 (Precalculus) – Precalculus 11 or Foundations of Math 11 (or equivalent) with a grade of at least B, or Precalculus 12 (or equivalent) with a grade of at least C.

MATH 150 (Calculus I with Review) – Precalculus 12 (or equivalent) with a grade of at least B+.

MATH 151 (Calculus I) – Precalculus 12 (or equivalent) with a grade of at least A.

MATH 154 (Calculus I for the Biological Sciences) – Precalculus 12 (or equivalent) with a grade of at least B.

MATH 157 (Calculus I for the Social Sciences) – Precalculus 12 (or equivalent) with a grade of at least B.

#### Math for Teachers:

MATH 190 (Principles of Mathematics for Teachers)- Precalculus 11 or Foundations of Math 11 (or equivalent) with a grade of at least B.

#### Other:

MATH 113 (Euclidean Geometry) – Precalculus 11 (or equivalent) with a grade of at least B, or Foundations of Math 11 (or equivalent) with a grade of at least B.

MATH 130 (Geometry for Computer Graphics) – Precalculus 12 or Foundations of Math 12 (or equivalent) with a grade of at least B.

MATH 160W (Mathematics in Action) - Precalculus 12 or Foundations of Math 12 (or equivalent) with a grade of at least B.

MATH 178W (Fractals and Chaos) - Precalculus 12 or Foundations of Math 12 (or equivalent) with a grade of at least B.

MATH 197 (Hitchhiker's Guide to Everyday Math) - Precalculus 11 or Foundations of Math 11 (or equivalent) with a grade of at least B.

MATH 198 (Introduction to Quantitative Reasoning) - Precalculus 11 or Foundations of Math 11 (or equivalent) with a grade of at least B.

**SPROTT-SHAW DEGREE COLLEGE** – No representative sent.

[Note that Sprott-Shaw Degree College has been renamed as Ascenda School of Management.]

**THOMPSON RIVERS UNIVERSITY** – Suzanne Feldberg

2012-2013 was a (relatively) quiet year at TRU Math & Stats.

We had one retirement, Sonja Hot (20 years at TRU and 42 years of post-secondary teaching). As seems to be the practice at TRU right now, getting a tenure track position to replace retirees will be difficult. Faculty of Science has a 1.5-2.0% cut this year. The main effect is an increased use of sessional faculty.

There are no major curriculum changes. TRU has decided to pursue accreditation through the Northwest Commission on Colleges and Universities (like SFU and Capilano University). This should not affect transfer agreements.

Rick Brewster's term as chair is ending. Arm twisting is underway to pick the next chair.

**THOMPSON RIVERS UNIVERSITY (OPEN LEARNING)** – Iain Pardoe

There are four formats used for the delivery of courses at TRU-OL:

Print courses offer an independent method of study with the course materials primarily available in a traditional paper/print medium. Max 30 week completion time.

Standard web courses offer an independent method of study with the course materials primarily available via the Internet. Textbooks, CDs or other materials may be included in your course package.

Dynamic web courses offer independent study as well as a greater degree of interactivity through group participation online. The course materials are primarily available online but may be accompanied by texts, CDs or other materials. As an online learner, you will access external resources and interact with other students online, with guidance and support from your Open Learning Faculty Member. Each class has a specific start and end date.

Online courses are fully online in a paced, cohort, Open Learning Faculty Member-led model. Online courses provide opportunities for active and dynamic instruction through the use of technical tools and online pedagogical expertise. Interactive activities foster collaboration among the cohort and between the learners. Each class has a specific start and end date.

#### **OL Math Course Registrations**

April 1, 2011 - March 31, 2012: 1205

April 1, 2012 - March 31, 2013: 1522 (increase of 26%)

More and more campus students are talking to the campus Math department about taking advantage of OL courses to catch up, accelerate, or change their programs.

#### **Courses and approximate annual student enrolments:**

Math 0101: Practical Mathematics (ABE Gr 9), Print.

Math 0401: Intermediate Mathematics (ABE Gr 10 algebra), Print. [~50].

Math 0523: Advanced Mathematics (ABE Gr 11 Algebra), Print. [~80].  
Math 0633: Pre-Calculus (ABE Gr 12), Print.  
Math 1001: Pre-Calculus Mathematics, ~60 [Web: 26 (current) plus 22, Print: 9 (current) plus 4].  
Math 1071: Fundamentals of Mathematics for Business and Economics, ~20 [Standard Web: ~10, Print ~6].  
Math 1091: Business Mathematics, ~260 [Print: ~52, Web: ~203]. Minor revision in 2012 to reflect changes in interest rates and to keep the dates current, enhance for financial calculator usage, and update for new version of the text.  
Math 1101: Finite Mathematics, Print: ~90.  
Math 1141: Calculus I, Print: ?  
Math 1157: Calculus for Biological and Social Sciences, ~40 [Print: 21].  
Math 1171: Calculus for Business and Management Sciences, ~30 [Print: 13 (current)].  
Math 1241: Calculus II, Print: ?  
Math 1901: Principles of Mathematics for Teachers, Online paced: ~160 Major revision in 2011. Slight changes to the final exams and an additional exam form in 2013.  
Math 2111: Calculus III - Multivariable Calculus, ~60 [Print]. Major course revision in 2013.  
Math 2121: Linear Algebra, Print & Standard Web: ~80.  
Stat 1201: Introduction to Probability and Statistics, ~120? [Print].  
Biol 3001: Statistics for Biologists, Online paced: 6. This is a brand new course.

We currently have 13 faculty members. More information on our courses can be found at <http://www.tru.ca/distance/about.html>.

#### **TRINITY WESTERN UNIVERSITY – Stephen Benecke**

Trinity Western is a fully 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. Opened in 1962, it currently has approximately 1,400 domestic and 500 international students enrolled full time, as well as 2,000 part time.

The Mathematical Sciences department resides within the Faculty of Natural and Applied Sciences and encompasses Mathematics, Statistics, Computing Systems and Informatics, Physics, and Engineering. It offers degree programs in Mathematics and Mathematics with Computing Science and is also responsible for computing and ISYS programs, Physics, and an engineering transfer program.

A list of current courses offered is available at <https://www.twu.ca/academics/science/mathematics/>. General science students are found to be taking a concentration in Mathematics to go along with a Chemistry or Biology major. In the past there has also been an influx of students into a Math major who also major in HKIN, Nursing, Music, History, and other subjects.

The course Mathematics for Business (Math 101) has been revised to not serve as a prerequisite for Precalculus that Business students can take to satisfy their requirement, but to be designed around the specific needs of the School of Business, exclusive to these students. Other changes include the option for students not ready for Math 123 (Calculus) in the Fall to take Math 105 (Precalculus) in the Fall and Math 123 in the Spring. Due to curriculum changes to BC Math 12, the courses Math 105 and 123 will also be reviewed and adjusted in the near future.

Average enrolment per year (over the past four years) in first year Mathematics is 16 for Precalculus, 81 for Calculus I, 31 for Calculus II, and 47 for Elementary Education Math. First year Calculus I currently has a 90% success rate. Mathematics for Business had 161 students in its first year in the new format. In the last academic year, enrolment in our upper-level mathematics courses has been at record high levels.

#### **UNIVERSITY OF BRITISH COLUMBIA-OKANAGAN (Mathematics) – Wayne Broughton**

The Okanagan campus of UBC now has over 8300 undergraduate and graduate students enrolled, and we are reaching capacity in some programs. As you may know, UBC is moving to a “holistic admission” model that takes into account many factors, including non-academic ones, in selecting prospective students for admission.

Our first year calculus classes had only small enrolment increases this past year. In MATH 100 (Calculus I) we had 791 students registered in both Summer and Winter sessions of 2012, an increase of only 1% over 2011. In MATH 101 (Calculus II) we had 670 students registered in 2012, an increase of 5% over 2011. For the business calculus stream (taken by students in the Bachelor of Management program), our numbers in 2012 were almost unchanged, with 308 students in MATH 116 (Differential), and 126 students in MATH 142 (Integral).

Finally, in our Pre-calculus alternative MATH 126 (Basic Mathematics: an Aboriginal Perspective) we had 31 students registered in 2012, a small drop from 2011.

There have been no significant changes to our courses that will affect transferability.

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

There have been no changes in the past year that affect transfer credit or articulation. Nora asked a question about the UBC Bridge program. It is now called UBC Vantage College, with a web site at [www.vantagecollege.ubc.ca](http://www.vantagecollege.ubc.ca).

One instructor was hired by our department using money from this program.

**UNIVERSITY OF THE FRASER VALLEY – Ian Affleck**

Our department has not had any budget cuts. We have a new Dean of Science - Lucy Lee. One exciting vision that she has shared with the Faculty of Science is the aim to create a new Science Building at UFV.

The first intake of students into our Data Analysis Certificate (DAC) program are taking their last courses this May/June. Enrolment numbers look to be increasing for the 2013 intake. As was the case last year, we are offering a late summer section of first-year statistics to accommodate international applicants to the DAC who don't have the required statistics background.

We successfully introduced a new STAT label for all of our statistics courses in Winter 2013. (This was one of the recommendations from our program review.) Thus we now offer MATH and STAT courses, with a handful of courses that are cross-listed as MATH/STAT. The transition has gone smoothly with very little confusion – a lot of advertisement was done and we made posters outlining the changes for all of the advising centres on campus.

We continue to have very full first-year courses with significant waitlists on service courses such as statistics and business math courses. Enrolments in our 2nd year and above courses continue to be stable or growing, due in part to the DAC students. In particular, in the past academic year, we had 62 students in Calculus III, 38 in 200-level Linear Algebra, 23 in our 200-level “how to do proofs” course, 35 in 200-level calculus-based statistics course, 19 in 300-level numerical analysis, 15 in our 300-level modern geometries course, 7 in our new 300-level algorithms course, 28 in a 300-level statistics course, and 39 in Vector Calculus.

Our new stream of biology calculus stream has successfully run this past year. This consisted of one Fall section of our regular Calculus I course which was designated for biologists (same learning outcomes, but examples from life sciences), and a newly created Calculus II course, MATH 118: Calculus II for Life Sciences, specifically for the biology students. To keep students' options open, we have allowed MATH 118 (with a high enough grade) as a prerequisite wherever our mainstream Calculus II is used.

Changes to our upper-level requirements for Math Majors and Minors (part of the recommendations from our recent program review) will take effect in Fall 2013. Currently, we require Majors to take a certain minimum number of upper level credits in Math, but only specifically require MATH 340 (Introduction to Analysis) among those. In the future, required upper level classes will be MATH 312 (Vector Calculus), MATH 322 (Complex Variables), MATH 340 and one of MATH 339 (Introduction to Applied Algebraic Systems) or MATH 439 (Modern Algebra). We continue to work on an Applied Stats Minor.

The number of students attending the final round of the BC Secondary Schools Math Contest at UFV continues to grow (147 students this year from 26 different schools this year). Increased numbers this year may in part be due to a radical change to the way we offered UFV entrance scholarship money to the top performers. Whereas for the past 6 years we had offered \$4000 to each of the top three Senior contestants, this year and beyond we will offer varying amounts ranging from \$300 to \$2400 to the top 14 contestants (top 7 in each category).

We have hosted three Math Mania events so far this year, and have one more scheduled in June. These events continue to be very successful with a lot of interest in the community. The time slots were booked very quickly. Moreover, as part of her sabbatical, Susan Milner has been travelling around the province, doing math-related outreach to public schools. This has been very well received. Her 180th school visit occurred on the day of her related presentation at the Sharing Math conference at UNBC on May 17th.

**UNIVERSITY OF NORTHERN BRITISH COLUMBIA – Jennifer Hyndman**  
**UNBC**

- University Enrolment is flat at (83% of BC government target). Science increasing and Arts decreasing.
- Continuing to look at a first year Foundation Year series of courses for sciences
- Developing transfer agreements to increase number of foreign students
- Early Alert research under way addressing how to determine early in the semester who is at risk of failure.

**Departmental**

- Honours Mathematics degree approved.
- Looking at Minor in Math Education to help stream students from BSc Math into BEd.
- First Year Enrolment over 3 semesters -- Fall through Summer:

|                             | 2010 -- 2011 | 2011 -- 2012 | 2012 -- 2013 |
|-----------------------------|--------------|--------------|--------------|
| MATH 100 Calculus I         | 210          | 203          | 215          |
| MATH 101 Calculus II        | 123          | 139          | 138          |
| MATH 115 Precalculus        | 115          | 141          | 132          |
| MATH 150 Finite Math        | 179          | 128          | 175          |
| MATH 152 Calc Non-majors    | 205          | 224          | 239          |
| MATH 190 Math Elementary Ed | 31           | 15           | 16           |
| STAT 240 Basic Statistics   | 162          | 197          | 169          |

**UNIVERSITY OF VICTORIA** – Gary MacGillivray

We have no upcoming curriculum items for this year that would affect articulation or transfer. Next year will probably be more significant as we move into Math 101 (Calculus 2) and Math 102 (Calculus 1 for Students in the Social and Biological Sciences) redesign.

**VANCOUVER COMMUNITY COLLEGE** – Jean MacLeod

No report received.

**VANCOUVER ISLAND UNIVERSITY** – Glen Pugh

1. There are no major math course changes (to Calc I & II, or otherwise) which would affect transfer agreements. We will be meeting next week and will discuss the Core Calculus modifications introduced at this year's BCcupms meeting.
2. Biology has reduced their statistics requirement to one course (Biometrics) which has been modified to include some content previously supplied by a prerequisite course.
3. Enrolment is healthy. First year courses are mostly full, while second and third year courses have strong numbers compared to past years. The minor degree continues to be popular with 15 or so students progressing through the programme. There is appetite among the upper year students for the development of a major and we are exploring that possibility.
4. We have offered both Real Analysis and Complex Variables recently as topics courses and both were quite popular with our upper year students. We hope to add these to the standard course offerings.
5. Math for Education Students and Precalculus are now being offered at our satellite Duncan campus in alternating years.
6. New faculty: Dean Slownowsky has returned to our department after spending a few years away pursuing other studies (Master of Public Administration). Dean will be handling mainly statistics courses.
7. We had a successful sitting of the Putnam Math Competition this year. We had 17 students writing and our team ranked in the top 150 for the first time.

**YUKON COLLEGE** – Tim Topper

A status quo year at Yukon College. Our university-transfer mathematics offerings continue to be single sections of:

- Math 100 Single Variable Calculus I
- Math 101 Single Variable Calculus II
- Math 105 Introductory Statistics
- Math 130 Finite Mathematics (in alternate years)
- MATY 101 Introductory Finite Math I (for students in the Yukon Native Teacher Education Program)

**ACTION (Jim Bailey):** Jim will send letters Quest, Corpus Christi and Royal Roads, inviting them to next year's BCcupms meeting and reminding them of the importance of sending a representative to participate in discussion of articulation issues.

Following the reports there was concern expressed over the perceived deterioration of quality of programs and service to students in some places, particularly smaller communities, although Capilano University and UNBC have also been affected. Members were especially troubled by perceptions that mathematics sections were being cut in places where students do not have other suitable options, perhaps without sufficient consultation with mathematicians and the community in order to fully understand the consequences of the cuts.

A working group was struck to draft a position statement on behalf of the BCcupms. Members of the group will come from the institutions which have been most affected in the last year, namely, Regan Sibbald (NWCC), Jim Bailey (CotR), Doug Henderson (Selkirk), Deanna Baxter (Capilano University), and Al Fukushima (Nicola Valley Institute of Technology). They will work via email to draft a statement, which will be sent out over the listserv for comment and approval (if possible). The finalised statement will be signed by the Chair of the BCcupms and will be sent to college and university presidents.

**ACTION (Working Group): Draft a statement related to the recent course and program cuts and distribute it to the BCcupms listserv before the end of September.**

## 9. COMMITTEE BUSINESS

### 9.1 Topics for our 92<sup>nd</sup> Meeting

Suggestions for topics for our next meeting included: MOOCS (Justin Gray), completion rates (Kevin Craib), Enhanced Web Assign—experience with online web-based assignments in place of traditional texts (Wayne Broughton) [note: Gary MacGillivray and Ian Affleck mentioned having experience], open-source textbooks (Susan Chen), observations on the new grade 12 cohort (Glen Pugh), follow-up on on-line high school math courses—possibilities for tracking (Justin Gray), blended-mixed mode courses and outcomes associated with them (Kevin Craib), and Mathnasium (private centres that teach math)—franchise opportunities—is this coming to Canada? (Kevin Craib).

### 9.2 Date and Location of the 92<sup>nd</sup> Meeting

The 92<sup>nd</sup> meeting will be hosted by Kwantlen Polytechnic University in Richmond. Dates are May 13 – 15, 2014. A volunteer is needed to run the Sharing Math Conference next year.

In 2015, the 93<sup>rd</sup> meeting will tentatively be held at Vancouver Island University. This is to be confirmed.

In 2016, the 94<sup>th</sup> meeting will tentatively be held at Columbia College in downtown Vancouver. This is to be confirmed.

### 9.3 List Updates: E-mail, Member Contacts & Listservs

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 and Gary MacGillivray can be contacted for changes to the listserv. The Statistics listserv and the MFEE listserv are both maintained by Susan Chen.

Instructions for how to send a message to the listserv will be sent out to representatives via email, once the new listserv is in place.

## 11. Adjournment of the Wednesday session

The Wednesday Session of the 91<sup>st</sup> meeting of the BCcupms adjourned at 4:13 p.m.

**Many, many thanks to Nicholas Buck and the Mathematics Department at the College of New Caledonia for all their excellent work in hosting us for this meeting.**

**List of Committee Members Present**

**Concurrent Math/Stats – Tuesday, May 14, 2013(a.m); Plenary Session – Tuesday, May 14, 2013 (a.m/p.m.); Secondary Teachers Session – Tuesday, May 14, 2013 (p.m); Plenary Session – Wednesday, May 16, 2011 (a.m/p.m.)**

| Name               | Institution  | MATH | STATS | TUES | TEACHER | WED  |
|--------------------|--|------|-------|------|---------|------|
| Ian Affleck        | University of the Fraser Valley  | X    |       | X    | X       | X    |
| Jim Bailey         | College of the Rockies (Chair)   | X    |       | X    | X       | X    |
| George Ballinger   | Camosun College  | X    |       | X    | X       | X    |
| Deanna Baxter      | Capilano University  | X    |       | X    | X       | X    |
| Chris Becker       | BC Association of Mathematics Teachers (President)                           | X    |       | X    | X       | X    |
| Gera Belchev       | Coquitlam College  | X    |       | X    | X       | X    |
| Stephen Benecke    | Trinity Western University   | X    |       | X    | X       | X    |
| Len Berggren       | Alexander College  | X    |       | a.m. | X       | p.m. |
| Wayne Broughton    | University of British Columbia (Okanagan)                                    | X    |       | X    | X       | X    |
| Nicholas Buck      | College of New Caledonia   |      |       | a.m. |         |      |
| Chien-Hsun Chang   | Capilano University  |      | X     | X    | X       | X    |
| Susan Chen         | Camosun College  |      | X     | X    | X       | X    |
| Kevin Craib        | Langara College  |      | X     | X    |         | X    |
| Ana Culibrk        | Columbia College   | X    |       | 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       | X    |
| Suzanne Feldberg   | Thompson Rivers University   | X    |       | X    | X       | X    |
| John FitzGibbon    | BC Council on Admissions and Transfer  | X    |       | X    | X       |      |
| Nora Franzova      | Langara College (Vice Chair)   | X    |       | X    | X       | X    |
| Al Fukushima       | Nicola Valley Institute of Technology  |      | X     | X    |         | X    |
| Justin Gray        | Simon Fraser University  | X    |       | X    | X       | X    |
| Brian Hatcher      | School District 57   |      |       |      | X       |      |
| Doug Henderson     | Selkirk College  | X    |       | X    | X       | X    |
| Jennifer Hyndman   | University of Northern British Columbia                                      | X    |       | X    |         | X    |
| Gabriela Kakushkin | Vancouver Community College  |      | X     | X    | X       | X    |
| Kevin Keen         | University of Northern British Columbia                                      |      | X     | p.m. |         |      |
| Pranesh Kumar      | University of Northern British Columbia                                      |      | X     |      |         |      |
| Clint Lee          | Okanagan College (Kalamalka Campus)  | 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    |
| Gary MacGillivray  | University of Victoria   | X    |       | X    | X       | X    |
| Jean MacLeod       | Vancouver Community 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    |
| Susan Oesterle     | Douglas College (Secretary)  | X    |       | X    | X       | X    |
| Iain Pardoe        | Thompson Rivers University (Open Learning)                                   |      | X     | X    | X       | X    |
| Glen Pugh          | Vancouver Island University  | X    |       | X    | X       | X    |
| Shane Rollans      | Thompson Rivers University   |      | X     | X    | X       | X    |
| Christian Sdoutz   | Kelly Road Secondary   |      |       |      | X       |      |
| Regan Sibbald      | Northwest Community College  | X    |       | X    | X       | X    |
| Wesley Snider      | Douglas College  | X    |       | X    | X       | X    |
| Tim Topper         | Yukon College  | X    |       | X    | X       | X    |
| Jan Verster        | Kwantlen Polytechnic University  | X    |       | X    | X       | X    |
| Tracy Wall         | College of New Caledonia   | X    |       | X    | X       | X    |

\*North Island College (regrets sent), BCIT (regrets sent), Athabasca (regrets sent), Sprott-Shaw Degree College (now called Ascenda School of Management) and the Ministry of Education did not send representatives this year. Quest and Royal Roads have not yet sent a representative to any of the BCcupms meetings.

## BC Secondary School Mathematics Contest 2013 Report to the BCcupms

On May 3, 2013 the Final Round of the BC Secondary School Mathematics Contest was written at 12 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.

Participating institutions are:

|                                 |           |
|---------------------------------|-----------|
| Capilano University             | (CapU)    |
| College of New Caledonia        | (CNC)     |
| 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 that did run the Final Round.

| Institution | Final Round |         | Top Three Scores |              | Averages |        |
|-------------|-------------|---------|------------------|--------------|----------|--------|
|             | Juniors     | Seniors | Junior           | Senior       | Junior   | Senior |
| CapU        | 21          | 16      | 95, 94, 94       | 50, 48, 46   | 58.9     | 31.5   |
| CNC/UNBC    | 14          | 13      |                  |              |          |        |
| Doug        | 13          | 14      | 71, 67, 63       | 85, 83, 77   | 53.2     | 64.2   |
| Lang        | 40          | 13      | 88, 85, 83       | 74, 65, 58   | 49.5     | 46.3   |
| NIC         | 24          | 13      | 62, 59.5, 55     | 73, 48, 35   | 35.5     | 28.1   |
| NWCC        | 12          | 7       | 55, 54, 45       | 35, 31, 26   | 29.3     | 20.0   |
| OC/UBCO     | 79          | 24      | 60, 53, 51       | 51, 35, 32   | 29.7     | 25.5   |
| TRU         | 36          | 36      | 47, 44, 40       | 57, 38, 34   | 25.7     | 22.8   |
| VIU         | 45          | 39      | 81, 74, 57       | 50.5, 49, 48 | 36.1     | 25.8   |
| UFV         | 84          | 62      | 82, 81, 73       | 94, 67, 56   | 34.8     | 27.0   |
| TOTAL       | 368         | 237     |                  |              |          |        |

Approximately 1500 Juniors and 750 Seniors throughout the province wrote the Preliminary Round this year. The top reported Junior and Senior Preliminary scores were both 60 and 56, respectively, out of 60. 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 605 students participated in the Final Round this year. This number is up significantly from last year's, and is well above average compared to previous years.

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 3, with some type of activity provided for the sponsor 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.

Two institutions have instituted the practice of separating junior contestants, specifically grade 8, to allow them to work on certain portions of the contest in teams. Having done this over the last two years at OC has 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: Nora Franzova at Langara College; Sherrie Wang at North Island College; Erfan S. Zahra'i at Northwest Community College; Clint Lee, Leslie Corbett and Satoshi Tomoda 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 themselves. Indeed, they have indicated that their entire departments are involved with hosting the contest. Special thanks should go 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, and to Mike Szesztopalow a past contestant from Vernon who is now a PhD student in mathematics at Waterloo University.

Furthermore, the people who submitted problems and met at Okanagan College last May to put together the initial drafts of the contest papers and reviewed them as they developed are: Ian Affleck (UFV), Jim Bailey (COTR), Nicholas Buck (CNC), Clint Lee and Satoshi Tomoda (OC), Nora Franzova (Lang), Mona Izumi (NWCC), Annie Marquise and Natasha Davidson (Doug), Paul Ottaway (TRU), and Jennifer Hyndman (UNBC). Solutions were prepared and typeset by Jim Bailey (COTR), Satoshi Tomoda (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 Problem Preparation 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/2013/MathContestBCCUPMReport\\_2013.htm](http://people.okanagan.bc.ca/2013/MathContestBCCUPMReport_2013.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 2014 contest are:

|                    |                          |
|--------------------|--------------------------|
| Preliminary Round: | Wednesday, April 2, 2014 |
| Final Round:       | Friday, May 2, 2014      |

Respectfully submitted to the BCCUPMS on May 14, 2013 by

Clint Lee  
Okanagan College, Vernon

**MINUTES OF THE STATISTICS SUBCOMMITTEE  
91<sup>st</sup> BCcupms MEETING, MAY 14 – 15, 2013**

**Present:** Bruce Dunham (UBC-V), Susan Chen (Camosun), Gabriela Kakushkin (VCC), Al Fukushima (NVIT), Pranesh Kumar (UNBC), Kevin Craib (Langara College), Chien-Hsun Chang (Capilano), Shane Rollans (TRU), Iain Pardoe, (TRU O-L), Kevin Keen (UNBC), Richard Lockhart (SFU).

**Regrets:** Apologies for absence were received from Veda Roodal Persad (TRU O-L), Julie Peschke (Athabasca) and Jason Loeppky (UBC-O)

**Chair:** Bruce Dunham

**Acting Secretary:** Richard Lockhart

**1. Approval of Agenda**

**Motion of approval of agenda:** Moved: Susan Chen; seconded: Al Fukushima.

**Carried unanimously.**

**2. Approval of minutes of the Statistics Subcommittee Session of the 90<sup>th</sup> meeting**

**Motion of approval of minutes:** Moved: Al Fukushima; seconded: Susan Chen.

**Carried unanimously.**

**3. Matters arising from minutes**

There were no matters arising.

**4. Institutional Reports**

The reports of Douglas College, UFV and UBC-O were presented *in absentia*.

**Camosun College**

The department continues to offer four first and second year statistics courses with little change in enrolment from the previous year.

More teaching technologies have been embraced in the statistics courses this year. In particular, i-Clickers were used regularly in two courses and the students loved it. Lecture notes were presented in OneNote on a tablet PC and then posted on D2L after each class for three statistics courses. Most students still make their own notes during class, but they also check the on-line lecture notes often. After last year's experiment with StatsPortal for ebook and online assignments in one section of MATH 216, all MATH 216 classes were moved to StatsPortal this year. The response from students is so positive that this will be continued next year.

The Elementary Statistics labs were switched to Excel from SPSS, and the other three statistics courses will move to R from Minitab in September 2014. Each Statistics course has seven structured one-hour labs.

**Capilano University**

In MATH 101 for non-science not much has changed. MATH 205 was revised this past spring. The course covers the same topics as UBC's STAT 251, and uses the same course notes. Enrolments are good. The TI 83/84+ calculator is used on these courses.

The institution has shown a resistance to labelling Statistics courses with a STAT code.

**Douglas College**

Two courses, MATH 1160 (introductory statistics without calculus) and MATH 2260 (introductory statistics with calculus), are still offered. There has been tremendous growth in MATH 1160 this past year (roughly doubling the number of sections

offered) due to the course being required for the foundations year for students hoping to enter nursing. MATH 2260 was offered at roughly half-capacity. Texts were switched to a custom-published version of the text by Hayter.

Options are being explored to potentially replace the use of TI-84 calculators for tutorials. The alternatives include Minitab, SPSS, R, and Excel.

### **Langara College**

All STAT courses are full, with long waiting lists. Langara offers eight STAT courses: three first year, four intermediate, and one software course. Enrolments are growing overall. Some individual course information follows:

- STAT 1123 (business applications): Many BBA students are required to take this.
- STAT 1124 is a next level first year course.
- Enrolment growth is primarily due to nursing at Langara since an introductory Statistics course is now required with a C+ grade. The department plans nine extra sections of the relevant course for next year.
- Work is ongoing toward offering STAT 1181 in mixed mode this fall for the first time.
- STAT 3222, and 3223: The first is targeted to business management, the second is for accounting. An extra section of 3223 was added this summer.

For the International Year of Statistics, Kevin Craib spoke at the Greater Vancouver high school science contest. He spoke about careers in Statistics and showed a video.

Langara is using projects in first year statistics courses; students created posters this year. The StatsPortal (linked with the Moore and McCabe book) has been added to some introductory courses. Instructors are positive about the experience.

### **Nicola Valley Institute of Technology**

The institute is losing its Dean of Academic Studies to VIU at Duncan. In Statistics there is not much change. There are two STAT courses: 203 for Social Work, and an introductory course for Business, BUSM 207.

### **Simon Fraser University**

Personnel: Jiguo Cao is returning from Western; the department has lured Liangliang Wang from Western. Liangliang was a student of Doucet and Bouchard-Coté (UBC).

Budget: The position is the same as last year: budgets are tight but the situation is not too bad.

Enrolments: Enrolments have risen very rapidly over the past four years; they have gone from about 1700 to about 3500 students per year. The biggest source of growth has been in service courses.

Course revisions: There have been no revisions to introductory non-calculus courses. The STAT 270 course now uses only a home grown "text" by Tim Swartz because this is so much cheaper for the students than Devore.

The new major and minor programs have rolled out quite successfully with some very large enrolments at the 3<sup>rd</sup> year level. Here is what has been done:

1. The minor program has been completely altered to focus on applied statistics and data analysis. The program is intended to complement degrees in other disciplines. There has been a jump in the number of students in the minor.
2. Introduction of STAT 340, statistical computing.
3. Adoption of learning outcomes for each course and for the overall program. This is motivated by a desire to be clear about the status of computing in each course and in the program overall.
4. Creation of three applied courses, cross-listed with three new graduate service courses: STAT 445 Multivariate Analysis, STAT 475 Discrete Data Analysis, STAT 485 Time Series Analysis.
5. Deletion of STAT 402/602, deletion of STAT 400.

Modification of STAT 285 to delete time series.

### **Thompson Rivers University**

For the current academic year the department had fourteen tenured or tenure-track faculty, two term certain faculty and three sessional faculty, two of those full time. Of these, three (including one sessional) have degrees in statistics and a fourth has a strong research background in statistics.

#### Enrolment:

Enrolment in statistics service courses and in upper level courses is fairly stable.

Sociology is currently debating whether to drop their introductory statistics course and have their students take the course offered by the Department of Mathematics and Statistics.

Tourism is in the process of creating a course called “Orienteering in Tourism: Essential Skills for Research” to replace the existing introductory statistics delivered by the Department of Mathematics and Statistics. The Tourism course includes a four week module “Foundations of Quantitative Research: Statistics” which is to cover from descriptive statistics to analysis of variance. There are discussions with Tourism to modify this proposal.

#### Course Development:

The introductory course STAT 1200 was taught as part of the TRU Start Aboriginal Cohort program. This was the second year of the program. Eighteen regional aboriginal secondary school students took three courses at TRU as their final term of Grade Twelve. They took English and Biology as well as Statistics. Their term is condensed to ten weeks because their first term is not over until the end of January.

#### **Thompson Rivers University, Open Learning Division**

The division teaches an introduction to probability and statistics to about 120 students per year. There are stable enrolments. A new statistics for biology students course has been created which is fully on-line and very applied in nature. There were only six students this year. The course used R, which was ambitious but seemed to work well.

#### **University of British Columbia, Okanagan**

Overall enrolment numbers are roughly the same as last year. The department lost one faculty member to another job and there is no sign that he will be replaced again leaving the department with just three people in Statistics. The BSc. Program that was launched in May will have its first graduate in June. There has been moderate interest in the program. However, without more faculty it is uncertain if the program will remain viable.

#### **University of British Columbia, Vancouver**

The department moved to its new home, the Earth Sciences Building, last September. The move has been good overall, and the department now has ready access to well-equipped lecture theatres of varying sizes. The new laboratories have been successful too, being better designed for group work.

The number of students on Statistics programs continues to rise. The total number of students on all our undergraduate programs stood at 193 in Fall 2012, compared to 145 the previous year and 110 in 2008. These figures exclude minor students. Overall 36 students graduated on our programs since June 2012.

The department offered a “new” course last fall, STAT 300, Intermediate Statistics for Applications. This second course in Statistics has been in UBC’s calendar since the nineties but had not been offered for over ten years. The new incarnation was developed from scratch, and aims to be a generic second applied course in Statistics suitable for any student who has taken a traditional first course. Material covered includes nonparametric methods, goodness-of-fit, experimental design, ANOVA, the bootstrap, inference for regression, introduction to logistic regression, and elementary time series analysis. The course attracted a healthy enrolment, with 98 students from diverse backgrounds completing the course.

The department’s Carl Wieman Science Education Initiative (CWSEI) project has continued at a good pace. Dr. Gaitri Yapa has assisted in transforming the teaching on various courses, including STAT 200, STAT 241/251, 300 302, and 305, by helping to successfully incorporate interactive learning techniques.

Further funding has been secured from UBC’s Teaching and Learning Enhancement Fund to develop WeBWorK to facilitate on-line homeworks on our courses. Dr. Djun Kim developed WeBWorKiR, an integration of WeBWorK with R. Homeworks were created and used on STAT 200/241/251 this year, with courses using WeBWorKiR expanding to include STAT 300, 302, and 305 next year. Student feedback has been very positive. Resources for Statistics assessment resulting from our project are available to the wider community (as described in agenda item 6).

R cmdr has replaced Excel as the software used in STAT 200.

### University of Northern British Columbia

There have been no changes to the statistics offerings in the past year. The non-calculus course STAT 240, basic statistics, had enrolments of about 100 last year. In January the number was in the high 70s, and about 30 registered for intersession. Pranesh Kumar teaches 371, probability and statistics for scientists and engineers, with about 50 enrolment. There are four 4th year courses.

### University of the Fraser Valley

The first intake of students into the Data Analysis Certificate (DAC) program are taking their last courses this May/June. Numbers look to be increasing for the 2013 intake. As was the case last year, a late summer section of first-year statistics is being provided to accommodate international applicants who do not have the required statistics background.

As a result of a recommendation from an external program review committee, the MATH prefix is being changed to STAT for all Statistics courses. A new STAT label was successfully introduced for all statistics courses in winter 2013. The department now offers MATH and STAT courses, with a handful of courses that are cross-listed as MATH/STAT. The transition has gone smoothly with very little confusion. Three courses will be cross-listed as MATH/STAT, namely MATH/STAT 270, 370 and 450.

The department will be re-designing its statistics minor programs: a minor in applied statistics is likely.

The course in introductory statistics for nursing students has been removed from the calendar; nursing students now take the course in introductory applied statistics intended for any student who has at least Math 11. Some other Statistics courses (MATH 302, MATH 451) have also been removed from the calendar as part of the general housekeeping exercise.

### Vancouver Community College

Jean MacLeod is retiring; a new department head is coming. Numbers in Statistics are healthy; the department runs two or three STAT courses per term at least. Nursing is a big user. Often there is a waiting list for a course, sometimes resulting in new sections being opened.

## 5. The Flexible Pre-Major in Statistics (Bruce Dunham, UBC-V)

With the agenda and prior to the meeting, a document had been circulated that attempted to summarise lower-level requirements on the four Statistics major programs in the province (namely those at SFU, UBC-O, UBC-V, and UVic). The information was gathered from the websites of the relevant programs. The motivation is to work toward having a “flexible pre-major” in Statistics, similar and appended to that for Mathematics major programs in BC.

It was agreed to move forward with this proposal, recognizing that no assurance could be given that any student having all or most of the lower-level requirements for a Statistics major program at an institution would automatically gain entry to that institution. There were some additional details required for the documentation, including some information on the requirements outside of MATH, STAT, and CPSC courses. There was also a recognition that although all programs have at least one CPSC course as core, the actual content of those courses was not prescribed.

**Action: The documentation will be modified to include additional details as suggested. Individuals at the four institutions which offer Statistics major programs will be contacted to check for accuracy and overall approval of moving forward with the proposal. (Chair)**

## 6. The WeBWorKiR project (Bruce Dunham, UBC-V)

Bruce Dunham presented on a project in his department that is funded by UBC’s Teaching and Learning Enhancement Fund. On-line homework systems are becoming widely used in undergraduate Statistics courses in the province, with the most popular being those linked to textbooks (such as StatsPortal and MyStatLab). Although these are of good quality, the expense is considerable to students who opt not to buy a new copy of the associated book. WeBWorK, on the other hand, is freely available, and is developed and maintained by The Mathematical Association of America (see [www.webwork.maa.org](http://www.webwork.maa.org) for further details).

WeBWorK is an on-line homework system which presently has a database of thousands of mathematics questions, mostly at the level of elementary algebra and introductory calculus. There are very few questions on topics in probability and statistics. The project at UBC has two aims (i) to create sets of questions suitable for use in undergraduate probability and statistics courses and (ii) to enhance the functionality of WeBWorK to enable it to communicate with the statistical software R.

The project commenced in May 2012, and good progress has been made in the intervening months. The integration with R

was developed and has been dubbed WeBWorKiR (WeBWorK integrating R). This application permits access to full R functionality, which allows for data to be randomly generated, graphics to be imported, analysis to be performed, data and summary statistics extracted and incorporated into WeBWorK questions. The application was trialed in earnest in STAT 241/251 last term, with great success. So far WeBWorK has been implemented in STAT 200 and STAT 241/251, and next academic year it will also be used in STAT 300, STAT 302, and STAT 305.

Student feedback on WeBWorK has been almost uniformly positive. For example, on a midterm survey of STAT 200 students around 90% either agreed or strongly agreed with the statement “The online WeBWorK assignments were useful to your learning.” Comments were largely positive, such as “Good amount of questions-- not too many but still reinforces learning” and “Forces me to keep up with class”.

Various individuals have been involved in the project, notably Djun Kim (as web applications developer), Bruce Dunham, Yew-Wei Lim, and Eugenia Yu (creation and testing of questions), Davor Cubranic and Pan Luo (technical support), and several graduate students (coding questions). It is expected the project will continue at least until 2015.

Some technical support is available for those wishing to use WeBWorKiR. The relevant module will be incorporated into later versions of WeBWorK, but institutions wishing to made use of this application may require guidance on installation on their servers. For the duration of the project, Davor Cubranic will provide some support for local institutions wishing to use WeBWorKiR for their Statistics classes. Davor may be contacted at [cubranic@stat.ubc.ca](mailto:cubranic@stat.ubc.ca).

## **7. Any other business**

As 2013 is The International Year of Statistics, a brief discussion summarized local activities to mark the event. Langara College had mentioned their event in their institutional report, and noted here that funding was provided from PIMS. UNBC were organizing public lectures, and UBC-V had hosted several high-profile speakers.

A proposed discussion on open and flexible learning initiatives was postponed to next year’s meeting due to lack of time.

## **8. Motion to adjourn**

Moved by Shane Rollans and seconded by Kevin Craib.