

## Calendar

[Please give notification of upcoming events to Jeff.]

1992

Feb 21 Colloquium:  
*Recreational Graph Theory*  
*(Graph Labelling Problems)*  
4:10 002 Kalkin

Feb 21 Statistics Student  
Association meeting  
2:00 Basement Mansfield

## Message from the Chief

Many significant events and activities have occurred since the last issue of the Newsletter in November. Of course, the biggest news is the new Ph.D. degree in Mathematical Sciences. Indeed, February 8, 1992, the date at which the Department's proposal received Trustee approval, marks the rebirth of doctoral work in Mathematics at UVM after a hiatus of nearly two decades. Thus, effective with the academic year 1992-93, this department is once again authorized to award

our profession's highest degree. So eloquently articulated by Ken Golden at the Trustee meeting, the Mathematical Sciences Ph.D. benefits the entire university and the State of Vermont in general.

Two unique, synthesizing features of the Mathematical Sciences doctoral program deserve special attention. First, a key element of the program is its focus on the links between core and applied mathematics. As noted in the proposal, "by implementing a Ph.D. program which blends suitable aspects of core and applied mathematics, UVM has an opportunity to play a leadership role in an emerging national trend." Secondly, in entitling the new degree *Mathematical Sciences* we are emphasizing the broad aspects of mathematics and its applications. "This incorporates the flexibility to respond to the broad array of sources and uses of mathematics, both those currently existing on campus and those which may be represented at a later date." In particular, the Department has established a Committee on Applied Mathematics to help nurture interface educational programs at both the undergraduate and graduate levels and encourage interdisciplinary research. Chaired by Bill Lakin, the membership of this Committee includes mathematical scientists from many other disciplines across campus.

While the Ph.D. has received much publicity, less visible in the public eye are equally important educational thrusts at the undergraduate level. Under the leadership of the PUMP Committee (Progressive Undergraduate Mathematics Program), the Department has revised its undergraduate Mathematics program to highlight such interface specialty areas as *Actuarial Mathematics*, *Applied Mathematics*, *Computational Mathematics*, *Mathematics of Management*, *Probability and Statistics*, and *Theory of Computing*, as well as the traditional program in *Classical Mathematics*. In this connection, both the Department and the College of Business Administration are enthusiastically committed to

interdisciplinary undergraduate programs that incorporate majors and minors in both disciplines. In addition, again under the aegis of the PUMP Committee, a team of students and faculty are writing a Student Handbook for undergraduates interested in Mathematics and Statistics. Curriculum innovation that incorporates the interplay of mathematics and computing is also well underway in the Department.

Finally, under the sponsorship of the Vermont State Mathematics Coalition, two six-week internships for Vermont mathematics/science teachers will be offered this summer at IBM. In addition to the professional development inherent in the internships, the teachers selected for these internships will receive salary from IBM together with three graduate credits sponsored by the UVM Division of Continuing Education. This program is a wonderful opportunity for teachers, and I hope that you will encourage the Vermont mathematics and science teachers whom you know to apply. The deadline for applications is March 11.

All of the above initiatives are manifestations of the guiding principles for Mathematics at UVM, expressed as follows in the Ph.D. proposal: "The Mathematics faculty and the UVM Administration have a common vision in which precollege mathematics education and outreach in Vermont, undergraduate education across campus, graduate education including doctoral work, interdisciplinary interaction with Engineering, Science, and the Medical College, and mathematical research and scholarship are all interlocking components of the overall UVM Mathematics fabric."

## General Delivery

### **MATH/STAT DEPT FIELDS FIRST SKI TREK TEAM IN HISTORY**

Dan Jones, Jonathan Sands, and Holly Puterbaugh have formed the very first team of three or more cross-country skiers from the same workplace to participate in the annual Vermont Lung Association Ski Trek for Life and Breath. Our formidable team, "The Vertically Challenged," dares others to come forward and compete, not in speed, but in total fundraising for the Vermont Lung Association. This has already gained publicity for the

UVM Math/Stat Department in the Ski Trekker's newsletter. There is a chance that some faculty members at St. Michael's College will take up the challenge, as well as some Red Cross employees.

The tenth annual ski trek will take place on Feb. 29 and March 1 at Craftsbury, where participants will ski 50 kilometers or more. We invite our colleagues to sponsor us (see Dan Jones) or to join our team (see Dan, Holly or Jonathan).

Thank-you for your support. Dan, Holly, and Jonathan

### **MATH/STAT HANDBOOK UNDERWAY**

In conjunction with the UVM Student Chapter of the MAA, the PUMP Committee is now undertaking a major project this semester to produce a handbook for undergraduate mathematics and statistics majors in Engineering and Mathematics or in Arts and Sciences at UVM. Plans are to include the following sections, for which the names of some math/stat faculty or students involved in the writing are given in parentheses.

- I. Introductory welcome, orientation, and invitation to the major (Burgmeier, Lawlor).
  - II. Description of the first year (Dinitz).
  - III. Major and minor requirements (Dinitz, Gross).
  - IV. Advising (Puterbaugh).
  - V. Support and employment opportunities on campus (Costa, Lyle, Sands).
  - VI. Careers and summer programs (MacPherson, Sands).
  - VII. Extracurricular activities (Theoret, Sands).
- App. 1. Course descriptions (Yu).  
 App. 2. Faculty profiles.  
 App. 3. Checklists for graduation.

Because each person has a certain expertise, we would like to include every member of the department in this project. Please speak to the appropriate people listed above or to Jonathan as you think of things which should be mentioned in the Handbook. We also need help with the writing, and are soliciting volunteers. So let us know if you would like to work with us. It should be fun.

Jonathan Sands

## Computer Stuff

To get online help for the UNIX system from any UNIX machine type

man command

or

man -k keyword

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### E-mail with mail and elm

You can exchange electronic mail (e-mail) messages with anyone who has an internet or bitnet address. If you have an account on one of the EMBA mainframes then your internet address is

username@uvm.edu

where `username` is usually your last name. The simplest way to send a message is to use the `mail` command. At the UNIX prompt you just enter `mail user`, where `user` is the username of a user on the same machine you are using, or `username@machine` to send to a user on another machine, or the complete internet address of a user at another site. You will be prompted for the subject of the message, and then you type the message line by line until you are done. However, you cannot edit the message other than to erase characters on the current line. You cannot go back to a previous line. When you are finished, type a period in the first space of the next line, and the message will be sent (you might be prompted for additional addressees with `Cc:`). You can try this by sending a message to yourself. If you have mail you will be notified when you login, and you will also receive a notification if you are already logged in. To read the mail you enter `mail` with no username. At the mail prompt enter `?` to see a list of the commands available to you. The most useful are: `h`, `d`, `t`, `r`, `s`, `q`, `x`. To exit use `q`. On exiting, some of your mail might be saved in a file called `mbox`, or you can choose to save messages in specific files of your choosing (called folders). To reread these messages, use `mail -f folder` to read the messages in a given folder, or just `mail -f` to read the messages stored in `mbox`. You can send a file you have already created by entering

mail username < filename

or

mail -s 'subject' username < filename  
if you want to include a subject line.

A convenient way to send a message to someone who has already sent you a message is to use the

reply option. If you have a copy of their message in `mbox` or in some other folder, just use `mail -f` as described above and then use `r` to reply to a message. The message you type in is then sent to the address of the person whose message you are "replying to." This way you don't have to type in or even know their full address.

A more sophisticated and more convenient mailer (if you know `vi` or Emacs) is `elm`. More on that next time.

## Colloquium

The next Colloquium talk will be on Friday, February 21, at 4:10 in 002 Kalkin. The speaker is Nora Hartsfield of Western Washington University and UVM, who will speak on

### RECREATIONAL GRAPH THEORY (GRAPH LABELLING PROBLEMS)

*Abstract: Suppose we label the edges of a graph with distinct positive integers so that the sum of all the labels of any vertex is the same. (Compare the idea to the idea of a magic square.) This is an example of a graph labelling problem, and such labelled graphs are called magic. We shall look at magic, supermagic, antimagic, graceful, Egyptian, and sum graph labellings, and possibly more. No specialized knowledge is required to understand and enjoy the talk.*

## Announcements

### Statistics Student Association

The new Statistics Student Association is now organized, with Rosanne Callas and Robin Mercier as Co-Chairpeople, Teri Tripi as Social Chairperson, and Bud Davies as Financial Secretary. Larry Haugh has served as the faculty advisor. On Friday, February 21, at 2:00 pm will be the first of a series of Career Talks, by Lynn Harnois, one of

our MS graduates, and currently working for the Census Bureau. The meeting will be held in the basement of Mansfield House and is open to anyone with an interest in Statistics or in learning about related job opportunities (see notices posted in the Department).

### New Statistics Course

A course designed especially for our *mathematics and statistics majors* will be offered for the first time this Fall. (The new course will be an alternative to the traditional STAT 141.)

**STATISTICS 195:** Introduction to Modern Statistical Reasoning.

**INSTRUCTOR:** Brian MacPherson

**PREREQUISITES:** Mathematics or statistics major. Sophomore standing.

The aim of statistics—to forge a link between deductive probability and inductive inference based on empirical information—is philosophically intriguing. It is difficult to identify an area of rational inquiry where the pursuit of truth is more fascinating. The purpose of this course is to introduce students to the excitement of statistical thinking while taking full advantage of current computational resources. Graphical methods and principles are powerful tools for exposing the structure of data, and will constitute a primary focus of the course. These techniques are relevant for data analysis, when the analyst wants to explore data, and for data communication, when the analyst wishes to communicate data to others.

The domain of study will encompass: data management, EDA, resistance, outlier detection, transformations, standard probability models, simulation, the probability integral transformation, sampling distributions, sample size determination, simultaneous inference, relationships, the method of least-squares, transformable non-linear models, polynomial regression, and model selection.

The microcomputer will be utilized to explore graphic display techniques, including: iterative methods for data description, back-to-back stem-and-leaf exhibits, multiple notched box-plots, probability plots, confidence and prediction belts, multivariate plots, scatterplot matrices, and three-dimensional spinning in real time. Rapid feedback will make it possible to view several alternative display formats and to refine the selected mode of presentation for the final showing.

The approach will incorporate class activities, probability experiments using manipulatives, and modest primary data collection exercises. Students will be encouraged to interact with their data and occasionally draft brief essays communicating their understandings and interpretations.

## Chronicles

On January 28, 1992 Bert Johansson went to Choate Preparatory School in Connecticut and gave a talk on Analytic Geometry and Coordinate Systems to a group of about 125 students and teachers. While there he took the opportunity to hand out some literature on UVM, which was well received.

On February 13, 1992 Dan Zwick gave a Colloquium talk at Dartmouth College titled *An Optimization Problem Arising from Analysis of Measurements*. In the talk he described some recent research leading to an algorithm for numerically solving a problem that arose in the analysis of coordinate measurements of manufactured parts for the purpose of quality control.

## Advertisements

### STARVING ARTIST

Professional landscape painter/secretary needs warm, quiet, sunny, secure studio space for painting — in return for artwork, homemade chocolate chip cookies, blueberry coffecake and fresh green beans in season. Please call Mary Betty at 656-4355 weekdays.