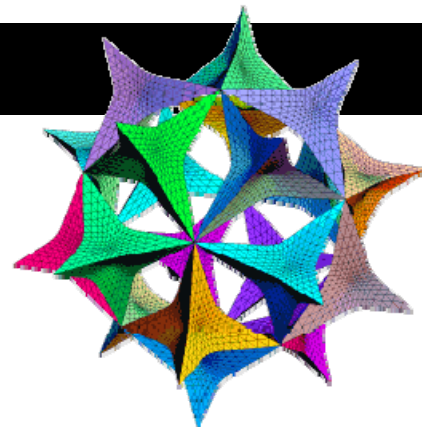


MATHEMATICS & STATISTICS



NEWSLETTER

Volume 15 Number 2

February 2001

RETIREMENT: THOMAS UPSON

Prof. Thomas Upson

Professor Thomas C. Upson, *the Master Teacher*, put down his chalk this past year to start a new life in retirement. His 37 years at RIT began in the Fall of 1963, the same year that the College of Science and our department were instituted as independent academic units of the institution. He received his Bachelor's Degree from Tufts University and his Master's from RPI, both in Mathematics; he also attended graduate school at the University of Buffalo in order to upgrade his knowledge in some areas of interest.

His career reflects RIT's long-standing commitment to *Excellence in Teaching*. In fact, he is the only RIT faculty member who has received two awards for outstanding teaching: The *Distinguished Young Teacher Award*, in 1969, and the *Eisenhart Award for Outstanding*

Teaching, in 1996. He recalls with justifiable pride that the year he received his first award, the Commencement Speaker, who also participated in the Teaching Awards Ceremony, was none other than Werner VonBraun, the famous German rocket scientist who was centrally instrumental in the genesis and the eventual triumph of America's space program.

During the academic year 1972-73 Prof. Upson served as Interim Department Head and, in connection with that appointment, he likes to tell a very interesting story involving ... applied probability! There were three candidates for the position: Prof. Upson, and two other members of the department – we'll call them X and Y. A colleague from the department was agonizing as to whom to choose in responding to the Dean's request for input and he sort of asked Prof. Upson for help in making that decision. With his well-known penchant for finding easy solutions to difficult problems, Prof. Upson took a coin out of his pocket and said: "Heads, you support X; tails, you support Y; and if the coin stands on its edge, you choose me" and proceeded to flip the coin. Do

you want to know what happened? You guessed it! The coin rolled down the hall and came to a stop on its edge! By the way, the agonizing colleague is one of our foremost statisticians and is still a member of our department.

For many, many years prior to his retirement, Prof. Upson was the senior statesman of our department and commanded the profound respect of his colleagues both within and well beyond the department. Objective at all times, well-balanced in his judgment, calm in his appraisal of a situation or problem, and wise in his advice and counsel, he was the person whose opinion set the standard by which solutions to problems were evaluated. He knew when to speak up and when not to. His reputation for these qualities was known throughout the Institute and he was widely sought for appointments on committees and task forces whose charge represented some of the most important business of RIT.

Prof. Upson spent the academic year 1979-80 on sabbatical leave at Paisley College in Scotland as a visiting faculty member of the school's Mathematics Department.

Always looking for new opportunities to utilize his talent and his vast experience in teaching, during the late eighties Prof. Upson became involved in *distance learning* – long before many in the world of education knew what the term meant. The technology, although revolutionary at the time, was not as user friendly as it is today and, as he puts it, “it took lots of blood, sweat and profanity”. What, he believes, helped him the most in overcoming the inherent difficulties of this new teaching modality and, especially, the danger of impersonality, was the broad experience in the craft of teaching he had accumulated over the previous quarter-century. He began with the *Key Program*, teaching students in three school districts in the Southern Tier of NY State. Then, as part of a larger RIT initiative, he organized and delivered the *GM Project* in Detroit which continues to this day. Prof. Upson considers his involvement in this field the crowning activity – the swan song, if you will – of his long career in the teaching-learning enterprise.

Prof. Upson has always been and continues to be very community spirited. Throughout his career, he has been involved in numerous organizations and activities; among them, the Boy Scouts, Habitat for Humanity, his church, advisor to the Alpha Phi Omega fraternity, Faculty Advisor to Student Government, Amateur Dramatics Society, charter member of the Phi Kappa Phi National Honors Society chapter on the RIT campus, and many others. In his spare time, he loves to golf. During his retirement, he intends to concentrate on and increase his activities in his church

and with the Habitat for Humanity where, he says, “in addition to driving nails, I want to become involved inside the organization, in planning and committee work where there seems to be a real need”.

As he looks back at his long career in the teaching profession, Prof. Upson believes that the biggest overarching event during the last four decades has been the changed nature of RIT from a local technical college “back then” to a technological university with a stellar reputation both nationally and internationally.

His answer as to how he feels about the whole thing was vintage Tom Upson: “I enjoyed every minute of it; in fact, I had a ball.”

BREITENBACH'S CO-OP

Mark Breitenbach

In the summer of 2000 I performed a co-op at National Security Agency (NSA) in Fort Meade, Maryland. While at NSA, I tested success rates and efficiency of existing algorithms for solving a particular cryptographic mathematical problem. I then formulated a new algorithm and implemented this solution for the original problem. Finally, I tested and interpreted the results for my solution.

The work that I performed at NSA involved many topics covered in my coursework at RIT. Previous courses that I found particularly useful in my research were Linear

Algebra and the Abstract Algebra sequence. Also, at NSA I was introduced to many useful numerical methods.

I found my employment at National Security Agency to be both challenging and exciting. I learned much from my co-workers and my research. Eventually I would like to pursue a full-time position at NSA.

CALCULUS-PHYSICS PROJECT

A three-year project was initiated this past spring to assess the first-year calculus and physics courses for the purpose of identifying strategies that can be developed to improve student success in these courses. Prof. Sophia Maggelakis heads the Mathematics & Statistics Department involvement, and Prof. Vern Lindberg plays this role for the Physics Department.

The project entails three phases. Phase one is the current stage and involves: assessing where we are, identifying approaches successfully used by other institutions, and adapting those that seem particularly suitable for us. Phase two will consist of putting a program together and developing a plan of implementation. The final phase will involve piloting courses to test and evaluate the proposed solutions, and then implementing assessment techniques to measure student learning and the effectiveness of those solutions.

The desired outcomes of this project are four-fold: clear understanding of where our students are and where they need to be; closer coordination between mathematics and physics curricula; calculus and physics packages that

will help students succeed without compromising standards; achievement of the same base level of skills and knowledge of all students who complete the first-year calculus and physics courses.

Quite clearly this project involves as “key players” both **faculty** and **students**. Extensive surveys have already been conducted, and a short-range assessment of grades has been run. Collaboration has been done with the LDC regarding supplemental instruction and with the College of Engineering regarding various problems and complaints that their students have voiced. The Office of Admissions has been approached regarding admission policies, academic background of admitted students, and whether there is a need to offer remedial or preparatory courses. The Associate Provost for Academic Programs has been consulted regarding the findings of the Task Force on Retention. Beside all this, a couple relevant conferences have been attended and extensive literature searches have been made.

Perhaps you are wondering why so much attention has been given to this matter recently. Over the past several decades, there has been a nation-wide decline in the performance of college undergraduates in the fields of mathematics and physics. In response, a variety of approaches and important innovations in introductory courses have been implemented and assessed as being successful to some extent. There is, however, no one approach that stands out as superior to others.

Twenty-four faculty members of our department are presently involved through a variety of

“subgroups” to make a concerted effort at making significant improvements in the first-year calculus course offerings. These “subgroups” include: Assessment and Administering of Placement/Diagnostic Tests, Assessment of Student Learning, Use of Technology and the Web to Improve Teaching, Design of a Project-Based Curriculum, Procedural Issues (i.e., Devise Strategies to Enhance Teaching), Designing a Preparatory Course, and Restructuring the Curriculum.

Students have played a significant part already through their survey responses; plans are in the making for them to have a continued role in any future developments and implementations.

MAA, AWM NOMINEES

Congratulations to Mark Breitenbach, Joanne Mule, Sarah McCormick, Marissa Robertson, Brianna Decker, and Shawn Dwyer. These students were the six mathematics and statistics majors selected to receive the 2001 Mathematical Association of America Student Award. This award will entitle these students to a free one-year membership in the MAA as well as a subscription to the Mathematics Magazine and the College Mathematics Journal.

Joanne Mule, Marissa Robertson, and Sarah McCormick were also selected to receive the 2001 Association for Women in Mathematics Student Award. These students will receive a free one-year membership in the AWM as well as a subscription to the AWM Newsletter.

Both of these awards are prestigious honors. The selection is

based on both overall academic performance and performance in their chosen field of study. Students must also have achieved third year standing by completing 90 credits or more and be a full-time student in the Department of Mathematics and Statistics.

Congratulations again to these outstanding students!

ANNUAL PUTNAM COMPETITION

This new millennium marked the sixty-first annual William Lovell Putnam Mathematical Competition. RIT, as usual, had a group of students participating. The following students took this year’s exam: Roger Mao, Donald Butler, Charles Moulton, Jason Furgal, John Chatham and Carol Penepinto. The results will be available by mid-March. Our team still does not have solutions for all of the test problems. For instance they are still looking for proof of the following theorem:

Let $f(t) = \sum_{j=1}^N a_j \sin(2\pi jt)$, where each a_j is real and $a_N \neq 0$. Let N_k denote the number of zeros (including multiplicities) of $\frac{d^k f}{dt^k}$.

Prove that $N_0 \leq N_1 \leq N_2 \leq \dots$ and

$$\lim_{k \rightarrow \infty} N_k = 2N.$$

Help is welcome!

Perfect numbers like perfect men are very rare.

-René Descartes

GENERALIZED BIPYRAMIDS

Curiosity seminars continue to play a role of stimulating some provocative thought among our faculty and students.

Before the Christmas break, Niek Sanders spoke on the topic of "Generalized Bipyramids". Under the supervision of Prof. Serge Lawrencenko, Niek disproved Prof. Douglas Meadows' conjecture stating that there does not exist a generalized bipyramid (or "suspension") of genus 2. As a matter of fact, he succeeded in constructing a series of generalized bipyramids of **arbitrary** genus, which are new and extraordinary polyhedra. A paper model of genus 2 and fascinating computer pictures were shown for the benefit of those who attended. This talk serves as an excellent example of involving our students in mathematical research.

POSTER SESSION

The students of the Mathematical Modeling class presented their final projects in a poster session held by the Mathematics and Statistics Club last November. Faculty and students from other math classes were present at the session where they got the chance to discuss with the students their projects and to ask questions. Various types of models, from discrete to continuous and from deterministic to stochastic, were presented. The applications varied from competing species models to budgeting professor salary increases, to collecting golf balls at a driving range, and to reaction time of the central nervous system, just to name a few.

JENNIFER RICHTER'S CO-OP

Jennifer Richter

This past summer I did a 12-week co-op with the Bristol-Myers Squibb Pharmaceutical Company in Wallingford, Connecticut. Bristol-Myers Squibb (BMS) is the maker of products such as Nuprin, Excedrin, Theragra vitamins, the Clairol hair care line, Pravachol (for cholesterol) and is the industry leader in cancer drugs.

While I was with the company, I was working with the Analytical Research & Development group. One of my summer responsibilities was to build a database of NMR information about the BMS chemical compounds that are drug candidates. However, the majority of my summer was spent performing statistical analysis on the data that I entered. It was used to see if chemical shift values of structurally unknown compounds could be introduced into a data set of values of known compounds, and then determine if the unknown compound is similar to the known compounds – in a nutshell. I was recently in contact with my supervisor from the summer and was told that the project I was performing this analysis for is currently being patented.

My summer experience was very valuable and I really learned a lot from it. I got an inside look at how a pharmaceutical company is run, enjoyed what I was doing, got interviewing experience, work experience, and a better understanding of what kind of

people companies are looking to hire.

Bristol-Myers Squibb is a great company with a well-established summer intern program. They treat their interns as equals and really try to provide a learning experience for them. The company paid for me to attend a weekend conference in New Jersey and provided many seminars for the interns to show them what was involved with the industry. I was generously paid, and the company found housing for me and provided a housing stipend that full covered my rent.

My summer experience was great, and I would highly recommend BMS to anyone who is interested in doing a co-op in an exciting mathematical or science field.

COLLOQUIA

During the Fall Quarter we were informed and challenged on three occasions. The first colloquium was presented by Prof. Josef S. Torok of the Department of Mechanical Engineering. He spoke on the "Formulation of Problems with Constraints in Lagrangian Dynamics", in which he presented various ways of dealing with constraints and constraint forces.

This was followed by Prof. John Blanton, a retired professor of mathematics from Saint John Fisher College. He has translated several books that were written by Leonhard Euler, including his most recent "Foundations of Differential Calculus". He favored us with some facts about Euler's life, examples of his work, and how he became interested in translating his works.

The final colloquium was a joint event of the Teaching Effectiveness

Committee and The Calculus Project, entitled "CALCULUS, an Active Approach with Projects". This was a workshop that addressed issues relating to the use of group projects and in-class activities in calculus. The presenters were Profs. Diane Driscoll Schwartz and Stan Seltzer from Ithaca College. The goals of the project are to: emphasize the unity of calculus, focus clearly on the central concepts of calculus, increase geometric understanding, teach students to be good problem solvers, and improve attitude toward mathematics. The activities include converting students from passive note takers to active listeners. Projects are used for the purpose of teaching persistence, broadening perspectives, exposing students to open-ended problems, and integrating topics. In summary, the Ithaca College Calculus Group has found that projects engage the curiosity of students and challenge them. It gave them the experience of going through the "experiment, conjecture, learn" process, and enabled them to experience the benefits of cooperative learning.

FACULTY NEWS

Prof. Eva Culakova presented her talk "Thoughts on Teaching Calculus as a New Faculty Member" at the semi-annual meeting of the Seaway Section of the Mathematical Association of America, held November 3 and 4 at SUNY Fredonia. At the same meeting two other members of the department gave talks: **Prof. James Marengo** presented "Bounds for Correlation Coefficients" and **Prof. Darren Narayan** presented "The Ranking Game." **Prof. Edwin**

Hoefer gave a report to the meeting in his role as secretary-treasurer for the Section.

Several faculty members attended the Joint Mathematics Meetings in New Orleans January 10 - 13, 2001. **Prof. Darren Narayan** presented "Animation of Areas and Tangent Lines using Java Applets" at the MAA contributed paper session on *Innovative Uses of the World Wide Web in Teaching Mathematics*. **Prof. Darren Narayan** was also a co-presenter of "A Complete Classification of Tournaments Having a Disjoint Union of Directed Paths as a Minimum Feedback Arc Set" at the AMS *Session on Combinatorics*. **Prof. Carl Lutzer** presented "Changing Basis with Hockey Pucks" at the MAA contributed paper session on *Classroom Demonstrations and Course Projects that Make a Difference*. **Profs. Carol Marchetti** and **Eva Culakova** gave a talk "Math Socialization: How to Eat, Drink & be Merry While Introducing Mathematical Reasoning, Problem Solving Skills & Networking" as part of the MAA contributed paper session on *Mathematical Experiences Outside of the Classroom*.

Profs. Marcia Birken and **Rebecca Hill** attended the meeting of the MAA Committee on Computers in Undergraduate Education that was held during the Joint Meetings. Also attending the Joint Meetings were **Profs. Laxmi Gupta, Edwin Hoefer, and Sophia Maggelakis**. While at the meetings, **Profs. Eva Culakova, Darren Narayan, and Carl Lutzer** participated in the Project NExT workshops.

2000-2001 CURIOSITY SEMINAR SERIES

The Curiosity Seminar series started two years ago as a forum for communicating mathematics that faculty are currently working on either for research, teaching or sheer enjoyment. It continues to enjoy success this school year. Scheduled at noon on Wednesdays, attendance averages about 15 people with a record high of almost 40 that included several students when Prof. Serge Lawrencenko gave his first talk. The seminar allows its participants to share difficulties and ideas, work on common problems and update each other on esoteric topics in mathematics. The list of presenters to date with their topics is given below.

Prof. Carl Lutzer:

Detecting Breast Cancer Before it is Too Late

Prof. Darren Narayan:

Finite Fields and Infinite Possibilities

Prof. James Marengo:

Extremal Correlation Coefficients

Prof. Douglas Meadows:

Really Radical Polynomials

Prof. Serge Lawrencenko:

Toroidal Triangulations with Flat Faces

Prof. Marvin Gruber:

A Tale of Two Estimators

Prof. Serge Lawrencenko:

21 Minimal Triangulations of the Torus

Mr. Niek Sanders:

Generalized Bipyramids

Prof. Marvin Gruber:

Some Applications of Differential Geometry to Statistics

Prof. James Marengo:

A Geometric Interpretation of Conditional Expectation

PROBLEM CORNER

1. A certain number, composed entirely of nines, is exactly divisible by 23. How many digits does the number have?
2. It is snowing. A snowplow starts at noon and plows two miles in the first hour and one mile in the second hour. When did it start snowing?
3. A and B run a race that is a mile long. In the first heat A gives B a start of 11 yards and beats him by 57 seconds. In the second heat A gives B a start of 81 seconds but is beaten by 88 yards. In what time could each run a mile?

FALL 2000 DEAN'S LIST

Cory Baitz
Jennifer Baldwin
Michael Bannerman-Martin
Brett Billings*
Mark Breitenbach*
Donald Butler
Paul Chwiecko
Kari Clark
Darryl Cooney*
Shana Dagal
Brianna Decker*
Joel Dreibelbis*
Shawn Dwyer*
Calvin Farmer
Jennifer Goodenow
Sarah Gruetze
Brian Grundy
Thomas Henthorn
Stacy Krokowski
William Kronholm
Jason Kuby
Garrett Manhart
Sarah McCormick
Jeffrey Medlar*
Joanne Mule*
Thomas Prevendoski*
John Priestly
Jennifer Richter*

Marissa Robertson*
Victoria Shults*
Robert St. Pierre*
Benjamin Stabley*
Tiffany Swasta*
James Wakefield*
Benjamin Zindle

Congratulations!
(*) Perfect 4.0 GPA

ALUMNI NEWS

Teresa Bisailon (SMAC '90) recently moved to San Diego. She is president of her own technical training company, *Terabyte Networks*. She said that RIT gave her a great start. Congratulations, Teresa!

Amy Carey (SMAS '98) is a programmer and data analyst at *Howard W. Proskin & Associates*. She creates SAS data sets and does statistical analyses. She is planning to attend graduate school to study Biostatistics.

Chris Conlon (SMAC '99) is still employed by the National Security Agency as a Telecommunications System Engineer. In May he will receive his MS in Telecommunications from the University of Maryland.

Kathleen (Smith) Grundon (SMAS '94, EQAS '96) is Director of Quality Assurance for *Adaptive Broadband*. She is responsible for developing and implementing a corporate quality and reliability program world-wide. Kathleen is also a Ph.D. candidate at the University of Maryland. She and her husband are expanding their current family that includes an 11 year old son by adopting a two year old girl.

Kristin Handzlik (SMAM '00) is now an Actuarial Statistician at

Blue Cross Blue Shield Rochester. She loves her new job and appreciates the new challenges that provide a constantly changing work environment. She plans to begin work on an MBA next fall.

Marlene (Hart) Hentschel (SMAM '98) is a communication teacher at the Rochester School for the Deaf. She works with deaf students on their English and American Sign Language skills. Last year she received her MS in Secondary Education for Deaf Students from RIT.

William "BJ" Hackman (SMAM '98) is currently working in the Actuarial Department for *Geico*. He lives in Silver Spring, MD, and he recently became engaged.

Jeffrey L. Adams (SMAM '82) is vice president and chief actuary for Health Now NY Inc. in Buffalo, NY. Congratulations, Jeffrey!

Mathematics and Statistics *Newsletter*

Articles written by:

Prof. John Paliouras
Prof. Wanda Szpunar-Lojasiewicz
Prof. Jim Runyon
Prof. Rebecca E. Hill
Jennifer Richter
Mark Breitenbach

Print Edition by Dirk P. Wyatt

Internet Edition by Rebecca E. Hill

Send your News item to:
E-mail: mathdept@rit.edu

or mail to:
Rochester Institute of Technology
Department of Mathematics and Statistics
College of Science
85 Lomb Memorial Drive
Rochester, NY 14623