

DEPARTMENT OF MATHEMATICS

Report to the Board - Spring 95

PERSONNEL

Professor Nacer Abrouk was on a special one quarter leave during Spring quarter serving as a statistical consultant to the Kellogg company.

Professor George Berzsenyi was on sabbatical leave during Winter and Spring and worked on developing the USA Mathematical Talent search as well as successfully obtaining further funding for the Young Scholars program.

Professor Ralph Grimaldi was on a full year sabbatical at Clemson University, where he is developing his special interests in discrete mathematics.

Professor Robert Lopez continued his special leave, during Fall and Winter quarters, to work as a consultant for Waterloo Maple Software, making presentations at various institutions. He returned to full time teaching in the Spring.

Professor Al Schmidt has decided to retire after 46 years of service, effective at the end of the spring quarter. We thank Professor Schmidt for his long and dedicated service. A "mid-life career change celebration" (Professor Schmidt's terminology) will be held May 19.

Professor Brian Winkel has accepted a position as Full Professor of Mathematics at United States Military Academy, West Point, NY .

Professor Gary Sherman was granted a one quarter sabbatical leave for the winter quarter of next year.

GRANTS AND CONTINUING GRANT ACTIVITIES

Professors George Berzsenyi and Steve Carlson received an additional two years funding from the NSF for the Young Scholars program. This summers program will host 50 young scholars for 4 weeks of intensive mathematical experiences. Professors, Berszenyi, Carlson, Kiaer, and Rickert will participate in the program. The students are selected from the 1000+ students who participate in the USA Mathematical Talent Search, which is supported by the NSF and the NSA. Professor Klebanoff also participates in the USA Mathematical Talent Search. The amount of the NSF portion of the grant is approximately \$95,000 annually and the NSA portion is \$20,000.

Professor Kurt Bryan received funding from the Foundation Coalition to revamp our upper division mathematical modelling course. This funding was part of the Foundation Coalition funding for upper division courses.

Professor Jack Kinney has received a \$8,000 grant from the Indiana State Department of Education for the Indiana Quantitative Literacy Project - 1995. This grant allows the Institute to conduct two simultaneous week-long workshops in training teachers to teach topics in probability and statistics in the pre-college years. About 60 Indiana teachers of mathematics are expected to enroll. One of the instructors in the President of the National Council of Teachers of Mathematics.

Professors Robert Lopez and Bruce Danner received a grant of \$5000 from the Lilly Foundation to introduce the use of the computer algebra system Maple to the theoretical mechanics course, taught this fall.

Professors Robert Lopez and Mark Yoder have received approximately \$144,000 from the NSF to conduct a workshop this summer in the use of computer algebra systems in undergraduate education.

Professor Gary Sherman is preparing for his seventh NSF-REU (Research Experiences for Undergraduates) summer program (seven weeks). The program continues to produce refereed faculty-student publications: 16 published/accepted, 2 submitted. The amount of the grant is approximately \$60,000

Professors Aaron Klebanoff, Lynn Kiaer and Brian Winkel and Jerry Fine will continue in their second summer of working with six high-school teachers in a project to develop complex, technology based problems in Calculus. The funding for this activity, obtained by Brian Winkel, is a \$100,000 NSF grant combined with \$26,400 from the Arvin Foundation (for the high school teachers). Some of the problems were class tested by Aaron Klebanoff at RHIT this year. During the final phase this summer, the problems will be set up as an electronic educational resource, publicly available on an Internet node at RHIT.

Professors Nacer Abrouk and Yosi Shibberu continued their participation in the Sophomore Curriculum design. They will be joined by Professors Lautzenheiser and Kinney during the continuation of the curriculum design activities this summer. This activity is funded through the Foundation Coalition grant.

STUDENT ACTIVITIES AND PRESENTATIONS

Mathematics Competitions: About thirty students participated in the sixth annual Alfred R. Schmidt Freshman Mathematics Competition, coordinated by Professor Goddard. The first prize winner was Jamie Kawabata. The RHIT team placed 32nd this year in the Putnam competition under the direction of Steve Carlson, while Aaron Klebanoff directed the Math Modelling team consisting of Nick Fiala, Jeff Paterson and Nick Tallyn. Twelve students attended the MAA TriState meeting in Angola, we placed third in the MAA Indiana Section competition.

A number of students attended the following conferences: Miami Undergraduate Mathematics Conference, the Rose-Hulman Undergraduate Mathematics Conference and the MAA section meeting in Angola, IN.

During the Spring Honors and Awards Banquet Jamie Kawabata was awarded the Palmer Award for outstanding performance as a freshman and Richard Mohr was awarded for his outstanding presentation of his research results obtained while attending the Purdue Research Experiences for Undergraduates Program. Richard's presentation and other student presentations are listed below.

Mark Lancaster, Chris O'Malley, James Poylio, Two Poles are Better than One: Bipolar Functions, 21st Annual Student Conference, Miami University, October 1994, Pi Mu Epsilon.

Rick Mohr, Finding the Closest Normal Matrix to a Given Matrix, Special Session at the AMS Annual Meeting, San Francisco, January 1995.

Carlton Puryear III, Analysis of Ring Effect in a Ray Tracing Program from Gaussian Optics,, 12th Annual Rose-Hulman Undergraduate Conference, March 1995.

John Goodhue, Investigation of Tile Line Mapping Using Differential Geometry, 12th Annual Rose-Hulman Undergraduate Conference, March 1995.

Frank Pfeiffer, Goldilocks and the Three Bears: An Engineering Approach, 12th Annual Rose-Hulman Undergraduate Conference, March 1995.

Rick Mohr, Finding the Closest Normal Matrix to a Given Matrix, 12th Annual Rose-Hulman Undergraduate Conference, March 1995.

Surat Intasang, Looking at Sunflowers: Surprising Fibonacci Numbers , 12th Annual Rose-Hulman Undergraduate Conference, March 1995.

FACULTY ACTIVITIES

Professor Nacer Abrouk has devoted considerable time to the Center for Industrial Statistics (CIS), which was created for the purpose of developing industrial relations with RHIT and local industries. The main function of CIS is to involve Rose-Hulman students in projects originating from industrial needs involving statistical methodologies such as quality control and process improvement, experimental design, efficient consumer response, product development and market strategies. The following are recent CIS projects: "A Comparative Study of Chicago Cutlery Products using the CATRA machine." (Chicago Cutlery Corporation, one Rose-Hulman student (Mr. Allen Dove, ME)). "Small Sample Confidence Intervals for the Weibull Distribution Parameters in Lifetime Studies" (General Motors Corporation, three Rose-Hulman students (John Padmore, Group Leader, ME)), "Assessing Final Product Quality for Film Production" (Applied Extrusion Technologies, one Rose-Hulman student (David Jones, EE)).

As noted above, Dr. Abrouk is on special leave during the spring quarter, serving as a senior project leader statistician at Kellogg Company, Battle Creek, Michigan. At Kellogg he has consulted on sample surveys, experimental design, quality defect prevalence, quality control, producing several internal reports for Kellogg, as well as giving a talk on methods of regression analysis.

Other activities include:

developing a Biostatistics course, taught in winter 1995,

publishing "Population Genetics: Estimation of Distributions through Systems of Non-linear Differential Equations" in the Maple Technical Report, co-authored with Robert J. Lopez,

teaching a course in advanced statistics entitled "Regression Analysis" at the 7th 1994 ICTM conference, Orlando, Florida. The course is published in the proceedings of the ICTM, 1994 conference.

selected by Ford Motor Company as a panelist for a conference attended by 23 universities and 20 industries from the U.S. The conference is scheduled for May 16, 1995 at the Fox Theater in Detroit, Michigan

attending a seminar in Statistics at Michigan State University, Department of Statistics,

providing statistical consulting for General Housewares Corporation, Terre Haute, Indiana and Terre Haute Medical Laboratories,

ASEE conference program chairman, for ASEE conference Anaheim, California, June 25-28, 1995,

serving as a freshman advisor, on the Laptop Committee, the Graduate Studies Committee, as well as serving on the thesis committee for Scott Salter's , Master's degree: Lifetime Data Analysis of Night Vision Devices in Military Applications.

Professor George Berzsenyi continued his regular columns in Consortium (USAMTS and Problems, Puzzles and Paradoxes), Quantum (Math Investigations), Mathematics and Informatics Quarterly (IMTS), and Math Horizons (Problem Section), as well as the coordination of the USA Mathematical Talent Search (USAMTS) and its associated Young Scholars Program (YSP), which were described above. As noted above, he, along

with Steve Carlson, successfully gained additional support for these two programs.

Professor Allen Broughton "learned the ropes" of being head of the department as well as teaching calculus on a daily basis using computers and computer algebra systems. He has served on the Curriculum Innovation and Continuous Improvement Commission, provided significant input to the Laptop committee, provided input on the selection of HSLs and Chemistry department heads, and served on the Foundation Coalition Management Structure. He has revamped the mentoring process for junior faculty in the department, and initiated a redesign of the first two years of mathematics instruction, to be carried out next year. He attended the Mathematics Department Chairs meeting in Washington during October as well as attending the Miami Undergraduate Conference, and the MAA meeting at IUPUI.

He continues his collaboration with a group of mathematicians at the Universidad Nacional de Educacion a Distancia and Universidad Complutense in Madrid, Spain, working in the area of symmetries of Riemann surfaces. He has been an active participant in the Applied Mathematics Seminar, giving five of the presentations.

This summer he will be working on:

- serving as a member of the laptop orientation team,

- writing a series of worksheets on calculus and differential equations based problems,

- organizing the departments curriculum materials in calculus and differential equations to ensure greater accessibility both at RHIT and nationally,

- completing the reorganization of the departmental administration,

- seeking additional grant opportunities for curriculum innovation.

Finally, he is the faculty sponsor of the new Rose-Hulman Roller Blades club.

Professor Kurt Bryan, with co-author Lester Caudill at the University of Kentucky, submitted a paper, "An Inverse Problem in Thermal Imaging" to the SIAM Journal of Applied Mathematics; he was also invited to present these results at an ASME conference in the summer. He continues to work with Lester Caudill on the mathematics of thermal imaging for corrosion detection. He recently completed another paper (with Michael Vogelius at Rutgers University) on homogenization techniques for modeling electrical conductors with many cracks, to be submitted for publication. He continues work with Vogelius on electrical imaging techniques. He also participated in a one week symposium during March of 1995 on "Waves and Scattering Theory" at the Institute for Mathematics and Its Applications in Minneapolis. In the fall, with professors Lautzenheiser, Shibberu, Broughton and Klebanoff, he started a weekly applied mathematics seminar and gave a number of the talks. In the fall he worked to redevelop and revive the Calculus of Variations course, to give it a more modern applied flavor. He also acted as course coordinator for the differential equations sequence during the fall and winter terms. During the academic year he served on the Quality of Education Committee and also refereed several papers for SIAM journals.

Professor Steve Carlson, in collaboration with Professor Berzsenyi, has received a grant from the National Science Foundation which will fund the fifth and sixth years of the USAMTS/ Rose-Hulman Young Scholars Program. Along with Berzsenyi and Professor Kiaer, he has begun the recruitment process for that program's summer component which will bring 50 mathematically talented high school students to campus. As Secretary-Treasurer of the Indiana Section of the Mathematical Association of America, Carlson worked on the planning committees for the Fall and Spring Section Meetings, which were held at IUPUI and Tri-State University, respectively. At the Tri-State Meeting, he was elected Section Vice-Chair for 1995-1996. In

addition to attending the Section Meetings, he attended the Annual Miami of Ohio Mathematics Conference last fall. He served as the advisor and coach for the Rose-Hulman team entered in the 1994 Putnam Competition, and he has continued his work as a contributor of reviews and abstracts for publication in the "Media Highlights" column of the College Mathematics Journal and Zentralblatt für Mathematics. He continues to coordinate the ISU-RHIT-SMWC Mathematics Colloquium series and is completing a two-year term as a member of the RHIT Faculty Affairs Committee, which he chaired this year and to which he has been re-elected for another two-year term.

Professor Bart Goddard organized the Alfred R. Schmidt Freshman Mathematics Competition last September and attended the Western Number Theory Conference, last November. He provides a valuable service to the department and institute by serving on the Laptop committee. Professor Goddard will also be the principal mathematics instructor in the summer school this year, and a freshman advisor.

Professor Elton Graves has again provided excellent service this year to the general mathematical community by bringing up the Indiana participation in the American High School mathematicians to record levels. This connection helps Rose-Hulman have a higher profile. He has served on the Laptop Committee, providing valuable input on classroom implementation issues. He is director of Fast Track Calculus which, as described below, has reached record enrollments this year. He is faculty advisor for the Pi Mu Epsilon Fraternity and is advisor to approximately 40 students (taking on Nacer Abrouk's load in the spring.) He was also participated in the Applied Mathematics Seminar.

During this academic year Professor Ralph Grimaldi is on sabbatical at Clemson University where he is teaching classes in linear algebra and attending classes in areas related to discrete mathematics and statistics. In addition he is attending weekly seminars on discrete mathematics, graph theory and the theory of algorithms. He has given three presentations in the discrete mathematics seminar and one in the graph theory seminar.

This semester Professor Grimaldi was invited to speak at the joint colloquium held by Converse College, Wofford College, and the University of South Carolina at Spartanburg. The talk was held at Converse in February and dealt with a survey of applications of the Fibonacci Numbers. A second presentation, including recent results on generating sets and the Fibonacci numbers, was given at a second invited talk held at the University of Tennessee at Knoxville in late March. The paper "The Catalan Numbers via a Partition" was published this winter in the journal *Congressus Numerantium*. Professor Grimaldi attended the 26th International Conference on Combinatorics, Graph Theory and Computing in March at Florida Atlantic University. While at the conference he chaired a session on graph theory and presented the paper "Generating Sets and the Fibonacci Numbers". Another paper on "Unit Parallelogram Graphs" which he coauthored with Jean Dunbar (of Converse College) and Joydeep Goshal (a graduate student at Clemson University) was presented at the conference by Professor Dunbar. Both papers are being prepared for submission to the journal *Congressus Numerantium*.

Professor Grimaldi was recently honored, along with 19 other authors, by the Friends of the Cunningham Library at Indiana State University because of the success of his textbook *Discrete and Combinatorial Mathematics*, now in its third edition. Finally, this July, Dr. Grimaldi will be the main speaker for a two week program on discrete mathematics sponsored by the Rocky Mountain Mathematics Consortium at the University of Wyoming at Laramie.

Professor Lynn Kiaer is completing her first year of teaching in the Integrated First Year Curriculum in Science, Engineering and Mathematics (IFYCSEM). Besides teaching activities - she also taught the Operations Research sequence this year - she completed the revision of a paper that has been accepted for publication in *PRIMUS*, and has had a paper on female participation in mathematics competitions accepted as

part of a panel on Gender and Mathematics at the National Women's Studies Association 1995 Conference, to be held in June at the University of Oklahoma. In addition to refereeing papers for the Naval Logistics Quarterly and the Management Institute, Professor Kiaer has reviewed a revision of Lawson's Linear Algebra, a discrete mathematics textbook for Oxford University Press, and an operations research chapter for a mechanical engineering handbook published by Professional Publications. Professor Kiaer has also been able to broaden her perspective this year thanks to an on-going consulting arrangement with Pfizer, in which she is working as a consultant to several teams of Pfizer employees who are addressing various aspects of minimizing release time for sterile pharmaceutical products. Not only has this industry experience been valuable in terms of professional development, but the contact with Pfizer management at the Vigo Plant led to a consulting project for a team of six IFYCSEM students.

Professor John Kinney has developed a course in statistical data analysis for chemical engineers. He is currently teaching one section of the course with the assistance of Dr. Jerry Caskey. As mentioned previously, Professor Kinney has also received a grant from the Indiana State Department of Education for the Indiana Quantitative Literacy Project - 1995. He also spoke to the Indiana Council of Teachers of Mathematics in Indianapolis and to the Ohio Council of Teachers of Mathematics in Toledo in October. Dr. Kinney has also:

- been elected President of the Indiana State University chapter of Sigma Xi, and attended the Annual Meeting of Sigma Xi in March.
- published a paper (with James Kepner): "Generalised Geometric Random Variables" in the March, 1995 issue of Teaching Statistics,
- was chair of the Honors and Awards Committee,
- and continues to work on a text for an undergraduate course in probability titled, Probability: An Introduction With Statistical Applications. The manuscript is under contract with John Wiley & Sons for publication.

In his teaching, Professor Aaron Klebanoff has continued to make use of and revise work done on the NSF grant entitled Complex, Technology-Based Problems in Calculus with Applications in Science and Engineering referred to above. He has also devoted significant energy and time developing and teaching a new course in fractal geometry and chaos.

In his professional development, he has attended three mathematics meetings: the national American Mathematical Society meetings in San Francisco and both Indiana Section Mathematical Association of America meetings. He has received funding to represent Rose-Hulman at Boston University's Differential Equations workshop this June. He has been attending the Applied Mathematics seminar on wavelets. He will be giving a presentation in the RHIT- ISU - SMWC Colloquium series on the subject of fractals and chaos. And finally, he has spent a fair amount of time collaborating with my new colleague at ISU on anti-predatory population models.

He selected and advised the Mathematical Contest in Modeling team. He is a member of the Coeducation committee and has given a presentation to the Department on awareness of gender differences in the learning styles. He continues to advise a master's degree student and has taken on a second advisee. He has also participated on the following committees: Freshman Studies, Mathematics Department Hiring Committee, and has graded for the USA Math Talent Search.

In addition to being the speaker at a mathematics colloquium at Wabash College, Professor Roger Lautzenheiser gave the welcoming talk at the Rose-Hulman Mathematics Conference. During the fall

quarter, he attended both the Indiana section meeting and the Miami of Ohio mathematics conference. He, along with Kurt Bryan, organized an applied mathematics seminar in which multigrid methods and wavelets were discussed.

Professor Robert Lopez returned to full-time teaching at RHIT this spring, after a Sabbatical leave and an additional 18 months funded leave while working with Waterloo Maple Software. During the past year Dr. Lopez has edited the Birkhauser text *Maple V: Mathematics and Its Application*, Proceedings of the Maple Summer Workshop and Symposium, Rensselaer Polytechnic Institute, Troy, NY, August, 1994. In addition, he published the Birkhauser text *Maple via Calculus: A Tutorial Approach*, and jointly, with Kent Harris, published the Wiley text *Discovering Calculus with Maple*, 2nd, ed. The paper *Population Genetics: Estimation of Distributions Through Systems of Nonlinear Differential Equations*, jointly authored with Dr. Nacer Abrouk, has been accepted for publication in the Maple Technical Newsletter, a journal for which Dr. Lopez continues to be an Associate Editor.

Dr. Lopez gave seminars at the University of California-Berkeley the University of California-Davis, the University of California-Santa Cruz, the University of California San Francisco, Simon Fraser University, the University of Nebraska-Lincoln, Texas Tech, the University of South Carolina, the University of Alberta, Kingsborough CC in New York City, Purdue University, the Stanford Linear Accelerator Center, and Mississippi State University.

Together with Dr. Bruce Danner of the Physics Department, Dr. Lopez has obtained a Lilly grant for the development of a version of the physics course *Theoretical Mechanics* as a computer-algebra based course.

Professor John Rickert continued to serve as a member of the USAMTS staff and as an associate editor for the Math Horizons problem section. He continued his analysis of the Mathematics Diagnostic Test. He gave a talk at the ISU-Rose-Hulman-St.Mary-of-the-Woods mathematics colloquium entitled *Wringing Pell's for solutions*. He gave a similar talk with the same title at the Spring meeting of the Indiana Section of the MAA. He was invited to give his presentation, *Bounds on the number of solutions to a pair of simultaneous diophantine equations*, at the number theory seminars at the University of Illinois-Urbana, the University of Michigan-Ann Arbor and the University of Waterloo. He was the organizer for the twelfth annual Rose-Hulman conference on Undergraduate Mathematics. He was the coordinator of the Engineering Statistics class for the Spring 1995 term. He was supervisor for Rose-Hulman's four teams competing in the Indiana College Mathematics Competition administered at the spring meeting of the Indiana Section of the MAA. He served as a freshman advisor. He served as director for the Jump Start program and began plans for a second class of students. He was one of the organizers of the 29th annual Rose-Hulman High School Mathematics Competition. He served as a coach and organizer of the teams representing the state of Indiana at the American Regions Math League meet, to be held in June. He will be teaching at the Rose-Hulman Young Scholars Programs with high scoring students from the USAMTS.

Professor Al Schmidt participated on the Honors and Awards banquet, and sought funding for the construction of a bell tower on campus. He is currently working on the publication of the department newsletter.

Professor Gary Sherman spoke ("The Great Shootout") in the Woods Lecture Series at Butler University this past fall and at the Southeastern International Conference on Combinatorics, Graph Theory and Computing at Florida Atlantic University this spring (*Counting Triple Products in Finite Groups*). In January he presented an MAA Minicourse (*Doing Discrete Mathematics with Undergraduates*) at the annual AMS/MAA meetings in San Francisco. The six Rose-Hulman NSF- REU-94 students presented three papers in a Special Session at that meeting. The REU continues to generate publications: one paper appeared, three papers were accepted for publication, and two papers are being refereed. Sherman was appointed to the joint MAA/AMS/SIAM committee to select the winner of the first annual Morgan Prize for the outstanding undergraduate research paper in mathematics and has a contract offer (Springer-Verlag) for *Indiscrete Discrete Mathematics*, a text that is the end product of an NSF-ILI Leadership grant.

Professor Yosi Shibberu participated in an NSF sponsored research workshop entitled Workshop on Algorithms for Macromolecular Modeling, Kansas Institute for Theoretical and Computational Science, University of Kansas, Lawrence, KA, September 30 -- October 2, 1994. He also gave a talk entitled Engineering Mathematics, Optimization and Optimal Design at the Seventh Annual International Conference on Technology in Collegiate Mathematics, Orlando, FL, November 17--20, 1994. Professor Shibberu attended the Fall Regional Conference of the National Society of Black Engineers held in Columbus, OH, November 4-6, 1994, the Spring Regional Conference held in Indianapolis, IN, February 17--19 and the National Convention held in Detroit, MI, March 22--26. Professor Shibberu continues to be actively involved in the development of the Foundation Coalition Sophomore Engineering Curriculum.

Professor Brian Winkel, in addition to teaching in the IFYCSEM and serving on the Foundation Coalition Management Team, continued to edit and publish PRIMUS and CRYPTOLOGIA. During the winter quarter he spent 8 weeks at home with eye problems requiring surgery. As previously mentioned, he has accepted a position as Full Professor of Mathematics at United States Military Academy, West Point NY. Also as previously mentioned he will be working with his colleagues and high school teachers on a project to develop complex, technology based problems in Calculus, this summer.

FACULTY COLLOQUIA AND SEMINARS

Judy Walker, Codes and Algebraic Geometry

Dr. Nora Hopkins, An Introduction to non- associative algebras

Dr. John Rickert, Wringing Pell's for solutions.

Dr. Alisha A. Waller, A Queueing Network Model for Field Support Systems

Dr. Thomas Roby, Reed College, Counting on non-commutative algebra

Dr. David Barsky, University of California at Davis, An Introduction to Percolation

Dr. Victoria Booth, National Institutes of Health, A Minimal Model for the Origin of Bistable Firing Behavior in Motoneurons

Dr. Aaron Klebanoff, Chaotic Fractals

Applied Mathematics Seminar: Allen Broughton, Kurt Bryan, Elton Graves, Aaron Klebanoff, Roger Lautzenheiser, Yosi Shibberu

PAPERS, PUBLICATIONS AND TECHNICAL REPORTS

Nacer Abrouk and Robert Lopez, Population Genetics: Estimation of Distributions through Systems of Non-linear Differential Equations, Maple Technical Report.

John Kinney, (with James Kepner): Generalised Geometric Random Variables, in the March, 1995 issue of Teaching Statistics,

Robert Lopez, Maple V: Mathematics and Its Application, Birkhauser

_____, Proceedings of the Maple Summer Workshop and Symposium, Rensselaer Polytechnic Institute, Troy, NY, August, 1994.

_____, Maple via Calculus: A Tutorial Approach, Birkhauser

Robert Lopez and Kent Harris, Discovering Calculus with Maple, 2nd, ed, Wiley

Ralph Grimaldi, The Catalan Numbers via a Partition, Congressus Numerantium.

Technical Report Series

MS TR 94-05 An Inverse Problem in Imaging, Kurt Bryan and Lester Caudill

MS TR 94-06 Square Roots of Finite Groups - II, Matthew Devos, David McAdams, Rebecca Rappaport

MS TR 94-07 Distinct Products of Triples in Finite Groups, Curtis Z. Mitchell

MS TR 95-01 Conjugacy classes of Triple Products in Finite Groups, Kevin Hutson & Emily Salvo

MS TR 95-02 An Elementary Proof that Finite Groups Lack Unique Product Structures. Matthew Cushman

PROGRAMS

The Twenty-Ninth Annual RHIT High School Math Contest was held on November 12 1994. Over 350 students from 23 schools attended. The contest was organized by John Rickert and Lynn Kiaer.

The USA Mathematical Talent Search attracted 1000+ participants this year. From these students will be selected 50 students to participate in the four week Young scholars program. Professors Berszenyi, Carlson, Kiaer, Rickert and Klebanoff participated.

The Twelfth Annual RHIT Undergraduate Mathematics Conference was held on March 10-11, 1995. The main speaker was I. Martin Isaacs for the University of Wisconsin at Madison, who gave two excellent talks on logic problems and counting problems in groups. The conference was organized by John Rickert and the next conference will be organized by Nacer Abrouk.

The Fast Track Calculus program this year has resulted in over sixty applications, about 50 of whom we expect will attend, doubling our previous largest enrollment. Professors Elton Graves and Robert Lopez will be teaching in the program. The program will give us an opportunity to test out the use of the laptop computers in the classroom before the main freshman class arrives.