

DEPARTMENT OF MATHEMATICS

Report to the Board - Spring 1997

PERSONNEL

Professor **Dave Bond** resigned to take on a position as research scientist at the Alliance for Marine Remote Sensing in Nova Scotia.

Two new faculty members will join the Math Department in the Fall. **Mr. David Rader, Jr.**, comes from Rutgers University specializing in Operations Research and **Mr. Matthew Hopkins** comes from Tulane University specializing in Computational Fluid Dynamics.

GRANTS AND CONTINUING GRANT ACTIVITIES

Professor **Allen Broughton** was awarded \$30,000 to conduct an NSF-REU in Hyperbolic Geometry and Computational Group Theory. This is the ninth consecutive year that Rose-Hulman has been an REU site. He was also awarded an \$8000 (jointly with Ed Doering in the Electrical engineering department) from the Foundation Coalition to develop a course entitled Mathematical Methods of Image Processing.

Kurt Bryan is in the second year of an NSF research award (joint with Michael Vogelius of Rutgers)

STUDENT ACTIVITIES, PRESENTATIONS and AWARDS

Mathematics Competitions: Forty-two students participated in the seventh annual **Alfred R. Schmidt Freshman Mathematics Competition**, coordinated by Professor Rickert. The first prize winner was Randy Motchan. Dr. Rickert was also the advisor for the Virginia Tech Regional Mathematics Competition written by 12 students.

The **Mathematical Contest in Modeling** team of Josh Horstman, Jamie Kawabata and Jayme Moore earned an Outstanding Award for their solution of the "B" problem. The Institute for Operations Research and the Management Sciences (INFORMS) selected this team's paper as the INFORMS Outstanding Paper for the 1997 Modeling Competition in Mathematics. The team of Matthew Adams, Patrick Swickard, and Carl Tracy received Meritorious Award for their solution on the "A" problem. The team of Jim Meyer, Fred Franzwa, and Jon Matthews earned a Successful Participant award for their solution on the "A" problem. The Institute for Operations Research and the Management Sciences selected RHIT as the INFORMS Outstanding Paper for the 1997 Modeling Competition in Mathematics. Out of 563 registered teams 409 earned some degree of recognition; the 409 successful teams represented 8 countries and 224 institutions. In what follows, the "A" problem is the velociraptor problem and the "B" problem is the scheduling problem.

9 (5A/4B) Outstanding; also (1A/1B) from INFORMS - our team got the B
62 (37A/25B) Meritorious

101 (58A/43B) Honorable Mention
237 (134A/103B) Successful Participant

Though two other school did win two meritorious awards, Rose-Hulman was the only school to win an outstanding and a meritorious award. Advisor: Aaron Klebanoff.

RHIT had five teams in the **Indiana College Mathematics Competition**. The teams of Kyle Lacey, Tyson Patterson, and Christopher Prince; Jamie Kawabata, Randall Motchan, and James Moore; and Frederick Franzwa, Jonathan Matthews, and James Meyer posted exceptional performances. RHIT claimed second and third place and four of its teams were in the top 8 of 25 teams. Advisor: John Rickert

The **57th Annual Putnam Competition** team of Jamie Kawabata, James Moore, and Randall Motchan place ranked 28th in the country. A total of 2,407 student from 408 collages and universities in Canada and the United States participated in the Competition. There were teams from 294 institutions. Jamie Kawabata ranked 89th and both Ben Ford and Josh Horstman both placed in the top 500 of the country. Advisor George Berszenyi

Pi Mu Epsilon

Thirty-seven students and faculty members attended the Annual Pi Mu Epsilon Banquet on April 30. Twenty-seven of the Rose-Hulman student body were inducted into Pi Mu Epsilon, an honorary mathematics fraternity. Dr. Herb Bailey Professor Emeritus of RHIT spoke on *A Stronger Triangle Inequality* and other problems arising from his Echoes problem column.

Math Club

The Math Club is a newly formed student club of which Patrick Swickard is President. This year they got organized and participated in Math Awareness Week by making a web page on famous math majors.

Conferences and Workshops

A number of students attended the following conferences and workshops: the Rose-Hulman Undergraduate Mathematics Conference, the Fall MAA meeting at Rose-Hulman, the Spring MAA section meeting at Franklin College, the Miami University Undergraduate Mathematics Conference, and the Hewitt Associates Actuarial Seminar in Chicago.

Awards

During the Spring Honors and Awards Banquet, Randall Motchan and Matt Lepinski were awarded the Palmer Award for outstanding performance as freshmen and Jayme Moore was awarded the Sousley Award as the outstanding graduating mathematics senior. Ten other students were recognized for their excellent performance in various mathematics competitions noted above.

Student Presentations

Brad North (with Roger Lautzenheiser), *Visual Linear Algebra*, Fall MAA Indiana, Rose-Hulman.

Jamie Kawabata, *The Bijection from Derangements to Perfect Scramblings*, RHIT Undergraduate Mathematics Conference

Student Publications

Barry Balof, Eric Farmer, Jamie Kawabata, *The link between scrambling numbers and derangements* MSTR 97-03

Study Abroad: Budapest Semesters in Mathematics, Jamie Kawabata and Surat Intasang.

FACULTY and STAFF ACTIVITIES

Professor **Nacer E. Abrouk**, in addition to other courses, taught MA 422 (bioengineering statistics) and MA 590 (experimental design and quality control). Math 590 was taught at Crane Naval Base and to local industry in conjunction with the engineering management MS program. He presented a paper at the MCOTS conference, Oshkosh, Wisconsin, entitled "The Impact of Industrial Statistics on Engineering Curriculum". Abrouk published a paper in the AJSE entitled "Approximation of Distributions Governed by Fokker-Planck Equations". He also participated in four MS committees at RHIT. He published an advertisement study for Chicago Cutlery in a North American published Magazine: Martha Stewart, November 1996 Issue. He also coordinated with Jeff Meyers an effort to generate projects for the Center for Industrial Statistics by soliciting companies in Indianapolis and Evansville, Indiana. Also, assisted Jeff in the preparation of a brochure, now completed, for the Center for Industrial Statistics.

Professor **George Berzsenyi** continued to administer the USA Mathematical Talent Search (USAMTS) until January, at which time he was successful in transferring the operation of the project to the Consortium for Mathematics and Its Applications (COMAP) and the National Security Agency (NSA), with COMAP in charge of the administrative aspects and NSA of the mathematical aspects of the program. Professor Berzsenyi will continue to prepare the problem sets for both the USAMTS and its global extension, the International Mathematical Talent Search (IMTS) until May of 1999, at which point an International Problems Committee will assume his present responsibilities. Till that time, he will also continue his work with the IMTS, though in January he has already turned over the editorial work on the IMTS column in Mathematics and Informatics Quarterly (M&IQ) (as well as the USAMTS column in Consortium) to his successor, Dr. Gene Berg, who is the Mathematics Advisor to the Chief Scientist at NSA. This year's USAMTS involved over 1500 students nationwide; this was the eighth year of the program.

In addition to preparing the USAMTS columns in Consortium and the IMTS columns in M&IQ during the fall, Professor Berzsenyi continued writing the "Problems, Puzzles and Paradoxes" column in Consortium and the "Math Investigations" column in Quantum. He also published an article on the USAMTS in *Mathematics Competitions* and submitted another one on the IMTS to the same journal. He also prepared a section entitled "Providing Opportunities through Competitions" for the book Developing Mathematically Promising Students, to be published by the National Council of Teachers of Mathematics (NCTM). The publication of The Contest Problem Book V is scheduled by the

Mathematical Association of America for June, 1997. This volume was prepared jointly by Professors Stephen B. Maurer (of Swarthmore College) and George Berzsenyi.

In February Professor Berzsenyi was an invited speaker at the Math Convocation at Southwest Texas State University, and in April he gave a colloquium talk at Eastern Illinois University. He continues to serve on the Editorial Board of Math Horizons (as well as those of Consortium, Quantum, M&IQ, and several others), and as the North American Representative to the World Federation of National Mathematical Competitions (WFNMC).

Professor **Allen Broughton** was awarded \$30,000 to conduct an NSF-REU in Hyperbolic Geometry and Computational Group Theory. During the winter quarter, he taught a new course on the Mathematics of Image Compression and following up on these ideas was awarded an \$8,000 grant (jointly with Ed Doering in the Electrical and Computer Engineering department) to develop a companion course on Advanced Mathematical Methods of Image Processing. His paper (with numerous co-authors) *Symmetries of Riemann Surfaces on which $PSL(2,q)$ Acts as a Hurwitz Automorphism Group* appeared in Journal of Pure and Applied Mathematics. He attended the Fall and Spring meetings of the Indiana Section of the MAA, the Miami University Undergraduate Mathematics Conference, and the AMS meeting winter meeting in San Diego. He also significantly improved the departmental web page. In November, along with Roger Lautzenheiser, Robert Lopez and Yosi Shibberu conducted a workshop for six Japanese mathematicians during the KIT/RHIT symposium. He, along with faculty from other departments, made a number of demonstrations of the use of laptop technology in the Olin for the Assessment conference, RHIT benefactors, and Olin visitors. He serves on the Laptop Committee and the Laptop Orientation Committee.

Professor **Kurt Bryan**, with co-author Lester Caudill at the University of Richmond, has continued research into mathematical inverse problems related to thermal nondestructive testing. They will present some of their results at a conference on differential equations and computer simulations at Mississippi State University in May. In February Professor Bryan spent a week at Rutgers University, continuing work with Michael Vogelius of Rutgers University on inverse problems and modeling related to electromagnetic eddy currents methods for nondestructive testing. A paper, "Teaching a Transport Phenomena Problem using a Symbolic Algebra Package", written with Hossein Hariri in chemical engineering, was presented at the Illinois-Indiana meeting of the ASEE in March, 1997. Professor Bryan also refereed several papers for SIAM journals and an NSF grant in the division of mathematical sciences.

Professor Bryan also participated in a day-long conclave on "Bridge Programs" for minorities and women, sponsored by the Foundation Coalition, acted as a freshman advisor for 12 IC students, and continued as organizer and chief presenter of the Applied Mathematics Seminar.

Professor **Steve Carlson** organized the Fall meeting of the Indiana section of the MAA has been on sabbatical leave during the winter and spring terms of the 1996-97 year to do research and writing, and taught topology and geometry as a Visiting Professor at Indiana University, Bloomington, for the spring 1997 semester. He is working on a manuscript on the topology of surfaces, to be used in RHIT classes. He also attended and co-chaired the Spring meeting of the MAA Indiana Section held at Franklin College.

Professor **Elton Graves** has spent much of his time this past quarter in discovering ways to incorporate the use of laptop computers into the teaching of the department's Complex Variable course. In addition he has been sitting in on Professor Abrouk's Statistics course to learn to efficiently incorporate

the laptop into the teaching of engineering statistics. Outside of the classroom Professor Graves continues to serve the Institute as a member of the Faculty Affairs Committee, the Laptop Committee, and Chair of the Admission and Standings Committee. As the advisor to the mathematics honorary, Pi Mu Epsilon, he arranged for the Annual Initiation Banquet on May 6, in which 27 new members were inducted into the honorary. The guest speaker at the banquet was Dr. Herb Bailey, Professor Emeritus of Rose-Hulman. As Director of the Fast Track Calculus program, he oversaw the mailing of 1,500 letters to possible participants, and corresponded with applicants and their parents. Over 71 applications were received for the program and 56 students were invited to participate.

As the Indiana Director for the American High School and American Junior High School Mathematics Exams (AHSME, AJHSME) he oversees the administration of these national exams in Indiana. At the State MATHCOUNTS meet, held at Rose-Hulman, he acted as the judge, along with Professor John Rickert, to arbitrate any disputed answers. He was also able to announce that three students at the competition had won \$10,000 in Rose-Hulman Scholarships for having perfect scores on the AJHSME. At the Indiana Section Meeting of the MAA, Professor Graves awarded Park Tudor School of Indianapolis the first place team trophy for winning the Indiana team competition in the 1997 AHSME. Under Professor Graves' direction, Indiana continues to be a national leader in the number of schools which participate in the AJHSME and AHSME. As a member of the Vigo County School Corporation's Broad Based Planning Committee, Professor Graves acted as Chair of a parent subcommittee which prepared a new brochure for parents whose children will be entering the school corporation's program for gifted education.

Professor **Ralph Grimaldi** served as a freshman advisor, the course coordinator for Differential Equations I and II, chair for mathematics curriculum revision, and as a member of the First Year Team. In addition, in November he coordinated (with John Rickert) the Rose-Hulman High School Mathematics Contest. With regard to professional development, he refereed three articles for the Mathematics Magazine, and attended the National Mathematics Meetings in San Diego in January and the 28th Southeastern Conference on Combinatorics, Graph Theory, and Computing at Florida Atlantic University in March. While at the Southeastern Conference, Professor Grimaldi chaired a session on graph theory and presented the paper "The Tennis Ball Problem and the Catalan Numbers", which he coauthored with Professor Joseph Moser, a Rose-Hulman alumnus. His paper "Monochromatic Triangles in Complete Graphs", which he co-authored with Professor John Rickert, was published in *Congressus Numerantium* in December. The article "A Tiling Scheme for the Fibonacci Numbers" (co-authored with Professors Robert Brigham, Richard Caron, and Phyllis Chinn) was published this spring in the *Journal of Recreational Mathematics*. This past April Professor Grimaldi was the Dr. Harlan C. Miller Memorial Lecturer at Texas Women's University where he delivered a series of lectures on discrete mathematics and combinatorics.

Professor **Lynn Kiaer** is completing her third year of teaching in the Integrated First Year Curriculum in Science, Engineering and Mathematics (IFYCSEM). In addition to teaching in the IFYCSEM and other courses, she MA 444, Deterministic Models in Operations Research, in the winter term. She also served on two MS committees during the past academic year, and has been an active participant in the Applied Mathematics Seminar on the Traveling Salesman Problem. Besides teaching activities, she attended the Southeastern Conference on Combinatorics, Graph Theory and Computing in February, and presented a paper on her time-tabling research, which is also being submitted to *Congressus Numerantium*. She also represented Rose-Hulman and the Integrated curriculum, along with Dr. Froyd, as an invited panelist at the AMS/MAA meetings in January. Dr. Kiaer is the program chair for the mathematics section of the ASEE, whose annual meeting is being held this summer in Milwaukee.

Professor Kiaer is continuing work on applications modules for the new edition of Howard Anton's Calculus, the first volume of which is due out this summer. This project came about as a result of Dr. Anton's seeing, on the web, materials prepared by Professor Kiaer during her participation in the NSF Project for Complex, Technology-Based Calculus Problems, originated by Professor Winkel and continued by Professor Klebanoff.

Professor **Jack Kinney's** text, Probability: An Introduction with Statistical Applications, has been published by John Wiley & Sons. He is also the author of a Solutions Manual for instructors who adopt the book. His book was honored at a reception for authors hosted by Friends of the Cunningham Library at Indiana State University.

Talks include a presentation to the local Sigma Xi Chapter, and a talk on statistics in integrated programs at a regional meeting of the National Council of Teachers of Mathematics in South Bend. In March he organized and chaired a session at a regional meeting of the American Society for Engineering Education in Indianapolis. He also presented a paper at that session.

He continues to be interested in the use of computer algebra systems in teaching probability and statistics, especially in how these can be used to establish mathematical ideas. He is currently at work on a new text on mathematical statistics.

Professor **Aaron Klebanoff** has been involved with various activities throughout the year. He began the school year by teaching a computer orientation session. During the Fall Quarter, he attended (and also helped run) his first meeting as a Project NExT-IN (New Experiences in Teaching Mathematics) Fellow at the Indiana Mathematical Association of America (MAA) Fall meeting at Rose-Hulman. It was also during the Fall Quarter that Dr. Klebanoff advised Patrick Swickard in the process of founding Rose-Hulman's new math club. In November, Dr. Klebanoff presented a talk at the International Conference on Technology in Collegiate Mathematics held in Reno, Nevada on the technology based calculus problem web site which he helped to develop and currently manages. He was also a member of a panel of experts on using the world wide web to enhance education. During the winter quarter, Dr. Klebanoff worked with his colleague Cary Laxer (in computer science) to develop the course in chaos and fractals which they are currently team teaching to a class of 21 students. Dr. Klebanoff also attended a four-day conference on dynamical systems and chaos in early January. In addition, he helped put together the best modeling teams ever for the international Mathematical Contest in Modeling. The three teams earned "Outstanding", "Meritorious", and "Successful Participant" awards making it the best showing for Rose-Hulman, and also the best result of any institution in the world for 1997. In support of mathematical competitions, he also helped grade for the Math Counts competition for junior high school math students. Dr. Klebanoff attended the spring meeting of the Indiana MAA in Franklin, Indiana, where he also had business as the local representative and as a Project NExT Fellow. Finally, Dr. Klebanoff was the conference organizer for the math department's 14th annual math conference. In conjunction with the math conference, he invited Dr. Michael Moody to also talk about the math clinic at Harvey Mudd College.

Professor **Roger Lautzenheiser** attended an American Mathematical Society meeting held at the University of Tennessee, Chattanooga during the fall quarter. Later in the quarter, Professor Lautzenheiser and junior electrical engineering student, Brad North, gave a joint presentation at the MAA Indiana Section meeting which was held at Rose-Hulman. The talk was a demonstration of the linear algebra software package which Lautzenheiser, North, and Professor Shibberu developed last summer. Dr. Lautzenheiser also participated on a panel discussion for reform in linear algebra at the spring meeting of the MAA Indiana Section meeting held at Franklin College.

Professor **Robert L. Lopez** participated in the Laptop Orientation Program, and served as a Freshman Advisor during the 1996-97 academic year. He presented an invited workshop at Florida International University, spoke at the International Conference for Technology in Collegiate Mathematics, and presented a workshop at the RHIT-KIT Joint International Symposium. He was honored, as the recipient of the Board of Managers' Outstanding Scholar Award with the planting of a tree near the Student Union. Dr. Lopez published three articles in MapleTech: two in the series "Tips for Maple Instructors" and one, with Michael Monagan, "Tips for Maple Users and Programmers." He continues to serve the journal MapleTech as Section Editor for Education. He wrote a significant portion of the student supplement to Richard Penney's Linear Algebra text, and submitted a proposal for Upper-Division Course Development sponsored by the Foundation Coalition and the National Science Foundation.

Professor **John Rickert's** papers "Simultaneous Pell Equations", written with David Masser, and "Monochromatic Triangles in Complete Graphs", written with Ralph Grimaldi, appeared in the Journal of Number Theory, and *Congressus Numerantium*, respectively. He also submitted a paper to The Journal of Recreational Mathematics. He and Lynn Kiaer produced educational modules for the next edition of Howard Anton's Calculus. He continued his analysis of the Mathematics Diagnostic Test. He was coach for Rose-Hulman's five teams competing in the Indiana College Mathematics Competition administered at the spring meeting of the Indiana Section of the MAA. Three of these teams were the top five scoring teams in the competition. He served as a freshman advisor. He served as director for the Jump Start program. He was chair of the Student Affairs Committee. He was one of the organizers of the thirty-first 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 May and is part of the Indiana contingent acting as a contest coordinator for the University of Iowa site of the competition. During the summer, he will be a teacher at the 1997 Research Science Institute, held on the campus of M.I.T. He is preparing to take a one year sabbatical leave during academic year 1997-8. He will spend the year researching various number theoretic topics.

Professor **Gary Sherman** wrote two papers for publication (one with students), worked on his idiosyncratic text "Indiscrete Discrete Mathematics" and talked and visited with faculty from around the country who are interested in how he uses technology in discrete mathematics and abstract algebra, most recently at the University of Louisville. He was recently named chair of the MAA's Allendoerfer Prize Committee and invited to speak to the MAA's NEXT Fellows at the Atlanta Mathfest.

Professor **Yosi Shibberu** gave a talk on symplectic geometry and the simple harmonic oscillator at the fall sectional meeting of the Mathematical Association of America, held at Rose-Hulman, October 26, 1997. He help organize a workshop on the teaching of algebra and differential equations at the Third Rose-Hulman Kanazawa Joint International Symposium on Engineering Education for the 21st Century, held at Rose-Hulman, November 5, 1996. Professor Shibberu was invited to participate in a 10 day workshop on Rational Drug Design organized by the Institute of Mathematics and its Applications at the University of Minnesota, April 2-12, 1997. He attended the spring regional conference of the National Society of Black Engineers, February 15-16, 1997, Chicago, Illinois. He continues to serve as faculty advisor for the Rose-Hulman chapter of the National Society of Black Engineers and advisor and tutor in the Academic First Program sponsored by Eli Lilly and a judge in science fair and quiz bowl competitions held by the local chapter of the NAACP and the Indianapolis

chapter of the National Organization of Black Chemists and Chemical Engineers. Professor Shibberu continues to be actively involved in the Foundation Coalition Sophomore Curriculum as well as the math department's curriculum committee. He is currently the sophomore advisor for math majors and a member of the student affairs committee and the diversity council.

PRESENTATIONS, SEMINARS, COLLOQUIA

Off campus presentations:

Nacer Abrouk

The Impact of Industrial Statistics on Engineering Curriculum, MCOTS conference, Oshkosh, Wisconsin.

George Berzsenyi

The USAMTS, an Overview, invited speaker, Math Convocation at Southwest Texas State University,
The USAMTS, an Overview, colloquium talk, at Eastern Illinois University.

Allen Broughton

workshop presenter, *Using Computers in Mathematics Education*, KIT/RHIT Joint International Symposium,
numerous presentations (with many others) on using laptop technology in the Olin classrooms for Assessment conference, RHIT benefactors and Olin visitors.

Kurt Bryan

several presentations on *Traveling Salesman Problem* (and organizer), RHIT Applied Mathematics Seminar.

Ralph Grimaldi,

series of lectures on discrete mathematics and combinatorics, Dr. Harlan C. Miller Memorial Lecturer at Texas Women's University.

Lynn Kiaer,

with Jeff Froyd, invited panelist on Integrated Curriculum AMS/MAA meetings San Diego.
Time-Tabling Research, Southeastern Conference on Combinatorics, Graph Theory and Computing,
several presentations on *Traveling Salesman Problem*, RHIT Applied Mathematics Seminar

Jack Kinney

Probability, presentation to the local Sigma Xi Chapter
invited address, *Team Teaching in Integrated Programs in Science and Engineering*, National Council of Teachers of Mathematics regional meeting, South Bend.
Paper *Statistics as a Thread in Cooperative Curricula in Engineering* and organizer for *Integrated Programs* session at regional meeting of the American Society for Engineering Education in Indianapolis.

Aaron Klebanoff

A WWW site for Complex, Technology Base Calculus Problems with Applications in Science and Engineering, International Conference on Technology in Collegiate Mathematics, Reno, panel member, *Using the World Wide Web to Enhance Education* International Conference on Technology in Collegiate Mathematics, Reno.

Roger Lautzenheiser

with Brad North, *Visual Linear Algebra*, Fall MAA Indiana section meeting, Rose-Hulman. panel member, *Reform in Linear Algebra*, Spring meeting of the MAA Indiana Section, Franklin College, workshop presenter, *Using Computers in Mathematics Education*, KIT/RHIT Joint International Symposium

Robert L. Lopez

Maple Seminar & Workshop, invited workshop at Florida International University, *The Changing Face Of Classical Mathematics*, at the International Conference for Technology in Collegiate Mathematics, International Symposium, workshop presenter, *Using Computers in Mathematics Education*, KIT/RHIT Joint International Symposium

Gary Sherman

Equations, Scramblings and Random walks in Finite, University of Louisville.

Yosi Shibberu

Symplectic Geometry and the Simple Harmonic Oscillator, Fall meeting MAA Indiana section Rose-Hulman, workshop co-organizer, *Using Computers in Mathematics Education*, KIT/RHIT Joint International Symposium

PAPERS, PUBLICATIONS AND TECHNICAL REPORTS**Paper and Publications:****Nacer Abrouk**

Approximation of Distributions Governed by Fokker-Planck Equations, AJSE, to appear
Consulting Study: Advertisement study for Chicago Cutlery,, Martha Stewart, magazine November 1996.

George Berzsenyi

Problems, Puzzles and Paradoxes, column in Consortium
Math Investigations, column in Quantum.
The USAMTS, an Overview, Mathematics Competitions
The IMTS, an Overview, Mathematics Competitions
Providing Opportunities through Competitions section for the book Developing Mathematically Promising Students, National Council of Teachers of Mathematics (NCTM).
with Stephen B. Maurer, The Contest Problem Book V, Mathematical Association of America, to appear June, 1997.

Allen Broughton

with numerous coauthors, *Symmetries of Riemann Surfaces on which $PSL(2,q)$ Acts as a Hurwitz Automorphism Group*, Journal of Pure and Applied Mathematics.

Kurt Bryan

with Hossein Hariri, *Teaching a Transport Phenomena Problem using a Symbolic Algebra Package*,

with Lester Caudill, Jr. *Uniqueness for a Boundary Identification Problem in Thermal Imaging* MS TR 96-04.

Ralph Grimaldi

with Joseph Moser *The Tennis Ball Problem and the Catalan Numbers*,

with Professor John Rickert, *Monochromatic Triangles in Complete Graphs*, Congressus Numerantium,

Professors Robert Brigham, Richard Caron and Phyllis Chinn, *A Tiling Scheme for the Fibonacci Numbers*, Journal of Recreational Mathematics.

Lynn Kiaer

Time-tabling Research, submitted Congressus Numerantium.

with John Rickert, continuing work on applications modules for the new edition of Howard Anton's Calculus

Jack Kinney

text and solutions manual, Probability: An Introduction with Statistical Applications, John Wiley & Sons.

Robert Lopez

2 article in *Tips for Maple Instructors*, Column in MapleTech

1 article with Michael Monagan, *Tips for Maple Users and Programmers*, column in Maple Tech.

portions of student supplement to Richard Penney's Linear Algebra text

John Rickert

with David Masser, *Simultaneous Pell Equations*, Journal of Number Theory

with Ralph Grimaldi, *Monochromatic Triangles in Complete Graphs*, Congressus Numerantium, respectively.

Apocalyptic Powers, he Journal of Recreational Mathematics.

with Lynn Kiaer, continuing work on applications modules for the new edition of Howard Anton's Calculus

Gary Sherman

Equations, Scramblings and Random walks in Finite Groups, submitted to American Mathematics Monthly,

Research and Discovery in Discrete Mathematics and Group Theory - with Undergraduates, Proceedings of NSF Conference at Depauw University.

Technical Report Series:

MS TR 96-03 *CWATSETS: Weights, Cardinalities, and Generalizations*, Richard Mohr

MS TR 96-05 *A Stronger Triangle Inequality*, Herb Bailey

MS TR 97-01 *Generalized Conjugacy Classes*, Pramod N. Achar, member of 1996 REU.

MS TR 97-02 *The Link Between Scrambling Numbers and Derangements*, Barry Baloff, Eric Farmer, Jamie Kawabata, members of 1996 REU.

PROGRAMS and CONFERENCES (more details of programs in various locations above)

Fall Meeting of the Indiana Section of the MAA About 100 faculty and students from all over Indiana attended the two day conference on October 26. The principle speakers were Lazlo Babai University of Chicago, and Eotvos University and Bill Merion, Valparaiso University. Steve Carlson was the organizer.

The **Fourteenth Annual RHIT Undergraduate Mathematics Conference**, organized by Aaron Klebanoff and Elton Graves, was an overwhelming success. Ninety-seven participants came from as far away as Tuscon, Arizona, to listen to and/or present papers. RHIT has the only conference in the country that is completely student speakers, except for the invited speakers. The guest speakers this year were Gil Strang of MIT, Michael Moody of Harvey Mudd, and Herb Bailey, RHIT Professor Emeritus.

The USA Mathematical Talent Search attracted nearly 1500 participants this year. Program director **George Berzsenyi**

The **Fast Track Calculus** program this year continues to attract record numbers of applicants, 56 students have been invited to participate and enrollments are expected to be about the 40-50 range. Professors Elton Graves, Robert Lopez, Lynn Kiaer will be teaching in this summer's program which begins July 20.