

DEPARTMENT OF MATHEMATICS
Annual Report to the Board of Trustees of
Rose-Hulman Institute of Technology
1 June 03 - 31 May 04

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1. Department Overview

This was a very successful year for the department. In addition to very successful teaching, professional development and service programs on the part of the faculty here are some high points:

Successful at hiring three new faculty

Successful implementation of revised Calculus and Differential equations Sequence

50% of incoming freshman have advanced math placements, Fast Track Calculus is about 10% of the freshman class

The number of math majors, double majors and minors shows continuing growth.

The initial Board of advisors meeting was held in October.

The undergraduate math conference had a record setting number of student speakers

The undergraduate math journal appears to be setting records for the number of papers for undergraduate math journals

2. Personnel and Staffing Changes

Tanya Leise is leaving to take a position at Amherst College, and *Jerry Muir* is leaving to take a position at University of Scranton.

Jeff Leader was tenured and *David Finn* was tenured and promoted to Associate Professor.

Three new Assistant Professors were hired, *William (Steve) Galinaitis* from Ferrum College, *Ken McMurdy* for the University of Rochester, and *Brian Martensen* for the University of Texas at Austin.

Steve Carlson will be on sabbatical in the winter and spring quarters working at the MAA headquarters in Washington

3. Student and Alumni Highlights

Pi Mu Epsilon Honorary Mathematics Fraternity Twenty-six new members of the Rose-Hulman student body were inducted at the spring 2004 Initiation Banquet for the Indiana Gamma Chapter of Pi Mu Epsilon. The speaker was David Houseman from Goshen College, secretary of the Indiana Section of MAA.

Mathematics Competitions

- a. **15th annual Alfred R. Schmidt Freshman Mathematics Competition** (advisor John Rickert) Twenty freshmen took part in the Fifteenth Annual ARS Competition. First place was awarded to *Hari Ravindran*, 2nd place was awarded to *Joe Bauer, Stephen Dupal and Angela Smiley*, and 3rd place was awarded to *Amanda Rohde*.
- b. **25th Annual Virginia Tech Regional Mathematics Competition** (advisor John Rickert) Twelve Rose-Hulman students participated in this nation-wide mathematics problem solving competition held November 2003.
- c. **64th Annual Putnam Competition** (Advisors Kurt Bryan and John Rickert) In the 64th Annual William Lowell Putnam Mathematical Competition student *Guy Srinivasan* ranked in the top 500 out of 3,615 contestants.
- d. **20th Mathematical Contest in Modeling** (advisor David Rader) Three teams from Rose-Hulman spent four days in February competing in this annual international modeling contest. The team of *Nic Trainor, Dan Abretske and Jay Groven* received Honorable Mention as did the team of *Alex VanBrunt, Brandon Ross and Jeremy Sands*. The team of *Matt Ellis, Guy Srinivasan and Eric Borzello* received Successful Participant certificates.
- e. **39th Indiana College Mathematics Competition** (Advisor John Rickert) The Rose-Hulman team of *Guy Srinivasan, Alex VanBrunt and Kellan Wampler* placed 1st out of 42 Indiana college teams at the 2004 ICMC held at Indiana State University in April 2004. Other Rose-Hulman team members were *Joe Bauer, John Bernhard, Joshua Brown, James Bumpus, Dean Fehlau, Curtis Katinas, Michael McClurg, Hari Ravindran, Amanda Rohde, Angela Smiley, Nic Trainor and Geoff Ulman*.

Student Presentations

Rose Math Seminar

- Nic Trainor* - Fast Reconstruction of Internal Cracks with Thermal Imaging.
- Dan Abretske* - The Banach Fixed Point Theorem and Solvability of Integral Equations.
- Amanda Stephens* - Probability Models in Genetics.

21st Annual Conference On Undergraduate Mathematics.

- Dan Abretske* - An algorithm for Auto Focusing a Camera from Image Data.
- Brian Barker* - Maximal Covering Groups and Perfect Cwatssets.

Graeme Mason - Transparent Grid Termination in Electromagnetic Simulation.
Amanda Stephens - Gene Duplication: Mathematical Assumptions and Biological Implications.
Nic Trainor - Fast Reconstruction of Cracks Using Boundary Measurements.

Nic Trainor also gave a poster presentation on a his REU work (same as above) at the Joint AMS-MAA mathematics meeting in Phoenix AZ, and the all-Indiana REU workshop at Indiana University.

Student Awards

During the Spring Honors and Awards Banquet, *Nic Trainor* received the Clarence P. Sousley Award, presented to a senior mathematics major for exceptional performance in mathematics.

Freshmen *Angela Smiley* received the Theodore Paine Palmer Award for demonstrating excellence in mathematics during the freshman year.

Guy Srinivasan was recognized for placing in the top 500 for the Annual William Lowell Putnam Mathematical Competition, and students *Guy Srinivasan*, *Alex VanBrunt* and *Kellan Wampler* were recognized for placing 1st out of 42 Indiana college teams at the 2004 ICMC held at Indiana State University in April 2004.

Summer Internships and REU's

Nic Trainor participated in the 2003 summer REU at Rose-Hulman, working with Kurt Bryan.

Scott Mollan participated in a 2003 summer REU in Applied Statistics at Ohio State University.

Brian Barker worked on a summer research project, funded by the Mathematics Department, with advisor Tom Langley.

Justin Droba - Weaver Grant awarded (for 2004-05 year) advisors Jeff Leader and Dave Voltmer

4. Faculty and Staff Activities

4.a Teaching and Curriculum Development

Departmental Level The faculty is organized into four self selected interest groups according to the four concentrations of the degree program. Each group made significant improvements in the concentration areas: The groups are:

traditional mathematics concentration – convener Steve Carlson
discrete applied mathematics – convener David Rader
continuous applied mathematics – convener David Finn
statistics – convener David Rader

In addition, the coordination of courses with multiple sections was greatly improved, with almost all faculty now taking on the informal leadership role of course coordination.

Enrollment in all mathematics classes increased 3.8% to 3175 students in 153 sections.

Additional Course and Curriculum Development

Diane Evans - continued development and coordination of statistics courses

Mark Inlow - Redeveloped MA485 Regression (only taught once before)

Developed MA482 Bioengineering Statistics (first time offered) MA223 – Wrote Minitab macros to facilitate teaching bootstrap methods for the first time in Engineering Stats I

The theoretical Computer Science courses were cross-listed with mathematics and are now being taught jointly by the mathematics and CSSE departments.

David Finn - taught a new topics course on Fields, Flows and Waves.

Josh Holden - Abstract Algebra

Jeff Leader - Introduction to Parallel Computing

Jerry Muir continues to develop his notes for complex analysis

John Rickert - Elliptic Curve Cryptography

4.b Student Advising and Mentoring

Student Advising and Support

Freshman Advisors: Elton Graves, David Finn, Roger Lautzenheiser, Jeff Leader, John Rickert, Tom Langley

Sophomore Advisor: Tom Langley

Junior Advisor: Tanya Leise

Senior Advisor: David Finn

Statistics advisor: Diane Evans

Double majors and minors: Allen Broughton

Pi Mu Epsilon Advisor: Elton Graves

Math contests: See section 3 above

Actuarial Advisor – Jeffery Leader

Conducted independent study courses for two math majors in graduate-level analysis topics, as part of preparation for graduate school – Jerry Muir

RHIT Martial Arts Club Advisor: Jeffery Leader

Goldwater Scholarship representative: Allen Broughton, one scholar – Chad Zarse

Rose Cycling Club (the "Rose Pedals") – Tanya Leise

Project and thesis advising other academic student mentoring

Allen Broughton - Worked with student Brodie Smith on carbon nanotube research.

Diane Evans

Member of Master Thesis Committee for Sean Ames at RHIT for his thesis entitled "Identification and Analysis of Auger Screw Design Parameters for Use in Wheel Tractor Scrapers"

Consulted with student (Eric McDonough) about his co-op project with General Electric Consumer Products in Louisville; he was working on a Six Sigma project, 2003-04.

Consulted with senior CS major (Josh Hertz) to help him find a statistical way to optimize an algorithm called AntNet, 2003-04.

Worked with students on two different Technical Communication Projects; web-based APPL instructions and Minitab macros, 2003-2004.

Worked with student (Amanda Stephens) on her senior research problem dealing with genetics and probability.

Elton Graves - Master's Thesis Committee for Jim Laser

Jerry Muir - Directed Nic Trainor's undergraduate thesis in abstract Fourier Analysis (the first thesis in the department's new thesis option in Math Major).

Thomas Langley - supervised cwatset research of Brian Barker, RHIT math major.

Tanya Leise - Masters Thesis Committee of Steffen Finck, "Use of the Finite Element Method for Open Channel Flow Analysis"

John Rickert

During summer of 2003, worked as tutor at the Research Science Institute Program at MIT. Four of his students were finalists in the Intel Science Talent search, and he was a guest of one of those students at the awards ceremony in Washington, D.C.

Served as coach and organizer of the teams representing the state of Indiana at the American Regions Math League meeting to be held June 2004.

Will be working as tutor and teaching assistant coordinator at the Research Science Institute program at Cal Tech during summer of 2004.

David Rader

Michael Seifert - Engineering Management Master's Project

Scott Ohlmiller - Electrical Engineering Master's Thesis.

Jeff Leader - Masters Thesis Committee for Hongbing Fu, "Noise Assessment Procedures for Light Hovercraft"

4.c Faculty and Staff Professional Development

Publications, Articles, and Writing

Allen Broughton

book chapter and website for "Introductory Nanoscience and Technology", under development.

(with D. Jelski and L. Nemes) "Anharmonic Vibrational Motions in C_{60} : a Potential

Energy Surface Derived from Vibrational Self-Consistent Field Calculations, submitted to J. Cluster Science

Kurt Bryan

"Reconstruction of Cracks with Unknown Transmission Condition", on the 2002 REU group's work, has been submitted to the journal "Inverse Problems"

(with M. Vogelius), contributed a chapter on electromagnetic methods of crack detection to the book "Geometric Methods in Inverse Problems and PDE Control", published by the IMA in January 2004.

Stephan Carlson

"Curricular Options for Topology in the Undergraduate Curriculum," a proposal for an MAA Professional Enhancement Program (PREP) Workshop (to be offered in summer 2005) submitted to the Mathematical Association of America.

Diane Evans

(with J. Drew and L. Leemis), "The Distribution of the Kolmogorov-Smirnov Statistic for Exponential Populations with Estimated Parameters", resubmitted October 2003.

David Finn

A second article on the mathematics of bicycle tracks "Which way did you say that bicycle went?" has been recently accepted in the Mathematics Magazine pending revisions.

G. Elton Graves

"The Impact of Calculus Reform as Seen by Engineering Seniors" to be published by ASEE in June 2004.

Ralph Grimaldi

(with P. Chinn and S. Heubach), "Rises, Levels, Drops, and Plus Signs in Compositions: Extensions of a Paper by Alladi and Hoggatt", published in the Fibonacci Quarterly.

The fifth edition of his textbook, "Discrete and Combinatorial Mathematics: An Applied Introduction", was published by the Addison Wesley Publishing Company, followed by publication of the Instructor's and Student's Solution Manual in November.

"Binary Strings with No Isolated 1's in Even Positions", was published in the journal *Congressus Numerantium*

"A Combinatorial Identity Involving the Stirling Numbers of the Second Kind", was accepted for publication by the journal *Utilitas Mathematica*.

Joshua Holden

"A Comparison of Cryptography Courses", *Cryptologia*, accepted.

(with P. Moree) "Some Heuristics and Results for Small Cycles of the Discrete Logarithm" submitted to *Mathematics of Computation*.

"Distribution of the Error in Estimated Numbers of Fixed Points of the Discrete Logarithm", submitted to *Proceeding of Algorithmic Number Theory: sixth international symposium*.

(with J.D. Achter), "Notes on an analogue of the Fontaine-Mazur conjecture", published in *Journal de Th'eorie des Nombres de Bordeaux*, 15:627--637, 2003.

"First-hit analysis of algorithms for computing quadratic irregularity", published in *Mathematics of Computation*, 73:939--948, 2004.

Mark Inlow

"The dark-colour-inducing neuro-hormone of locusts; strain-dependent, and phase-independent effects on adults of the migratory locust," C. Grach, Y. Yerushalmi, M. Inlow, and M. Pener; *Locusta migratoria*, *Physiological Entomology*, 2004, 29: 97-107.

Thomas Langley

(with J. Remmel) "Enumeration of n -tuples of permutations and a new class of power bases for the space of symmetric functions" submitted to *Advances in Applied Mathematics*.

(with J. Remmel) "The plethysm of two Schur functions at hook and near-hook shapes" published in *Electronic Journal of Combinatorics*.

Jeffery Leader

Jeff Leader's textbook, *Numerical Analysis and Scientific Computation* (Addison-Wesley), was published in February 2004. He continues to work on ancillary materials for it.

Edited, and contributed material to, the ninth edition of Howard Anton's textbook, *Elementary Linear Algebra* (Wiley).

Tanya L. Leise

(with J.R. Walton), "A method for solving dynamically accelerating crack problems in linear viscoelasticity" *SIAM J. Applied Math* **64**:1 (2003), 94-107, electronically published paper.

(with Jay R. Walton) "An analytical and numerical study of a dynamically accelerating semi-infinite crack in a viscoelastic material", accepted by *Int. J. Fracture*.

Jerry Muir

(with T. Suffridge) Construction of convex mappings of p -balls in C^2 , submitted and accepted for publication in the journal *Computational Methods in Function Theory*, special edition dedicated to the memory of Walter Hengartner.

Gary Sherman

continued to work on his monograph on cwatsets.

Presentations

Allen Broughton

Are the Students Competent Users of Mathematics? *Laptop in the Curriculum* panel discussion at joint AMS-MAA mathematics meeting in Phoenix AZ.

Kurt Bryan

with Lester Caudill of the University of Richmond, delivered a lecture on their work on *Inverse problems related to thermal imaging* at a conference at the Rensselaer Polytechnic Institute, in April 2004.

Gave lecture at the Rensselaer Polytechnic Institute Conference on work done at Rose-Hulman by the summer 2002 and 2003 REU groups under his direction.

In January, gave introductory lecture on inverse problems at Rutgers University on nonlinear partial differential equations arising in corrosion modeling.

Diane Evan

The Distribution of the Kolmogorov-Smirnov, Cramer-von Mises, and Anderson-Darling Test Statistics for Exponential Populations with Estimated Parameters, Joint Statistical Meetings; San Francisco, California; August 2003.

David Finn

Presented his mathematical research and grant activities at the joint AMS-MAA mathematics meeting in Phoenix AZ.

Elton Graves

presented paper *Seeing the Flow and Watching the Wave* at national MAA meeting January 2004).

presented paper “*What the Shortstop Sees*” at Indiana Section meeting of MAA (April 2004).

Ralph Grimaldi

presented the mini-course *Fibonacci and Catalan Numbers* at the joint AMS-MAA mathematics meeting in Phoenix AZ.

presented the paper, *Ternary Strings that Avoid the Substring ‘21’* at the 35th Southeast Conference on Combinatorics, Graph Theory and Computing.

Joshua Holden

New Conjectures and Results for Small Cycles of the Discrete Logarithm”, RHIT Math Seminar, October 22 and 29, 2003.

Understanding the Magic: Teaching Cryptography with Just the Right Amount of Mathematics, MAA Session on Applications of Mathematics in Computer Science, Joint Mathematics Meetings, Phoenix, January 9, 2004.

Cryptography and Computer Security for Undergraduates, Panel, SIGCSE Technical Symposium on Computer Science Education, Norfolk, Virginia, March 4, 2004.

Mark Inlow

A New Generalization of Neyman's Smooth Test and Its Application to Testing Binary Response GLM Goodness of Link, Joint Statistical Meetings, San Francisco, August 5, 2003.

Thomas Langley

Maximal covering groups and perfect cwatsets at the joint AMS-MAA mathematics meeting in Phoenix AZ.

Roger Lautzenheiser

Gave talk *Exploring the Numerical Range* at the United States Military Academy, October 2003.

Jeffery Leader

presented *Singular Vectors and Protein Motifs in Mathematical Phylogeny* in a Special Session at the Joint Math. Meetings in Phoenix in January (paper with Gary Stuart).

Tanya Leise

A solution method for dynamically accelerating cracks in viscoelastic materials and elastic bimerials, given as part of a minisymposium at the SIAM Conference on Mathematical Aspects of Material Science, May 23-26, 2004 in Los Angeles.

Half-plane boundary value problems, March 4, 2004, invited talk for the Mount Holyoke College Math Department Seminar.

The Celestial Sphere: Geometry and Astrolabes, March 3, 2004, guest speaker for the Mount Holyoke College Math Club, and on April 14, 2004, for the Rose-Hulman Math Seminar.

Jerry Muir

Construction of convex mappings of p -balls in C^2 as invited participant in the Modern Function Theory special session during the Joint Mathematics Meetings in Phoenix.

Rose Math Seminar

Student speakers listed in section 3, Rose faculty speakers listed below.

Complete series given here <http://www.rose-hulman.edu/math/seminar/RoseMathSeminar.php>

Kurt Bryan - Imaging the Inner Wall Profile of a Blast Furnace.

Brad Burchett, (Mech Eng) - Numerical ODE Solving for a Chaotic System.

David Finn - Viscosity Solutions to PDE's (2 part series).

Joshua Holden - Small Cycles of the Discrete Logarithm (2 part series).

Tanya Leise - The Celestial Sphere: Geometry and Astrolabes.

Jerry Muir - A Theme and Variations from Geometric Function Theory (3 part series).

Lorraine Olson (Mech Eng) - Inverse Electrocardiography.

Conferences and Workshops attended

Allen Broughton and Kurt Bryan attended the Indiana REU workshop with their students.

Allen Broughton and Elton Graves attended the Fall 2003 Indiana Section MAA Meeting in Goshen, Indiana.

Allen Broughton, Kurt Bryan, Stephan Carlson, David Finn, Elton Graves, Ralph Grimaldi, Joshua Holden, Thomas Langley, Jeff Leader, Tanya Leise, Christopher Leisner and Jerry Muir attended the January 2004 AMS/MAA Joint Meetings in Phoenix, Arizona.

Allen Broughton, Kurt Bryan, Steve Carlson, Dave Finn, Elton Graves, Ralph Grimaldi, Josh Holden, Mark Inlow, Roger Lautzenheiser, Gary Sherman, David Rader, and John Rickert attended the Spring 2004 Meeting of the Indiana Section of the MAA at Indiana State University in March 2004.

Steve Carlson, David Finn and Tom Langley attended MathFest 2003 in Boulder, Colorado, in the summer of 2003.

Diane Evans attended the MAA's Professional Enhancement Program Workshop "Regression Analysis: The Heart of Statistical Methodology" presented by Dick Schaeffer and Jeff Witmer and funded by the NSF. She also visited Cummins with other RHIT faculty members and received a short course presentation on Six Sigma. Rose is interested in strengthening ties with Cummins with possibilities for getting Rose students (including statistics students) involved with Cummins' projects. In September 2003, she attended a one day workshop given by Edward Tufte entitled "Presenting Data and Information".

Diane Evans and Mark Inlow attended the National Joint Statistical Meetings in San Francisco in August 2003.

Elton Graves attended ASEE National Meeting in June 2003

Ralph Grimaldi attended the 35th Southeast Conference on Combinatorics, Graph Theory and Computing, where he chaired a session on graph theory.

Joshua Holden attended the March 2004 SIGCSE Conference held in Norfolk, Virginia. He participated in the panel discussion.

Jeffery Leader attended the Conference and Short Course on Parallel Computing in San Francisco, California, held in February 2004, as part of developing a new parallel computing course (MA/CSSE 490).

Tom Langley attended a week-long MAA PREP workshop on knot theory at Wake Forest University in June 2003 and attended the AMS Sectional Meeting held in March at Miami University.

David Rader attended the October 2003 INFORMS Conference in Atlanta, Georgia.

Yosi Shibberu attended the BioSensor Conference in Indianapolis, Indiana in October 2003. He attended the Invention to Venture Workshop on Technology Entrepreneurship, sponsored by NCIIA, in Chicago, March 2004. He also attended the Bioinformatics Education Workshop, sponsored by BioQuest Curriculum Consortium, Indiana State University, March 2004.

Other professional development activities

Allen Broughton worked with four students during the summer 2003 REU. He also worked on the SCAN Project, a joint NSF-funded project by Indiana State, Rose-Hulman and UW Stevens Point to write a Nanotechnology text book.

Kurt Bryan continued work with Lester Caudill, University of Richmond, on inverse problems related to the thermal imaging. He also continued work with Michael Vogelius of Rutgers University, on nonlinear partial differential equations arising in corrosion modeling. He has been working with Casey Russell in the Chemistry department at Northern Kentucky University on an inverse problem related to differential scanning calorimetry; and has continued work with Tom Fredman at Abo Akademi University in Finland on an inverse problem related to blast furnace monitoring (which also provided a project for some summer REU students) Supervised a group of four REU students in summer of 2003. He has also successfully recruited eight students for the 2004 REU program.

Diane Evans - Working/consulting with an education researcher from Ohio Dept. of Education on a paper/project entitled, "The Probability of Pass Rate Turbulence Around a Given Cut Score on Parallel Forms of a Test Equated by a Standard Algorithm: A Monte Carlo Simulation," 2003-04.

David Finn - Ongoing research projects on the existence and behavior of nonlinear elliptic partial differential equations in differential geometry that will be his contribution to the department's REU in the summer of 2005-2006.

Elton Graves - Finished two year NSF research project on calculus reform, Invited panelist on Invited panelist on MAA CUPM Subcommittee on Curriculum Renewal Across the First Two Years

"The impact of technology in calculus courses on long-term student performance and employment" at national MAA meeting (Jan 2004).

Josh Holden - Cryptography consultant, Vadium Technology, Summer 2003. "XOR Convert Phase of the AlphaCipher Key Distribution Protocol", proprietary document prepared for Vadium Technology, July 2003.

Jeff Leader - Ongoing research in computational genetics with Gary Stuart of ISU.
Christopher Leisner - Attended MAA mini-course on Undergraduate Research @ Joint Meetings. Assisted with proctoring and grading of freshman math placement testing.

Jerry Muir – Spent summer at the University of Kentucky continuing ongoing research with Ted Suffridge in several complex variables

David Rader - During summer of 2003, consulted with Tredegar, Inc. regarding some machine scheduling problems.

Gary Sherman Developed a version of MA415 based on theory of cwatsets with Tom Langley. Continued working on monograph on the theory of cwatsets.

4.c Faculty and Staff Professional Service

RHIT Committee Chairs

Admissions and Standing Committee – Elton Graves
Academic Software Review Team – Allen Broughton
Graduate Studies Committee – Jeffery Leader
Laptop Computer – David Rader
Honors and Awards – David Rader
Parallel Computing – Allen Broughton

Other Professional Service

Allen Broughton - Judge, Undergraduate Student Poster Session, Joint Meetings in Phoenix.
Department webmaster.

Kurt Bryan reviewed an NSF grant and several papers for the journals, "Inverse Problems" and "Inverse Problems in Engineering". Organized the math department's weekly seminar. Judge, Undergraduate Student Poster Session, Joint Meetings in Phoenix.

Steve Carlson - Member and chair of the national MAA Committee on SIGMAAs (Special Interest Groups of the MAA). Organized and chaired two meetings associated with the MAA Committee on SIGMAAs at 2004 Joint Meetings.

Diane Evans - Reader for integrated project (by Steffen Lohmann) in the Engineering Management Program. Reviewer for: *John Wiley Publishing Company, The College Mathematics Journal*. Member of American Statistical Association, MAA, Indiana's Project NExT. Member of a panel discussion with faculty members from other Indiana colleges at the Spring 2004 Indiana MAA. Met with graduate students regarding job searches.

David Finn - Continues to review papers for Mathematical Reviews, has referred papers for Transactions in Mathematics, the College Mathematics Journal, and the International Journal of Mathematics and Mathematical Sciences, and has reviewed a Differential Equations and Linear Algebra textbook for Prentice Hall, Served on a site visit team for an NSF-MIE proposal.

Additionally, he has been appointed to be the Newsletter Editor for the Indiana Section of the MAA, and continues to be the MAA departmental Liaison

Elton Graves - Indiana State Director AMC 8 and AMC 10/12. MATHCOUNTS coordinator for Francis Vigo Chapter. Site Coordinator for state MATHCOUNTS competition. Refereed papers for ASEE in 2003 and 2004 Refereed paper for College Math Journal.

Joshua Holden - Judge, Undergraduate Student Poster Session, Joint Meetings in Phoenix. Co-organizer, Graduate Student Workshop, Indiana MAA Section Meeting at Indiana State University. Secretary, Academic Computing Committee.

Mark Inlow - Selected to attend NSF-funded workshop, "A Data-Oriented, Active-Learning, Post-Calculus Introduction to Statistical Concepts, Applications, and Theory," at Cal Poly San Luis Obispo, June 21-25, 2004.

Jeff Leader – Chair of mathematics Computing Environment Committee.

Mike Mcleish – Coordinator of interdepartmental MSDNAA software distribution project.

Jerry Muir - Reviewed several papers for Mathematical Reviews. Reviewed a new edition of an analysis text for Prentice Hall.

David Rader - Continued to serve as the MAA section's Public Information Officer. Department Curriculum Committee chair.

John Rickert - Web-master for the American Regions Mathematics League historical web site.

Gary Sherman - Consulted with Eagle Creek Systems on upcoming project with Ventures. Refereed papers for several journals.

Yosi Shibberu – Actively involved in the MEED group, an interdisciplinary group of faculty working on a new multidisciplinary, senior design sequence which encourages entrepreneurship. The group has been meeting weekly during the academic year.

4.d Faculty Honors and Awards

David Finn – Received one of the George Polya Awards for mathematical exposition at the MathFest in August 2003 for his article "Can a bicycle create a unicycle track?" which appeared in the College Mathematics Journal last year.

4.e Membership in Faculty Clusters

Imaging Systems Faculty: Allen Broughton David Finn, Jeff leader

Parallel Computing Users Group: Allen Broughton, Jeff Leader, Josh Holden

Nanotechnology Faculty: Allen Broughton

5. Grants and Continuing Grant Activities

The Rose-Hulman **NSF-Research Experience for Undergraduates** Program will continue during the upcoming summer. This summer's program, which will be directed by *Kurt Bryan* (PI) and *Thomas Langlely*, is the sixteenth consecutive year of the program. The grant has been renewed for three years for \$167,000.

David Finn will continue to administer NSF grant **Course, Curriculum and Laboratory Improvement** (CCLI) for curriculum development in 3D geometry this summer. Three Rose-Hulman students Guy Srinivasan, Kellan Wampler and Angela Smiley will participate for six weeks this summer. This is the third and final year of the \$75,000 grant.

A small \$2,500 grant was obtained by *Allen Broughton* from the MAA to support the Undergraduate Mathematics Conference.

The **SCAN Project** a \$100,000 NSF-funded joint project among Indiana State, Rose-Hulman and UW Stevens Point to write an Nanotechnology text book. **Allen Broughton** is a member of the Rose- Hulman team (Jelski, Tilstra, Western).

6. Departmental Programs

Fast Track Calculus 50 students, Director Elton Graves, Instructors: Elton Graves and Roger Lautzenheiser.

Rose-Hulman Undergraduate Mathematics Journal, Editor *Roger Lautzenheiser*, Assistant editor *David Rader*, fall, 2003 issue - 7 papers with 15 authors; spring, 2004 issue - 7 papers with 17 authors. It appears that the journal has more papers than any other undergraduate math journal.

Rose-Hulman High School Mathematics Competition (thirty-eighth annual). organizers Ralph Grimaldi, John Rickert, Diane Evans and Joshua Holden, about 500 students.

Rose-Hulman Undergraduate Mathematics Conference (March 2003, 21st annual), co-organizers, Jeffery Leader and Diane Evans; 26 student talks, about 80 conference participants. Record setting number of student speakers.

MATHCOUNTS The regional and state competitions were held at Rose-Hulman. *Elton Graves* is the Rose-Hulman coordinator.