Department of Mathematical Sciences
Annual Report for 2001

December 4, 2000

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1. Overview

This has been an excellent year for research, outreach, teaching improvement, and graduate recruitment in the Department of Mathematical Sciences. The faculty who submitted annual reports had 39 refereed publications and several books appear in 2001. The previous year saw a 20% increase in external funding in support of departmental projects in research and education over 1999. Most of those awards were multi-year grants still in affect. New grants were awarded to support the PREP program, from the Fulbright Foundation, and from the ICASA Institute at New Mexico Tech. Our graduate program has 48 students, which is a record. We were again successful in recruiting graduate students from the minority community. Three outstanding young mathematicians joined the faculty: Guram Bezhanishvili, a specialist in universal algebra, Adam Sikora, a harmonic analyst, and Elizabeth Gasparim, who specializes in geometry and mathematical physics. Several College Faculty were hired in regular positions and we have had five visiting research faculty who contributed to our teaching and research missions.

The department conducts many outreach programs, most of which have attracted external funding. Alyne Fulte continued to direct the Proyecto Access Las Cruces PREP program with funding from the National Aeronautics and Space Administration, Intel, and others. Sandy Geiger and Chris Weaver continued to direct the Mathematics Accessible to the Visually Impaired Student (MAVIS) program, this year with support from the New Mexico Commission on Higher Education. Professors Patricia Baggett and Patrick Morandi, with other faculty input and the assistance of John Pierce, Computer Operations Group director, designed a state of the art computer laboratory/classroom. Grants from NASA and the Department of Education will equip it as a mobile wireless classroom. The department has a strong presence in the AGEP program, a multi-institutional effort with NMSU as lead institution, which has National Science Foundation support to increase the presence of members of minority groups in the professoriate in science, mathematics, and engineering fields. Professor Lolina Alvarez serves as the primary departmental representative in that effort. A team of mathematics and engineering faculty led by Professors David Finston and Caroline Sweezy direct

an NSF sponsored project which provides academic and nonacademic support for economically disadvantaged students. Professor Baggett continues her partnership courses for Las Cruces Public School teachers and NMSU undergraduates and graduate students. She added a new science course this year.

The department played an important role in service to the mathematics community, the state of New Mexico, and the university. Faculty members served on professional society committees, journal editorial boards, and organizing committees for national and international conferences. Professor Kitty Berver co-chairs the New Mexico Higher Education Mathematics Articulation Task Force. Many faculty interacted with the Las Cruces Public Schools. Faculty members participated on sensitive university and college committees and in the faculty senate.

The most serious problems faced by the department continue to be a shortage of tenure track faculty and staffing of our Computer Operations Group (MathCOG). Of the four tenure track positions we attempted to fill in 2001, we were successful with three. Even with these hires, our tenure track ranks are down by five, and we anticipate two more retirements in Summer, 2002. The job market in mathematics has opened up and our offers to several promising individuals were turned down in favor of more attractive offers elsewhere. It should be noted that Robert Wisner and Joaquin Loustaunau, who retired in 1999 and 1998, did not have active research programs and therefore were assigned to three courses per semester. Since the increased use of new mathematics in many fields of study compels us to consider only faculty active in research for tenure track positions, these retirements result in a net loss to the department of three teaching positions rather than two. MathCOG has only one permanent staff member, John Pierce. The other personnel are students, all but one undergraduates. The department maintains three laboratories, one of which serves the entire university community through our service courses. Faculty rely increasingly on technology in all of their professional activities. Moreover, the department has not been immune to the computer viruses plaguing the society as a whole. In addition, our computers, like most in academia, are invaded by hackers on a daily basis. The workload is excessive beyond reason for a single staff member.

2. Personnel Changes

Associate Professors Irena Swanson and Joe Lakey were awarded tenure and Ross Staffeldt was promoted to Professor. Professors Ray Mines and Joseph Zund retired after more than 30 years of distinguished service to NMSU. Professor

Zund offered a portion of his substantial mathematics library to the department. University funding is now effecting the conversion of a lounge in Walden Hall to a faculty resource center housing this collection. Professor Reinhard Laubenbacher resigned. We are experiencing the large turnover that was predicted in 1999, at which time the department developed a long term hiring plan. We have been implementing the plan and all of our 2001 hires were in line with it. Our current search includes mathematics education and mathematical biology. We have some very exciting prospects in both areas.

The department was fortunate to have Drs. Guram Bezhanishvili, Raghavan, Peter van Rossum, Christopher Stuart, and De Jun Feng as visiting faculty. They each taught two courses each semester and are actively engaged in collaborative research with NMSU faculty members. A Fulbright grant also brought Professor Busiso Chisala to the department for collaborative research and teaching. With our shortage of staffing in tenure track positions, it is only with the services of such visitors that we are able to meet our teaching obligations.

3. Curricular Activities

Professors Alvarez and Baggett developed new courses that have significant enrollment from the ranks of Las Cruces area public school faculty. Two of the three Mathematics Learning Center courses underwent significant revisions. The Supplementary Major in Applied Mathematics is now drawing significant interest, particularly from students majoring in Engineering disciplines. The MAVIS program in the department took a leadership role in addressing the needs of visually impaired students.

One of the department's major curricular efforts involved development of course materials using mathematical software and the internet to improve courses taken by mathematics, science, engineering, and education majors. With NASA support, Professor Staffeldt developed materials that incorporate advanced software in our course in third semester calculus. The software enables students to investigate fine details of surfaces in three dimensional space and also to apply calculus to more realistic problems. Professor Morandi had NASA support to redesign our introductory course in modern algebra, required of math and secondary math education majors. The redesign introduces abstract concepts through familiar applications and uses software to effect calculations structures that generalize our familiar number systems. Professor Julian has been energetic in developing programs for the graphing calculator that perform much of the tedious numerical

work that arises in applications. The faculty have expanded their use of the computer in the classroom. The old portable PC/overhead projector combination has proved to be unwieldy. We have equipped some of our classrooms with permanently installed overhead projectors and have acquired sufficiently many laptop computers to enable many more faculty members to integrate computer use in their teaching. Future planning calls for the purchase of portable projectors because of concerns for the security of the ceiling mounted projectors. Funding for this process is provided by grants from NASA and the Department of Education and Instructional Equipment funds.

Developing new programs and courses is an important activity in the department in order to introduce students to new mathematics and to better meet their programmatic needs. A group within the department designed a new one year sequence integrating differential equations and linear algebra. Professor Lakey is piloted this course in 2000-01. Students who complete the sequence will learn the content of Math 392 and Math 480, but integrated in a natural context that will enhance the two subjects both for engineering undergraduates and mathematics students. Students will receive 300 and 400 level credit. Despite its success, we were unable to run the course in 2001-02 because of scheduling incompatibilities with many engineering programs. We are working on a resolution of this problem. Professors Lodder and Pengelley are writing a textbook that emphasizes the use of historical sources in the teaching of mathematics. This is a hallmark of their teaching styles. As always, faculty offered special topics undergraduate- and graduate-level courses on recent developments in pure mathematics and on the use of advanced technology in the elementary and middle school classroom.

The department participates actively in the Honors and General Education programs. Faculty members routinely teach the Honors courses "Spirit and Evolution of Mathematics" and "Great Theorems: The Art of Mathematics." Honors courses on mathematics appreciation and number theory have been developed. Professor Lampert developed an Honors course on Jewish literature. In addition to the Honors courses, the department offers an array of courses approved for General Education, including courses on mathematics for elementary education, business calculus, and mathematics appreciation. An alternate means of meeting the General Education requirement in mathematics is to take six credits of mathematics that require Math 115.

The National Science Foundation Grant "Math/Engineering Scholarships" offers academic and financial support to over 40 undergraduates and graduate students. Grant activities include a mathematics course that introduces students to

research opportunities. The program has been coordinated by Professors Finston and Sweezy.

3.1. Student Advising

Student advising is handled by special departmental committees. Undergraduate mathematics majors are advised by members of the Undergraduate Majors/Minors Committee. This committee nominates mathematics majors for scholarships and awards and informs them about study and career opportunities. The Undergraduate Curriculum Committee coordinates the update of our course offerings, syllabi, and information provided to instructors. The committee assists the College of Education with preparations for the NCATE accreditation visit to take place in Fall, 2002. Advising of graduate students is coordinated by the Graduate Studies Committee, which also makes recommendations for graduate assistant appointments, coordinates comprehensive exam preparation and grading, and updates our graduate course offerings. Members of the department advise for the Advising Center and the Honors program and many advise secondary mathematics education majors. Professor Sweezy handles most of the advising for Supplementary Majors in Applied Mathematics.

Sandy Geiger is assigned as Special Students Program Coordinator to monitor students who are handicapped, have learning disabilities, or are experiencing great difficulties in their classes. She monitors students repeating a Mathematics Learning Center class more than one time and Native American students, and she acts as liaison with the American Indian Program Office and Student Support Services. She is also the departmental Americans with Disabilities Act (ADA) contact.

3.2. Graduate Studies

Graduate enrollment in the department was at a record high in 2001 with 48 mathematics graduate students enrolled in Masters and doctoral programs (an increase of 14% over the 2000 record). Three Mathematical Sciences graduate students were awarded master's degrees and three were awarded doctorates during the year. The department continues to attract relatively large numbers of students from groups traditionally under-represented in mathematics (40% are women and 23% are US citizen members of ethnic minority groups). Six of our graduate students are citizens of Mexico. Our recruiting efforts in the minority

community and in area colleges and universities continue. A combination of departmental, College, Graduate School, and central administration funds enabled several graduate students to attend the SACNAS annual meeting. Two of these students participated in graduate recruitment activities organized by the Graduate School at the conference. The Sloan Foundation awarded the department funds to increase the presence of minority graduate students and the National Science Foundation awarded NMSU the AGEP grant for similar purposes in a broader spectrum of scientific disciplines. One of our new doctoral students was recruited with the AGEP grant and two continuing students had support from that program.

The department offers a seminar designed specifically for graduate students, introducing them to areas of contemporary mathematics suitable for thesis topics. We have been developing a doctoral program in mathematics education. Revised requirements for doctoral comprehensive examinations and course work were approved in 2001. The new requirements ensure that our doctoral students will have the breadth necessary for successful careers and enable them to progress more rapidly to thesis work in areas newly represented on the faculty.

Cooperative and research opportunities for our graduate students have expanded. A cooperative arrangement with Mackichan software has been underway for a year and is expected to continue. Several graduate students were supported during the academic year and summer by research grants made to PSL. The department and PSL have designed a new program to offer research assistantships to up to 6 new graduate students who are US citizens.

3.3. Teaching Improvement

The Teaching Committee oversees the coordination of multi-section courses and classroom observations of faculty members and graduate student teaching assistants. The committee drafted plans for a longitudinal study of student performance, to assess the efficacy of current mathematics preparation for courses with mathematics prerequisites. We have been unsuccessful so far in obtaining funds for release time for Professor Lampert to collect and analyze the appropriate data.

Faculty members are using advanced technology, including mathematical software and the internet, in significant ways in their teaching. With NASA, NSF, and Department of Education support, Professor Baggett is offering a new course on the use of technology in elementary science classes. Professor Staffeldt has

developed programs used by several faculty to aid students in visualization of various structures of geometric significance in calculus and differential equations courses. NASA funds provided him with release time to make these materials accessible to all of our faculty. He published a paper about this work and spoke about it at national conferences on engineering education. Professor Morandi has developed programs for use in graduate modern algebra courses and uses internet sites in courses for prospective teachers. The same NASA funding provided him with a course release to revamp the introductory course in modern algebra required of mathematical sciences and secondary mathematics education majors. Professor Julian uses the graphing calculator in innovative ways in graduate and undergraduate courses. He has submitted a paper to a professional journal on one aspect of this work.

A major strength of the department's educational program is the participation of graduate students and talented undergraduates as tutors and graders in the Mathematics Learning Center. This provides a history of experience with the peer-tutoring aspect of learning, which is inherent in the cooperative learning projects now taking place in many other classes. It creates a valuable training program for new graduate assistants, introducing them to educational issues while they are under close supervision by experienced educators.

Several faculty members developed an interest in the mathematical education of future teachers. Many faculty members worked on updating the mathematics competencies for the teacher preparation program, and two faculty members attended the New Mexico Roundtable discussions on the preparation of future teachers.

Other work with undergraduate students includes coaching and other preparation of students for the prestigious Putnam and COMAP competitions. Caroline Sweezy and Marcus Cohen conducted these activities.

3.4. Outreach

The department engages in outreach activities both within and external to the university. The Liaison Committee was established in 1997 to contact faculty members from client departments and contact mathematics departments at branch campuses for their feedback concerning the content of mathematics courses. We have been working with the Computer Science department to update the course requirements that we have in common.

The department continued its teaching exchange with the Department of

Physics; Professor Zund offered an advanced graduate-level course on relativity in the Department of Physics, while Thomas Hearn taught a mathematics course. Mathematics Learning Center faculty members work closely with faculty at the Doña Ana Branch Community College, indeed the new two semester version of Math 115 has faculty from both institutions as instructors.

Educational outreach activities included visits to area public, elementary, middle, and high schools to speak to students, externally funded programs to improve mathematics teaching at these levels, and an enrichment program for talented high school mathematics students. The department has hosted the Diné College Science Honors program in Summers 1998 -2001. The department was awarded a Fulbright Foundation grant to support the visit of a mathematics educator from sub-Saharan Africa. The proposed program for the visiting scholar has community involvement through activities in the Las Cruces Public Schools as a central activity.

A highlight of our outreach to public schools is the PREP program. The program encourages disadvantaged middle school and high school students to study mathematics and science through an intensive summer program of enrichment activities. Professor Fulte has energetically sought for and obtained support of federal, state, and private agencies to conduct this program.

Professor Baggett teaches a series of partnership courses in which NMSU students are matched with active Las Cruces area high school teachers. Professor Morandi requires education majors in his Math 111 and Math 112G courses to visit elementary school classrooms. Professor Baggett will again conduct a Mathematics Education Institute in Spring, 2002. With the support of an Eisenhower Foundation grant, the department held a conference for mathematics teachers and teachers of the visually impaired to facilitate their use of the mathematics materials developed at NMSU. A follow-up conference will be held in Spring, 2002. External funding for these activities was secured this year.

In 2000 and 2001 the department was contacted by representatives of the Deming, Silver City and Cliff school districts concerned with the performance of graduates of their high schools on the NMSU Mathematics Placement Examination. The department hosted a day long conference in November to acquaint sixteen teachers and administrators from those districts with the exam, the department, and the placement process. A similar conference for Las Cruces, Alamogordo, Hatch, and Gadsden districts is planned for Spring, 2002.

Professor Alvarez visited the Technical University in Juárez, Mexico to discuss effective means of using technology in the mathematics classroom.

4. Research Activities

The productivity of our research program continued a growth trend begun in 1992, as did the number of faculty members supported by outside funds. Faculty members spoke at numerous conferences and universities. Interdisciplinary research remained an important part of our research effort. The Mathematical Sciences Summer Research Awards, funded by an anonymous donation to the NMSU Foundation enabled Professors Caroline Sweezy and Ted Stanford to further their research efforts. Professor Sweezy spent part of her 2000-01sabbatical at the University of Vermont to collaborate on several research projects, Professor Kurtz spent his sabbatical at the University of Missouri, and Professor Hung Nguyen spent part of his sabbatical year at various universities in Europe and the Far East. Professor Tony Wang obtained grant funds from Taiwan to deliver a series of lectures there and conduct collaborative research. Professor Harding was awarded the International Quantum Structures Association Year 2000 Research Award and Professor Swanson's POWRE grant enabled her to spend academic year at the University of Kansas to further her research and progress on the writing of an advanced text in commutative algebra.

Members of the department were productive researchers. Twenty of the tenure-track faculty members had a total of forty six books, papers, and monographs appear in print in 2001. Faculty members delivered dozens of talks on their research at conferences and at other universities.

Several faculty members continued to receive external funding to support their research. Nine faculty members conducted mathematics research with funding from the National Science Foundation, the National Security Agency, Sandia National Laboratory, Los Alamos National Laboratory, the Army Research Office, and the Astrophysics Research Lab (through PSL). Eight faculty members conducted funded educational research work during the past year; some of these projects involved joint work with public schools in the Las Cruces area and with the New Mexico School for the Blind in Alamogordo. Support came from the National Science Foundation, the National Aeronautics and Space Administration, the New Mexico State Department of Education, the New Mexico Commission on Higher Education, the New Mexico Eisenhower Foundation, and the Intel Corporation.

Members of the department conduct joint research with mathematicians at other institutions. Some highlights of this type of activity include: Professor Swanson's POWRE grant, a special NSF award, to conduct research and write an

advanced text with collaborators at the University of Kansas; Professor Nguyen's service as a Senior Research Fellow of the ASEE/NAVY Summer Faculty Research Program in San Diego, California; Professor Ernie Barany works with faculty at New Mexico Tech. Professors Alvarez and Stanford conduct joint research projects with faculty at institutions in Mexico.

The department sponsors a weekly colloquium and several weekly seminars. The colloquium series included 26 lectures during the year, 20 of them presented by visitors to NMSU. Most of the speakers from other institutions visit the department to collaborate with our faculty on their research. A few of the talks were presented by members of other departments on campus, explaining how they use mathematics in their research. The seminars specialize in algebra, analysis, cryptography, lattice theory, statistics, and topology. The "Basic Notions" is a more informal, general interest seminar. The New Mexico Analysis seminar is a joint venture between the mathematics faculty of NMSU and UNM. The Spring, 2001 session was held at UNM and featured talks by NMSU graduate students as well among talks by established mathematicians. Together with their counterparts at UNM, Professors Alvarez and Lakey secured NSF funding for the seminars for the next two years.

Faculty members participate in interdisciplinary research. Professors Barany and Krupa are conducting joint research with faculty members in the College of Engineering at New Mexico Tech on externally funded projects. Professor Lakey collaborates with staff at PSL and Statisticians Hung Nguyen, Nhu Nguyen, and Tony Wang consult with researchers around campus.

5. Professional Service Contributions

The department provided service for the mathematical community and the university. We are an institutional member of several professional organizations, and a sponsor of one journal. Department members worked on committees and conferences for these organizations. They served as journal editors and referees of research articles and grant proposals. For the university, faculty members were members of sensitive university and college committees, and were outside representatives on tenure and promotions committees for nine departments. The department is represented in the faculty senate by Doug Kurtz (Professor Salamanca Riba substituted for him during his Spring 2001 sabbatical) and on the Education Council by Professor Finston.

Members of the department play an important service role in the mathemat-

ical community. The department is an institutional member of the American Mathematical Society, the Mathematical Association of America, the Society for Industrial and Applied Mathematics, the American Mathematical Association of Two-year Colleges and the Association for Women in Mathematics. It is an institutional sponsor of the *Pacific Journal of Mathematics* and a member of the Rocky Mountain Mathematics Consortium. Twenty members of the department served as referees for journals and books, reviewers for the two major mathematical abstract journals, and referees for grant proposals to the National Science Foundation and the National Security Agency. Faculty members took part on conference organizing committees and organized special sessions at national and international conferences sponsored by professional societies. Professors Richard Bagby, Pat Baggett, Kitty Berver, Hung Nguyen, Nhu Nguyen, John Harding, David Pengelley, and Joe Zund served on editorial boards of professional journals. Professor Jerry Lodder is the department's representative to the Rocky Mountain Mathematics Consortium and Professor Sweezy is on the board of directors of the Pacific Journal of Mathematics. Professor Kurtz serves as the department's representative to the Mathematical Association of America (MAA). David Pengelley is a member of two MAA committees, and Lolina Alvarez is a member of the American Mathematical Society Committee on Committees. Doug Kurtz serves on two committees of the American Mathematical Society and one of the Mathematical Association of America. Joe Zund was a member of one Special Commission and two Special Committees of the International Association of Geodesy, and the chair of one Special Subcommission. He served on one committee of the American Geophysical Union.

The department plays a major role in the university's service mission. Members of the department served on the Disability Resource Advisory Board, the Educational Diagnostician Advisory Council, the Faculty Senate and its Library Committee, an ad hoc Committee on Admissions, two General Education Committees, two Outcomes Assessment Committees, and the Westhafer Award Committee. One faculty member serves on the Publications Board for the ASNMSU. The department provided advice and assistance to the College of Arts and Sciences with representatives on the Curriculum and Educational Policies, Faculty Affairs, and Research Affairs Committees, and on the College Council. Mathematical Sciences faculty served as outside members on tenure and promotions committees for the Departments of Astronomy, Chemistry, Computer Science, Government, History, Physics, Philosophy, and Psychology. Faculty members also served as advisors in the College of Arts and Sciences Advising Center, advisors to sev-

eral student organizations, and Dean's representative on many graduate student exam committees external to the department. . All department faculty members participated in committee work within the department.

6. Community Relations

Working with groups and agencies outside the university is important to the department. Several faculty members worked with Las Cruces Public School students and teachers.

The department has been involved in the New Mexico Commission on Higher Education Mathematics Articulation Task Force, which coordinates the transfer of credits for mathematics courses among the institutions of higher learning in the state. Currently, Professor Kitty Berver is cochair of the task force. She is responsible for maintaining the internet-accessible database that articulates transfer credits. She was also external evaluator of the lower division mathematics program at Eastern New Mexico University.

The department has increased and improved its interactions with local public schools. Pat Baggett reorganized her Math 111 (Fundamentals of Elementary Mathematics I) and Math 112 G(Fundamentals of Elementary Mathematics II) classes to run concurrently with special topics Math 301 and Math 501 courses for pre and in-service teachers. She created a new course on teaching mathematics and science with technology and offered it in Fall, 2000. Elementary education majors in these courses are paired with practicing teachers enrolled in the concurrent graduate course, who act as mentors to the pre-service teachers, allowing them to observe, co-teach, and finally teach alone, in their classrooms. Several other Math 111 and Math 112G instructors had their students observe public school classes. The in-service teachers received free tuition with funds provided by a grant from the New Mexico Commission on Higher Education and from NASA. The administration of the Las Cruces Public Schools and, in particular, the Teachers' Center have been highly supportive of this initiative, which has led to several joint interactions involving the department, the public schools, and the College of Education.

Professor Baggett continues her practice of teaching a class a week in elementary and middle schools, presenting workshops, and addressing the LCPS School Cabinet. Several other faculty members are frequent visitors to area schools..

Professor Fulte's PREP program had financial support from National Aeronautics and Space Administration, Intel, and local companies. The year 2001

program brought nearly 200 sixth through tenth grade students to NMSU over the summer to learn mathematics, science and engineering. It seeks to intervene with minority students early in their public school careers, give them the encouragement and educational background necessary to keep them in school, and affords them exposure to scientific and technological careers.

The department maintains several display cases in public areas in Science Hall, in the classroom wing and near the department office. These help to introduce visitors to the members of the department and to give timely information about mathematical topics of current interest.

Three faculty members serve on a joint committee with members of the Doña Ana Branch Community College mathematics faculty. Their activities include working to develop a smooth transition from branch college to main campus mathematics courses, arranging mini-conferences involving members of both faculties at the beginning of each semester, and sponsoring the "After Math" contest in the student newspaper.

The department supports university and state activities by providing space for organizations on campus. It has housed the university's Women's Studies Program for ten years, as the university refuses to provide space for this recognized program. It converted a seminar room into the office of the southern coordinator for the New Mexico MESA (Mathematics Science Engineering Achievement) program and provides office space for the PREP director and secretary.

7. Outcomes Assessment Activities

7.1. Undergraduate Outcomes Assessment Activities

The department's undergraduate program evaluation includes a survey to be completed by all Mathematical Sciences faculty teaching courses in which at least one mathematical sciences major is enrolled. The survey was devised by Richard Bagby in collaboration with the Undergraduate Majors/Minors Committee. The questions to be answered for each mathematical sciences major are:

1. Does the student display the ability to understand definitions and use them in appropriate situations? Often /Seldom

2. Does the student display the ability to complete explicit calculations and derivations? Often /Seldom

3. Can the student clearly express a written mathematical argument? Often/ Seldom

4. Does the student display the ability to apply theoretical knowledge to solve problems? Often /Seldom

5. Does the student demonstrate a degree of mathematical maturity? (Indications of this are the ability to think of a problem in several ways, to anticipate developments in course material, to relate the subject material to other courses in meaningful ways.) Often /Seldom

Faculty are also asked to justify their responses, indicating the methods by which they arrived at the assessment.

Complementing the survey, all students with senior status are invited for a discussion with the department head every semester until graduation. The discussion enables the department head to asses the satisfaction students have with their program of study, assess their preparation for their future mathematical life (graduate school or career), and supplement the standard advising that students receive. Four such interviews were conducted in 2001. The department intends to institute a senior seminar course as a requirement for the major. The department's outcomes assessment program was accorded level 3 status in Spring, 2001.

Results of Assessment Activities Our previous assessment activities included exit interviews and post graduation surveys. Neither elicited much response from students. However, instructors of the two "theoretical " courses required of all mathematical sciences majors agreed that these courses need serious revision. Richard Bagby's new text *Introductory Analysis, A Second Look at Calculus,* published this year by Academic Press, is a step in this direction. David Finston and Patrick Morandi have revised the content of the algebra course and are collaborating on a text with the revised content. We continue to encourage our majors to participate in national competitions, such as the Putnam Examination and the COMAP Modelling Contest.

7.2. Graduate Outcomes Assessment Activities

The assessment of our graduate program includes a survey of graduates with advanced degrees and evaluation of the performance of our graduate students

on master's and doctoral examinations. In 1999 we instituted a questionnaire administered to the chairs of graduate examining committees for the oral comprehensive exams and final orals for the master's and doctorate. The intent is to assess whether the examinee demonstrates mathematical breadth and content specific knowledge appropriate to his or her level. Five of our students passed their master's examinations in 2000 and the questionnaires were administered at these exams. Our graduate outcomes assessment program was also accorded level 3 status.

Results of Assessment Activities The information we have received from our established assessment activities, along with the new breadth of research interests in the department, led to a proposal to expand the subject areas on which students can be examined for the doctoral comprehensive and to impose course requirements for our doctoral students. It was voted on and passed in Fall, 2001. The revision enables students to progress more rapidly into research leading to a doctoral dissertation. It necessitates course revisions as well since the written portion of the comprehensive exam is based on year long course sequences at the 500 level. Therefore, if faculty members wish to have an area considered as an examination area, there must be a year long sequence of 500 level courses upon which to base the examination. The revision includes course requirements to ensure that our Ph.D.s have appropriate breadth in several mathematical areas.

7.3. Research Outcomes Assessment Activities

The proposal to assess the research program incorporated the university's mission with proposals from the American Mathematical Society. It involved the research production of faculty members and participation of graduate and undergraduate students in research and creative activities. The research production of the faculty is assessed by the percentage of the tenure-track faculty members who publish research results during each three-year period. This percentage should be at or above the average for Carnegie I Research Universities, which was 84% for the fall of 1994.

Results of our Assessment Activities More than 80% of the tenure-track faculty members currently on our staff published research results during the past three years. During 2001, faculty members offered advanced courses in pure and applied mathematics and mathematics education to undergraduate and graduate

students, introducing them to ideas at the forefront of these fields. The department offered special topics courses in the spring, summer, and fall, including advanced courses in mathematical physics, and mathematics applied to coding theory. The majority of the faculty use problem-solving and writing assignments in their classes. Our students continue to participate in national mathematics competitions, and are often acknowledged for their performances. They competed in the Putnam Examination, the MathQuiz, and the Mathematics Modeling Contest. The MathQuiz teams fielded by the department ranked in the top 10% in this international competition. Graduate and undergraduate students are involved in mathematical research in faculty research projects funded by the NSF, Los Alamos National Lab, externally funded programs in mathematics education, and on research projects funded by the Physical Sciences Laboratory.

8. Department Self-Study

Part of the university's review process is university-wide self-studies which began in spring, 1995. The department volunteered to be one of the first in the College of Arts and Sciences to perform a self-study. As the follow-up to the self-study, we proposed the following three activities:

1. Develop a research program in mathematics education.

2. Receive permission to hire visiting faculty members beginning in March for the following academic year.

3. Increase the number of minority students in our graduate program.

Over the past six years our success on items 1 and 3 are significant. The program in mathematics education is extremely active. We are presently conducting a search for additional faculty members with primary research interest in mathematics education. Our graduate recruiting efforts resulted in10 students of minority heritage, and we have developed strategies to draw talented minority mathematics majors nationwide to our graduate program. Funding to sustain this effort has been awarded to the department from the Sloan Foundation and to the university from the National Science Foundation through the AGEP grant. The department works with the Graduate School on recruiting efforts through SACNAS, the Western Name Exchange, and the McNair Program. Item 2 remains a problem. Faculty will continue to request leave without pay, and the

temporary vacancies these leaves create give us an opportunity to get talented mathematicians as visitors. Early approval for visiting faculty will enable us to get the best fit for the department in terms of teaching needs and research compatibility.

9. Computing Facilities

The department made several significant advances in its computing facilities this year. John Pierce is to be commended for his work in protecting our network from possible damage due to hackers and viruses. The department currently has thirty *Sun* computers, including one *Sun* servers, 135 *IBM* compatible PC's, three of which run *Linux/NT*, and 20 printers. Additionally, there are two PC/overhead projector combinations, a fixed projector in two classrooms, and 6 laptops used for instructional purposes. These machines are used by faculty members and graduate students for research and for the preparation of teaching materials. The department purchased the fixed overheads and laptops through funds provided by external grants. We obtained funds to upgrade the graduate student computing laboratory. A new computer lab/classroom was constructed with BR&R funds. A combination of external and internal funds will equip this lab as a wireless mobile classroom that will begin operation in Spring, 2002.

The department maintains three computer labs incorporating state-of-the-art equipment and software. The undergraduate lab houses twenty two networked personal computers, equipped with the mathematics word processing and computing software, *Scientific WorkPlace*, designed by Adjunct Professor Roger Hunter, and the symbolic computing software, *Maple*. This lab has been used for students in calculus, linear algebra and several graduate-level courses. The graduate students' lab is equipped with 9 UNIX machines and three personal computers. The computing equipment available to faculty and students in the Mathematics Learning Center was upgraded with funding from the department's portion of new Title V funding from the Department of Education. The department has an ongoing need for computing equipment and advanced software for educational uses.

The Computer Operations Group has one full time staff member. The other staff consists of student workers. This is inadequate staffing for an operation as large as ours. In comparison, Computer Science has a smaller operation with three full time staff members. Dean Casillas has agreed to fund one half of a second staff member provided the department can come up with the remaining funds. We continue to work on this.

10. Advanced Degrees Awarded in 2001

Name	Degree
Mark Rhodes Advisor: Irena Swanson	Ph.D.
Ying Wang Advisor: Joseph Lakey	Ph.D.
Amal Mostafa (Interdisciplinary) Advisor: Mary Anne Staffeldt	Ph.D.
Karen Price Advisor: David Pengelley	Master's
Barrett Church Advisor: John Harding	Master's
Gloria Johnson Advisor: Ross Staffeldt	Master's

11. Departmental Colloquia for the Year 2001:

- Bill Wickless, University of Connecticut, "Quotient Divisible Groups." January 11, 2001.
- Michael Zakharyaschev, King's College London, "Modal Logic and Spatio-Temporal Representation and Reasoning." January 12, 2001.
- Dev Sinha, Brown University, "The Two Lives of Cobordism Theory." January 16, 2001.
- Elva Telles, New Mexico State University, "EEO Issues for the Twenty-First Century." January 18, 2001.
- Paul Bracken, Universite de Montreal, Canada, "Introduction to the Generalized Weierstrass System: Symmetry Properties and Explicit Solutions." January 19, 2001.
- Bingtuan Li, University of Utah, "Linear Conjecture for Spread in Cooperative Models." January 22, 2001.
- Sompong Dhompongsa, Chiang Mai University, Thailand, "Some Geometric Properties of Orlicz Spaces." January 23, 2001.

- Lourdes Juan, Mathematical Sciences Research Institute, "A Generic Inverse Differential Galois Problem for GL_n." January 24, 2001.

- Moxun Tang, University of Minnesota, "Turing Patterns in the CIMAS Reaction Diffusion System." January 26, 2001.

- Adam Sikora, Australian National University, "Harmonic Analysis Without the Fourier Transform." February 1, 2001.

- Vince Gutschick, New Mexico State University, "Optimization Theory in Plant Physiology and Ecology: What it Tells Us." February 22, 2001.

- Jonathan David Farley, Vanderbilt University, "Posets With the Same Number of Order Ideals of Each Cardinality: A Problem From Stanley's 'Enumerative Combinatorics'." February 15, 2001.

- Ioan James, Oxford University, England, "Problems of Mathematical Biography: Remarkable Mathematicians From Euler to Zariski." March 5, 2001.

- Elizabeth Gasparim, University of Texas at Austin, "Instantons, Charges, and Singularities of Plane Curves." March 8, 2001.

- Guram Bezhanishvili, New Mexico State University, "Algebraic and Topological Approaches to Super-Intuitionistic Logics." March 12, 2001.

- Martin Flashman, Humboldt State University, "Some Early History of Logarithms." March 20, 2001.

- Melvin Henriksen, Harvey Mudd College, "d-Ideals in Lattice-Ordered Rings of Continuous Functions." March 29, 2001.

- Joseph D. Zund, New Mexico State University, "Spinors, Projective Geometry, and Veblen Conjecture." April 19, 2001.

- Yde Venema, Institute for Logic, Language and Computation, University of Amsterdam, "Game Algebras." April 20, 2001.

- Abraham Nemeth, Wayne State University, "On the Other Hand, Readable Serial Math." April 24, 2001.

- Berlin Wu, National Chengchi University, Taiwan, "Fuzzy Genetic Modeling and Fusion Forecasting for Nonlinear Time Series." August 30, 2001.

- Carlos Castillo-Chavez, Cornell University, "Mathematical Models for the Spread of Tuberculosis." September 11, 2001.
- Ngo Viet Trung, Institute of Mathematics, Hanoi and University of Kansas, "Triangulations of Lattice Polytopes and Toric Varieties." October 19, 2001.
- Martin Golubitsky, University of Houston, "Oscillations in Coupled Systems and Animal Gaits." November 16, 2001.
- Irena Swanson, New Mexico State University, "Integral Closures of Ideals." November 29, 2001.
- Lisa Freehill, ADVANCE Program, Topic TBA. December 6, 2001.

12. International Activities 2001

12.1. Colloquiua

- Michael Zakharyaschev, King's College London, "Modal Logic and Spatio-Temporal Representation and Reasoning." January 12, 2001.
- Sompong Dhompongsa, Chiang Mai University, Thailand, "Some Geometric Properties of Orlicz Spaces." January 23, 2001.
- Adam Sikora, Australian National University, "Harmonic Analysis Without the Fourier Transform." February 1, 2001.
- Ioan James, Oxford University, England, "Problems of Mathematical Biography: Remarkable Mathematicians From Euler to Zariski." March 5, 2001.
- Yde Venema, Institute for Logic, Language and Computation, University of Amsterdam, "Game Algebras." April 20, 2001.
- Berlin Wu, National Chengchi University, Taiwan, "Fuzzy Genetic Modeling and Fusion Forecasting for Nonlinear Time Series." August 30, 2001.

12.2. Department Visitors

- Guram Bezhanishvili, Tbilisi, Georgia, Spring 2001.
- Peter van Rossum, University of Nijmegen, 2001-02.
- Stefan Schmidt, Germany, Spring, 2001
- George Voutsadakis, Greece, Spring, 2001.
- De Jun Feng, China, 2001-02.
- Raghavan, Chennai Mathematical Institute, India, Spring, 2001, and December 2001-February, 2002.

12.3. Collaborative Research

- Ross Staffeldt conducts joint research with colleagues in Germany.
- Irena Swanson conducts joint research projects with faculty in Italy and Germany, among others.
- John Harding conducts research with colleagues in the Czech Republic and Canada.
- Pat Morandi does collaborative research with Susanne Pumpluen, University of Regensburg.
- Joe Lakey does collaborative work with colleagues in Australia Syndey, Australia.
- David Finston conducts joints research with colleagues in the Netherlands.
- Martin Krupa collaborates with colleagues in Vienna.

12.4. International Service

- Joe Zund was a member of one Special Commission and two Special Committees of the International Association of Geodesy, and the chair of one Special Subcommission.
- Lolina Alvarez is US Liaison of the Argentine Mathematical Union

- John Harding is an officer of the International Quantum Structures Society.
- Guram Bexhanishvili served on the Scientific Board of the Tbilisi Symposium on Language, Logic, and Computation.

12.5. International Conferences and Lectures

- Lolina Alvarez lectured at the Technological University in Ciudad Juárez and at a conference in Morelia.
- Joseph Lakey lectured at a conference in Morelia.
- Mai Gehrke lectured at universities in Germany, the Netherlands, and Portugal and at conferences in Finland and Poland.
- Guram Bezhanishvili held a visiting research appointment at teh University of Barcelona in Summer, 2001.
- John Harding was an invited speaker at the conference of the International Quantum Society in Italy.
- Tony Wang presented talks at several universities in Taiwan.
- Hung Nguyen spoke at international conferences in Thailand and Taiwan and lectured at universities in London, Paris, and Bangkok.
- David Pengelley spoke at a conference in Scotland.
- Nhu Nguyen spoke at universities in Hong Kong and Thailand.
- Ted Stanford was an invited speaker (3 talks) at a two week workshop in Kyoto.
- Irena Swanson gave invited talks at conferences in Morocco and France.
- Susana Salamanca-Riba lectured at an international conference Argentina.

13. Refereed Faculty Publications and Books Appearing in 2001

Josefina Alvarez

- "The Weyl correspondence as a functional calculus", (refereed) *Proceedings of the International Conference on Algebraic Analysis* held at the Banach Center of the Polish Academy of Sciences in September, 1999, Banach Center Publications Series 53 (2000), 79-88.

- (with M. Folch-Gabayet (Mexico), S. Pérez-Esteva (Mexico)): "Banach spaces of solutions of the Helmholtz equation in the plane", *Journal of Fourier Analysis and Applications* 7 (2001), 49-62. The completion of this paper was partially supported by a Minigrant from the Arts and Sciences Research Center.

- *"Distributions and Fourier Transform",*

- monograph published by the Program of Applied Mathematics, Argentina, and distributed by the Argentinian Mathematical Union, 89 pages.

- "Loving Mathematics Infinitely", *The Chronicle of Higher Education,* January 19, 2001.

Bagget, Pat

- Bagget, P. & Ehrenfeucht, A. (2001) Nissen II: A Geometry solution from multiple perspectives. Mathematics Teacher, March 94 (3), 230-232. (Letter to the editor)

Ernest Barany

- Barany, Ernest, "Identification in the presence of symmetry: Oscillator networks", *IEEE Trans on Aut. Cont.*, **46** (3), pp476-481, March 2001.

- Barany, Ernest, "Control of Chaos using time delay feedback" *Proc of IEEE CDC*, Orlando, FL, December 2001, to appear.

Bezhanishvili, Guram

- Guram Bezhanishvili, "Glivenko Type theorems for intuitionistic modal logics", *Studia Logica* **67**, 89-109, 2001

- Guram Bezhanishvili, "Locally finite varieties", *Algebra Universalis* **46**, 2001.

Marcus Cohen

- Cohen, M. "8-Spinor Grand Unification", in *Cosmology and Particle Physics* ed. V shoposhnikov. Proceedings of CERN Conference "CAPP 2000", Verbier, Switzerland. Jul, 2000.

David Finston

- Deveney, J. K., and Finston, D. R., "Sliced G_a actions." *International Journal of Algebra and Computation* 11 (2001) 19-24.

Mai Gehrke

- (with J. Harding), "Bounded Lattice Expansions", *J. of Algebra* **238,** 345-371 (2001).

John Harding

- Bruns, G. & Harding, J., "Algebraic Aspects of Orthomodular Lattices", pp. 37-65, in Current Research in Operational Quantum Logic, Coecke et. al. Ed., Kluwer Academic, 2000.

- Bruns, G. & Harding, J., "Epimorphisms in Certain Varieties of Algebras", *Order*, 17: 195-206, 2000.

- Gehrke, M. & Harding, J., "Bounded Lattice Expansions", *J. Algebra*, 238: 345-371, 2001.

- Harding, J., "States on Orthomodular Posets of Decompositions", *Internat. J. Theoret. Phys.*, 40: 1061-1069, 2001.

- Harding, J. & Navara, M, "Embeddings into Orthomodular Lattices with given Centers, State Spaces, and Automorphism Groups", *Order*, 17: 239-254, 2000.

Martin Krupa

- M. Krupa and P. Szmolyan. "Extending geometric singular perturbation theory to non-hyperbolic points - fold and canard points in two dimensions". *SIAM. J. of Math. Anal.* **33**, 286-314 (2001).
- M. Krupa and P. Szmolyan. "Relaxation oscillations and canard explosion". *JDE* **174**, 312-368 (2001).
- M. Krupa, M. Schagerl, A. Steindl, H. Troger, "Stability of Relative Equlibria, Part I: Comparison of Four Methods", *Meccanica* **35**, 325-351, 2001.
- M. Krupa, A. Sreindl, H. Troger, "Stability of Relative Equilibria, Part II: Dumbbell Satellites", *Meccanica* **35**, 353-371, 2001.

Joseph Lakey

- Hogan, J., and Lakey, J., "Embeddings and uncertainty principles for generalized modulation spaces
" *in* Modern Sampling Theory: Mathematics and Applications, 75-108, Birkhauser, 2001.
- Lakey, J., Obeidat, S., and Pereyra, M., "Multiwavelet characterization of function spaces adapted to the Navier-Stokes equations" *in* Wavelet Applications in Signal and Image Processing VIII, 372-383, (*invited paper*, refereed conference proceedings, 2000)
- Hogan, J., and Lakey, J., "Sampling for shift-invariant and wavelet subspaces" *in* Wavelet Applications in Signal and Image Processing VIII, Proc. SPIE 4119, 36-47, refereed conference proceedings, 2000.
- Hogan, J.A. and Lakey, J., "Sampling and Aliasing without translation invariance" in Proc. of the 2001 Intl. Conf. on Sampling Thy. and Appl., 61-66, Univ. of Central Florida Press, 2001. (paper submitted, accepted and appeared in 2001)
- Hogan, J.A. and Lakey, J., "Zak transforms, sampling and aliasing in multiresolution spaces" in Proc. Conf. on Appl. Math., Edmond, OK February 2001, 79-93. (paper submitted, accepted and appeared in 2001)

Jerry Lodder

- Exhibited on transparencies: "Researches on the Curvature of Surfaces," *Special Session on the Mathematics in the Age of Euler, Joint Mathematics Meeting*, New Orleans, Jan. 10–13, 2001.

Pat Morandi

- Morandi, P., Pérez-Izquierdo, J., Pumplüm, S., "On the Tensor Product of Composition Algebras", *Journal of Algebra*, 243: 41-68, 2001

Hung Nguyen

- Some practical applications of soft computing and data mining (with N. Prasad, V. Krenovich and H. Gassoumi). In *Data Missing and Computationsl Intelligence* (A. Kandel et al, Eds.), Physica-Verlag, 273-307, 2001.

- Extension of the concept of propositional deduction from classical logic to probability (with D. Bamber and I.R. Goodman). *International Journal of Information Sciences* (131), 195-250, 2001.

- *Fuzzy Mathematics and Statistical Applications*, Text Book (with B. Wu), Taipei, 2001.

Nhu Nguyen

- Lambda-hyperconvexity in metric spaces (with M. A. Khamsi, H. Knaust and M. O'Neill) *Nonlinear Analysis - Theory, Method & Applications,* 43(2001), 21-31.

- The AR-property in linear metric spaces, (with M. Khamsi and L. Valdez-Sanchez), *Topology Appl.* 109(2001), 267-284.

David Pengelley

- *Lagrange and the Solution of Numerical Equations*, with R. Laubenbacher and G. McGrath, *Historia Mathematica* **28** (2001), 220–231.

- *Excerpts on the Euler-Maclaurin summation formula*, from *Institutiones Calculi Differentialis* by Leonhard Euler, translated by David Pengelley, 28 pages, published at `http://math.nmsu.edu/~history`.

Susana A. Salamanca-Riba

- S. A. Salamanca–Riba and D. A. Vogan Jr. "Strictly small representations and a reduction theorem for the unitary dual." in *Representation Theory. An electronic Journal of the A. M. S.* Volume **5,** (2001), 93–110.

Adam Sikora

- Sikora, Adam, Wright James, "Imaginary powers of Laplace operators". *Proc. Amer. Math. Soc.* **129** (2001), no. 6, 1745-1754. http://www.ams.org/journal-getitem?pii=S0002-9939-00-05754-3

Ross Staffeldt

- Staffeldt, Ross E., "Maple and Advanced Calculus at New Mexico State University", *Proceedings of the American Society for Enginneering Education 2001 Annual Meeting*, June 24-27, 2001 (CD-ROM).

- Staffeldt, Ross E., "Technological Aids fof Teaching Advanced Calculus", The paper is available on the New Mexico Space Grant web site at http://spacegrant.nmsu/conference/2001/d

Theodore Stanford

- *Validity of threshold crossing analysis of symbolic dynamics from chaotic time series* (with Erik Bollt, Ying-Cheng Lai, and Karol Życzkowski). Physical Review Letters, 85 16 (2000), 3524–3527.

- *What Symbolic Dynamics Do We Get With A Misplaced Partition? On the Validity of Threshold Crossings Analysis of Chaotic Time-Series* (with Erik Bollt, Ying-Cheng Lai, and Karol Życzkowski). Physica D. 154 3-4 (2001), 259–286.

- *Brunnian links are determined by their complements* (with Brian Mangum). Algebraic and Geometric Topology 1 (2001), 143–152.

Irena Swanson

- Swanson, I., "Linear equivalence of ideal topologies", *Math Zeitschrift*, **234** (2000), 755-775.

- Hübl, R., and Swanson, I., "Discrete valuations centered on local domains", *J. Pure Appl. Algebra*, **161** (2001), 145-166.
- Laubenbacher, R. C. , and Swanson, I.,"Permanental ideals", *J. Symbolic Comput.*, **30** (2000) 195-205.

14. Faculty Grants for 2001

Josefina Alvarez

Grant title	Date of Submission	Agency	Amount	Statu
NSF proposal number 0086986	2000	New Mexico Analysis Seminar	$20,941	3 year
Subcontract from the NSF funded program		NM CETP	$23,742	

Baggett, Pat

Grant title	Date of Submission	Agency	Amount	Status
Math and science educators for the future (with Finston et al.)	1999	NASA	$590,788	active over 3 years
NMSU Title V Developing Hispanic-Serving Institutions Program (with Nassersharif, Morandi, Finston, et al.)	2000	US Dept. of Education	$1,019,702	active over 5 years
Collaborative for Excellence in Teacher Preparation (for 5th Annual Math Education Institute and web development)	2000	NSF	$6200	through May 2002

Ernest Barany

Grant title	Date of Submission	Agency	Amount	Status
Complex Systems Modeling Analysis Simulation (with R. Colbaugh, K. Glass)	3/1/01-2/28/02	New Mexico Tech	$50,000,000	
Complex Systems Modeling, Analysis Simulation	Jan. 2001-May 2001	Subcontract from NMT	$50,000	
Singular Perturbation Theory for Nonhyperbolic Points (with M. Krupa)	Nov 2000	NSF		declined

Marcus Cohen

Grant title	Date of Submission	Agency	Amount	Status
Singularities and Jets in Nonlinear, Multispinor Fields	Dec. 01	AFOSR - NSF (Joint) "Physical Mathematics and Applied Analysis	$225,000	Budget in Preparation

David Finston

Grant title	Date of Submission	Agency	Amount	Status
Engineering/Mathematics Scholarships	August, 1999	NSF	$220,000	Active
Math and Science Educators for the Future	December, 1999	NASA	$600,000	Active
MAVIS	March, 2000	Eisenhower Foundation	$20,000	Active
Sloan Fellowships	August, 2000	Sloan Foundation	$30,000	Active
Strengthening Hispanic Serving Institutions	Spring, 2000	Dept. of Education	$2 million	Active
Visiting Scholar	November, 2000	Fulbright	$25,000	Active

John Harding

Grant title	Date of Submission	Agency	Amount	Status
Orthomodular Posets of Decompositions	10/01/01	NSF	$127,695	Pending

Martin Krupa

Grant title	Date of Submission	Agency	Amount	Status
Dynamics of Hybrid Systems Complex Sys. Modeling, Analysis, & Simulation, NMIMT	08/01/01	ICASA (NMT)	$66,000	

Joseph Lakey

Grant title	Date of Submission	Agency	Amount	Status
New Mexico Analysis Seminars	April 2000 3 years	NSF	$20,941	current Co-PI
Collaboratinve: sampling and uncertainty	Oct. 2001 3 years	NSF	$50,841	pending
Uncertainty principles in time-freq. anal	Oct., 2000 3 years	NSF	$172,453	not funded
Scientific Computing	Jan. 2001	NSF	$20,001	not funded

Jerry Lodder

Grant title	Date of Submission	Agency	Amount	Status
"Leibniz Homology, Characteristic Classes and K-theory,"	November, 2001	National Science Foundation	$61,491	pending

Pat Morandi

Grant title	Date of Submission	Agency	Amount	Status
Title V - Developing Hispanic Serving Institutions Program	9 March 1999	Dept. of Ed.	$2,500,000	funded
Mathematics & Science Educators for the Future	3 December 1999	NASA	$598,000	funded

Nhu Nguyen

Grant title	Date of Submission	Agency	Amount	Status
Non-Uniform Fast Fourier Transforms and their Applications	Oct. 30, 01	NSF	$207,811	Pending

Susana A. Salamanca-Riba

Grant title	Date of Submission	Agency	Amount	Stat
Unitary representations and Zuckerman modules	12/04/96	National Science Foundation	76,336.00	Ende 06/30
Sloan minority Ph. D. program in Mathematical Sciences	08/25/00	Alfred P. Sloan Foundation	per Sloan formula	Gran 12/11
Unitary dual of real Lie groups.	10/12/01	National Science Foundation	121,694	Pend

Adam Sikora

Grant title	Date of Submission	Agency	Amount	Statu
The methods of wave equation and spectral multipliers for elliptic and sub-elliptic differential operators	4th of Oct 2001	NSF	$82,000	Pendir

Ross Staffeldt

Grant title	Date of Submission	Agency	Amount	Status
Algebraic K-theory of spaces	Nov. 2000	NSF	$105,000	declined
Algebraic K-theory of spaces	Nov. 2001	NSF	$105,000	pending
MASEF grant with Bagget, Finston, Morandi	awarded spring 2000	NASA	$598,000	active

Theodore Stanford

Grant title	Date of Submission	Agency	Amount	Status
NSF Summer Grant	November 2000			declined

Irena Swanson

Grant title	Date of Submission	Agency	Amount	Status
Power of ideals	Oct. 1998	NSF	$90,000	Active til May 02
Integral closures	Dec., 1999	NSF-POWRE	$75,000	finished
REU site: Computational Algebra Summer Institute at Colorado College	Sept., 2001	DMS infrastructure program	$227,280	submitted PI: Michael Siddoway CO-PI: Irena Swanso
Decompositions of ideals	Oct., 2001	NSF	$223,227	submitted
Decompositions of ideals	Oct., 2001	NSA	$76,150	submitted
Travel Grant for ICM 2002 Beijing, China	Oct., 2001	NSF	airfair, lodging	submitted

Caroline Sweezy

Grant title	Date of Submission	Agency	Amount	Status
Parabolic Functions	Oct., 2000	NSF	$62,000	pending
Math/Engineering Scholarships	Aug., 1999	NSF/CEMS	$220,000	funded for Fall 2000-S'02

Tony Wang

Grant title	**Date of Submission**	**Agency**	**Amount**	**Status**
Multivariate Linear Models under Elliptical Distributions Scholarships	Aug., 2000	NSC of Taiwan	$42,000	funded
Inferences in growth curve models	March 2001	A.S. of Taiwan	$19,200	Funded