CLAS notes

Vol. 11, No. 8 | The University of Florida College of Liberal Arts & Sciences | August 1997

A Faculty Success Story

The Dean's Musings

Congratulations are in order to CLAS faculty. Over the past two years, they have achieved remarkable success in winning research funding from national agencies. At a time when total funding resources have been flat or even decreasing, CLAS faculty have been moving strongly against the tide to set funding records at UF.

Let's look at the numbers. In fiscal year 1994-95, CLAS grants and contract funding was at a quite respectable $16,910,336. The next year showed a strong increase of 15% to reach a funding total of $19,487,068. This was at a time when agencies were cutting back under severe budget pressures. But this past year was even more spectacular for CLAS faculty. Fiscal year 1996-97 showed a total outside funding of $25,508,262 — an almost unbelievable rise of 31% in one year! And a two year increase of 46%. What's going on here?

The answer is that CLAS has many really outstanding faculty who are aggressively competing well in tough national competitions. The successes are coming from all levels. From our newly hired faculty, from our experienced faculty, from expected disciplines, and from those disciplines for which fund acquisition is more difficult. In one sense, success begets success. Grants won by one person encourage submissions by others. Faculty working across disciplines submit joint proposals that draw upon complementary talents and

--See **Musings,** page 10

Mathematics Solving Real World Problems

New Arrival in CLAS Combines Pure and Applied Math

Tim Olson

Tim Olson is an optimist. He believes that higher level mathematics offers wonderful opportunities to solve important problems facing society. In a still brief career, his research has produced results to justify such optimism. For example, how to detect land mines hidden underground or tumorous masses in tissue, problems that are not so different mathematically as one might think.

Olson, a new assistant professor of mathematics, is "delighted" to be in Florida, after having followed a circuitous route of training. After an undergraduate degree from Montana, a doctorate at Auburn, followed by postdoctoral positions at Dartmouth and Johns Hopkins, he was drawn to UF by the presence of groups interested in his specialty of imaging. Olson summarizes his research interest in lay terms as "trying to get as much information as possible from very little data." By the use of complex mathematics, he is able to maximize signal-to-noise ratios, to find the scientific needle in the haystack.

To detect land mines, the use of ground penetrating radar emitted from a plane requires the ability to pick out and distinguish the small mines from other ground based objects, such as rocks. By constructing mathematical algorithms to deconvolute the overwhelming array of data received in these situations, images can be created to pinpoint the location of the mines. Olson is also interested in medical imaging where the problem may be to detect in human tissue small masses that may be of cancerous potential. Again, it is the application of pure mathematics to attack real problems that Olson finds satisfying.

"I just find this very rewarding to work with other colleagues in related disciplines," says Olson. "It allows me to use my bag of tricks from mathematics to provide insight into new methods of problem solving. The mathematics itself is great fun, made even more satisfying by addressing

Olson summarizes his research interest in lay terms as "trying to get as much information as possible from very little data."

This month's focus: Department of Mathematics

--See **Mathematics,** page 9

CLAS notes Gets New Editor

Jane Gibson, the new editor for the College of Liberal Arts and Sciences, is joining us from the English Department, where she has recently completed her master's degree. After graduating from the University of North Carolina at Chapel Hill in 1990 with a bachelor's degree in English, she worked as an editor's assistant and a public school teacher. Here on the University of Florida campus, she has spent the last two years completing her coursework while teaching composition and technical writing for the English Department and the Writing Center.

"I am excited about this opportunity to help publicize the impressive work being done in the College of Liberal Arts and Sciences," she said. "I look forward to getting to know more about each department and would welcome the input or suggestions of faculty and staff."

Her e-mail address is *jgibson@clas.ufl.edu.*

UNIVERSITY OF FLORIDA

CLAS notes *is published monthly by the College of Liberal Arts and Sciences to inform faculty and staff of current research and events.*

Dean: *Will Harrison*
Editor: *Kim Pace*
Graphics: *Sally Brooks*

Worldwide web *http://clas.ufl.edu/clas-notes*

Book Beat

Re-Engineering Female Friendly Science (Teacher's College Press)
by **Sue V. Rosser** (Women's Studies)

- adapted from book jacket -

Rosser, Director Of the Center for Women's Studies and Gender Research, is also the author of the pioneering book *Female Friendly Science* (1990), which introduced feminist teaching methods to math and science education and outlined a six-stage model for transforming curricula to attract and retain women in the sciences. This book was so successful that its reforms were assimilated into mainstream science education but, ironically, lost their appeal to women in the process. Now, in ***Re-Engineering Female Friendly Science***, Rosser revisits the feminist origins of curriculum transformation and puts the gender back in gender equity.

(*Excerpt*) *Although the mainstream of science education now advocates curricular transformations that overlap with those advocated by feminist scientists, in some cases, such as when all examples in teaching about the history of science are white men, curricular reforms represent cooptation rather than transformation. Similarly, the impact of gender issues has been overlooked in some of the current science education trends, such as the school-to-work reform movement in high school, group work in undergraduate classes, and the transition to graduate school. In other cases, such as the creation of single-sex sections in the coeducational environment, too much credence may have been placed in a single, gender-based solution.*

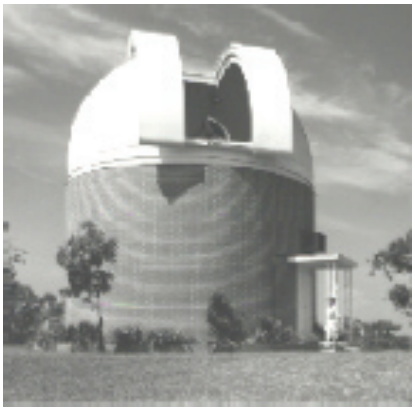
Nominations Are Due for Howard Foundation Fellowships

The George A. and Eliza Gardner Howard Foundation seeks to aid the personal development of promising individuals at the crucial middle stages of their careers. Nine fellowships will be offered for 1997-98 to support persons engaged in independent projects in the field of history, including the history of science, archaeology and political science.

Stipends of $20,000 will be given for a period of one year; awards are made for projects requiring full-time work over an extended period of time. Applicants should be in the middle stages of their careers and free of all other professional responsibilities during their fellowship year. Support is intended to augment paid sabbatical leaves, making it financially possible for grantees to have an entire year in which to pursue their projects, free of any other professional responsibilities. Accepted nominees should therefore be eligible for sabbaticals or other leave with guaranteed additional support. Nominees should normally have the rank of assistant or associate professor or their nonacademic equivalents.

Applicants associated with an academic institution must be nominated by the president of the institution or a designated representative. Each institution may nominate only two candidates. To permit coordination of UF nominations, projects should be submitted to Ms. Rosie Warner, College of Liberal Arts & Sciences, 2014 Turlington Hall, 392-6800, by October 1, 1997. Final nominations are due October 15, 1997.

30 Years on Rosemary Hill



In 1966-67, Prof. M. H. Teller, Department of Physics and Astronomy, was appointed as the general contractor to build the optical observatory in Levy County, Florida, in particular, the building for the 30-inch telescope. The site was at a low sand ridge locally known as Rosemary Hill. The Florida rosemary (Ceratiola ericoides) extirpated in this area of sandy soil is known as rosemary balds. The rosemary scrub has a faint but distinctive odor. It is not the rosemary (Rosmarinus officinalis) used as herb. The observatory ground-breaking took place on the seventeenth day of July in the year 1967 of the Common Era, with a volunteer crew of students, staff, and faculty.

Ode to the Ground-Breaking on Rosemary Hill
By Yuanshui

On the southern knot of a Bronson ridge
Above a Florida aquifer forty-yard high
With open view to the Hergert's land,
Cheerful men gathered to dig a hole.

"Here is the spot," they all pointed and exclaimed,
"Rosemary, oh, rosemary,
You must understand. You'll be razed
For the building come."

Dirt flew and sweat flowed under the summer sun.
From west to east a lone pine's long shadow moved.
And then there was a hole five-foot deep
Walled with plywood eight-foot square.

The secretary's urgent note was awaiting;
"No matter how late you get back today,
The Assistant Dean wants to see you in Tigert Hall.
The general contractor quit because of you."

"No-sir-ree and ye-sir-ree,
No, not again on our own we'll go a-working;
Yes, his commands we'll obey."
That was how the observatory got started, in a roll.

Opened toward heaven the thirty-inch stands
Over the hole that was dug on the Julian Day
Two million four-hundred-thirty-nine thousand six hundred and eighty nine,
In the year ding-wei of the gentle lamb.

Thirty fleeting years slipped by like in a day.
The sunset'll always tint the sky red and serene.
Who'll work till the next sunrise to begin a new day,
Atop the quiet Rosemary Hill?

Farewell to our comrades in labor and sweat,
Who have faded away like the summer clouds,
From that rosemary-scented hill,
Where nature nurtures dreams of men.

It's Only Logical!

by Doug Cenzer

The subject of logic has its roots in classical philosophy and today has branches in many disciplines, including mathematics and philosophy, as well as computer science, linguistics, and law. Many people enjoy solving puzzles with elementary logical reasoning. More advanced techniques of logic are used in expert systems which, for example, help doctors diagnose illness with the aid of computers. Current research on hybrid algorithms is using logic in the design of onboard software which can map out the flight plan of an airplane in real time.

My research is in the area of mathematical logic. The University of Florida is the host for the Eprints service, which collects abstracts in mathematical logic and makes them available on the Internet. Just as mathematics is the language of science and provides the foundation of science, so logic is the language of mathematics and provides the foundation of mathematics. This universality is part of the appeal of logic, along with the mystery of such problems as the logical paradoxes and the closely related issues of undecidability and incompleteness.

Given a sequence of data, we wish our computer to "learn" how to predict the future values of the sequence

Doug Cenzer
Professor of mathematics

My research in mathematical logic has involved many areas of mathematics, including algebra, analysis, topology and combinatorics. I have just finished long survey articles on two topics in computability theory.

The first topic is Pi-O-l classes, or effectively closed sets. The basic idea here is to view the solution of a problem, such as coloring a graph, as a sequence of choices of branches — so the set of solutions forms a tree. We are interested in how to represent mathematical problems in terms of these trees and in how the complexity of the tree relates to the complexity of the solution.

The second topic is feasible mathematics, or complexity-theoretic mathematics. Here we say that a function is feasible if it is computable using a reasonable amount of resources. Just as computability in mathematics considers the question of whether there exist algorithms (computer programs) for solving various mathematical problems, the question we are interested in is whether these algorithms are feasible. This area is related to the famous P=NP problem. For example, the coloring problem is known to be intractable (thus not quite feasible).

Computability theory, the branch of mathematical logic where my work is focused, is most closely linked with computer science. I belong to several research groups, based on the Internet. Our Computability group just returned from a meeting in Kazan, Russia. We are setting up a Binational Exchange Agreements, sponsored by the National Science Foundation, with Russia and Kazakhstan.

The LICS (Logic in Computer Science) forum is a subgroup of the engineering organization IEEE. A central focus of this group has been finite model theory. There are two particular ways one can attempt to understand a finite problem. One approach is to write a logical sentence characterizing the problems which have solutions. The approach is to write a program which solves the problems. Finite model theory studies the connection between these two approaches. Many of the problems concern networks, and have applications to, for example, telephone networks and railroad shipping. Our work has been primarily devoted to

Doug Cenzer
Professor of mathematics

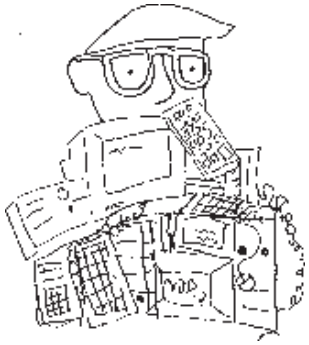
infinite versions of these finite problems. Perhaps our most interesting result was a representation of the integers which allowed the computation of 2^x in polynomial time while maintaining the p-time computability of addition, subtraction and multiplication. This provides a way of calculating exactly with very large numbers.

COLT (Computational Learning Theory) is a part of the Machine Learning community. Bill Moser wrote his Doctoral Thesis in this area; he is now employed at the software startup company Hybrithms in Seattle. The general area of machine learning is concerned with such problems as teaching robots to perform tasks (like walking, or playing chess). We are interested in the area of inductive inference. This is a form of pattern recognition. Given a sequence of data, we wish our computer to "learn" how to predict the future values of the sequence and to deduce the program which is producing this data (assuming that there is one). Moser and I have extended the usual inductive inference of discrete data to the inference of continuous (rational) data. He showed, for example, that any continuous, computable rational function could be successfully infered.

The previous two groups are concerned with discrete problems. The CCA (Computability and Complexity in Analysis) group studies continuous, rather than

--See **Logical** on page 5

Student Computers



What if every student at UF had access to computers? What if every student had an e-mail address that they were given free of charge at entry to the university that stayed with them for their entire time at UF? What if every student could buy and use CD-ROM material to supplement there in-class instruction? And what if every student could be given assignments that required the use of the web or the use of tools that were previously available only on university computers? We are about to find out.

UF has issued a policy requiring all students new to campus in Summer B 1998, as well as on-campus juniors to be able to perform basic computational tasks using their own equipment. The complete text of the policy is available on the web at `http://www.clas.ufl.edu/clasnet`. Each college must define the capabilities required for their curricula.

CLAS is such a large and diverse academic community that defining computing capabilities for all of our 22 academic departments is a bit daunting. All of our departments use computing, but in quite varied ways. We are developing an approach to student computers that will open up opportunities for improved instruction. The approach starts with instruction. What is it that we want our students to be able to do with their new "required" capabilities? Certainly they can produce word processed papers, but what other opportunities are created?

Our graduate disciplines provide one perspective. In several of our departments graduate students make regular use of department computing facilities to do simulations, use interactive instructional materials, perform computations, synthesize, display and report results. These tasks can be performed by our much larger undergraduate student body if we can assume that they have the computing resources available to them where they live. Departments understand that these experiences are critical to academic development in the disciplines.

The Writing Project (`http://www.ucet.ufl.edu/writing`) provides another perspective. For three years our freshman and sophomores have been taught in rooms filled with computers. Students use e-mail and the web on a daily basis and interact electronically both synchronously and asynchronously. Our experience indicates that students master these new tools and environments rather easily and use them to interact in ways that were not previously possible.

Language learning can be enhanced with interactive CD-ROMs. Mathematical and physical science students can use tools such as matrix algebra and symbolic calculus software to perform a richer set of exercises than could previously be assigned. Social science students can access and analyze data. Contact with students can increase through the use of e-mail. The web provides new opportunities for providing access to information produced both locally and linked from around the world.

For students with mobile computers (laptops, notebooks and other), the college will be constructing "access labs" - rooms with network jacks that can be used by students to connect their computers to the campus network and the Internet. These labs will contain no equipment. They will merely provide opportunities for students to use their computers while on campus and access electronic resources. Access facilities will also be available in the libraries and in dormitories.

But of course with these opportunities come challenges. Students will need to learn how to own and operate their computers and how to arrange for repair. Students may need to upgrade or replace their computers during their stay at UF. Students will need to learn how to back up their materials, access the Internet, locate materials on-line and operate e-mail systems. Tasks that may require new learning now will need to be commonplace beginning in 1998.

The university has expressed a desire to disinvest in computer equipped classrooms. Some believe that mobile student computers can take the play off computers in classrooms. I do not believe this is feasible in the next several years. Laptop computers are not reliable enough for classroom use. A room full of 30 or so student computers would be bound to include several problems - full hard drives, stuck floppies, misconfigured network cards and other nuisances that would interfere with instruction. I think it best to continue to provide computer classrooms where appropriate and rely on student computers for out of class work.

The opportunities and challenges presented by this change in the way the university operates are enormous. If you have questions or comments regarding student computers, please e-mail me at `mconlon@stat.ufl.edu`. You can learn more about student computers and the issues surrounding them at a college web site created for this purpose. Check out `http://www.clas.ufl.edu/clasnet/student-computers`. I look forward to hearing from you.✎

Mathematics in Tomography by Bernard Mair

The applications of computer generated images run the gamut from the traditional display of maps and topographical features to the structure of minute integrated circuits etched on silicon wafers. The formation, representation, and analysis of images have therefore become a significant area of research in many disciplines such as mathematics, computer science, physics, and electrical engineering, thus making it a truly interdisciplinary subject. My current research deals mainly with the formation of medical images in positron emission tomography (PET). However, some of the mathematical techniques developed in this research will be applicable to image reconstruction problems occurring in other areas.

PET is a procedure in nuclear medicine used to determine the intensity of internal biochemical and metabolic processes in living tissue. This procedure is quite different from traditional X-ray methods, which determine images of the internal anatomical structure by passing high energy beams through the patient. In PET, these high energy rays result from radioactive decay inside the patient. The radioactivity is usually a result of changing the atomic structure of simple substances such as glucose which is readily absorbed by living tissue. Since regions with high metabolic activity absorb a proportionately larger amount of glucose than regions of lower metabolic activity, these highly active regions also result in a larger number of high energy emissions. Data is collected by placing the patient in a scanner which keeps track of the number of these high energy emissions occurring in various regions. However, the scanner cannot tell exactly where these emissions occurred inside the body. This information is obtained by a mathematical algorithm that is an integral part of the PET machine. This algorithm is able to take the "raw data," which looks nothing like the internal biochemical structure, and convert it into a meaningful image that physicians and medical researchers then use to make diagnoses, plan treatments, determine the health of individual organs, and do psychological studies of the brain.

> **"To perform research in this area, I have had to learn some biology and medicine, and a significant amount of the physics and engineering"**
>
> Bernard Mair
> Professor of mathematics

Among other things, the PET procedure has been used to determine

(a) the effects of various drugs on the human brain,
(b) the health of the human heart, by estimating the volume of blood flow
(c) the location and treatment of tumors
(d) the responses of the brain to lesions or surgical resectioning.

PET is being used extensively to determine the response of the brain to various stimuli, and to map which areas of the brain are responsible for functions such as speech, motor skills, cognitive skills, and memory recall. PET provides information that is complementary to other medical imaging modalities such as CAT and MRI, which provide mainly anatomical information. Therefore, a major emphasis in the medical research community is to develop automatic computer guided methods of combining information from the different imaging modalities into a single consistent, aligned image containing all the "pieces of the puzzle" so that the physician can obtain a realistic picture of the brain, or the heart, or any other organ of interest, in a truly active, functional form. And all this, without lifting a scalpel or spilling any blood.

Bernard Mair
Professor of mathematics

PET is a very effective and versatile imaging method, so there is significant interest in obtaining more accurate numerical algorithms for use in the commercial machines. One of the major obstacles in achieving this is the significant deviation of the raw data from the approximate mathematical model used to derive present reconstruction algorithms. This sometimes results in degraded images that are not able to accurately resolve small but significant details, especially when they are close to regions of high uptake, such as the abdomen.

A major goal of my research is to obtain a precise mathematical formulation and understanding of the underlying model, which has so far been only approximated numerically. I hope that an appropriate formulation will result in a new paradigm from which more accurate, stable, and faster numerical algorithms can be obtained. I also develop algorithms based on the currently adopted numerical model. To perform research in this area, I have had to learn some biology and medicine, and a significant amount of the physics and engineering involved in PET scanners.

I work very closely with two other faculty members, Murali Rao in the Mathematics Department, and John

--See **Mair** on page 9

Three CLAS Faculty Awarded 1997-98 Term Professorships

These professorships, funded entirely by private sources, allow the College to recognize faculty who excel in both scholarship and teaching. Each will receive a one-year supplement of $5,000 in salary and $1,000 in research support.

Patricia Craddock

Herb and Catherine Yardley Term Professor

Dr. Craddock, professor of English, has been designated the 1997-98 *Herb and Catherine Yardley Term Professor*. Her research focus is eighteenth century literature, especially history as literature.

Richard Scher

Robin and Jean Gibson Term Professor

Dr. Scher, professor of political science, has been designated the 1997-*98 Robin and Jean Gibson Term Professor*. His primary areas of research are southern and state politics (especially Florida), regional politics and political culture, and voting rights.

Rodney Bartlett

David L. Williams Term Professor

Dr. Bartlett, graduate research professor of chemistry, has been designated the 1997-98 *David L. Williams Term Professor*. His research focuses on quantum mechanical description of molecular structure and properties.

--Logical from page 4

discrete problems. This includes the basic material from Calculus and Differential Equations. Classic problems here are to find maximum and minimum values of continuous functions and to solve differential equations It has been shown, for example, that a differential equation may have a computable equation but no computable solution. We have been working on putting continuous problems in the framework of Pi-O-l classes, thus providing a uniform approach to many apparently different problems.✎

Seventh Annual

Fall Academic Convocation

Thursday, September 11, 1997
4:00pm
University Auditorium

Guest Speaker: Lucius Barker
William Bennett Munro Professor of Political Science
Stanford University

Grant Awards through Division of Sponsored Research

June 1997 Total $2,777,467

Investigator	Dept.	Agency	Award	Title
Corporate...$129,356				
Katritzky, A.	CHE	Abbott Lab	30,000	Chemical sample collection.
Katritzky, A.	CHE	Multiple Cos	2,498	Software research support.
Katritzky, A.	CHE	Multiple Cos	1,198	Software research support.
Kennedy, R.	CHE	Am Chem	14,000	American Chemical Society Division of Analytical Chemistry Graduate Fell.
Tan, W.	CHE	Am Chem	20,000	Molecular nanostructures and their applications.
Yost, R.	CHE	Brystol-Myers	39,000	Laser microprobe ion trap mass spectrometry.
Abboud, K.	CHE	Dow Chem	7,000	Crystal structure determination.
Dolbier, W.	CHE	Specialty Coat.	9,060	Synthesis and production of fluorinated paracyclophones.
Thomas, C.	CRI	Corrections	2,000	Private Corrections project.
Scicchitano, M.	POL	Avmed	4,600	A survey of member satisfaction.
Federal...$2,365,838				
Boinski, S.	ANT	NSF	52,203	Squirrel monkeys: A test of primate social evolution theory.
Dermott, S.	AST	NASA	82,800	Dynamics of solar system dust.
Ewel, J.	BOT			
Jones, D.	BOT	NSF	5,000	Sustainability of soil fertility in reconstructed tropical ecosystems.
Williams, K.	BOT	NSF	25,000	Young Investigator Award.
Reynolds, J.	CHE	Air Force	38,643	Reactive conjugated oligomers for conducting elastomers and star polymers.
Richards, N.	CHE	NIH	90,676	Arparagine biosynthesis in normal and tumor cells.
Bowers, C.	CHE	NSF	75,000	Enhanced sensitivity NMR studies of nanostructured electronic materials.
Wagener, K.	CHE	NSF	95,000	Acyclic diene metathesis polymerization.
Winefordner, J.	CHE	NSF	7,500	Analytical systems.
Winefordner, J.	CHE	NSF	3,400	Analytical systems.
Bartlett, R.	CHE	Air Force	103,467	Ab initio based density functional methods for molecules,polymers and crys.
Chege, M.	CAS	DOE	340,947	National resource center and foreign language and area studies fellowships.
Mingo, G.	DSSP	DOE	283,419	Upward Bound Program.
Waylen, P.	GEO	NSF	10,000	The effects of El Nino on Central America.
Fradd, S.	ICP	DOE	32,018	Instruction and assessment of English language learners.
Mair, B.	MAT	NSF	39,913	Positron emission tomography: Modelling analysis and algorithms.
Mitselmakher, G.	PHY			
Tanner, D.	PHY	NSF	280,000	Input/output optics for Ligo.
Buchler, J.	PHY	NSF	77,000	Nonlinear stellar pulsations.
Maslov, D.	PHY	NSF	100,000	Career: Mesoscopic interacting systems.
Meisel, M.	PHY			
Sharifi, F.	PHY	NSF	300,750	Development of a variable temperature, high frequency NMR system.
Mitselmakher, G.	PHY			
Korytov, A.	PHY	DOE	177,000	Research on elementary particle physics.
Tucker, C.	PSY	DOE	58,000	Statewide dissemination of the methods developed in model partnership ed.
Tucker, C.	PSY	DOE	12,000	Statewide dissemination of the methods developed in model partnership ed.
Conlon, M.	STA	NIH	16,401	Project CARE (Cocaine abuse in the rural environment).
St Mary, C.	ZOO	NSF	17,996	The evolution of mixed sex allocation patterns.
Emmel, T.	ZOO	DOI	74,980	Captive propagation and experimental reintroduction of Schaus Swallowtail.
Giesel, J.	ZOO	DOI	10,925	Impacts from red imported fire ants on the Florida grasshopper sparrow.
Foundation...$25,616				
Williams, P.	ANT			
Moseley, M.	ANT	Bruno	5,000	1997 Cerro Baul Excavation Project, Moquegua, Peru.
Hackett, D.	REL	Louisville Inst.	20,616	Fraternal orders and American religious history.
Other...$19,464				
Jones, D.	BOT	Misc Don	1,679	Miscellaneous donors.
Eyler, J.	CHE	Misc Don	5,000	Miscellaneous donors.
Eyler, J.	CHE	Misc Don	11,500	Miscellaneous donors.
Scicchitano, M.	POL	Misc Don	1,285	Grant support training public service program.

*—see **Grants**, page 9*

--**Mathematics** *continued from page 1*

problems of broad interest."

Most mathematicians tend to work alone on individual projects, which can also be very rewarding. And easier to control. Olson notes, "You have to consider the start up costs for any collaborative project.", by which he means the intellectual investment that must be made to learn enough about wider projects in order to bring the proper mathematics to bear on the problem. This can be a daunting prospect when working with a medical team on body imaging or with military experts in land mine detection.

Currently, Olson is a principal investigator in a multidisciplinary grant sponsored by the US Navy and its Naval Surface Warfare Center. He describes the project scientifically as "an investigation of the combination of computational detection techniques with marked point processes to create a robust algorithm for non-parametric classification of hostile terrain." Land mine detection, to the uninitiated.

Olson is more than just a researcher. One of his former colleagues calls him "one of the three or four best math teachers I've had the pleasure to see in action." Olson says, "I really enjoy showing students that mathematics can be both stimulating and understandable." Olson becomes animated when discussing how a "difficult" subject like math can be made more accessible for those who do not "initially buy into this concept." Olson appears to have the enthusiasm, coupled with a warm sense of humor, to make that philosophy work. Students may also be shown how useful even apparently esoteric mathematics can be.

A major new initiative centered in CLAS, with the Department of Mathematics as a lead department, involves the development of a state-of-the-art Imaging Center. This new faculty member is excited about the prospect of playing a role in the fledgling Center, one that will depend upon interdisciplinary collaborative research. There is no question that the success of the Center will depend upon such scholars as Tim Olson.✎

--Mair from page 6

Anderson in Electrical and Computer Engineering and with doctoral students Raymond Carroll (Mathematics) and Chen Hsien Wu (Electrical and Computer Engineering). We also collaborate with Dr. John Votaw at Emory University Hospital on this project. In fact we are preparing to test some of our algorithms on PET data provided to us by Dr. Votaw.

I truly enjoy the interaction between the various disciplines that is a vital component of this project. I try to carry over my enthusiasm for interdisciplinary research to my classes. I believe it is extremely important for our students to understand the motivation and possible applications of the mathematics they are learning. Hopefully, this motivates students to learn the material better and be more enthusiastic about the subject.

In addition to teaching and research, I have been responsible for the graduate program in the Department of Mathematics, since 1996. Over the past five years, the job market for mathematicians with graduate training has been evolving rapidly. No longer can a mathematics doctorate expect to automatically obtain a tenure-track job in a Ph.D. granting research university institution, such as University of Florida. More graduates are seeking (and obtaining) employment in areas such as telecommunications, finance, insurance, research labs, various engineering and medical type industries, and—not surprisingly—the computer industry. It may come as a surprise to many that the National Security Agency is the largest employer of mathematicians in this country (the actual number is classified, but it is a four digit number!). I believe this change is a credit to the discipline as it demonstrates the fundamental reliance of technology and business on mathematics and the acceptance of this view by those in leadership. In order to prepare our students for this changing market, we have modified our graduate program, especially at the Master's level to encourage our students to take courses in other departments such as statistics, physics, finance, electrical and computer engineering, and industrial and systems engineering. We have also introduced new courses in the mathematics departments. These include courses in wavelets, nonlinear optics, mathematics of finance, and medical imaging. As a result, we currently have six graduate students in some form of internship program. Two are with investment companies, three are with high tech industries, and one with the medical school. We intend to continue modifying our program to increase the number of training options available, and improve the quality of our program.✎

—**Grants** *continued from page 8*

State...$114,358

Winefordner, J.	CHE	Phosphate Inst	99,858	Laser induced breakdown spectroscopy for monitoring of slurry streams.
Parker, K.	CRI			
Lanza Kaduce, L.	CRI	Dept. of Corr.	14,500	Evaluation of recidivism among releasees from privately operated prisons.

Universities...$122,835

Spector, A.	PSY	FSU	93,259	Effect of perinatal salt exposure on taste function program.
Shuster, J.	STA	Northwestern	29,576	Pediatric oncology group - phase I clinical trials in children.

--**Musings** *continued from page 1*

expertise.

The ability to secure grant funding is so important today that we like to give appropriate visibility and recognition here in the College Office. For example, each month in this newsletter we devote one full page (sometimes running over to a second page) to a listing of grants funded in the previous month. This is more than just a recognition of success. It is sometimes helpful to see where others are gaining support. And in a college this large, the funding report helps faculty know what type of research projects their colleagues are pursuing, sometimes leading to useful communication about potential joint efforts.

Primary credit goes to the faculty, of course, but it may be worth pointing out the efforts of two important people in facilitating research funding. Karen Holbrook, VP for Research, has been tireless in promoting UF research and in supporting major funding efforts that require institutional matching. Jim Dufty, the CLAS associate dean for research and himself a funded researcher, has worked directly with faculty across the College in developing research proposals, and he does much behind the scenes to strengthen CLAS research. Thanks to both of them for their significant contributions.

The funding success has been widespread in the College, but a few departments deserve special mention. Chemistry continues to lead the way with a 35% increase last year for a total of $9.5 million; Physics was up 27% to $4.0 million; Statistics increased 23% to $2.5 million, Geology showed a spectacular 133% increase to $1.34 million; Astronomy was similarly outstanding with a 130% increase to $1.5 million; Mathematics and Botany had major increases to the $500 thousand level. It was not just the hard sciences, however, that made progress. Anthropology was up sharply to $443 thousand. Other strong performers included Romance Languages, Women's Studies, Sociology, Political Science, Geography, Religion, and African Studies. It was a very good year.

An important factor beyond the research dollars is the peer recognition of CLAS faculty by their colleagues at other institutions who review these proposals and determine funding by their ratings. What they are saying is that CLAS faculty are producing some of the best scholarly ideas in the country, and the rewards are following.

Congratulations to a superb faculty that is growing better each year. The new faculty class of 1997, some 30 strong arriving this month, will build further on this strong base. What an enticing prospect.

Will Harrison,
Dean

[harrison@chem.ufl.edu]

From the Chair....

Joe Glover, chairman of the Department of Mathematics

Mathematicians live in interesting times. As society, science, technology, and medicine become more complex, they become underpinned by increasingly sophisticated mathematics. The high definition television set (HDTV) you will soon be forced to purchase; the fingerprint identification system used by the FBI; the security protocols which protect the electronic flow of money; the CD-ROM holding an entire encyclopedia; the computer trading of stocks and options on Wall Street: all of these exist thanks in large part to the efforts of mathematicians, both pure and applied. And yet, mathematicians find themselves scrambling to justify what they do to a society which increasingly looks for short term profits and easily previsible goals. Mathematicians find it easy to blame a society in which many people find no shame in admitting their innumeracy, but mathematicians have also done an abysmal job in explaining to the public what it is they do and why they are so important to society.

The UF Mathematics Department has begun to expand its involvement with the interdisciplinary activities on campus, both in teaching and in research. A primary example is the department's role in the new imaging science research initiative being organized in the SUS. Mathematical techniques for storing, manipulating, and processing two and three dimensional images have been developed in the past twenty five years which are central to imaging science and technology. This initiative will showcase Florida's strengths in the physical and computational sciences, engineering, and medicine. While the department will become increasingly visible through its growing applied mathematics program, its pure mathematics program is no less important, both for its internal beauty and for future applications. For example, Ito's theoretical development of stochastic calculus in the 1940's is now the practical basis for options pricing on Wall Street. Abstract topological and geometrical theories developed in this century now model physics' vision of reality. The department has several world-renowned research groups making fundamental contributions in pure mathematics, including algebra, differential equations, topology and geometry, logic, combinatorics and probability. Our challenges in the next century are to maintain the internal vitality of pure mathematics, to transfer developments in pure mathematics into applications, and to equip students with the mathematical training they will need to advance an increasingly complex society. The Mathematics Department looks forward to hosting the Spring 1999 meeting of the American Mathematical Society in Gainesville.