January 1998

CLASnotes

Vol. 12 The University of Florida College of Liberal Arts and Sciences No. 1

The Dean's Musings

Computers and Teaching

1998 will be an eventful year for computers in CLAS. You have all heard about the mandate that new UF students, beginning July, 1998, will be required to have computers. This should properly be viewed as a real opportunity for our students and faculty, although not without certain attendant problems. And the problems are often easier to perceive than the opportunities.

It is possible that the great computer influx may not be such a change after all, as most (no one knows exactly how many) of our current students already own or have access to a computer. These students have grown up in a digital environment with the full expectation that computers are a constant tool. Requiring them to have a computer is like stating the obvious. So what's the worry?

The major problem facing the students, outside of cost, is to determine what type of computer will be needed. In this time of model-overload, constantly updated features, and a confusing range of choices, the selection of a computer is not trivial. A few schools have taken the approach of specifying for their students exactly the brand, model, and capabilities that should be purchased. The University of Florida is far too complex for such a solution. Engineering students will have considerably different computing needs than students in Fine Arts or Architecture. CLAS, with its built-in diversity, confronts this problem even within the college. And assuming that colleges could agree on their particular needs, no student operates solely within a given college. This is best exemplified by the fact that CLAS faculty teach about 50% of the credit hours at

—See Musings, page 12

New Physics Building Opens

Innovative Design Provides 'Teaching Space With a Future'

Front entrance of new Physics Building.

"We knew this was a once in a lifetime opportunity," says Liz Seiberling, physics professor and building committee chair of the new $32 million physics facility, "so we put a lot of thought into the design." Seiberling, a surface physicist, seized the chance to help shape her own future as a scientist and teacher by getting involved with the new Physics Building from the very earliest planning stages. "I've always been interested in architecture," she explains, "so I participated in the design of the labs and teaching spaces. Then, as the building progressed through the planning and design phase to the construction phase, I continued to take responsibilities until finally I ended up doing a lot of ordering of furniture and equipment. It's been a five year process."

Surprisingly, despite its 225,000 square feet, the impressive new structure, located on the corner of Museum Road and North-South Drive, fits agreeably into its environment. A small alteration of the original plans (thanks, in part, to the action of concerned students) allowed for the preservation of two large oaks in front of the building, and once the remainder of the landscaping is finished, these venerable trees will lend a look of experience and maturity to the new facility.

Physics Building lobby.

The windows that dominate the front of the building accurately portray the sunny feeling one gets inside, especially in the spacious lobby area **(pictured left)** and on the third floor where the departmental and office space is located. The offices (nearly all of which feature large windows) are organized around a central outdoor courtyard, that Seiberling hopes will be a focal point. "We tried to incorporate all kinds of interaction areas into the design," she explains, "so that people will be able to have more informal meetings, enhancing communication within the department."

Until their recent move, the Physics Department was scattered throughout Williamson Hall, McCarty Hall and the Nuclear Science Building. Professors had to plan ahead to schedule meetings and secure access to suitably sized conference areas. Although Seiberling admits that the new building "may at first appear compartmentalized," she notes with pride that, "if you look carefully, there are many little spaces tucked away for meetings and conferences, formal and informal, a feature she feels "lends to the spontaneity and ease with which we will now be able to work cooperatively."

Also of note is the "lecture-demo" hall, smaller than the typical lecture room, which seats 100 people and is fully set up for demonstrations. "It's very close to being interactive where every seat can

—See New Building, page 8

This month's focus: Physics

Around the College

DEPARTMENTS

ENGLISH

On November 15, the History Channel included **Jim Haskins'** forthcoming book, *Black, Blue, and Gray: African Americans in the Civil War* on a list of three recommended books at the end of its "Field Trip–The Civil War" program for children. On November 22, he accepted the annual Carter G. Woodson Award for nonfiction for the secondary school audience, awarded to his book *The Harlem Renaissance* (Millbrook, 1996), at the National Council for the Social Studies convention in Cincinnati, Ohio.

Greg Ulmer conducted a colloquium via videoconference technology with a design class at the University of Media and Design, in Helsinki, Finland, on November 6.

GEOGRAPHY

Peter Waylen was an invited speaker at the University of Nottingham, England, where he presented a talk entitled "El Niño and its Social and Economic Impacts in Central America." He was also an invited participant in a forum and workshop held in Lima, Peru, sponsored by NOAA, the Inter-American Institute and the Peruvian Ministry of Fisheries, on "Is This the El Niño of the Century?". He co-chaired a session on the impacts of El Niño on water resources in western South America and is heading an international collaboration attempting to forecast major flooding that may result from El Niño in northern Peru.

MATHEMATICS

Krishnaswami Alladi gave a one hour plenary lecture entitled "Invariants Under Partition, Conjugation and Q--series Identities" at the International Conference on Number Theory and Applications, held at the Research Institute of Mathematical Sciences in Kyoto, Japan, November 10-14.

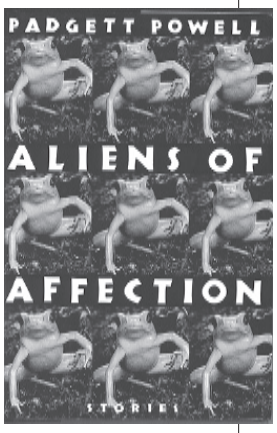
Bernard Mair spoke at the IEEE 1997 Nuclear Science and Medical Imaging Conference in Albuquerque (Nov. 8-16) on results of research in reconstructing positron emission tomography images. The title of his talk was "An Alternating Minimization Weighted Least Squares Reconstruction Algorithm."

SOCIOLOGY

Jay Gubrium gave the keynote address at a conference for health care professionals on "Care, Satisfaction, and the Quality of Life" sponsored by the Sunnybrook Health Science Center at the University of Toronto, Canada, December 5, 1997.

Padgett Powell *reads from his new book,* **Aliens of Affection,** *during the December installment of the "Writers at Florida" series sponsored by Goerings Book Store.*

Aliens of Affection
(Henry Holt and Company, Inc.)
by ***Padgett Powell***
(English)



Goerings Showcases UF Writers

For over seven years, Goerings Book Store on University Avenue has been hosting the "Writers at Florida" series, which features 12 readings a year by UF Creative Writing faculty, graduate students and the occasional alumna/us. The events are "hugely attended," says Goerings co-owner Tom Rider, and they give grad students in creative writing the opportunity to present their work publicly. Goerings also hosts autographing parties for UF faculty who've recently published books (their "Authors on Sundays" series), and conducts benefits for UF groups like Graduate Assistants United and The Center for Women's Studies and Gender Research. In addition, Goerings encourages fledgling writers from the Alachua County Schools with their "Young Writers Series" cosponsored with the Gainesville Fine Arts Association.

Radheindu Nair, 1HP, a student in Vasudha Narayanan's REL 3330 (Religions of India), dances as part of her project on the importance of performing arts in the Hindu tradition.

Around The College

African Studies Quarterly Goes Global

Michael Chege Reports on UF's **African Studies Quarterly**

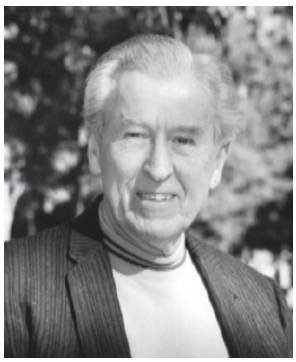
Our last issue of *African Studies Quarterly* has been receiving widespread international attention, and we wanted to bring this to your notice. This is the only African Studies journal in the US that is available exclusively on the internet. At the last African Studies Association meeting in Columbus, Ohio, the journal had a stand in which we displayed the current issue on screen and demonstrated to conference participants how to access it. The stand was immensely popular and received an estimated 300 visitors.

Worth greater note is the fact that our latest issue (Fall '97) on "Crisis in the Great Lakes" has drawn the attention of the United Nations Department of Humanitarian Affairs in Geneva, Switzerland. The issue contains contributions by recognized experts (from UF, Africa and other US campuses) on ways of resolving the conflicts and humanitarian crises in Central Africa. We have just been notified that the United Nations Department of Humanitarian Affairs will post one of the key articles in ReliefWeb. This is available to all the UN personnel working on humanitarian relief around the world and also to voluntary non-governmental organizations like the Red Cross, Action Aid, Save the Children, and others. This will give our journal a lot of international exposure.

ASQ is run by volunteers made up of graduate students and our office staff and can be accessed at **www.clas.ufl.edu/africa/asq/.**

African Studies Quarterly
The Electronic Journal of the Center for African Studies

Williams Honored in Special Program



At the October conference of the Florida Communication Association, **Don Williams**, Professor Emeritus (Communication Processes and Disorders), was honored in a special session featuring participation by five of his former students and a former colleague. Making presentations were four students who studied under Dr. Williams: Tyrone Adams, Arkansas State University at Monticello; Ringo Ma, State University of New York at Fredonia; Tamara Bollis-Pecci, University of Denver; Mittie Nimocks, University of Wisconsin at Platteville; and Williams' former colleague, Lynne Webb, University of Memphis. Kellie Roberts (UF Center for Written and Oral Communication), also a former student of Williams, chaired the program.

Discussing various dimensions of the professor's responsibilities, each speaker cited criteria for excellence in professorial teaching, research, and service and then applied these standards developed in published studies to Williams' professorial career. After Williams responded to the tributes, he was presented with an expanding book containing letters from former students and colleagues, as well as a commemorative plaque from his department. Plans are being made for the publication of the presentations.

Williams came to UF from Cornell in 1959. In his department, he served as founding director of the Communication Studies Division. Although he retired in 1995, Williams continues to be active in academe. Last year, he served as visiting professor at The Linguistic University in Nizhny Novgorod, Russia; this year, he presented a research paper at an international conference in Spain; and in 1998, he plans to present a paper at an international conference in Hungary. Since 1976, Williams has held teaching/lecturing appointments in 16 countries on six continents.✎

CLAS TEACHING AND ADVISING AWARDS

The deadline to nominate a teacher or an advisor for the 1997/98 CLAS Teaching/Advising Awards is February 9, 1998. Nomination forms are available from Department Chairs, in 2014 Turlington Hall and 100 Academic Advising Center, and in envelopes posted by elevators and entrances to CLAS buildings. Forms may be returned to:

2014 Turlington Hall
CLAS Teaching Advising Awards Committee
University of Florida
Gainesville, FL 32611

Forms are also available at **www.clas.ufl.edu** under "Dean's Office" link. For more information please contact **Ksenia Bobylak**, CLAS Dean's Office, **392-2223.**

A New Approach to Fusion

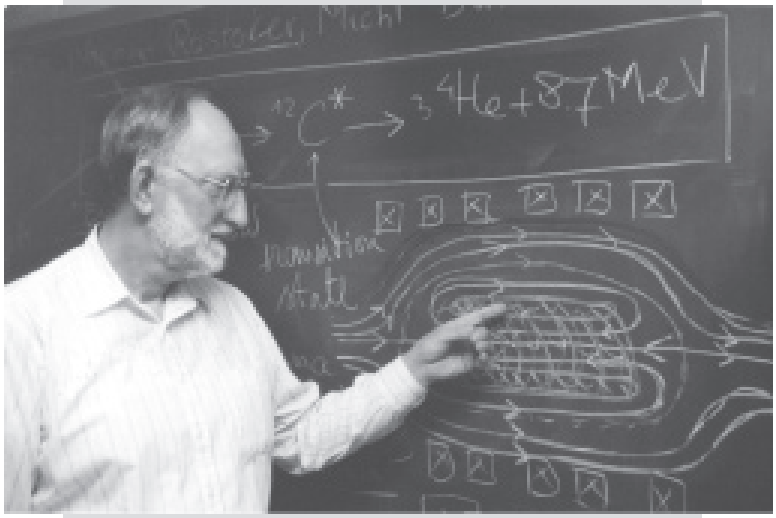
Monkhorst Working on Potential Fusion Breakthrough

Henk Monkhorst's latest research, published in a recent *Science* article, seems almost too good to be true. Monkhorst and Norman Rostoker (UC-Irvine), have theorized a fusion reactor that could efficiently provide electricity at a fraction of current costs. The fuels for his reactor are abundant, cheap and environmentally benign: hydrogen and boron-11. Hydrogen is easily attainable (using electrolysis) from ocean water, and boron deposits are plentiful (for example: 140 million tons in California, 500 million in Turkey). A 100 megawatt power plant (10-15 of which would equal the total power generated by GRU) would burn only 200 grams of boron a day, as opposed to the over 700 tons of coal needed to power a similarly sized coal-burning plant. Better yet, the reactor emits no radiation; in fact, it has no adverse by-products at all. In addition, because the reactor is safe and clean, it would be possible to build small "neighborhood" power plants right in the area where the power is to be consumed, eliminating wasteful long distance electricity transport.

But as exciting as this news sounds, Monkhorst is the first to quell potential hype. "We still have a long way to go," he maintains. "Nothing is certain yet. It is a design that has been very well thought out, but we see a lot of things that have to be fine tuned, and we cannot do that until we conduct further experiments and make more refined calculations."

Monkhorst has been pursuing ideas of fusion for over a decade. After working on several disappointing possibilities, he remained determined to continue: "I couldn't let go of the idea because it fascinated me as a challenge, and if it were to be successful, the positive ramifications would be incredible."

In the summer of 1994, Monkhorst contacted his future partner, Norman Rostoker, at UC-Irvine. While Monkhorst had worked on fusion ideas that centered around particle beam technology, Rostoker had largely focused on ideas using plasma physics. They batted theories back and forth, and Rostoker sent Monkhorst a paper and a patent he had on one idea. Monkhorst says, "As I studied it [Rostoker's idea] , it occurred to me that by using his particular plasma configuration and injecting beams in it, with velocity of the hydrogen and the boron-11 [non radioactive fuel] such that it maximizes the fusion rate, we could have the benefits of non-radioactive fuel, the benefits of this particular magnetic field configuration, and so on."



Monkhorst describes the process of fusion which should occur in the central chamber of his new reactor.

He sent Rostoker some notes, and although the California scientist didn't fully understand what Monkhorst was proposing, he did invite his new-found UF colleague to attend a Washington DC conference on alternative fusions, where they finally met face to face. Between presentations, Rostoker found Monkhorst in the audience and sat down to talk. Monkhorst began "making scribbles" of his theory on a *Washington Post*. "He [Rostoker] stared at it, and he stared at it," Monkhorst remembers, "and then he became very quiet, and I said to myself: 'I got you.' He got the idea. That was the first seed."

By the end of the year, the two scientists were invested enough in the idea to realize they needed to apply for a patent. "Since then, we have been studying, writing grant reports and papers, and giving talks," says Monkhorst, "and now, because our *Science* article was accepted and very carefully critiqued and reviewed, the whole world knows about it."

The reactor works by combining plasma, particle beams and magnetic fields. In the central portion of the rotating, cylindrically-shaped plasma (created with particle beams injected into the central chamber), ions of hydrogen and boron-11 are brought to collision at a specific velocity to maximize fusion. Because the current in the reactor is so intense, the magnetic fields actually wrap around the rotating plasma, creating a sort of self-confinement situation where the particles are forced towards the interior. Since there is less leakage and much better confinement of the particles than Monkhorst originally thought, the reactor may be able to work at much higher densities than initially predicted. That, in turn, will allow them to make a much more compact reactor. There are other physical advantages with this system; in particular, the plasma is very stable and doesn't break very easily under the influence of disturbances that Monkhorst says "always happen when you have a thermal system."

"You have to understand," says Monkhorst, "that everything in this business, if you let it sit there long enough, decays. Like your life and my life–we are decaying. If we do not constantly feed our systems with energy, we die. There is this tendency in nature to increase entropy, to increase chaos. This is at work in a plasma as well. The name of the game in plasma fusion physics is that you try to arrange for conditions where fusion takes place before the diffusion into chaotic motion

—See Fusion, page 7

High Energy Physicist Collaborates Internationally

An Interview with Guenakh Mitselmakher

Born in Lithuania, Guenakh Mitselmakher worked as a Staff Scientist in Dubna (the major nuclear and high energy physics center in Russia and one of the largest nuclear physics centers in the world) for 20 years. After Gorbachev's election made travel to the west possible, Mitselmakher became involved in several high profile international projects at top facilities including CERN, the Supercollider Lab in Dallas and Fermilab in Chicago (the most important high energy physics lab in the US) before accepting a position at UF in 1995.

Cn: *You are presently working on three different major international projects. Tell us about them.*

GM: The first project, which concerns the Large Hadron Collider (LHC) facility, will be located at CERN (European Center For Nuclear Research) in Geneva. The LHC there will be the world's most powerful accelerator in the year 2005. It will allow us to accelerate particles to their highest possible energy and then to collide them, creating new particles. This experiment may reveal some of the yet unknown fundamental building blocks of matter in the universe.

Cn: *What role does UF play in the experiment?*

GM: The machine itself is being built by the world scientific community. The US (DOE and NSF) is contributing about $530 million to the project. Over 500 US physicists from many universities and national labs will be participating in experiments with this project. UF is playing a leading role, though. We are designing one of the critical components of a major experiment, the CMS (Compact Muon Solenoid). This critical component is called Endcap Muon System, which is a $35 million project in itself. Its design and construction are being managed entirely by UF physicists. We expect that with our wonderful new lab in the new physics building, we will be able to do a lot of work related to this project.

Cn: *What about your work with CDF?*

GM: In preparation for experiments at LHC which will start in 2005, we are participating in experiments at today's most powerful facility at Fermi National Accelerator Laboratory in Chicago. Our experiment is called CDF (Collider Detector Facility). CDF is not a new experiment–it's actually already facilitated very major discoveries, including the recent discovery of the last quark. We think that all particle nuclei consist of quarks. The theory predicts that six quarks should exist, but we'd only found five before. CDF discovered the last one, called "topquark", with this experiment 2 years ago. By the way, one of the members of our group, Dr. Kongisberg (now an assistant research scientist at UF), was at Harvard at that time and was involved in this discovery.

Cn: *You are also testing Einstein's Theory of Relativity, right?*

GM: Yes, the search for gravitational waves in the universe. This search is being done by a large collaboration of scientists from Cal Tech, MIT and other institutes including UF. The experiment is called LIGO, which stands for Laser Interferometer Gravitational Observatory. This is the largest project ever undertaken by NSF–over $300 million. The UF group (David Tanner, David Reitze, Bernard Whiting, and Robert Coldwell) is designing and building a piece of this apparatus. UF is responsible for building a piece of the experiment called input optics (a piece of the interferometer). We expect that we will start experimenting with this new equipment during the year 2000, which will allow us to test the major predictions of Einstein's theory of general relativity–the existence of gravitational waves, which have never actually been detected. Strong (detectable) gravitational waves, according to general relativity, should be emitted by stars when they undergo a major cataclysmic transformation. When so called 'binary stars,' which consist of two stars, collapse, we expect to be able to measure these waves.

Mitselmakher in his new, two-story lab. He says the spacious facility demonstrates UF's commitment to develop a high energy physics group that is "strong by the most stringent international standards."

Cn: *So do you wait around and hope to catch a system in mid-collapse?*

GM: We have to wait. We know binary stars exist because pulsars are a type of binary system. We also know they should collapse from time to time because two stars make for an unstable system–they rotate closer and closer until they collapse. We can estimate with some precision how many of them should collapse–several tens per year. In principal, these binary collapses should be detected by this experiment. Of course, that's *if* the prediction of the theory is correct, and *if* our understanding of binary stars is correct, and *if* we design the experiment correctly.

There's always a risk, and there's never a guarantee. With any major scientific discovery, you see that there is an element of the unexpected. We designed this experiment with certain

—See Mitselmahker, page 7

SURFACE PHYSICIST EXPLORES 'UNCHARTED TERRITORY'

An Up Close Look at the Research of Liz Seiberling

Liz Seiberling is a trailblazer. As the first female faculty member hired by the UF Department of Physics ten years ago, she broke gender barriers. As the building committee chair of the new Physics Building, she helped shaped the future of her department. As a surface physicist, she probes the unknown microscopic make up of matter. "I have no idea what I'm going to find when I look at a new material," explains Seiberling. "It's what the pioneers must have felt when they first set foot on new land. There's just no way of knowing what you are going to see... it's all uncharted territory."

Seiberling in her old Nuclear Science Building office.

Surface physicists like Seiberling examine atoms on a clean well-ordered surface, in order to study the behavior and properties of these tiny particles. For years, Seiberling used an accelerator to examine atoms through a process called "ion scattering," and with her expertise in this technique, she developed a way to very sensitively measure the position of atoms on the surface.

More recently, though, Seiberling has been using an instrument called a Scanning Tunneling Microscope (STM), a fairly new invention (only about 12 years old). The STM is basically a sharp tip that comes right down near the surface and moves along it, going up and down depending on whether it comes close to an atom or not. In other words, it traces the atoms–or actually, the electronic structure of the atoms. "With the STM we can look at where atoms sit on a surface, and we can explore whether or not we can influence where they sit," says Seiberling. "Maybe we heat the surface or maybe we shine a laser on the surface–we can even develop enough skills to actually move atoms around with the tip of the STM. People have done this for a few years. It's a newly developing field." The picture of the little man **(lower right)** is an example of a manipulation of individual molecules, and scientists are actually doing this same kind of thing with atoms now. "Under certain conditions it's pretty easy to pick atoms up and move them around," says Seiberling. "It's really astounding to think [when looking at atomic versions of pictures like the molecule man] that those are individual atoms that someone has just reached down and moved."

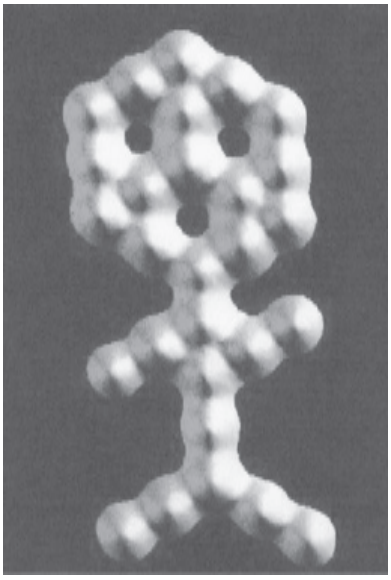
But Seiberling isn't content with just moving atoms. "I'm more interested in trying to form molecules or react atoms," she explains. "What we might do is pull an atom over here and then add another next to it.. Then the question is, are they now a molecule, or are they just two atoms sitting next to each other?" The STM can help answer this question because it can 'see' the electron cloud which indicates whether the atoms have formed a molecule or not. "Another thing we might do is put several atoms next to each other," Seiberling continues, "and see if we can build a molecule that would normally not occur in nature."

When asked about the potential applications of her work, Seiberling is cautious: "I think the realm of application is a ways off, as it always is in basic research. More interesting in the immediate future is testing theories of why or whether certain metastable systems exist or why certain molecular forms don't exist. Sometimes such forms are theoretically predicted, but chemists can't find them. So, if we go down and build one, can it exist? Its it metastable? If I heat it, is it going to spring into some other state?"

Scanning surfaces on such a minute scale *can* be tedious–Seiberling says "it's like looking through the desert with a fine-toothed comb"–but unexpected discoveries make the detailed work worthwhile. "I usually–and this is what I advise my students to do–go into an experiment telling myself, 'Well, it's either going to be A or B, and almost invariably it's C. Nature is unpredictable."

Recently, an undergraduate in her lab made a very interesting find. He noticed a strange alteration in a previously mysterious interference pattern on the surface. (Certain atoms have unusual clustering effects, which can be examined with STM. This interference pattern didn't correspond with what the group already knew about the clustering effect of the carbon they were examining. Such interference patterns have been observed before but never fully understood.) After careful study, Seiberling thinks the student found a tear in the surface, which slightly rotated overlapping layers of carbon atoms just enough to produce a "moiré pattern" (an optical effect that occurs

–See Seiberling, page 7



"Molecule Man" created by using the same technique Seiberling uses to move atoms.

Fusion

(continued from page 4)

has occurred.

What we have found is that we can arrange for these conditions, and that the time it takes for each ion to undergo fusion is short compared to the time it takes for the particles to scatter out of the system. Just like you and I are constantly avoiding decay and constantly building up and preserving our bodies by eating.....there's this kind of self-preservation at work in this reactor as well. The magnetic fields that are created through the rotation of this plasma are keeping these ions in place long enough for fusion to occur before they can escape. In fusion physics you try to beat the game of decay."

Theoretically, once the system is functioning, a reaction occurs in the reactor's central chamber, where the "soup" of plasma is contained by magnetic fields. This reaction produces helium with a high enough velocity to break out of the magnetically confined central chamber. These helium particles are channeled into two reverse cyclotrons at either end of the central chamber that change the helium's kinetic energy directly into electricity, without boiling water, making steam or driving generator turbines. The process is much more efficient because there is less heat rejection and no turning parts. Additionally, "all particulates, pollution, dust and crud and green house gases are eliminated," says Monkhorst.

The $70 million project (all privately funded) could see commercial application in ten years. A three-year feasibility study to examine "proof of principle" needs to be conducted first (all the calculations will be done here at UF, and the experiments will be done at UC-Irvine). If things look as good as Monkhorst hopes, the next step will be the involvement of the National High Magnetic Field Laboratory (NHMFL) in Tallahassee, including both the design of the magnets and the design of–and experiments with–the direct energy converter (the reverse cyclotrons). If this hurdle is cleared, they will begin building a prototype in Tallahassee, another 3-4 year process. "If things look good then," says Monkhorst, "there well be an overlapping period into commercialization."

But Monkhorst remains cautious. "We know the basic physics elements," he reiterates, "they are well understood, everyone agrees to that. How they all fit together is the main challenge. That's what the feasibility study is all about. Building up the plasma and keeping it in place long enough to produce a fusion reaction...it becomes an engineering challenge. Out of the detailed calculations will come the answers of what the parameters are for fine tuning the reactor, and if we can we really maintain those. We will know within three years whether this indeed will be 'go' in a truly big global way or whether it will die."✎

Mitselmakher

(continued from page 5)

expectations, but still we don't know exactly what it will discover.

Cn: *If you find gravitational waves, what will this mean?*

GM: Certainly it will give us a new instrument to probe the universe right away–it will immediately become a new method of seeing cataclysmic events in the universe. If you want to ask me if it leads us further, I would say "I don't know." I would think it would, but it's a little bit too far away to predict. I'm unable to see that far.

Cn: *Is it difficult to stay motivated and focused on a project when you don't have any idea what (if anything) your work might lead to?*

GM: For the physicist who has already run successful experiments, it's not hard. He knows that his work will eventually get results.

In my field, which studies the most fundamental properties of the building blocks of matter, experiments are very complicated and expensive. Because of that, they are conducted by huge collaborations of scientists–tens or even hundreds of physicists, sometimes from many countries. There is always a danger of getting lost in these collaborations. I was lucky enough to be in leading positions in some of these experiments, so that I was able to influence significantly the way these experiments were done.

For young physicists who have to spend many years in preparation for one experiment, it can be very difficult. There are practical considerations. They have to develop successful careers, so they must have results, and the sooner the better. There is definitely a sociological component to this type of physics.

Cn: *Tell us about your new facility in the recently opened building.*

GM: UF has made a large commitment to high energy physics. From hiring new faculty: myself, Andrey Korytov, Jacobo Konigsberg and Darin Acosta, to providing this large, well-equipped lab. No one university has undertaken an effort of this magnitude in recent years. It's wonderful.✎

Seiberling

(continued from page 6)

when two repetitive patterns are superimposed on each other and then rotated). On a larger scale, anyone noticing the strange geometric effects caused by viewing two overlapping screen porches, has seen a moiré pattern. "We think the interference pattern is indeed a moiré pattern," she says. "Right now, we're doing a computer simulation to mock this up so we can twist the layers on the computer to see if we can reproduce this same moiré effect."

Hai-Ping Cheng, another female physics professor who joined the UF faculty in 1994, is a theorist and expert on clusters. "We've written a proposal together," Seiberling explains. "We're hoping that sometime soon we will be able to collaborate. I can do the experiments and she can do the theory." Has Seiberling ever felt uncomfortable being one of few women in her field? " I didn't really think about it a whole lot," she says of her early days as a grad student and young physicist. " I always felt I fit in pretty well. But I think as I've gotten older, I've become aware that my way of thinking of things is different, and that there is a benefit to having a woman's perspective."✎

In Memory of

Russell S. Drago

1928 - 1997

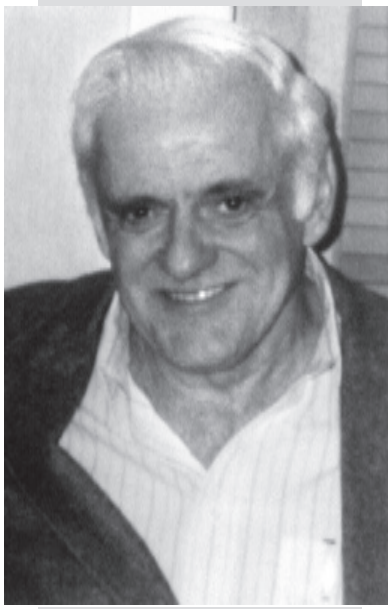
On the 5th of December, 1997, the University of Florida lost one of its most distinguished research scientists and teachers when graduate research professor of chemistry, Russell S. Drago suffered a fatal heart attack. He was leading a national conference of industrial and academic chemists on environmental chemistry at Palm Coast, Florida, at the time. He was 69.

An internationally known expert in the field of inorganic chemistry, Professor Drago was a leader in the study of catalysis of chemical processes and in the understanding of the theoretical basis for acid-base phenomena.

Professor Drago was born in Montague, Massachusetts in 1928. After receiving his BS degree from the University of Massachusetts, he completed his PhD in chemistry at Ohio State University with Professor Harry Sisler. He then joined the Chemistry faculty at the University of Illinois in 1955.

He was appointed to the Department of Chemistry faculty of the University of Florida in 1982 and was shortly thereafter promoted to the rank of graduate research professor of Chemistry, a position that he held at the time of his death.

Aside from the scientific impact of his research, Professor Drago was widely recognized for his unusual success in combining superb scientific research with the training of graduate students to become productive chemists in their own right. During his tenure at Illinois and Florida, he directed the doctoral dissertations of more than one hundred twenty chemists who now hold positions throughout the United States and the world of higher education or industry. At the time of his death, he was directing the doctoral research of twelve graduate students. The relationship of Professor Drago with his graduate students was often characterized by those who knew him best as that of an extended family, albeit one in which professional principles were firmly observed.



Russ Drago, Graduate Research Professor of Chemistry

During his professional career, Professor Drago received many honors and citations. Among these is the American Chemical Society Award in Inorganic Chemistry in 1969. He authored or coauthored more than four hundred scientific research papers and over a dozen books, including "Physical Methods in Chemistry" and "Applications of Electrostatic-Covalent Models in Chemistry." He was an invited lecturer at Gordon Conferences, American Chemical Society lecture tours, international conferences on coordination chemistry, industrial conferences, and numerous universities.

He initiated the annual Florida Catalysis Conferences in 1984 and later developed similar annual conferences on advanced materials and environmental chemistry.

Survivors include his wife, Ruth Ann Drago of Gainesville; three sons, Steve and Paul Drago, both of Gainesville, and Robert Drago of Philadelphia, Pennsylvania; a daughter, Patti Kouba of Chicago, Illinois; his mother, Lilia Drago of Gainesville; a brother, Ronald Drago of Raleigh, North Carolina; a sister, Geri Haynes of Ventura, California; and four grandchildren.

Provided by Dr. David Richardson, Chair of Inorganic Division, Department of Chemistry.

New Building (continued from front page)

be connected on-line," Seiberling says. "This is why I think this building has endless possibilities that we don't even realize yet–it's teaching space with a future!"

Another innovative addition to the building is the "project module," made up of four small (about 200 square feet) labs for student research. "The idea," says Seiberling, "is that a senior physics major can go in and set up a project and do a senior thesis on it." Participants can spend the whole semester in their own labs, without the traditional nuisance of constantly having to break down and reassemble experiments to make room for the work of others. Each of the four project labs in the module will be used for different types of experiments–one might have a laser, one a vacuum system, etc.

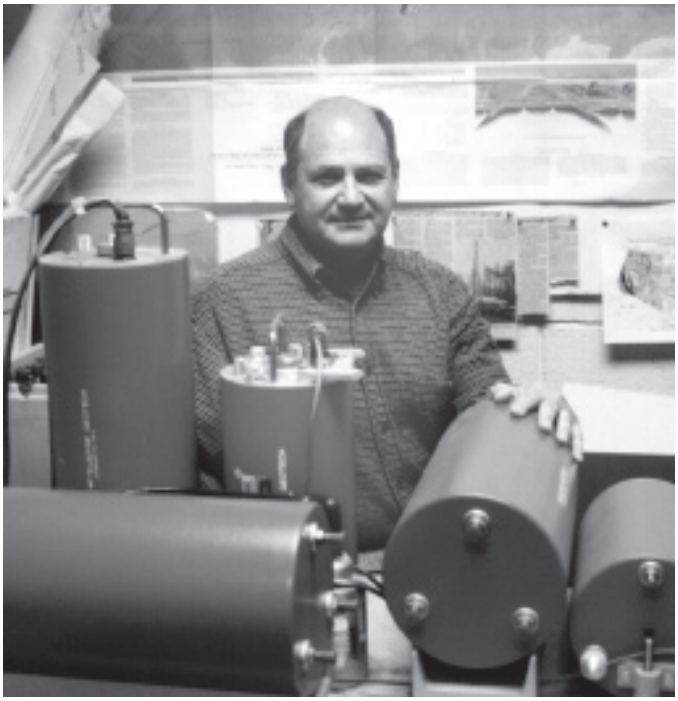
The many tangible benefits of the new building are obvious, including great publicity for the department on the national level and the additional space and better equipment necessary to enhance research efforts. But perhaps the most exciting benefit is a more personal one: the huge surge of excitement among faculty and staff. Seiberling agrees. "I overheard one professor say, 'Wow, we're a real physics department now,'" she laughs, "so I think the new building has given us the sense that we're worth it and that the program will be good."✎

Earthquakes In Florida?

"Not likely," say professors from the Department of Geology

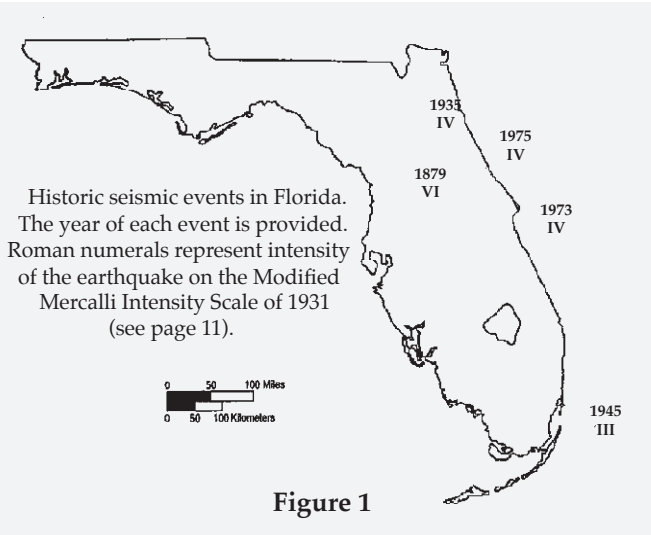
by Anthony Randazzo (Geology) and Douglas Smith (Geology)

Florida is one of the few low-risk areas for earthquakes in the coterminous United States. The Florida Platform is characterized by a unique seismological stability that has yielded very few confirmable earthquakes. Although many historical events have been reported as earthquakes in Florida, and some descriptions conclusively suggest actual earthquakes, no damaging events are known to have occurred within the state. Although earthquakes can occur at anytime, the geological and tectonic stability of the Florida Plateau suggests a very low likelihood of a major earthquake for the state. Earthquakes are the result of stress accumulation and slippage along faults. There is no evidence of unusual tectonic forces affecting Florida and considerable controversy about evidence interpreted as indicative of faults. Studies of the basement structure of Florida indicate that the region was faulted during the breakup of the ancient supercontinent Pangaea, some 200 million years ago. Traces of faults have been mapped on the land surface, but these are minor and there is no evidence of stress accumulation or slippage among them at present.



Tony Randazzo examines the seisometer located in the basement of Turlington Hall.

Some two dozen "tremors" had been recorded in Florida as of 1997. The epicenters of most of these are located out of state. The great earthquake on August 31, 1886 at Charleston, South Carolina, was felt as far south as Tampa. The vibration caused church bells to ring in St. Augustine. Many early reports of earthquakes in Florida originated in the region of the St. John's River. It is difficult to determine if those reports reflected active earthquakes or fearful responses to other natural phenomena such as atmospheric storms. It is equally difficult to distinguish among the reports of effects of events occurring in Florida and those occurring northward along the Georgia or South Carolina coast. What *is* known is that one of the original concentrations of European settlers with recorded histories was in the St. Augustine area, and so a disproportionate number of reported "events" may be expected there. Regardless, the St. John's River area does not have a distinctive geological subsurface conducive to earthquakes.



Historic seismic events in Florida. The year of each event is provided. Roman numerals represent intensity of the earthquake on the Modified Mercalli Intensity Scale of 1931 (see page 11).

Figure 1

Only five events in Florida have been identified between 1879 and 1997 that have been accepted as possible earthquakes (Figure 1). Although the 1973 and the 1975 events were each felt throughout a large local area, they were recorded only by seismograph stations outside of the state. Consequently, a single component seismograph station was installed in Turlington Hall in 1977, and no reportable events in Florida have been recorded since that time. Recordings are occasionally made, however, of micro-earthquakes (very small tremors not felt by humans) in Florida and larger quarry blasts. Beginning in 1989, the University of Florida station was upgraded with three-dimensional short-period and long-period digital instruments, and remote stations were installed in the Everglades, Sarasota County, Wakulla Springs, and Waycross, Georgia. The Florida Power and Light Corporation initially supported this seismic network because of its interest in the design-construction of nuclear power plants and such plants' resistance to earthquake stresses [regulations specify the max-imum allowable seismic activity in proposed nuclear plant locations].

The intensities of the earthquakes in Florida are defined by the Modified Mercalli Intensity Scale (Table 1-page 11). The worst tremor reported in Florida had a Mercalli Intensity rating of VI, which means that many of the inhabitants noticed the event, but

Grant Awards through Division of Sponsored Research

November 1997 Total $1,834,243

Investigator	*Dept.*	*Agency*	*Award*	*Title*
Corporate...$ 29,550				
Katritzky, A.	CHE	Am Cyanamid	1,950	American Cynamid compounds agreement.
Katritzky, A.	CHE	Mult Comp	27,600	Miles compound contract.
Federal...$ 1,484,687				
Dermott, S.	AST	NASA	19,997	Calibration and astrophysics with the Infrared Space Observatory.
Elston, R.	AST	NASA	46,935	Calibration and astrophysics with the Infrared Space Observatory.
Osip, D.	AST	NASA	13,463	Calibration and astrophysics with the Infrared Space Observatory.
Telesco, C.	AST	NASA	130,105	Calibration and astrophysics with the Infrared Space Observatory.
Judd, W.	BOT	NSF	63,616	Generic flora of the Southeastern United States (Phase III).
Boncella, J.	CHE	NSF	80,000	Early transition metal complexes.
Enholm, E.	CHE	NSF	114,000	New methods in free radical chemistry.
Stewart, J.	CHE	NSF	77,000	Engineering baker's yeast to perform enantioselective oxidations.
Talham, D.	CHE	NSF	95,000	Inorganic monolayers formed at organic templates.
Winefordner, J.	CHE	NSF	20,535	Advanced measurements & characterization.
Bartlett, R.	CHE	US Air Force	112,500	Metastable molecules in the ground and in excited states.
Reynolds, J.	CHE	US Air Force	100,000	Electronic property control through redox behavior of polymers.
Reynolds, J.	CHE	US Air Force	90,000	Multi-color electrochromic polymer coatings.
Benner, S.	CHE	US Navy	84,000	Replicatable functionalized biopolymers.
Micha, D. Ohrn, Y.	CHE	US Navy	50,400	Molecular spectra and dynamics at interfaces.
Micha, D.	CHE	US Navy	69,600	Molecular spectra and dynamics at interfaces.
McClellan, G.	GLY	DOT	202,541	Research and techno-economic evaluation: uses of limestone.
Opdyke, N.	GLY	NSF	20,765	A paleomagnetic study of the DWYKA system of South Africa.
Hooper, C.	PHY	DOE	89,230	Timeresolved x-ray spectroscopy of imploded gas filled microballoons.
Trickey, S. Kepner, J.	PHY	US Army	60,000	Theoretical numerical prediction of stopping properties.
Krause, J.	QTP	US Navy	5,000	Proposal to US Naval Research for partial support of symposium.
Other...$ 12,032				
Logan, K.	CPD	ASLHA	5,000	The influence of triadic conversational context on speech and language.
Hollinger, R.	SOC	Mult Sources	1,032	Security research project.
Shuster, J.	STA	Mult Sources	6,000	Database system development.
State...$ 20,000				
Randazzo, A.	GLY	Water Mgmt	20,000	Assessment of harm to natural systems.
Universities ...$287,974				
Norr, L.	ANT	East Carolina	12,793	Coastal estuarine biocultural adaptation.
Reynolds, J.	CHE	Ohio State	85,596	Active camouflage polymer coatings.
Olson, T.	MAT	Johns Hopkins	60,554	University-Industry cooperative research programs in math sciences.
Tanner, D.	PHY	Ohio State	24,404	Active camouflage polymer coatings.
Sullivan, N.	PHY	Stanford	8,335	Service contract.
Sullivan, N. Sabin, J.	PHY	Stanford	11,408	Service contract.
Shuster, J.	STA	Duke	24,884	Molecular markers of prognosis in medulloblastoma.

Procreative Man (New York University Press) by *William Marsiglio* (Sociology)

(review taken from book jacket)

In what ways do men think about and express themselves as procreative beings? Under what circumstances do they develop paternal identities? What is their involvement with partners during the pregnancy and delivery process, and how do they feel about it?

In *Procreative Man*, William Marsiglio addresses these and other timely questions with an eye toward the past, present, and future. Drawing upon writings ranging from sociology to biomedicine, Marsiglio develops a novel framework for exploring men's multifaceted and gendered experiences as procreative beings. Addressing such issues as how men feel about their limited role in the abortion decision and process, how important genetic ties are for men who want to be fathers, and men's reactions to infertility, Marsiglio shows how men's roles in creating and fathering human life are embedded within a rapidly changing cultural and sociopolitical environment.

(Excerpt) *Young men need to develop a better sense of how their masculine and partner role identities are related to their sexual and procreative feelings. If responsibility is defined broadly, without moral overtones concerning premarital sex, young men may learn that careless sexual behavior and disrespectful treatment of their female partners are unattractive behaviors. This process is likely to be enhanced if young men can be persuaded to redefine masculinity in terms of adulthood status rather than the rejection of femininity and homosexuality, as is currently the case. Campaigns to revise young men's perceptions of masculinity to include notions of adulthood responsibility may, in the process, fundamentally alter the way young men think about and express themselves as procreative beings.*

Earthquake (continued from page 9)

little damage was sustained. Most earthquake reports can be attributed to blasting, military activities, and other non-seismic phenomena.

Seismicity maps for the United States and the southeastern United States demonstrate a seismic quiescence for Florida and suggest an abrupt decrease of seismicity south of a proposed suture zone linking Appalachian basement crust (northern hemisphere) with a more stable Gondwana (southern hemisphere) basement. The geographic location of the epicenters of only three (1935, 1973, 1975) of the five events in Figure 1 have been documented. The 1945 event has credible newspaper documentation, but a poor epicenter determination. It coincided with a recording at a seismic station in Alabama, but no clear association could be established.

Early newspaper accounts of the 1879 event suggest its authenticity, but an exact epicenter cannot be identified, and the event could have originated within a wide area in northern peninsular Florida or southern Georgia.

The University-based seismograph has recorded hundreds of earthquakes from various parts of the world, most commonly the Caribbean area. Unfortunately, it was malfunctioning during the recent (October '97) earthquake in Alabama and failed to record it.

As the population of Florida continues to grow, an increased need for construction standards, insurance assessments, and seismic hazard analyses for nuclear power plants will evolve. Continued monitoring and documentation of the seismic activity of the Florida Plateau, however small, is essential to the development of the long term seismic characterization of the state.✎

Table 1

Excerpted from the Mercalli Intensity Scale of 1931

III - Felt quite noticeably indoors, especially on upper floors of buildings, but many may not recognize it as being an earthquake.
IV - During the day felt indoors by many, outdoors by few. At night some are awakened. Dishes, windows, doors disturbed; walls make cracking sound. Standing automobiles rocked noticeably.
V - Felt by nearly everyone, many awakened. Some dishes, windows, etc. broken; unstable objects overturned. Pendulum clocks may stop.
VI - Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.

Musings continued from page 1

UF, so that whatever computer standard we set immediately has a direct influence on most students' computer needs.

Then there is the Mac vs. PC battle. Some would say (not this writer, of course) that the war is essentially over except for cleaning up the last of the rear guard Mac troops. However, guerrilla action in the academic hills will continue for some time by Mac resistance fighters. The CLAS computer policy attempts to recognize this by strongly recommending the PC for our students, but permits any computer system that will do what needs to be done. And there's the rub.

What will our faculty want students to do with their newly purchased computers? In CLAS that answer is as broad as the disciplinary cultures, ranging from only e-mail to complex graphics and number-crunching. And what about faculty computer capability and individual expertise? Again, across the board variation. We have been upgrading and replacing faculty computers as fast as resources allow for our almost 600 faculty. Our goal is to replace 150-200 per year on a rolling basis with combined department, college, grant, and private sources.

Some faculty worry that the new UF computer policy will pressure them to change their teaching methods, but that is not the intent of this office. Our job is to help faculty make better use of computing in teaching and research and to provide the needed hardware, software, and assistance for them to succeed, whatever level that may be individually. I predict that we will have to run awfully hard to keep up with the CLAS faculty in this regard. In any case, it will be an interesting year.

Will Harrison,
Dean

[harrison@chem.ufl.edu]

Note from the Chair

Neil Sullivan, chair of the Department of Physics

Physics, is viewed as the most fundamental and far-reaching of the natural sciences, seeks to determine and explain quantitatively the elementary forces of nature and the properties of matter in their simplest terms. The overriding theme of the discipline is to seek unifying concepts and principles which can describe all observed properties ranging from the most elementary constituents of matter, to the behavior of common and exotic materials, to determining the origin and structure of the universe. At the university level it is the department's mission to expand our understanding of physics and to bring this knowledge to students at all levels and to society.

Physicists at the University of Florida are playing leading roles in research and education at some of the most challenging and exciting frontiers of contemporary science. High energy experimentalists are leading an international team to develop systems to detect new elementary particles at the highest man-made energies at CERN in Geneva. High energy theorists are leaders in developing fundamental unifying principles to describe elementary particles. UF laser physicists are developing the optics for the LIGO project to detect gravitational waves from outer space, and another team is searching for axions, which are promising candidates for the mysterious "dark matter" that constitutes 90% of the mass in the universe. Condensed matter physicists associated with the National High Magnetic Field Laboratory (NHMFL) are exploring the properties of new forms of matter at the extremes of temperature, magnetic field and physical size. The "High B/T" NHMFL annex of the Microkelvin Laboratory provides the most advanced facilities for studies at high magnetic fields and low temperatures (simultaneously) by users from all over the would. The Quantum Theory Project dedicated to high power computational problems in molecular properties, nanoclusters, and chemical physics is one of only a few of its kind in the world.

Physics research involves both large interdisciplinary teams and small groups centered around a single professor. All groups include students at several levels, from high school to undergraduate, graduate and post-doctoral. Teamwork is critical.

The importance of physics in everyday life cannot be underestimated. Nuclear magnetic resonance, lasers, and solid state transistors were all originally "pure" physics experiments set up to test fundamental ideas, with no preconceptions about future applications and engineering. Ultimately, they have had tremendous impact on improving our way of life. Some of today's experiments testing quantum mechanics will lead to tomorrow's breakthrough technologies, and only the most foolhardy would predict which ones. Because of the impact of physics on all science and technologies, a thorough grounding in the subject is essential for students entering professional schools (engineering, medicine, veterinary and health sciences, architecture, and aerospace sciences). The department taught approximately 9,500 students in 1996/97, and this number is expected to exceed 10,000 in 1997/98. Approximately 60% of all students who graduate at UF take a course in physics.

The new Physics Building has been a crucial factor in developing our new frontier research and educational programs. Without the additional space we could not have developed the new experimental research efforts or modernized our instructional programs. Bringing all the department activities together will forge new synergisms that will lead to exciting new endeavors and allow us to build our undergraduate and graduate programs to the levels needed for the future.✎

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.*

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