LITTLE by little

THE NEWSLETTER OF THE DEPARTMENT OF MATHEMATICS AT THE UNIVERSITY OF FLORIDA
VOLUME 23, ISSUE 1, FALL 2010

NATIONAL MEDAL OF SCIENCE AWARDED TO **RUDOLF KALMAN**

by Paul Ehrlich

On the morning of Thursday, October 8, 2009, we were surprised on looking at the *Gainesville Sun* to see an article headlined, "President Barack Obama honors former UF professor with science medal". The article led off with the sentence "President Barack Obama honored a Gainesville resident Wednesday at the White House with the National Medal of Science." A few days later, a posting followed on the College of Liberal Arts and Sciences website with a photo of a youthful-looking Kalman titled Former Mathematics Professor Wins National Medal of Science. Kalman was Director of the Center for Mathematics Systems Theory and Professor of Mathematics and of Engineering at UF during 1971–1992.

President Barack Obama honored Rudolf Kalman

Kalman was born in Budapest, Hungary in 1930. He earned his bachelor's degree and masters from MIT, then his Ph.D. from Columbia University in Electrical Engineering. After working at the Research Institute for Advanced Study in Baltimore, Kalman was a professor at Stanford during 1964–1972 before becoming a Graduate Research Professor at UF in 1971.

The Wikipedia article on Kalman summarizes aspects of his work as follows: "he is noted for his co-invention of the Kalman filter (or Kalman-Bucy Filter), which is a mathematical technique widely used in the digital computers of control systems, navigation systems, avionics, and outer-space vehicles to extract a signal from a long sequence of noisy and/or incomplete technical measurements, usually done by electronic and gyroscopic systems."

An article on the CLAS website further reveals that the "Kalman filter changed control theory and has become a common device in many engineering systems, from the Apollo lunar missions, to global positioning systems to radar tracking to automated drug delivery systems."

Among Kalman's many recognitions are membership in the U.S. National Academy of Sciences and the receipt of the IEEE Medal of Honor and the Charles Stark Draper Prize, as well as the Presidential Medal of Science most recently.

IN THIS ISSUE

The Teaching Company Taps UF Mathematics Professor 2
Report From the Chair 3
MAA President Delivers First-Annual Dongxing Wang Lecture 4
2009–2010 ANTC: Program in Algebra, Number Theory & Combinatorics 5
A Request 5
A Note of Thanks 5
Retirees Klauder, Martinez, and Thompson Celebrated 6
From the H1N1 Flu to the Big Chill to Zombies 10
Faculty & Staff Notes 12
Alumni News 13
Thank You For Your Support 14
Keep Your Classmates Up To Date 14

UF UNIVERSITY of FLORIDA

THE TEACHING COMPANY TAPS UF MATHEMATICS PROFESSOR

by Paul Ehrlich

For many years, we have noticed half page advertisements appearing in the New York Times and the Wall Street Journal for courses in a wide variety of fields with DVDs of noted university and college teachers lecturing on subjects of interest to a broad audience. In an advertisement for a course on "The Art and Craft of Mathematical Problem Solving," by a Professor of Mathematics at the University of San Francisco, the Teaching Company writes that they "review hundreds of top-rated professors from America's best colleges and universities each year. From this extraordinary group we choose only those rated highest by panels of our customers. Fewer than 10% of these world-class scholars are selected to make The Great Courses.

We've been doing this since 1990, producing more than 3,000 hours of material in modern and ancient history, philosophy, literature, fine arts, the sciences, and mathematics for intelligent, engaged adult lifelong learners."

Now this enterprise seems to be broadening its reach and our own long-time UF Mathematics faculty member Distinguished Alumni Professor Bruce Edwards was selected to produce a course *Understanding Calculus: Problems, Solutions, and Tips*, which is appropriate for not only the first semester of a college course in calculus, but also suitable for studying all the topics covered in a full year of AP calculus in high school at the AB level. This 36-DVD set, which consists of lectures of 30 minutes each, was released this past spring semester, 2010.

Little Review: In the past, we have seen advertisements from The Teaching Company for things like economics, the early history of Christianity, art history and so on. The course that you were commissioned to develop in the publicity materials mentions an audience including students taking AP calculus in high school. Is The Teaching Company trying to broaden its audience from older adults?

Edwards: Yes, my course is one of their first attempts to broaden the market. Up to now, the Teaching Company courses have appealed to "educated adults" and "life-long learners." Now they are interested in producing courses for folks who want to see the "nuts and bolts" of a college course. My calculus course is very similar to a college first semester calculus class, or an AP high school calculus class.

Little Review: We are pleased that the company chose you as a means to broaden their market. Do you think that your materials might be used by high school students to augment what they are learning in the class or would this be used in place of taking a course from a high school teacher?

Edwards: I think these materials could be used to augment, but not replace a high school or college calculus course. All the major topics of the AB Advanced Placement program are covered, so a student can see appropriate examples and explanations. The materials might also be of interest to calculus teachers looking for different ways to explain a concept.

Little Review: Given the national scope of The Teaching Company, we are curious as to how they came to link up with you to undertake this project.

Edwards: That's an interesting question. I don't know how they got my name, but one day I received a call asking if a representative of the Teaching Company could sit in on my class. He said he would be in Gainesville observing a few courses, including my large lecture second semester calculus course. I said "sure," and didn't think much more about it. He sat in the front row, taped my lecture on infinite series, and left for another class.

A few weeks later, I was surprised to receive a call from the Teaching Company asking if I would be interested in taping a sample lecture at their studio in Washington, D.C. At the time (Fall, 2007) I was busy with some other projects, and had to say no. They contacted me again over the summer, 2008 and asked if I would be interested in a calculus project. I was intrigued, and said yes, despite my fears on filming in front of a camera (actually two!). So I flew to Washington in September and gave a sample half-hour lecture on prime numbers. They must have liked my style, because I was offered a contract for the calculus course. I went to Washington for two weeks in July, 2009 for the actual taping (4 lectures a day for 9 days). Fortunately, my calculus textbook editors gave me permission to base the content of the course on our calculus textbook (with Ron Larson, Cengage Publishing). The finished DVD course (36 lectures on DVD and workbook) finally appeared in March, 2010.

Little Review: That is fascinating, that their representative heard you teach infinite series! Tell us a bit more about how the lecturing before the cameras went. Did you write on a chalkboard, use transparencies, or what?

Edwards: Lecturing before the two cameras was very unnatural for me. You have to keep watching the little red light so as to face the correct camera. There is no audience, and hence no feedback from students. And sadly, no chalkboard or transparencies. While talking I had to look at my PowerPoints, which were displayed under the cameras. For a given half-hour lecture I would prepare about 25–35 PowerPoints. Some had just a few words, like "discuss the tangent line problem," some had equations, and others had graphs. I had to verbally go through the equations as if they were appearing on a blackboard. The folks at the Teaching Company then edited my lectures by adding the equations below my face, or on the side. They also produced high quality graphics.

Little Review: Did you do any practice lecturing sessions with The Teaching Company prior to the July 2009 taping in Washington?

Edwards: No, there were no practice sessions (other than the sample lecture I delivered many months before taping the calculus course). I arrived in Washington on Sunday, August 9th, and began taping August 10th. We taped four lectures a day for 9 days. A typical day was 4 hours, either in the morning or afternoon.

Little Review: Thank you for enlightening us as to how your course came to fruition and we especially hope that the materials will be useful in improving the AP high school experience.

Interestingly enough, after we had concluded the e-mail exchanges back and forth with Professor Edwards which resulted in this article, the New York Times *on Wednesday, April 7, 2010 ran one of the half page advertisements for Edwards' own course, headed "Learn ways to approach and solve the fundamental problems of this mathematical field with 36 richly illustrated lectures delivered by an award-winning professor."*

REPORT FROM **THE CHAIR**

by Jed Keesling

The economy remains stagnant. There are signs of recovery, but it is sluggish and there is not much that we can do to change the tide. However, we are doing more than just waiting on the global forces to run their course. Below are a few of the accomplishments of this past year that we can celebrate. In more favorable times, there would be more. However, whatever the circumstances, we have no small list of success to report.

Miklos Bona was elected to the University of Florida *Academy of Distinguished Teaching Scholars*. **Andy Vince** spent a semester at *Australian National University* working with *Michael Barnsley* and *John Hutchinson*. They organized a semester concentrating on *Fractal Geometry.*

Rudy Kalman was awarded the *Presidential Medal of Science*. Rudy Kalman was Graduate Research Professor in the Departments of Mathematics, Industrial and Systems Engineering, and Electrical Engineering. His tenure was in Mathematics. He is a member of the *National Academy of Sciences* and received many other honors in his career at the University of Florida.

The first **Dongxing Wang** *Lecture on Mathematics Education* was given by **David Bressoud.** David Bressoud is President of the Mathematical Association of America. Also present and participating in the discussion afterward was **George Andrews**, President of the American Mathematical Society. Dongxing Wang is seen below with **Jed Keesling, William Hager,** and **David Wilson.** His endowment to the Department of Mathematics was given in the name of Hager, Wilson, and Edward Geiser. They served as Wang's mentors as a graduate student in Mathematics. Wang also gave a talk organized by the *SIAM Graduate Student* organization in the department.

John Thompson retired this year along with **John Klauder** and **Jorge Martinez**. John Thompson was a member of the *National Academy of Sciences*, a *Fellow of the Royal Society*, a recipient of the Presidential Medal of Science in 2000. Norwegian Academy of Science and Letters awarded him the *Abel Prize* in 2008. John is shown below with Dean Paul D'Anieri.

The Department of Mathematics graduated ten Ph.D.s, thirty-one Masters students, and about eighty undergraduates. We had new grants from various granting agencies awarded to **Alexander Dranishnikov**, **Alexandre Turull, Lei Zhang, Jay Gopalakrishnan**, and **Stephen Summers.**

We hired two new tenure-track Assistant Professors: **Vince Vatter** and **Scott McKinley**. They will be working on computational biology initiatives. Vatter's strength is Combinatorics and McKinley's strength is Probability and Stochastic Processes. Two Lecturer positions are being added to coordinate two of our large-lecture classes. These are being filled by **Kwai-Lee Chui** and **Shu-Jen Huang.**

Bruce Edwards produced a course for the *Teaching Company* entitled, *Understanding Calculus: Problems, Solutions, and Tips.*

Through a Provost Initiative, the Department of Mathematics is producing an *Online Calculus Book* with a *creative commons license*. The book will be adapted to Calculus as it is taught at UF. This will greatly improve the connection between the lectures and the text for the students. It will also reduce the overall cost of course materials for the students. Those writing the text are **Miklos Bona** and **Sergei Shabanov**. Miklos Bona was just elected to the UF *Academy of Teaching Scholars*. Sergei Shabanov was *UF Teacher of the Year* in 2009. There is follow-up funding for a similar project for the second semester Calculus.

Jay Gopalakrishnan will be a Visiting Professor at the *NSF Institute for Mathematics and its Applications* at the University of Minnesota. He will be a resource person for a year of emphasis on numerical PDEs. He has been very successful in obtaining grant support for his work. In addition to other grants, Jay is Co-PI on one just awarded to UF worth $9.7 million. The grant will be studying lightning. **Doug Cenzer** was awarded a Faculty Enhancement Opportunity Award to complete work on a book on *Algorithmic Randomness.*

Everything that we do depends on the hard work and competence of our staff. **Sandy Gagnon** completed twenty years of service at UF this past year. She is currently our Administrative Assistant. **Margaret Somers** is the Office Manager. **Gretchen Garrett** is the Program Assistant for the Graduate Program. **Connie Doby** is the Receptionist and Secretary to the Associate Chair. **Marie Hahn** is the Chair's Secretary.

Thanks to all of you receiving the *Little by Little* newsletter for your support during these hard times. Many of our accomplishments would not have been possible without the funds and moral encouragement that you have provided. We appreciate all that you have done for us and hope that we have made you proud.

Best regards,

Jed Keesling,
Professor and Chair
kees@ufl.edu


Bona


Cenzer


Dranishnikov


Edwards


Gopalakrishnan


McKinley


Shabanov


Summers


Turull


Vatter


Vince


Zhang


D'Anieri & Thompson


Keesling, Hager, Wang, and Wilson

MAA PRESIDENT BRESSOUD DELIVERS FIRST-ANNUAL DONGXING WANG MATHEMATICS EDUCATION LECTURE

As reported in the last issue of the newsletter, our alumnus **Dongxing Wang** donated monies (with matches from Exxon Mobil and further monies from the State of Florida) to establish an endowment for the "Hager, Wilson and Geiser Math Education Fund." Part of the endowment is to go toward an annual lecture on mathematics education. Recently Professor **David Bressoud** of the Department of Mathematics of Macalester College, currently President of the Mathematical Association of America, has been thinking and writing about issues concerning growing high school enrollments in calculus and how this effects higher education in mathematics. On February 18, 2010, Bressoud spoke about these issues at UF in delivering the First Annual Dongxing Wang Mathematics Education Lecture. While Wang was not able to attend himself, he was on campus the following Saturday and addressed the SIAM Gators after a luncheon in the Atrium. Wang is in the Upstream Research division of Exxon Mobil in Houston, involved in oil exploration. He works on solving inverse problems in which the material structure under the earth is determined by analyzing reflection data for acoustic signals. Below, Professors Geiser and Wilson themselves write about Wang and his endowment for the department.

ACCOMPLISHMENTS OF DONGXING WANG WHILE AT THE UNIVERSITY OF FLORIDA

Edward A. Geiser, MD, Department of Medicine, Division of Cardiology and David C. Wilson, Department of Mathematics

Dongxing Wang was born in Quanzhou, which is a coastal city of Fujian, China. This region has more than 2000 years of history. Wang's mother was a factory worker while his father was a school administrator. Although his family was extremely poor, his parents taught him to be thankful and honest. As a child, he developed an interest in mathematics because of his interest in counting stars. (This activity was a diversion from the turmoil taking place in China at that time.) His interest in mathematics pushed him to compete in the National Mathematics Olympics Competition, where he excelled. The skills he learned led him to enter one of the best mathematics programs in China, the University of Science and Technology of China in Anhui. While there, he earned a Bachelor of Science Degree in 1983 and a Master of Science Degree in Numerical Analysis in 1986.

In 1991, Wang came to the University of Florida to work with Professor **William Hager** in the area of Numerical Analysis. It was in a weekly seminar led by Professor Hager that we came to know Dongxing. While he was initially interested in earning a Ph.D. in mathematics, he switched to computer science in 1993. At that time we were collaborating at the Echocardiography Research Laboratory (ERL), directed by Dr. Geiser. The mission at the ERL is to design and implement computer based algorithms to make automated measurements on echocardiographic image sequences. In 1992 we invited him to join the ERL as a programmer. After a year, it was obvious that he was worth far more than the meager graduate stipend that we were paying him. While at ERL, Wang not only implemented our ideas, but also developed many new techniques of his own. At the ERL, not only did you have to be good at mathematics, but you had to be knowledgeable in computer science, physics, medicine, and statistics.

The years 1992 through 1997 were some of the most productive in the ERL. Four of the six patents filed were based on image processing methods developed or initiated during that time. Dongxing had an ability to visualize the need for adapting the shape of mathematical processes to the shape of cardiac structures as seen both in raster and polar format. This led to the development of new techniques for feature extraction that could be applied in multiple ultrasound views. One of his more novel approaches was to search for coupled borders using processes that not only moved radially but also changed dimension to adjust for changes in heart wall thickness both as a result of disease states and also normal thickening during the normal cardiac contraction and relaxation process.

In addition to developing methods of feature extraction, Wang was also adept at developing "batch" programs that ran statistical tests of the current methods against a database of 202 test-image sequences. These tests provided important feedback concerning the accuracy and robustness of the methods. These programs were so efficient that we could frequently run statistics on a current algorithm, change parameters, and rerun the statistic in the afternoon. Almost any of these batch runs would have qualified for an abstract or brief report. Through it all, Dongxing always had a positive attitude and was fun to work with. In 1997, Wang left the ERL to work at Exxon as a software developer in seismic processing and reservoir simulation. Because of the high computational intensity of the algorithms, these methods often involve parallel computing. Currently, he is converting various seismic codes to work on General Purpose Graphic Processing Unit (GPU). He reports that this area in parallel computing is very hot at the moment and there is a high demand for GPU developers in the oil industry.

2009–2010 ANTC: **PROGRAM IN ALGEBRA, NUMBER THEORY AND COMBINATORICS**

by Krishnaswami Alladi

The Program in Algebra, Number Theory and Combinatorics (ANTC) was in its third year during 2009–2010. It was fully supported by the National Science Foundation (PI: **Krishnaswami Alladi**, Co-PI: **Pham Tiep** as in the previous two years. The Program was highlighted by two Focused Weeks, namely,

(i) Focused Week on Integral Lattices, February 15–19, 2010 (Organizers: Krishnaswami Alladi and Pham Tiep)

and

(ii) Focused Week on Quadratic Forms and Theta Functions: March 22–26, 2010 (Organizers: Krishnaswami Alladi, **Alexander Berkovich** and **Frank Garvan**).

The Focused Weeks were in continuation of two highly successful conferences on Quadratic and Higher Degree Forms that were conducted in the ANTC Program of 2008–2009 (see the Little by Little of 2008–2009). Each Focused Week had about ten to twenty participants, a third of whom were graduate students from various universities around the nation. The lectures given by experts from around the world were of the seminar type. There were two to three such talks each day thereby allowing plenty of time for discussions among the participants.

The featured talk during the Focused Week on Integral Lattices was the Twelfth Erdos Colloquium by Professor **George Andrews** of The Pennsylvania State University, who was in residence for the entire Spring Semester as he has been in previous years.

The Focused Week on Quadratic Forms featured the Fourth Ramanujan Colloquium and seminars by Professor **Kannan Soundararjan** (Stanford University). We are thankful to Professor Andrews for continuing to provide financial support for the Ramanujan Colloquium.

To help prepare our graduate students for the Focused Weeks, Krishna Alladi conducted a year long Graduate Number Theory Seminar which ran alongside his graduate course in number theory and introduced the students to research topics. This was augmented by the weekly Number Theory Seminar organized by Alexander Berkovich that focused on quadratic forms.

The refereed proceedings of the Conferences on Quadratic Forms and Higher Degree Forms as well as the two Focused Weeks will be published in the book series *Developments in Mathematics* (Springer Verlag). This proceedings will also include some of the survey talks given in the NSF sponsored 2009 Arizona Winter School on Quadratic Forms. The Editors of these proceedings will be Krishnaswami Alladi (University of Florida), **Manjul Bhargava** (Princeton University), **David Savitt** (University of Arizona), and **Pham Tiep** (now at the University of Arizona).

A **REQUEST**

from Margaret Somers, Office Manager

If you would like to receive a copy of our on-line newsletter by e-mail, please e-mail Margaret Somers at msomers@ufl.edu with your name, mailing address, and e-mail address.

A NOTE OF **THANKS**

by Jed Keesling

It is again a pleasure to warmly thank all those who contributed to the support of our educational activities in the department during the past academic year. Donations received at the UF Foundation for the fiscal year through June 30, 2010 (not including the donation of **Dongxing Wang** described in an article elsewhere in this newsletter) totaled $5,650. Non-anonymous alumni and friends donations during the time period July 1, 2009 through June 30, 2010 included contributions from the **Accenture Foundation**, **Louis S. Block**, **Jennifer A. Buxe**, **William A. Coleman**, **Jane M. Day**, **John W. Devine**, **Dello L. Figueiras**, **Gregory S. Gardner**, **Joseph Glover**, **William M. Gross**,**William R. Hare**, **Arnold J. Insel**, **Patches L. Johnson Inge**, **Keith A. Josephs**, **Bryan S. Katz**, **James E. Keesling**, **John W. Kenelly**, **Barry E. Kimmel**, **Warren W. McGovern**, **Albert J. Rodger**, **Robert W. Shuford**, **Jeremy H. Simons**, **Irvin L. Smith**, **Aaron M. Sorin**, and **Melvin H. Thomas**.

RETIREES **KLAUDER, MARTINEZ,** AND **THOMPSON** CELEBRATED

by Paul Ehrlich

This spring semester, 2010, in the words of Chair **Jed Keesling** marked the ending of an era in mathematics at UF as Professor **Jorge Martinez**, Distinguished Professor of Mathematics and Physics **John Klauder**, and Graduate Research Professor **John Thompson** all retired. Thompson was feted first on Friday, April 9th with a colloquium by his former student, Professor **Richard Lyons** of Rutgers University on *John Thompson and Finite Groups*. This was followed by a splendid dinner buffet at the UF President's house held outdoors by the swimming pool and after dinner tributes including those by Provost **Joseph Glover** representing the UF President and Professor **George Andrews**, President of the American Mathematical Society. Around the Spring Recognition Day on Thursday, April 22nd, Professor **Warren McGovern**, a Ph.D. student of Professor Martinez, reported on Martinez's contributions beginning at 10:15 AM in Little Hall 101. Then collaborators with Martinez, Professor **Anthony Hager** of Wesleyan University, Professor **W. Charles Holland** of the University of Colorado, and Professor **Costas Tsinakis** of Vanderbilt University, as well as former Ph.D. student Professor **Chawne Kimber**, spoke of their associations with Martinez prior to our adjournment for the barbecue luncheon in the Atrium. At 4:30 PM in the New Physics Building, Professor **Sergei Shabanov** reported to a standing room audience on the life and work of Professor **John Klauder** prior to a wine and cheese reception on the lawn of the Physics Building. Finally, a banquet was held at the Hilton, honoring the retirees that evening. Now faculty members closer in research interests than the Editor will report on the three honorees.

JOHN R. KLAUDER

by Sergei Shabanov

In the article below, Professor Sergei Shabanov summarizes for us a lecture he delivered in the heart of the New Physics Building on April 22, 2010 to a standing room only audience including UF Senior Vice-President for Research Win Phillips. —the Editor

Our colleague, John R. Klauder, a renowned mathematical physicist, is about to retire. Of course, no true scientist ever retires as the passion of revealing the unknown never dies. His retirement simply means no teaching, no students (a great loss for the university as he is known as an outstanding teacher and mentor held in high esteem by students), much less of an involvement in the internal politics and workings of the university, and more time to enjoy scientific research free of any corporative obligation to secure external funding. This formal occasion provides yet another chance to look back on John's outstanding scientific career with praise, which he well deserves.

Klauder received his Ph.D. in 1959 from Princeton University under the supervision of Dr. J. A. Wheeler, a prominent theoretical physicist widely recognized for his contributions to General Relativity. Most of John's scientific career was associated with the A T & T Bell Laboratories (1953–1988) where he was the Head of the Theoretical Physics Research Department (1966–1967 and 1969–1971) and the Head of the Solid State Spectroscopy Research Department (1971–1976). He came to UF in 1988 as a Professor with joint appointments in mathematics and physics. Throughout his career, Klauder has been a consultant for the Theory Division of the Los Alamos National Laboratory (1978–1985), the Editor of the Journal of Mathematical Physics (1979–1985), the Associate Secretary-General of the Executive Council of the International Union of Pure and Applied Physics (1985–1990), a Member of the Executive Committee and the President of the International Association of Mathematical Physics (1985–1991 and 1988–1991, resp.), and a member of the NSF Physics Advisory Panel (1972–1975).

John's scientific brilliance was recognized well before he received his Ph.D. In the early 1950s, every major laboratory dealing with the processing of electromagnetic signals was (and still is) concerned with making radars to detect smaller targets at every larger distance. Larger distances mean a high power of emitted pulses, while smaller targets require shorter pulse durations. A combination of the two leads to high picks of the electromagnetic field strength not sustainable by emitting radar antennas. A resolution of the problem was obtained by creating a sequence of short pulses of a lower power, while the needed power of return signal from a target was to be achieved by smart signal processing. This latter task was assigned to a junior fellow at Bell Labs, John Klauder, who had only a bachelor's degree at the time. His contribution was a fundamental envelope-filter relation in the signal processing that quickly became a seminal, widely recognized contribution in radar science. When John's superior at Bell Labs, a Ph.D., first took a look at John's notes, he did not say much, but a few days later, John received a raise. Much later in 2003, when Klauder spoke in Maryland on electromagnetic wave propagation in dispersive media, an engineer from the audience approached him and said that in his field of radar research, there was also a famous Klauder. This engineer was stunned to learn that John was the very same Klauder. He could not hide his emotions and called up his colleagues exclaiming, "Hey, guys, come over here, we have the real Klauder." So much one could only wish for in applied research!

John's Ph.D. thesis provided a mathematical foundation for the concept of coherent states in quantum theory. His breakthrough result over the years radically changed the field of quantum optics, led to the concept of continuous representations of groups (not even believed to exist), Bargman-Segal spaces, the theory of wavelets (developed by John's collaborator at the time, I. Daubechies), and rigorous formulations of Feynman integrals for Bose and Fermi fields. In a nutshell, coherent states are all around us in everyday life. A fundamental concept of quantum physics asserts that a particle's position and velocity cannot be simultaneously measured; there is an uncertainty determined by the fundamental constant of nature, the Planck constant. Yet, how come everything around us looks so certain? The concept of coherent states provides a bridge between the uncertainty of the quantum world and the certainty of the classical world. Electromagnetic waves used for TV, annoying cell phones everywhere, radio, etc., are coherent states of photons. Although the position of each particular photon in the wave cannot be found (without its destruction in a measurement), all photons move in unison (somewhat similar to a bunch of waves of a small amplitude that create a large amplitude when moving in phase). A perturbation created by such a coherent collective motion appears as the classical electromagnetic field detected by antennas. On the mathematical side, Klauder's seminal contribution was to recognize and prove that such states form an overcomplete basis in the Hilbert space of quantum theory (the Hilbert space

associated with irreducible representations of the Heisenberg algebra) and to establish a resolution of unity for them. With this result, he also proved that the coherent states realize a continuous representation of the Heisenberg group. The latter idea was quickly picked up by mathematicians and physicists, and led to the generalization to other groups ("generalized coherent states"). As small deviations from the classical motion in the above example of electromagnetic waves exist as a result of the quantum origin of photons, Klauder's mathematics of coherent states provided a solid theoretical foundation to systematically study the effects of such deviations, which is the subject of quantum optics, that had been revolutionized with the new formalism.

All the fundamental forces of nature (electromagnetic, weak, strong, gravitational interactions) are described by so-called gauge theories. Mathematically, the fundamental fields that transmit the interaction between matter are connections in a fiber bundle with the base space being our space-time and the structure group depending on the interaction type (e.g., U(1) for electrodynamics, SU(3) for strong interactions). The quantization of these theories poses a problem as the connection is determined modulo gauge transformations (group shifts along fibers in the fiber bundle), so any observable must be a holonomy group element (e.g., electromagnetic connections can be shifted by the gradient of a function, while no physical (observable) quantity, like the curvature (field strength), is changed). In dynamics, this freedom reveals itself in constraints on the dynamical variables that must hold in the course of their evolution. The presence of constraints prevents one from applying the conventional quantization methods developed by the founders of quantum theory. The problem in electrodynamics was already recognized and solved by W. Heisenberg and W. Pauli (Nobel prize winners) in 1930. While studying quantization of Einstein's gravity theory, P. A. M. Dirac (also a Nobel prize winner) developed a general approach to quantization of constrained theories. With the advent of the gauge theories for strong and weak interactions in the early 1970s, the problem became greatly significant. The Dirac approach used an elaborate classification of constraints with a subsequent reduction of the total Hilbert space of quantum theory depending on the type of constraint. One of John's recent contributions was the development of a universal quantization of constrained dynamics in which no classification is needed; it works with a compact or non-compact group generated by constraints as well as for open algebras of constraints. The latter appears crucial for quantizing Einstein's General Relativity. Klauder's approach, now know as the "affine quantization of gravity" resolves the problem of how to preserve the positivity of the spatial metric tensor in quantum theory. String theorists claimed to have the only prior sound approach to quantum gravity, highly regarded as one of the virtues of this theory. But in a trade-off, string theory offers a phantasy world of ten dimensions where universes are floating as low dimensional sheets or where extra dimensions get compactified into Calabi-Yau manifolds, producing a zoo of new particles, none of which have yet been seen.

An extension of quantum mechanics to systems with infinitely many degrees of freedom, like fields, comes with an unpleasant price tag. Calculations of any physical process yield divergent results. The procedure to deal with the divergences and to obtain theoretical results compatible with experiment is known as "renormalization." Feynman, Tomonaga, and Schwinger received a Nobel prize for developing a consistent theory of quantum electrodynamics. Up to now, this remains the most precise theory as far as comparison with experiments goes. Renormalization is based on the use of perturbation theory. In ordinary quantum mechanics, the time evolution is described by a unitary transformation (generated by a self-adjoined operator called the Hamiltonian) of state vectors in a Hilbert space. A naïve application of this idea to quantum field theory

Professor John Klauder with his wife Agnes at the Spring Recognition Lunch.

fails. The quantum field Hilbert space is usually defined as a Hilbert space of free, non-interacting fields (the Fock space). But even an infinitesimally small amount of interaction added to the Hamiltonian produces a drastic effect on the state evolution: they get thrown from the original Hilbert space as their norm become divergent (so much for a "unitary" transformation in quantum field theory!). Naturally, the Hamiltonian has to be changed ("renormalized") by adding new terms that were not present in the original classical theory. Amazingly enough, a generally infinite series of the (divergent) extra terms appears to be of the same form in each order of perturbation theory, so that the whole process can merely be accounted for by redefining parameters of the Hamiltonian (such as masses of particles and coupling constants.) This somewhat miraculous procedure, called "renormalization," made quantum field theory viable and, in fact, the most accurate theory invented so far. It appears that not every field theory can be renormalized, Einstein's gravity being one example. The new terms to be added to the classical Einstein's theory form an infinite series that cannot be written in the form Einstein's Lagrangian by merely redefining the only parameter in the theory (Newton's gravitational constant). The paradigm of renormalizability has dominated fundamental physics for decades; non-renormalizable theories have not been considered acceptable. In the 1960s, Klauder solved several quantum field theories that could not be solved by perturbation methods (based on Feynman diagrams), thus showing that the concept of renormalizability might not be as fundamental as had been widely accepted. One of John's friends claimed that anything solvable in quantum field theory could be solved by the use of Feynman diagrams. He made a bet with John on solving one of these examples by this method. He failed and quit high-energy physics.

The success of perturbation theory in explaining experimental data hindered the development of other methods of quantum field theory, pushing them onto a side road. But eventually two significant problems emerged. The first was the problem of quark and gluon confinement (quarks are building blocks of hadrons, e.g., protons and neutrons that comprise nuclei, and gluons transmit interactions between the quarks). These particles are not observed free and are confined within hadrons. This problem has notoriously escaped all efforts to solve by conventional methods of quantum field theory for about 40 years, and was recently posted by the Clay Mathematical Institute as one of the Millennium Problems. The importance of this problem stems from the fact that by

continued on page 8

Retirees. continued from page 7

Einstein's equivalence of mass and energy, the gluon energy confined in protons and neutrons constitutes the bulk of the observed matter mass in the universe (the masses of the constituent quarks are small in comparison). The second problem is that a renormalizable quantum theory of scalar fields ("scalar" means a trivial representation of the Lorentz group) is proved to be free (all the classical non-linearities are renormalized away). But this is in apparent contradiction with the correspondence principle that asserts that quantum theory should reduce to the classical theory as the fundamental constant of quantum mechanics (the Planck constant) goes to zero. How can a non-linearity be recovered from a linear theory? The problem might not appear as merely a mathematical puzzle if one recalls that the fundamental Higgs particle that generates the remaining part of the masses of the universe (masses of quarks and leptons) is described by a scalar field, and billions are spent to hunt for it. A resolution of these two problems requires going beyond the conventional perturbative quantization. Recently, Klauder proposed a possible solution to the second of these problems: how a non-trivial quantum field theory of the scalar field can be developed that satisfies the correspondence principle. Numerical simulations are under way to verify his idea. "Close sources" (as news agencies used to put it) inform us that the theoretical ideas involved here and in affine quantum gravity will pretty much occupy the early days of John's retirement.

Among John's other contributions are the Langevin approach to complex correlation functions (quantum statistics with Hamiltonians non-quadratic in moments), correlation effects in two-photon pico-second pulses, a theoretical explanation of non-Gaussian random behavior of spin-resource experiments, and Wiener processes for singular potentials. The latter led Barry Simon to coin the term "Klauder's phenomena." In a simplified way, Klauder's phenomena refers to the existence of quantum theories for which perturbative theory would always fail to reproduce an exact solution, no matter how small the perturbation theory expansion parameter is.

John Klauder has an outstanding scientific career that intertwines with major streams of fundamental and mathematical physics over the past 50 years. In his research, while appreciating the advancements, he has never canonized the "common beliefs" of the time. His research style is marked by high originality and independence. The title of his recent book published by the Cambridge University Press says it all: *Beyond Conventional Quantization*. John's achievements have brought him worldwide recognition. He is a Foreign Member of the Norwegian Academy of Science and Letters, received the Lars Onsager Professorship (Norway, 2006) and the Lars Onsager Medal (Norway, 2006) and was elevated to the rank of Distinguished Professor at the University of Florida.

With all that said, one more time, "Happy retirement, John!"

JORGE MARTINEZ

by Warren McGovern

In a past newsletter, we learned that Professor Martinez had taken a course in topology from Professor Theral Moore while an undergraduate at UF. Now Martinez's Ph.D. student, Professor Warren McGovern, at Bowling Green State University, provides his own viewpoint on Martinez's influence—the Editor

When Professor Keesling sent me an e-mail inviting me to be the keynote speaker at the retirement ceremony on Thursday, April 22, 2010 in honor of Jorge Martinez, I immediately felt honored and, honestly, a little bit nervous. My instructions were to give a presentation that highlighted his mathematical career. Over the next week or so, I sent out a dozen e-mails to his former students (undergraduate, graduate, and Ph.D. students) as well as some of his co-authors. From his former students, I invited them to attend the ceremony and if they were not able to make it, to please forward me some thoughts about Jorge. Of the friends that I have kept up with since the early 1990s, I got responses from **Andrew Jauch** (B.S.), **Andrea Tucek Shafer** (B.S.), **Mindy Herzog** (B.S., M.S.) and **Jeffrey Leaning** (Ph.D.). I contacted all of Jorge's Ph.D. students. **David Kenoyer** (Ph.D. 1982), **Scott Woodward** (Ph.D. 1992), **Robert Finn** (Ph.D. 1997), **Chawne M. Kimber*** (Ph.D. 1999), **Ricardo Carrera***(Ph.D. 2004), and **Eric Zenk** (Ph.D. 2004). I also was able to get in contact with several of Jorge's co-authors: **Anthony W. Hager***, **W. Charles Holland***, **Constantine Tsinakis***, **Michael Darnel**, and **Mohammed Tesemma**. [* indicates that they were able to attend the celebration.]

It is always a pleasure for me to return to Gainesville and walk around the campus. In particular, I always feel welcomed at the Department of Mathematics, and this time was no different. From the smiling faces that greet you when you walk into 358 Little Hall to the nice "welcome back" from former professors, the department has been and continues to be a welcoming place. My trip back began Monday and ended on Friday. In between, I was able to put the finishing touches on a joint article with Jorge and attend the departments Algebra Seminar on Wednesday. *[In fact, Martinez spoke in this seminar on "Algebra by Choice"—ed.]* Throw in some fine Gainesville dining and the line between business and pleasure is definitely blurred.

As for the Retirement Ceremony on Thursday morning in honor of Professor Martinez, my task was to cover the professional side of his life in under an hour. The turnout was exceptional; Jorge was accompanied by his long-time partner Rita. Some of the high points of his career include the following, which can be found on the web site mathscinet, my main source. Jorge was editor or co-editor of 4 proceedings of conferences. His work is in the area of mathematics known as "Ordered Algebraic Structures." He has written 96 peer-refereed articles (not including 5 recent articles that are to appear) in 26 different journals. Forty-eight of these were solo efforts while the remaining were written with 17 differ-

Professor Jorge Martinez and Rita with some of his past collaborators and their spouses.

Professor Jorge Martinez with former Ph.D. students Ricardo Carrera, Chawne Kimber, and Warren McGovern.

ent co-authors. Twenty-two of the articles were published in the 1970s, eleven in the 1980s, thirty-one in the 1990s, thirty-two in the 2000s, and 5 in the 2010s. The journals which have published the most number of his articles are: Algebra Universalis (12), Czechoslovak Mathematical Journal (11), Communications in Algebra (8), Applied Categorical Structures (7), Journal of Pure and Applied Algebra (5), Transactions of the American Mathematical Society (5). His main co-authors have been A. W. Hager (19), **Paul Conrad** (8), Warren McGovern (7), and Eric Zenk (6).

Some other notable facts regarding Jorge's career include: (a) he was the Ph.D. advisor of 7 graduate students (David Kenoyer 1982, Scott Woodward 1992, Robert Finn 1997, Warren McGovern 1998, Chawne Kimber 1999, Ricardo Carrera 2004, Eric Zenk 2004); (b) he was the principal member of the Caribbean Mathematics Foundation; (c) he wrote a detective novel titled *For the Fragments of Justice* (1989) *[I read it during my early years at UF and was very impressed. Reflecting the author's interests, some of the characters in this novel enjoyed fine food and opera—ed.]*; he was a recipient of the Teacher Incentive Program Award (TIP) unveiled during the Lombardi presidency to recognize and spur excellent teaching.

With Jorge's long and prolific career, it is difficult for me to look back and find one theorem or research article that had the most influence in his research areas. One could argue that his series of articles on varieties and torsion classes of lattice-ordered groups had a huge impact on the study of lattice-ordered groups; it was his definition of torsion classes of lattice-ordered groups that led to a new way of classification. However, I have chosen the following three articles to cite in concluding my essay which, in my opinion, have had the most recent impact on the field:

Fraction dense algebras and spaces, A. W. Hager and J. Martinez, *Canadian Journal of Mathematics* (1993). *Complemented l-groups*, P. Conrad and J. Martinez, Indag. *Math*. (1990). *When an algebraic frame is regular*, J. Martinez and E. Zenk, *Algebra Universalis* (2003).

JOHN THOMPSON

by Alexandre Turull

In June 2010, one of the towering figures in science in the last one hundred years retired from the Department of Mathematics and became Professor Emeritus. Professor John G. Thompson made epoch changing contributions to the study of symmetry in general, and finite group theory in particular. His contributions to science are deep and wide ranging. We fully expect to hear more exciting contributions to some of mathematics fundamental problems from him in the near future. Through his humility, good sense, and example, he contributed greatly to the well being of our department.

In his career, Professor Thompson accumulated many honors. He is a member of the National Academy of Sciences since 1971, and he won the Wolf Prize in 1992. He brought to the University of Florida some of the highest academic honors that the University has ever achieved. While at UF, he received from then U.S. President William Clinton the Presidential Medal of Science in 2000. While there is no Nobel Prize in mathematics, it is generally acknowledged that the Fields Medal is the closest equivalent, with the notable difference that a recipient needs to be under the age of 40 to be awarded this prize. Professor Thompson was awarded the Fields Medal in 1978, before he had begun his association with UF. More recently, the Norwegian Academy of Sciences instituted the Abel Prize in a deliberate attempt to establish a prize in mathematics more closely analogous to the Nobel Prize. Thompson was awarded the Abel Prize in 2007, arguably bringing to the University of Florida its highest academic distinction.

Thompson is widely acknowledged as the "inspirator" and the guiding light of one of the greatest scientific achievements of recent

Graduate Research Professor John Thompson with UF President Bernard Machen

years: the Classification of the Finite Simple Groups. Groups are the mathematical objects that describe symmetry in its purest form. Since the work of Galois in the nineteenth century, it has been known that finite groups are important to the solution of a number of previously intractable problems. Further work of Galois showed that finite groups are best studied through their "composition factors" and that these composition factors are finite **simple** groups. Hence, the Classification of Finite Simple Groups provides the possible composition factors for every finite group, in a way similar to the elements of the periodic table providing the possible atoms of any chemical substance. The implications of having a complete Classification of Finite Simple Groups are now beginning to be felt throughout all mathematics.

The Classification of the Finite Simple Groups is a theorem that provides an infinite list of finite groups and asserts that every finite simple group is exactly one of the groups on this list. While complicated, the list is highly useful for the experts. The statement of this classification is compact, but the proof of the theorem is by far the longest proof of any single theorem ever written down in the history of mathematics. Most theorems in mathematics are proved in one page or two, but the proof of the classification theorem extends through an estimated fifteen thousand journal pages. It is the work of hundreds of mathematicians extending over a period of over fifty years.

While the utility of a classification of the finite simple groups was clear to many mathematicians, it was not until Thompson's work that the possibility of discovering and proving such a theorem became more than a dream. In his Ph.D. thesis in 1959, Thompson proved the then 60-year-old conjecture of Frobenius, the nilpotency of all Frobenius kernels, an achievement noted at the time in the New York Times. Soon, in a monumental tour de force, John Thompson and Walter Feit classified all the finite simple groups of odd order, in a way then handling half of the classification theorem. This result, the longest theorem ever proved at the time, was published in 1963 and occupied an entire issue (255 pages) of the Pacific Journal of Mathematics.

This achievement was closely followed by the N-group paper by Thompson, an even more general classification of finite simple groups. Thompson's methods were soon adopted by many other mathematicians, and the work to classify all finite simple groups was well under way. The classification effort led to the discovery of some new infinite families of finite simple groups, as well as twenty one previously unknown finite simple groups which do not fit into any family, bringing the total of so-called **sporadic** simple groups from five at the time of Thompsons' thesis to exactly twenty six simple groups today. Mathematicians such

continued on page 10

Retirees. continued from page 9

as Hall, Brauer, Suzuki, Gorenstein, Aschbacher, Griess, Janko, Fischer, Lyons, Solomon, Smith and many others contributed to the gigantic task of finding all the finite simple groups, and proving that the list is complete. All the while, the task was aided and guided by Thompson. One of the sporadic simple groups bears his name as its discoverer. Thompson also worked on some of the hardest remaining parts of the classification, namely, the classification of simple groups of Ree-type. The last piece of the first proof of the Classification Theorem was the publication in 2005 of the classification of the quasi-thin groups by Aschbacher and Smith. This 1221-page paper, includes an acknowledgement of the contribution to its final form at the Algebra Seminar of the University of Florida, led by John G. Thompson. Thompson's involvement in the Classification of Finite Simple Groups was deep and sustained throughout, from the beginning to the final paper.

The Classification of the Finite Simple Groups is a fundamental result in mathematics. Its impact on the theory of finite groups in general, is, of course, profound in all its areas. Beyond group theory, the existence of finite simple groups of type E8 and the existence of the largest sporadic simple group (the group now generally known as "the Monster") have proved to have profound and not fully understood connections with number theory, algebraic geometry, and in string theory in physics.

Here is not the place to attempt to describe the many diverse contributions of John Thompson to other areas of mathematics, except to say that they are numerous and exciting. One exception should be made for the following deep result that is easy to state: Thompson proved that there exists a polynomial with rational coefficients whose Galois group over the rationales is the Monster sporadic simple group.

The retirement of John Thompson from the University of Florida was marked by a colloquium lecture by his former student Professor Richard Lyons of Rutgers University, which described some of the retiree's mathematical contributions. The proceedings continued in the UF President's House, where Provost Joseph Glover presided over a reception. A number of speakers described the contributions of Thompson, including Professor George Andrews, current President of the American Mathematical Society, and many members of the Mathematics Department. Particularly noteworthy, was the description by Professor Peter Sin of his current collaboration with Thompson on some questions related to the Riemann zeta function, a collaboration they fully expect to continue. These proceedings closed by some succinct words by John Thompson himself. With his characteristic modesty, he emphasized the fact that what he knows is finite, but he does not know is infinite, and this makes life an interesting adventure.

FROM THE **H1N1 FLU** TO THE **BIG CHILL** TO **ZOMBIES**

by Paul Ehrlich

As the fall semester, 2009 began, I and (I am certain) many of my fellow faculty members felt a bit uneasy. During the summer vacation, I had been following newspaper articles detailing how various public and private schools had been closed for several weeks as a result of the H1N1 flu virus and also how this potential epidemic was effecting travel abroad and to the US. In my own case, since my earlier writing about the history of the mathematics department had brought to light the fact that the second Head Professor of Mathematics and Astronomy, Herbert Keppel, had died during the 1918 Spanish influenza epidemic, I was even more apprehensive about the fall semester amid concerns about whether sickness would spread so quickly that the campus would be closed. Also, I had contracted a bad flu just before Thanksgiving in 1968 and had spent several days in the student infirmary hospital. By the early winter months, so many students at Harvard and Radcliffe were ill that they just remained sick in their dorm rooms, with no beds available in the small infirmary; but no quarantining policies were implemented as far as I can recall.

By August 18, 2009, the mathematics faculty had received a beginning of the semester e-mail from Associate Chair **Rick Smith** which included as a 4th point the paragraph:

> "As most of you know, we are expecting an outbreak of swine flu this Fall. It is likely that many students will miss a week or more of classes. You should plan your grading policy under the assumption that there will be students missing exams, quizzes, etc. You may want to say something in your syllabus abour doctor's notes, contact by phone or email before the exam (not after), etc."

We knew that the administration was meeting behind the scenes trying to figure out their response to a potential epidemic, so this e-mail was no surprise. A few days later, an e-mail arrived from the Dean of CLAS, **Paul D'Anieri** in much the same spirit as that from the Associate Chair. Included in his e-mail were the following points:

- In order to avoid being overwhelmed, the Student Health Center will be telling students with normal symptoms NOT to visit the Center. They will also advise them to stay home in order to avoid infecting others.
- Plan now for how you might give a large number of makeup assignments.
- Begin planning for the possibility that instructors are likely to fall ill as well. Develop contingency plans with colleagues and students to help cover classes or develop alternative activities. By all accounts, this flu puts people down for roughly seven days, and we are advised to stay away from others for 24 hours after symptoms disappear.
- If you are infected, STAY HOME and don't infect everyone else.

At the same time, the University unveiled its official H1N1 (Swine) Flu web site. A follow-up e-mail from Associate Chair Rick Smith re-iterated points in the Dean's memo, including also "You may want to post course content on-line so that home-bound students can attempt to keep up."

As I prepared to begin the semester with my two sections of Honors Calculus III, I added a few sentences to my web site for the classes, including the suggested phrases that the students should

e-mail me in advance if they were going to miss a quiz or test from illness. Since I was the entire face of calculus III honors, I decided just to ignore the matter of figuring out who would teach for me if I contracted the flu myself. In preparing for the first day of class and discussing our flu policies, I reviewed for myself and mentioned to both classes that the great scientist Isaac Newton himself had been involved in an incident in which Cambridge University was closed down for two years as a precaution against the Great Plague of 1665–1666 and that during that time, Newton spent two years at home with his widowed mother developing some of his theories on calculus, optics and gravitation before returning to Trinity College as a Fellow in 1667.

As the semester progressed, the students in both sections of the Honors Calculus III were doing a commendable job of e-mailing me about illnesses in advance of missing quizzes or exams. By October, a student in one of the sections had indeed contracted a flu and was tested, but it turned out to be two different strains of a conventional flu, not the H1N1 flu. An ominous e-mail arrived from the administration threatening to make us put video of us lecturing on the internet in our larger classes using some internet technology with which I was entirely unfamiliar. However, this did not seem to apply to small classes like Honors Calculus, so I breathed a sigh of relief. Also during this time, the local newspaper kept reporting on attempts to obtain vaccine for the elementary schools and also on a campaign to encourage the public school students to take conventional flu vaccination. Finally by November, the Alachua County Health Department had been receiving more shipments of the H1N1 vaccination and a grand total of 800 dosages of the FluMist Nasal vaccine were available on Wednesday, November 5 for administration at the Student Health Services. I laughed with my wife about 800 dosages in the midst of over 40,000 students. In this time frame, I had still not seen more than 2 reported flu cases in my two calculus classes (perhaps some ill students did not bother to inform me). In an e-mail exchange and earlier conversation with Professor **Peter Sin**, I learned that he had given an exam on a Monday in late October which about 5 students missed, then that same week had been quarantined at home himself because his young son had gotten the flu at school. By November 5, the administration had sent out a request which resulted in an e-mail from Associate Chair Rick Smith that we provide some personal data from our classes about the incidence of flu. He wrote "Jed [Keesling] and I have compared notes and it appears that 15–20% of our students have had some form of flu." Hence, one might say that this was turning out to be the epidemic that fortunately was not an epidemic. (In summation, an article in the Wall Street Journal on December 11 offered the statistic that 1 in 6 Americans had been sick with the swine flu.)

As the semester was starting to wind down, this escape from a potential epidemic at UF was reflected in several more e-mails from the administration. On November 20, Associate Chair Rick Smith wrote us that two physicians at the Student Health Care Center have agreed to "reinstate the service of seeing students to provide medical documentation for the final exam period. You can now inform students that medical documentation will be required to justify not taking the final exam." This e-mail was followed by an e-mail from our own Professor **Bernard Mair**, Associate Provost, reiterating this last procedural point and also providing the summation of the situation:

"Our data now indicate that the number of reported influenza and influenza-like illnesses has been trending downward since a spike in September, but we continue to monitor the situation closely as it is still possible that this downward trend may be reversed.

In view of this situation and the need to develop a more systematic method for handling student illnesses for the final examinations, the university is temporarily changing its position on medical documentation. Instructors can now require medical documentation for students who claim illness as a reason for missing examinations, or any course assignments (such as papers) which are due during the final examination period December 12, 2009–December 18, 2009."

Somewhat to my surprise, I found that this apparently harmless e-mail was enough to vault Mair into the category of those like fellow mathematics faculty member Provost **Joseph Glover**, who have been featured in front page stories in the Daily Alligator. On Tuesday, December 1, the Daily Alligator ran a long article "New policy allows professors to require notes for absences" featuring a photo of Mair as well as quotes from other administrative spokespersons and CLAS Dean d'Anieri. A student was even quoted as saying that getting a doctor's note could be inconvenient for students who have the swine flu.

During the Department's Annual Christmas Party, I saw Professor Mair and asked him how he felt to have joined Provost Joseph Glover in being prominently featured on the first page of the Daily Alligator. He told me that he had not even seen the newspaper article himself and that these large, sensational articles with many quotations arise from a mere one minute phone conversation with a student reporter who had managed to reach him in his office.

In this same time frame, a second H1N1 vaccination clinic at the Student Health Care Center was announced for Wednesday, December 2, with another 800 doses available.

We all breathed a collective sigh of relief as the fall semester ended with no flu epidemic closing the campus, blithely unaware of what awaited us at the beginning of the spring term. It was quite warm during the mid part of December, so when I went to my office to do some posting of curricular materials on the Internet for the spring term, nothing seemed out of the ordinary in Little Hall. Just as the spring term was beginning, however, unusually cold temperatures replaced the early warmth. Reading e-mail on my home computer on Monday, January 4, 2010 before leaving for the first day of the spring semester, I was shocked to read the following e-mail from CLAS Dean d'Anieri:

"As many of you here have noticed, most, if not all of our buildings are unusually cold this morning. In addition to the obvious causes (first, it's cold out; second, lower temperatures were maintained over the break), a steam cogeneration plant operated by Progress Energy has failed, reducing the supply of heat to campus. What limited heating is available on campus is being directed to Shands Hospital. Progress Energy is working to solve the problem, but they do not anticipate they will have the system up and running until Friday."

This was followed by a more accurate e-mail from **Ed Poppell**, Vice President for Business Affairs from which we learned:

"As classes for the spring semester get under way Tuesday, students, faculty and staff should be aware that some offices and classrooms may be chillier than usual because the university's primary heating system is out of operation.

The primary heating system, a turbine engine located at UF's Progress Energy cogeneration plant near the Health Science Center, suffered a severe failure several weeks ago. The unit had to be shipped to the manufacturer to be rebuilt. In the interim, the university has used a back-up steam boiler system that has less heat-producing capacity than the jet turbine. That, combined with the current record-setting cold temperatures, has left some campus buildings colder than others.

The turbine was back on campus as of Monday, and officials

continued on page 11

H1N1, Big Chill, and Zombies. continued from page 9

expect it to be back in operation by mid-week. In the meantime, students, faculty and staff may wish to wear a sweater or light jacket to class or in their office."

On Wednesday, with classes beginning for me, I enjoyed reading this memo to the students as I looked at them, indeed, wearing sweatshirts or jackets. It seemed to me, in fact, that the Little Hall classrooms and offices were unusually cold for about two weeks, rather than "midweek" as the record cold snap continued on. This incident made the *Gainesville Sun* issue of January 6th with the headline *UF students return to cold classrooms*.

The semester continued without any further colorful incidents until April. Over many years, I have found that the 8th period classes seem to be more lively and less quiet than the 6th period. Thus I was not entirely shocked to find on a Monday in early April that 4 or 5 of the students in the 8th period showed up carrying large plastic toy machine guns and wearing red or blue bandanas on an arm or around their heads. After a moment of initial shock, in which I thought about how my 8-year-old grandson would love to have these guns, just like the sort of thing he has, the students muttered something to me about "zombies." An article in the Saturday, April 10th Gainesville Sun clarified the whole situation for me. These students were participating in a "humans" vs. "zombies" tag game on campus where the participants try to survive a zombie infection. A freshman student organized this event with official UF permission and around 1000 students participated, registering on a web site. Once a zombie shoots a human, the human becomes a zombie, but the zombies cannot die. I mentioned to my wife Norma seeing all of these colorful toy guns in class and a few days later, she encountered students with guns while waiting in line at Fire House Subs and learned about this game herself. We wondered to ourselves about a contest in which one side is guaranteed to win given enough time. On Monday, April 12, my 8th period class seemed very colorless with out these guns and colorful handkerchiefs. I learned that the game had ended that prior Sunday.

FACULTY & **STAFF** NOTES

by Paul Ehrlich

Several faculty members participated as session organizers at the local meeting of the American Mathematical Society held at Florida Atlantic University in Boca Raton during October 30–November 1, 2009.

Professors **Alexander Dranishnikov** and **Yuli Rudyak** organized a Special Session on *Geometry and Topology*.

Professor **Patrick De Leenheer** co-organized a special session on *Mathematical Models in Biology*.

Professor **Sergei Pilyugin** reported on joint work with De Leenheer in this last session, speaking on *Some notes on mutation models*. **Dr. Beyza Aslan**, Ph.D. 2007, now at the University of North Florida, spoke in a Special Session on Applied Partial Differential Equations on *Three Dimensional Current Generator of a Mountain Thunderstorm*, joint work with Professor **William Hager**, among other co-authors. Professors **Alexander Berkovich** and **Miklos Bona** spoke in a special session on Enumerative Combinatorics. Berkovich lectured on *Representations of an integer by* $x^2+y^2+z^2$ *and the modular equations of degree 3 and 5* while Bona spoke on *Isomorphisms and Symmetries in Random Phylogenic Trees*.

This year, the Joint Winter Meeting of the American Mathematical Society, Mathematical Association of America, etc., was held in San Francisco, California, with continued participation from UF mathematics faculty and Ph.D. alumni. Professor **Miklos Bona** spoke in an AMS special session on Permutations on *The absence of a given pattern and a number of occurrences of another*. Dr. **Larissa Williamson** spoke in a MAA Invited Paper Session on Online Delivery of Mathematics about *Successful on-line math course: myth or reality?* Professor **Jung-ha An**, Ph.D. 2005, at California State University in Stanislaus spoke in an AMS Session on Optimization and Control on *A Modified Piecewise Constant Mumford-Shah Model Based Simultaneous Image Segmentation and Registration*, joint work with UF Professor **Yunmei Chen**. Professor **Beyza Aslan**, Ph.D. 2007, of the University of North Florida, spoke in an AMS Session on Differential and Difference Equations on *The Change in Electric Potential Due to Lightning*, reporting on joint work with UF Professor **William Hager**. Professor **Paul Brodhead**, Ph.D. 2008, at Virginia State University, spoke in an AMS Session on Discrete Mathematics on *The strength of the Gratzner-Schmidt Theorem*. Professor **Pengwen Chen**, Ph.D. 2000, of the University of Connecticut spoke in an AMS Special Session on Interactions of Inverse Problems, Signal Processing, and Imaging on *A novel kernel correlation model with correspondence estimation*. Joint work with Professor **Stacy Levine**, Ph.D. 2000, of Dusquense University, on *Image Denoising via Feature-Based Sparse and Redundant Dictionaries* was reported on by her undergraduate advisee in an AMS-MAA-SIAM-Special Session on Research in Mathematics by Undergraduates. Professor **John Mayer**, Ph.D. 1982, of the University of Alabama at Birmingham spoke in an MAA Session on *Comparison of Inquiry-Based Class Sections and Lecture in the Context of Computer—Assisted Algebra Instruction* and also his joint research on *Combinatorial Classification of Cubic Polynomials with a Fixed Siegel Disk* was reported on by a co-author in an AMS Session on Dynamical Systems. Finally, Professor **Adnan Sabuwala**, Ph.D. 2008, of California State University at Fresno, spoke in an AMS Session on Differential and Difference Equations on *Particular Solution to the Euler-Cauchy Equation: A Novel Approach*.

Professors **Jorge Martinez** and **Chawne Kimber**, Ph.D. 1999, organized a workshop on *Frames: Algebra vs. Topology*, held in the Atrium during December 3–5, 2009. There were four three-day tutorials, given by **Rick Ball** (Denver); **Bernhard Banaschewski** (McMaster); **Warren McGovern** (Bowling Green), Ph.D. 1998; and **Ales Pultr** (Prague). In addition, there were lectures by **Fred Dashiell** (UCLA), **Tony Hager** (Wesleyan), **Peter Jipsen** (Chapman), **Peter Johnstone** (Cambridge), **James Madden** (LSU), and **Jorge Picado** (Coimbra). The workshop was funded by UF and the Consortium for Order in Algebra and Logic.

Professor **Jed Keesling** has been elected as Chair of the CLAS Assembly for 2010–2011 and Professor **David Groisser** has been elected to a term on the Curriculum Committee for 2010–2012.

Professors **Beverly Brechner** and **Louis Block** traveled to North Bay, Canada,

at the end of May, 2010, to attend a Topology Conference at Nipissing University and a Conference Dinner, honoring Ph.D. alumnus Professor **John Mayer,** Ph.D. 1982, of the University of Alabama at Birmingham at the time of his 65th birthday. Brechner also attended a conference on Mathematics Education in Washington, D.C.

Professor **Douglas Cenzer** has been awarded a Faculty Enhancement Opportunity award.

Professor **Yunmei Chen** reports that several of her Ph.D. students traveled to China during May 2010 to report on their research in imaging. **Jiangli Shi, Xiaojing Ye,** and **Haili Zhang** were invited speakers at a Summer School on Mathematical Imaging 2010 at the Institute of Mathematical Science, Zhejing University. Also, Ye delivered two hour lectures in the Department of Mathematics at Peking University.

Professor **Joseph Glover,** University Provost, traveled to Saudi Arabia with a group of seven UF administrators. The trip was at the invitation of the Saudi Arabian government and was connected to an educational exhibition. Saudi Arabia is putting 25% of its budget into education and expects to be sending a lot of graduate students to the United States. Partly because there are many well-placed UF alumni in the Saudi administration, but also because of UF's reputation, UF has been designated as one of 15 elite US institutions that the Saudi's are interested in working with in graduate education of their citizens.

Professor **Jay Gopalakrishnan** has been appointed to the Editorial Board of the journal Numerical Linear Algebra and Applications. He spoke in M.I.T.'s Distinguished Speaker Series during October 2009 and lectured at the Boeing Company in Seattle in September 2009. This lecture was telecast live to multiple, geographically disparate research groups of Boeing. His graduate student **Shugang Tan** is currently on a post-doc at Texas A&M University in College Station, TX and his graduate student **Minah Oh** will take up a tenure track position at James Madison University.

Emeritus Distinguished Professor of Mathematics and Physics **John Klauder** has been awarded the honorary degree Doctor Phylosophiae Honoris Causa by the Bogolyubov Institute for Theoretical Physics for his "world-distinguished contributions to theoretical physics."

Professor **Kevin Knudson**, Director of the UF Honors College, appeared as a contestant on the CBS game show Jeopardy on September 15, 2010.

Professor **Peter Sin** was active in two international meetings during 2010. First, he was a featured speaker at an International Conference on Design, Codes and Geometries (honoring Gary Ebert), held at the Virden Center, University of Delaware during March 29–April 1, 2010. Then he was on the advisory committee for an International Conference on Buildings, Finite Geometries and Groups (a satellite conference of the International Congress of Mathematicians 2010) held at the Indian Statistical Institute, Bangalore Center, during August 29–31, 2010.

In Summer of 2009, Professor **Stephen Summers** made a lecture-tour in Germany and France, financed by his host institutions there. He gave invited addresses at conferences in Leipzig and Goettingen, and invited seminar talks in Leipzig, Paris, and Hamburg. In addition, he was awarded an NSF grant for his proposal "Constructive Algebraic Quantum Field Theory," effective August 15, 2009 through July 31, 2011.

This spring, 2010, the Spring Recognition Day of Appreciation, April 22nd, was jam packed with activity. As reported elsewhere in this issue, Graduate Research Professor **John Thompson**, Distinguished Professor of Mathematics and Physics **John Klauder,** and Professor **Jorge Martinez** all retired. Thompson was feted first on Thursday, April 9th in advance of the Recognition Day in ceremonies in which his past student Professor **Richard Lyons** of Rutgers University delivered a colloquium on *John Thompson and Finite Groups* followed by a dinner and after dinner tributes at the UF President's House. On April 22nd, prior to the Appreciation Barbeque Lunch in the Atrium, Professor **Warren McGovern**, a Ph.D. student of Martinez, now a faculty member at Bowling Green State University, spoke about Martinez as did also several collaborators of Martinez and fellow Ph.D. alumni Professor **Chawne Kimber.** After the lunch in the Atrium, the traditional recognition ceremony followed. This year, the Robert Long Prize was presented by the chair of the selection committee, Professor **Louis Block**, to a philosophy student, **Marija Jankovic**, who wrote an essay on Aristotle on the Potentially Infinite. Almost 20 master degree candidates and 10 Ph.D. recipients were recognized as well as **Remy Ndangali** for his receipt of the CLAS Dissertation Fellowship. This year graduate students **Joshua Ducey, Anthanasios Gentimis,** and **Dennis Ledis** received Certificates of Excellence for teaching; and **Joseph Brennan, Robert Newton,** and **Ryan Sankarpersad** received Certificates of Merit. **Joshua Ducey** was also recognized as the recipient for the coming academic year of the Chat Yin Ho Scholarship. Earlier, **Paula Bezark** had been recognized as the recipient of the Kermit Sigmon Scholarship. The Chair **Jed Keesling** then paid tribute to the three retirees before he recognized Professor **Miklos Bona** for his election to the UF Academy of Distinguished Teaching Scholars this spring. At 4:30 pm, to a standing room only crowd in the New Physics Building, Professor **Sergei Shabanov** reported on John Klauder's extensive research and influence in mathematical physics, followed by a wine and cheese reception on the grounds of New Physics. Finally, a banquet was held at the Hilton Hotel to celebrate Klauder and Martinez with more after dinner tributes.

ALUMNI NEWS

by Paul Ehrlich

Professor Yataka Yamamoto, Ph.D. 1978 under former Graduate Research Professor Rudy Kalman, visited UF during the month of November, 2009, as the guest of fellow graduate student Professor Pramod Khargonekar, who had returned to UF and served as Dean of Engineering recently. Yamamoto is in the Department of Applied Analysis and Complex Dynamical Systems, Graduate School of Informatics, Kyoto University, Japan. He spoke while at UF on "Sampled-Data Control and New Applications to Signal Processings: Beyond the Shannon Paradigm," introducing a new digital filter design method, based on recent progress in sampled-data control theory made since 1990. SANYO Corporation of Japan has implemented this design into an LSI chip for improving MP3 sound to a CD quality.

Professor Hari Pulapaka, Ph.D. 1995, Professor of Mathematics at Stetson University and his wife Jennifer, a podiatrist, were featured in the November 2009 issue of Florida Trend magazine in a restaurant review for their new restaurant *Crest* in downtown DeLand. The couple "started the restaurant to promote a gourmet style of healthy eating emphasizing locally grown produce."

Professor Warren McGovern, Ph.D. 1998, of the Department of Mathematics, Bowling Green State University, was a plenary lecturer in the December Workshop on Frames: Algebra vs. Topology held at the University of Florida, giving three lectures on *A Survey of Algebraic Frames*.

Professor Taeil Yi, Ph.D. 2000, of the University of Texas at Brownsville visited UF to deliver the last colloquium of the academic year, speaking on April 19, 2010 on *Course Re-design for Hybrid/on-line Courses* in which he discussed how recently his institution had moved much of the mathematics instruction to on-line modalities.

Dr. Minah Oh, Ph.D. 2010, a past officer of the SIAM Gators, has accepted a tenure track position at James Madison University.

Dr. Dung Phan, Ph.D. 2010, has accepted a postdoctoral position at the IBM Watson Research Center.

Dr. Aaron Smith, Ph.D. 2010, graduated on August 7, 2010 and started teaching at the Marion Military Academy in Marion, Alabama on August 18th.

UF UNIVERSITY of FLORIDA
Department of Mathematics
Little by Little Newsletter
Editor: Paul Ehrlich

358 Little Hall
PO Box 118105
Gainesville FL 32611-8105

Telephone: 352-392-0281
FAX: 352-392-8357

www.math.ufl.edu

THANK YOU FOR YOUR SUPPORT

☐ **YES!** I would like to support the Department of Mathematics at the University of Florida.

☐ My Company matches gifts; form is enclosed.
Company Name:_____

Please use my gift for the fund indicated below.

☐ General Fund ☐ Mathematics Fellowship Fund
☐ Robert Long Prize in Mathematics ☐ Chat Yin Ho Scholarship Fund

Amount: (Please circle)
$500 $250 $100 $50 $25 Other $_____
THANK YOU!

Please check one of the following:
☐ You may list my name with those of other donors.
☐ Please do not list my name with those of other donors.

Please choose payment method:

Credit Card
Contributions via credit card are gladly accepted. Please call the secure credit card processing operator at 1-877-351-2377 or visit the Department of Mathematics Fund donation page at https://www.uff.ufl.edu/OnlineGiving/FundDetail.asp?FundCode=000815 to make an online gift.

Check
Please make checks payable to: University of Florida Foundation, Inc.

Name: _____
Address:_____
_____
City: _____ State: _____ ZIP: _____
Phone: _____
E-mail: _____
Degree: _____ Year:_____

Please complete the above form and return it to:
Department of Mathematics, Alumni Donations,
PO Box 118105, Gainesville FL 32611-8105

KEEP YOUR CLASSMATES **UP TO DATE**

Please use this form for address changes and to tell us what you are up to. Alumni updates can be sent via post to the address below.

Name: _____
Degree / Year: _____
Address:_____
_____
City: _____ State: _____ ZIP: _____
Phone: _____ E-mail: _____

☐ This is a change of address.

Current Position / Firm / Agency:_____
_____
_____

☐ This is a new position.

Personal News:_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____