

APAM NEWS

THE DEPARTMENT OF APPLIED PHYSICS & APPLIED MATHEMATICS

THE FU FOUNDATION SCHOOL OF ENGINEERING & APPLIED SCIENCE, COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK



2009 Commencement (left to right) Photo 1: Tracy Starck and Prof. Chris Marianetti; Photo 2: Paul Ennever, Everett Lin, Karen Chiang, Prof. Michael Mauel, Prof. Thomas Pedersen and Mikhail Klassen; Photo 3: Dr. Francesca Terenzi and Prof. Lorenzo Polvani



Dear Alumni and Other Friends of APAM:

In this issue we celebrate the wonderful graduates of our undergraduate and graduate programs this academic year, including those who won departmental prizes!

We also profile the many exciting recent activities in APAM, including the implementation of our new computer cluster and the amazing help our students and scientists have been providing to help students excel in computational methods and usage. We highlight the excellent research in our highly recognized plasma physics program, the international notice of the work of Simon Billinge, a major honor bestowed upon Aron Pinczuk, and two symposia: one organized by Lorenzo Polvani and Adam Sobel to honor their advisor and one in honor of Richard Osgood. This term was also highlighted by department events celebrating the long-time contributions to APAM by Jimmy Florakis and Jack Arbo.

In addition, we proudly announce the most generous contribution of major instrumentation to our materials science and engineering teaching lab!

Our major department renovation is very nearly complete. More on that in the next issue.

In closing, APAM is very pleased to extend a warm hello to our alumni and other friends of the department.

Best,

Irving P. Herman
Chair, APAM

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2009 SIMON PRIZE AWARD WINNERS

Dr. Özgür Kalenci & Dr. Gideon Simpon

The Robert Simon Memorial Prize is awarded annually by the Department of Applied Physics and Applied Mathematics to the graduate student who has completed the most outstanding dissertation. Should no graduate student's dissertation qualify in any given year, the prize may be awarded to either the most outstanding student who has completed a Master of Science degree in the department or to the most outstanding graduating senior in the department. The department chair in consultation with the department faculty selects the awardee. This year, Dr. Özgür Kalenci and Dr. Gideon Simpson each had an outstanding thesis. Both are extremely worthy of this recognition and both were awarded the full Simon Prize.

Robert Simon (December 25, 1919 - February 11, 2001) received a B.A. degree cum laude in Classics from the City College of New York in 1941, where he was elected to Phi Beta Kappa, and an M.A. in Mathematics from Columbia University in 1949. Between 1941 and 1944, Mr. Simon was a Lieutenant in the United States Armed forces serving in England, France, and Italy. He participated in the D-Day operation as a navigator for a plane that dropped paratroopers in the vicinity of Omaha Beach. General Dwight Eisenhower personally shook his hand and wished him well the night before the D-Day assault.

Mr. Simon, who was born and lived in NYC, spent a lifetime making valuable contributions to the field of computer science. Starting in 1953, he worked for 15 years at Sperry's Univac Division in various capacities including marketing, planning, systems engineering, systems programming and information services. He also spent a year working at the Fairchild Engine Division as Director of the Engineering Computer Group. He personally directed the establishment of several company computer centers at sites throughout the United States. Between 1969 and 1973, he was a partner with American Science Associates, a venture capital firm. Mr. Simon was a founder and Vice President of Intech Capital Corporation and served on its board from 1972 to 1981 and a founder and member of the board of Leasing Technologies International, Inc. from 1983 until his retirement in 1995.

The prize was established in 2001 by Dr. Jane Faggen with additional support from friends and relatives of Mr. Simon.



Prof. Irving Herman presents the award to
Dr. Özgür Kalenci



Prof. Marc Spiegelman and Prof. Michael Weinstein
look on as Mr. and Mrs. Simpson accept the award
on behalf of their son who was delivering a talk
at a professional meeting

Dr. Özgür Kalenci received a B.Sci. degree in Physics and in Electrical Engineering, with high honors in both disciplines, from Bogazici University, Istanbul, Turkey in June 2004. In September 2004 he started his Ph.D. studies in the Department of Applied Physics and Applied Mathematics at Columbia University as a Ph.D. candidate in Applied Physics. He joined the Diffraction Research Group, led by Prof. I.C. Noyan, in December 2004.

In his Ph.D. thesis, "A Rigorous Analysis of X-Ray Scattering From Distorted Single Crystals", Dr. Kalenci developed a formulation of dynamical diffraction which is valid for both symmetric and asymmetric reflections from distorted crystals. Through the analysis of this formulation, he analyzed dynamical to kinematical transition and the domain of validity for real-space measurements for strain determination. He analyzed the free-space propagation of diffracted waves from crystals to detectors and showed that the propagation distance causes a fundamental change in the nature of the measured x-ray diffraction data, and defined two regimes to determine whether the measured data is in the near-field or far-field. He also developed a numerical method to estimate strain quantitatively in thin-film/substrate systems and successfully applied this method to Si_3N_4 stressor features on silicon, which are in the core of new generation strained semiconductor microelectronic devices. During his studies, Dr. Kalenci collaborated with scientists from Argonne National Laboratory, Brookhaven National Laboratory and IBM T.J. Watson

Research Center, and spent two summers at Argonne as a research associate.

While at Columbia, Dr. Kalenci published two journal papers as the first author and five as contributor in *Journal of Applied Physics*, *Journal of Applied Crystallography*, *Applied Physics Letters* and *Powder Diffraction*. Four more papers, with Dr. Kalenci as first author, are under preparation.

He presently works as a quantitative analyst at Goldman Sachs and is based in London.

Dr. Gideon Simpson received his B.A. degree in Mathematics from Cornell University in 2003 with an honors thesis in analysis under Prof. John Hubbard. In 2004, he began his Ph.D. studies as a NSF IGERT Fellow in Columbia's joint program in Applied Mathematics and Earth Sciences, whose goal was to bridge the gap between the two disciplines. Advised jointly by Profs. Weinstein and Spiegelman, he well exceeded these goals, making fundamental contributions in both fields.

In his Ph.D. thesis, "The Mathematics of Magma Migration", he demonstrated first-rate achievements in (i) modeling, (ii) applied analysis, and (iii) scientific computation of multi-scale flows in porous and deformable media. The specific application arose from mathematical models of the flow of molten rock in the Earth's interior, although the modeling, analytical and computational issues arising are ubiquitous in multi-scale physical problems such as subsurface flow of water, hydrocarbons and CO_2 sequestration. While existing formulations for magma flow were developed heuristically at a macro-scale, Dr. Simpson systematically derived a more general class of partial differential equations (PDEs) by a subtle application of multiple scale homogenization/effective media theory. One subset of these equations is in general agreement with the current formulations, but places the theory on a much firmer footing and highlights critical changes in scaling relationships, that may drive a significant re-evaluation of existing results. As part of this work Dr. Simpson has done first-rate three-dimensional simulations of the effective media homogenized cell-problems illustrating the dependence of macroscopic properties (bulk viscosity and permeability) on the microscopic pore structure. This work has led to two first-authored papers in the *Journal of Geophysical Research*. Dr. Simpson has also made important contributions in analysis. One of the intriguing features of a reduced version of these equations is the presence of non-linear solitary "magma waves". A systematic reduction of McKenzie's models lead to a very challenging and, until Dr. Simpson attacked them, pretty much unexplored class of degenerate and dispersive nonlinear PDEs. (continued on page 3)

UNDERGRADUATE AWARD WINNERS

Prof. Irving Herman presented three undergraduate awards to outstanding seniors in Applied Mathematics, Applied Physics, and Materials Science and Engineering at the annual SEAS Senior Awards Dinner on May 5, 2009 in the Low Rotunda.

Each award winner this year is an outstanding student with a GPA above 4.0. The winners received a plaque and a check for \$250, and have their names inscribed on plaques in the department headquarters and are listed on the department web site.

Applied Mathematics Faculty Award Winner

Stanley Snelson

The 2009 Applied Mathematics Faculty Award winner, Stanley Snelson, has excelled in the classroom and in research. He has worked with Prof. Guillaume Bal on two intriguing projects, last year on an extension of a theoretical result in inverse transport theory and this year on variance reduction techniques in Monte Carlo simulations for transport equations. He is also this year's class salutatorian. After graduation he will enter the doctoral program at the Courant Institute of Mathematical Sciences at NYU.

Applied Physics Faculty Award Winner

Michael Shulman

The 2009 Applied Physics Faculty Award winner, Michael Shulman, is one of the best students to graduate from the Applied Physics program. He has an outstanding GPA and has taken a number of advanced graduate level physics classes. He has the rare combination of being very hands-on with strong analytic skills at the same time. He thinks independently and has excellent physics intuition. His extracurricular interests include running and bicycling. Combining his academic and extracurricular interests, he gave a beautiful presentation on the physics of bicycles in the Applied Physics Seminar this past fall. In the fall, he will enter the doctoral program in physics at Harvard.

2009 Simon Prize Award Winners: Dr. Özgür Kalenci and Dr. Gideon Simpson

(continued from page 2)

Dr. Simpson developed a detailed well-posedness theory of these equations, which required novel analysis in order to bound the porosity away from zero. He also developed a detailed and rigorous nonlinear asymptotic stability theory of the solitary waves as well as a novel computational method based on Sinc methods for highly accurate computation of non-linear waves in 1-, 2- and 3-dimensions. This work has resulted in three

Francis B. F. Rhodes Prize Winner

Vivek Singh

The Francis B. F. Rhodes Prize was established in 1926 by Eben Erskine Olcott of the Engineering Class of 1874, in memory of his classmate, Francis Bell Forsyth Rhodes, School of Mines, 1874, and is awarded from time to time to the member of the graduating class in materials science and metallurgical engineering who has shown the greatest proficiency in his or her course of study.

The 2009 Rhodes Prize winner, Vivek Singh, is a 3/2 student in Materials Science and Engineering. He arrived at Columbia in the Fall of 2007 after completing a B.S. degree in Physics at Adelphi University in Long Island. He has been on the Dean's List each semester, has carried out research on laser recrystallization in Prof. James Im's lab, and has been active in Engineers Without Borders at Columbia. Next year, he will begin his Ph.D. studies at M.I.T. in Materials Science and Engineering, with a specialty in Electronic Materials.

Haimovich Receives Honorable Mention for Goldwater Scholarship

Adrian Haimovich, an Applied Mathematics junior from North Brunswick, NJ, received honorable mention in this year's Goldwater Scholarship competition. The Goldwater, funded by the federal government, is the premier scholarship for undergraduates in the sciences and mathematics who plan to pursue a Ph.D.

published first authored papers. One in *Nonlinearity* (which was designated as an IOP Select Article) and two in *SIAM Journals on Mathematical Analysis and Discrete and Continuous Dynamical Systems*. Two more papers are in preparation.

Dr. Simpson is currently a postdoctoral fellow in the Mathematics Department of the University of Toronto.



2008-2009 GRADUATES

October 2008

M.S.

Iliia Auerbach-Ziogas (MSE), Casey Burleyson (AM), Theodore Kramer (MSE)

Ph.D.

Ozgur Kalenci (SS), Meninder Purewal (SS), Gideon Simpson (AM)

February 2009

B.S.

Michael Shulman (AP)

M.S.

David Blaich (MP), Matthew Davis (PP), Timur Dykhne (MSE), David Goluskin (AM), Ching Hung (AM), Chi Kuo (MP), Raul Mancera (MSE), Scott Murphy (MP), Clara Orbe (AM), Jay Shah (MP), Serenger Shen (MP)

M.Phil.

Jie Gao (SS), Zhang Jia (SS), Matthew Lanctot (PP), Braxton Osting (AM), Anil Raj (MSE), Tianzhi Yang (AM)

D.E.S.

Woo-Young So (MSE)

Ph.D.

Michael Hahn (PP), Wubiao Zhu (PP)

May 2009

B.S.

Damian Ancukiewicz (AP), Sanjay Aneja (AM), Darryl Burns (AP), Allan Cassis (AM), Kenneth Chen (AM), Tom Chen (AM), Stephen Cheng (AM), Karen Chiang (AP), Kyung Kuk Choi (AM), Nishi Dedania (AM), Jason Eckstein (AP), Paul Ennervet (AP), Avi Grumet (AP), Lili Gu (AM), Michael Hankin (AM), Samantha Hansen (AM), Bin Huang (AM), Samantha John (AM), Richard Joyce (AP), Sung Joo Kim (MSE), Mikhail Klassen (AP), Nicholas Knight (AP), Eugene Ko (AM), Michael Kosdan (AM), Jivan Kurinec (AM), Lu Li (AM), Everett Lin (AP), Michael Lin (AM/AP), Michael Lin (AP/AM), Ivan Loughman-Pawelko (AM), Manuel Maturana (AP), Joshua Narciso (AP), Nathaniel Nussbaum (AM), Cullen O'Niell (MSE), Ryder Onopa (AM), Erich Owens (AM), Bryant Rolfe (AP), Chandni Sacena (MSE), Christopher Scaduto (AM), William Schuessler (AP), Maya Sen (AM), Rikin Shah (AM), Vivek Singh (MSE), Stanley Snelson (AM), Theresa Starck (MSE), Samantha Tatora (AM), Sitaram Vangala (AM), Jason Wang (AM), Nathan Weiss (MSE), Robert Weniger (AM), Daniel Whitt (AM), Bo Xu (AM), Charles Young (AM), Aleksey Zelenberg (AM)

M.S.

Hayri Balcioglu (SS), Chitsun Chen (AM/CVN), Philip Chuang (MSE), Shun-Wei Hsu (MSE), Cheng-Ju Lin (MSE), Geng-Wei Lin (MSE), Chih-Hui Lo (MSE), Dennis Lo (AP), Pei Chin Luo (MP), William Martin (AM), Nikolaus Rath (PP), Niloofar Sahebalzamani (AM), Aaron Senter (PP), Emily Slutsky (MP), Neil Tandon (AM), Anthony Zacharakis (MSE)

M.Phil.

Austin Akey (MSE), Benoit Durand deGevigney (PP), Teresa Fazio (MSE), Masha Kamenetsky (SS), Avishai Ofan (SS), Yuri Zuev (SS)

Ph.D.

Brian Grierson (PP), Jeremy Hanson (PP), Joan Raitano (MSE), Francesca Terenzi (AM)

SIAM MATLAB Help Room

by Boris Grinshpun, B.S. 2010, Applied Mathematics

Are you new to MATLAB? Does your code refuse to run properly? Have no fear! All you need to do is visit the MATLAB Help Room.

For the past 4 years the Columbia University Chapter of the Society for Industrial and Applied Mathematics (CU SIAM) has operated a MATLAB Help Room. The Help Room is open weekly and staffed by volunteers experienced in working with MATLAB who provide individual help to anyone with MATLAB related issues. This semester the Help Room is open twice a week on Tuesdays and Fridays, and consists of 7 volunteers, 4 graduate students and 3 undergraduates.

Visitors to the Help Room have various levels of experience with using MATLAB, from beginners completing their first programming assignments to advanced users seeking help in writing code as part of their research. Students in the past have come from several departments in the engineering school seeking help on assignments and projects. Regardless of the difficulty of the problem, the help staff aims to work with the individual to tackle it. Challenges are welcome!

In addition to providing MATLAB help, the Help Room has also hosted a representative from MathWorks, who gave an introductory lecture on using MATLAB for physics applications, and for common tasks such as data import and analysis, working with equations, and visualization. Interested students learned new techniques and tools available to MATLAB users and were able to speak directly with the representative.

CU SIAM will continue the Help Room in the coming school year as a useful resource for students. Anyone with experience using MATLAB is encouraged to contact CU SIAM about becoming a volunteer in the Help Room.

ALUMNI NEWS

Bahram Jalali (Ph.D. '89, Applied Physics) was a featured speaker at the Columbia Symposium on Pure and Applied Science: Honoring Richard M. Osgood Jr. (See page 6 for more information about the Osgood symposium.)

Quinn Marksteiner (Ph.D. '08, Applied Physics, concentration in Plasma Physics) was an invited speaker at the American Physical Society's 50th Annual Meeting of the Division of Plasma Physics from November 17–21, 2008 in Dallas, Texas. (See page 4 for more information about the APS meeting.)

Timothy Merlis (B.S. '06, Applied Mathematics) attended the Plumbfest Symposium at Columbia University. He is currently a graduate student in Environmental Science and Engineering at the California Institute of Technology.

Matthew Witten (Ph.D. '04, Applied Physics, concentration in Medical Physics) was featured in the December 2008 *New York Times* article "Geography Has Role in Medicare Cancer Coverage". Witten currently runs the CyberKnife program at the Winthrop University Hospital in Mineola and is an advocate for the new radiation treatment for prostate cancer.

ALUMNI REUNION WEEKEND 2009

THURSDAY, JUNE 4 - SUNDAY, JUNE 7

APAM Lunch, Friday, June 5, 12:30 PM, Room 200 Mudd

<http://alumni.engineering.columbia.edu/reunion/>

Parallel Computing Mainstream in APAM

The cost of computing has plummeted by more than four orders of magnitude over the past 20 years, from a market-leading \$2,500 per installed Mflop/s in 1989 to about \$0.12 today, as represented by APAM's new 2.1 Tflop/s SiCortex system. (1 Mflop/s is one million arithmetic floating point operations per second, and 1 Tflop/s is a million times that.) As a result, computer simulation has become the modality of scientific discovery and engineering design of first resort in many fields, and is used to narrow the parameter space that must ultimately be explored by generally more expensive forms of physical experimentation. This is a far cry from the mantra of computer pioneers, such as R. W. Hamming of Bell Labs, who declared that the purpose of computing was "insight, not numbers."

APAM is therefore pleased to offer in-house cost-free access to a 1458-processor parallel computer for research and education, thanks to pooling of faculty start-up allowances and contributions from the department, Dean, and senior faculty. Beyond the new machine (in the renovated computer area in the Plasma Physics Laboratory on the first floor of Mudd) called "Amdahl" after the parallel computing pioneer from IBM, as consortium members, APAM'ers may also apply for privileged access to the super-computer currently ranked #28 in the world: a 100 Tflop/s, 36K-processor IBM BlueGene/L located at Brookhaven National Laboratory.

Users of Amdahl or BlueGene must convert their algorithms into a form that explicitly manages the passing of data between distributed memories. To this end, APAM post-doctoral researcher Ian Langmore, himself a relative newcomer to parallel computing, has been educating new users. (see related article below)

Parallel Computing for Dummies

by Ian Langmore, Postdoctoral Research Scientist

APAM's acquisition of two SiCortex clusters presents students and other researchers with an opportunity for parallel computation. Some, such as Ph.D. students Brian Grierson and Aron Ahmadi, and Prof. Chris Marianetti, have been able to jump right in and are using Amdahl's 1500 cores to their advantage. At the same time, a large percentage of Ph.D. students have a strong background in MATLAB, but lack the experience necessary to program a parallel machine. MATLAB provides users with a high level programming environment where issues such as memory management and variable typing are taken care of for you. Moreover, MATLAB provides a large library of easily accessible math functions. The free lunch ends however when one asks MATLAB to efficiently manage multiple processes in a distributed memory environment, or use high performance computational libraries (such as PETSc), or even run on many architectures (such as our SiCortex cluster). Instead, the world of parallel computing is dominated by the Message Passing Interface (MPI), as a library for lower-level languages such as C/C++/Fortran, all done within a Unix environment.

The workshop series this spring term, "Parallel Computing for Dummies", gave students a chance to get a "taste" of high-performance computing. The workshops were interactive: students brought laptops to class and worked out exercises planned by the instructor. Workshops were given in basic Unix skills, C programming, MPI, PETSc, and linking to/using outside libraries (in particular the GNU Scientific library). While these workshops were certainly not sufficient to turn novices into experts, they did provide students a chance to see what would be involved in making this transition. Moreover, a community of new users has been established.

In addition to the workshop series, APAM's Brian Grierson gave a "nuts-and-bolts" lecture on distributed arrays within PETSc and Prof. David Keyes gave a general theoretical introduction to scientific computing. (For more information see: <http://groups.google.com/group/apam-parallel-intro/web>)

Plasma Physics Meetings



Allen Boozer

The American Physical Society (APS) Division of Plasma Physics invited five Columbians to speak at its 50th Anniversary Annual Meeting in Dallas, Texas from November 17-21, 2008. Columbia participants included:

Allen Boozer, Professor of Applied Physics, gave a tutorial on the "Use of Non-Axisymmetric Shaping in Magnetic Fusion".



Michael Mauel

Michael Mauel, Professor of Applied Physics, representing the joint M.I.T.-Columbia superconducting levitated dipole project, gave a talk on "Improved confinement during magnetic levitation in LDX".



David Maurer

Jeremy Hanson, (Ph.D. '09), with the HBT-EP tokamak research project, spoke on "Feedback suppression of rotating external kink modes in the presence of noise".

Brian Grierson, (Ph.D. '09), with the CTX dipole basic plasma physics project, spoke on "Global and local characterization of turbulent and chaotic structures in a dipole-confined plasma".



David Maurer

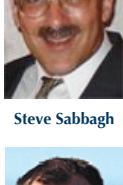
Quin Marksteiner, (Ph.D. '08), with the Columbia Non-neutral Torus (CNT) research project, spoke on "Observations of a Parallel Force Balance Breaking Instability in Non-neutral Plasmas Confined on Magnetic Surfaces".

Five other Columbians made presentations at the biannual IAEA Meeting on Controlled Fusion Energy in Geneva from October 13-18, 2008.



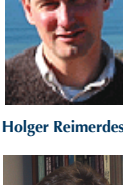
Darren Garnier

Dave Maurer, Adjunct Assistant Professor and Associate Research Scientist, representing the HBT-EP tokamak research project, spoke on "Control of Kink Modes Near the Ideal Wall Limit Using Kalman Filtering and Optimal Control Techniques."



Steve Sabbagh

Darren Garnier, Research Scientist, representing the joint M.I.T.-Columbia superconducting levitated dipole project, presented "Confinement Improvement with Magnetic Levitation in Superconducting Dipole".



Steve Sabbagh

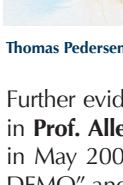
David Gates, (Ph.D. '94), presented "Overview of Results from the National Spherical Torus Experiment".

Steve Sabbagh, Adjunct Professor and Senior Research Scientist, spoke on "Advances in Global MHD Stabilization Research on NSTX".



Holger Reimerdes

Holger Reimerdes, Research Scientist, working with the DIII-D collaboration, spoke on "Wall-Stabilization and Its Limits in High Beta DIII-D Plasmas".



Thomas Pedersen

These meetings are the world's most prestigious in plasma physics, and the number of invitations awarded to members of Columbia's plasma physics program is evidence that quality science, hard work, and good results can make "large-size" impact even with a relatively small, but dedicated, team of plasma scientists!

Further evidence of Columbia's impact in plasma physics can be found in **Prof. Allen Boozer's** invited lecture to the European Physical Society in May 2008 in Crete, entitled "Stellarators and the path from ITER to DEMO" and in the 9th International Workshop on Non-Neutral Plasmas, hosted by Columbia University and organized by **Prof. Thomas Pedersen** in June 2008. (See Fall 2008 APAM Newsletter.)

Billinge Featured in *Scientific American*



Simon Billinge

Prof. Simon Billinge was featured in the article "Big Little Problem" by Mark Wolverton in the January 2009 edition of *Scientific American* magazine. An excerpt from the article is available at:

<http://www.apam.columbia.edu/announcements/>

Pinczuk Named 2009 Fellow of Academy of Arts and Sciences



Aron Pinczuk

Prof. Aron Pinczuk was named a 2009 fellow of the American Academy of Arts and Sciences. He specializes in the unique properties of semiconductors and is known as a leading experimentalist of inelastic scattering of light in two-dimensional systems. Pinczuk, originally from Buenos Aires, earned a Ph.D. in physics from the University of Pennsylvania in 1969 and holds numerous honors, including the Oliver E. Buckley Prize for

Condensed Matter Physics bestowed on him by the American Physical Society in 1994. He was affiliated with Bell Labs from 1978 to 2008.

Plumbfest 2008

APAM Professors, Lorenzo Polvani and Adam Sobel, along with Darryn Waugh from Johns Hopkins University, hosted a Symposium and Festschrift celebrating Prof. Alan Plumb's 60th Birthday.

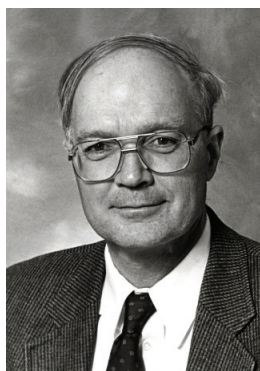
The symposium was held in the Davis Auditorium on Friday and Saturday, October 24-25, 2008. It ran a day and a half, and consisted of a dozen invited talks and a banquet at Tavern on the Green.

The symposium speakers included Isaac Held from GFDL/Princeton, John Marshall from M.I.T., Joan Alexander from NWRA/Boulder, Marv Geller from Stony Brook University, Lesley Gray from the University of Reading, Joanna Haigh from the Imperial College (London), Paul Newman and Mark Schoeberl from the NASA Goddard Space Flight Center, Bill Randel from the National Center for Atmospheric Research, Ross Salawitch from the University of Maryland, and Paul Kushner and Ted Shepherd from the University of Toronto.

Prof. Plumb, the honoree at the Symposium, is a Fellow of the Royal Society (UK) and the recipient of many prizes. He is one of the world's most eminent atmospheric scientists, and has made seminal contributions to the understanding of the ozone hole, the monsoon, and many other atmospheric phenomena. Prof. Plumb's was Prof. Sobel's doctoral dissertation advisor, as well as the postdoctoral supervisor of Prof. Polvani and Prof. Waugh at M.I.T.



(front row) Gang Chen, Lorenzo Polvani, Alan Plumb, Daniela Domeisen, Mary Eliff, Jessica Neu, Nikki Prive (back row) Gavin Esler, Cegeon Chan, Adam Sobel, Will Heres, and Darryn Waugh



(above and below)
Richard M. Osgood

Columbia Symposium on Pure and Applied Science: Honoring Richard M. Osgood, Jr.

The School of Engineering and Applied Science and the Departments of Electrical Engineering and of Applied Physics and Applied Mathematics sponsored the Columbia University Symposium on Pure and Applied Science: Honoring 40 Years of Contributions by Richard M. Osgood, Jr.

The symposium, which took place on Monday, January 5, 2009, was organized by Profs. Irving Herman, Keren Bergman, Tony Heinz, and Alan Willner. The all-day symposium in Davis Auditorium, followed by a formal dinner in Low Library, was attended by over 90 friends and colleagues.

Internationally renowned scientists covering the wide range of Prof. Osgood's interests in photonics, surface science, and nano-materials presented. Collectively, they have collaborated and interacted with him for 40 years. Invited speakers included:



(below)
Irving P. Herman

Steve Brueck, Department of Electrical and Computer Engineering, University of New Mexico

Vladimir Bulovic, Department of Electrical Engineering and Computer Science, M.I.T.

Nicholas Camillone III, Brookhaven National Laboratory

Erich Ippen, Department of Electrical Engineering and Computer Science, M.I.T.

Bahram Jalali, Department of Electrical Engineering, University of California, Los Angeles

Jim Misewich, Brookhaven National Laboratory

Peter Moulton, Q-Peak, Inc.

Alan Wilner, Department of Electrical Engineering, University of Southern California

Richard M. Osgood Jr. joined Columbia University in 1981 and became Higgins Professor of Electrical Engineering and Professor of Applied Physics and Applied Mathematics in 1988. He served as an associate director of Brookhaven National Laboratory from 2000-2002 and its acting Nanocenter Director, 2002. Prof. Osgood was, with Prof. Yang, a cofounder of the Columbia Microelectronics Sciences Laboratories (MSL), and has served as director or codirector of MSL and the Columbia Radiation Laboratory (CRL). He is a member of the ACS and MRS, and a fellow of the IEEE, OSA, and the APS. He was coeditor of *Applied Physics* (1983-95) and associate editor of the *IEEE Journal of Quantum Electronics* (1981-88). Prof. Osgood has served as a consultant to numerous research institutions and government agencies including M.I.T. Lincoln Laboratory. He is also on the DARPA Defense Sciences Research Council (Materials Research Council) and the Los Alamos National Laboratory Visiting Advisory Board (Chemical Sciences and Technology Division). Prof. Osgood has served as councilor of the Materials Research Society, as a member of the DOE Basic Energy Sciences Advisory Committee, and the scientific advisory board of Brookhaven National Laboratories. In 1991, he received the R. W. Wood Award from the Optical Society of America, and was invited to deliver the OIDA lecture at the Japanese Optical Association.



Alan Wilner, Asher Wilner,
and Richard M. Osgood



Chris Marianetti, Nader Zaki,
and Alex Harris



I.C. Noyan, Robert J. Von Gutfeld, James Misewich,
and Julian Chengjun Chen

For more photos of this event, please see:

http://www.apam.columbia.edu/announcements/osgood_photos/index.html

Farewell to Jimmy Florakis

After nearly fifty years at Columbia University and more than thirty years with the APAM Department, Mr. James "Jimmy" Florakis will be leaving our Applied Physics and Medical Physics Teaching Labs for well-deserved retirement.

In appreciation of his dedicated service to the department, Interim Dean Gerald Navratil, Prof. Irving Herman, Prof. Michael Mael, and John C. Arbo hosted a special lunch Jimmy and his family at the Terrace in the Sky restaurant on Thursday, May 21. Immediately following lunch, students, faculty, staff, and friends, gathered to say goodbye to Jimmy Florakis in the APAM department at a special reception held in his honor.

Jimmy was presented with a collection of photographs from decades of work in our teaching labs, and letters from students and staff. He was also presented with a plaque which read *"In appreciation for your more than 30 years of dedicated service to the Department, as supervisor of the teaching laboratories of our Applied Physics and Medical Physics Programs, and for nurturing our student in the safe and proper use of scientific apparatus."*

The department thanks Jimmy for his many years of service and commitment. He will be dearly missed.



The Florakis Family:
Christina, Cathy, George, Eleni, Helen, Jimmy, and Dean

Arbo Honored for Leadership and Service

On December 12, 2008, the Faculty of the Department of Applied Physics and Applied Mathematics honored John C. Arbo for his dedicated leadership and service to the department.



Irving P. Herman presents the award to John C. Arbo

"Jack" has been a cornerstone of the medical physics masters program from its beginning and has also contributed to the infrastructure of APAM in many ways over the years. As part of the celebration, Jack was presented a plaque that stated it was being presented as an *"Expression of Appreciation for your Leadership in the Development and Nurturing of the Medical Physics Program and for Twenty Years of Service as an Instructor of Outstanding Quality and Dedication."*

IN MEMORIAM

We are sad to announce the passing of Harold J. Waddlegger (October 9, 1920 - April 7, 2009).

From 1982 until he retired in 1990, Harold was the Shop Foreman for the research laboratories in our department. Previously, from 1968 until 1978, his title was Instrument Maker in Columbia's Office of Research Services; from 1978 through 1981 he was the Senior Machinist in the Department of Civil Engineering.



Harold J. Waddlegger
1920-2009

Harold is remembered not only as an expert machinist, but as a dedicated colleague, an unflappable shop supervisor, and a good friend.

DEPARTMENT OF APPLIED PHYSICS & APPLIED MATHEMATICS FUND

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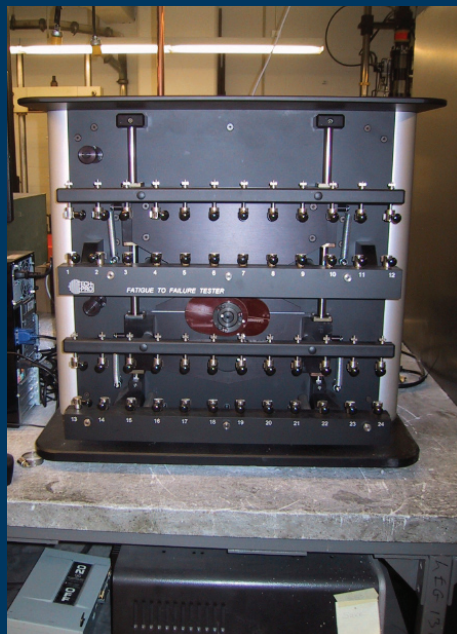
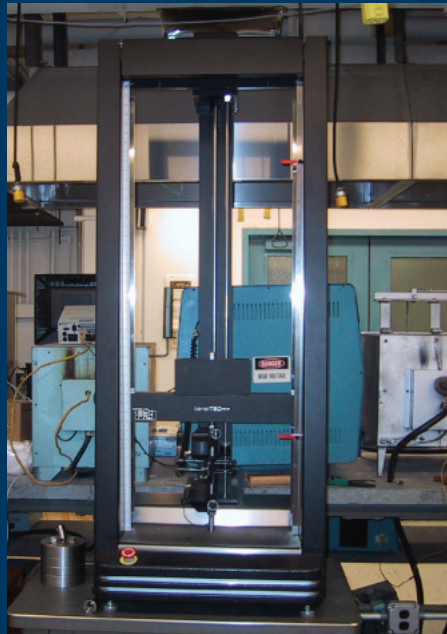
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Prof. Irving P. Herman, Chair
Department of Applied Physics & Applied Mathematics at Columbia University
500 W. 120th Street, 200 Mudd, Mail Code 4701, New York, NY 10027

Key Donation to MSE Teaching Lab

The Department received a wonderful and most generous donation of state-of-the-art materials testing equipment from Kay, John, and Matthew Putman. This includes instruments that measure viscosity, rheological properties, fatigue and failure, filler dispersion, and stress vs. strain. This donation thoroughly upgrades and modernizes the Department's materials science and engineering undergraduate teaching laboratory. It also serves as a new vital part of the Department's shared materials characterization equipment for research. Many thanks to the Putman family!



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Photos/Images: Cassia Beierle, Chad Gurley, Nicholas Rivera, Christina Rohm, & Allan Wilner

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We welcome submissions for our next newsletter. Please contact us at the mailing address listed above or at:

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