

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



2010 APAM Alumni Lunch: (front row, left-right) Rui He, Ruth Griswold, Dean Feniosky Peña-Mora, Sarah Angellini, William Lupatkin, Prof. Siu-Wai Chan, Prof. Aron Pinczuk, Prof. Irving Herman, (back row, left-right) Thomas Klinger, Timur Dykhne, Prof. Chris Marianetti, and Prof. David Keyes



Dear Alumni and Other Friends of APAM:

Our department warmly welcomes our new undergraduate and graduate students, postdoctoral scientists, and research scientists to APAM, and hopes that each of you has a splendid career and life here at Columbia! We are very proud of each of you. (We are very proud of our continuing students, scientists, staff, and faculty, and of our alumni and friends as well!)

This issue details the awards and honors bestowed upon our faculty, research scientists, and graduate students, including Steve Sabbagh, Adam Sobel, Pavol Juhas, Andrew Ying, Arunabh Batra and Teresa Fazio! We profile visits from old friends and alumni, and articles about Adrian Haimovich and Chris Scholz. We also highlight the ground-breaking paths set by Chris Wiggins, C. Julian Chen, Simon Billinge, and our Plasma Physics effort (in science and in long-distance running), and a historic landmark in the professorial career of Richard Osgood.

We mourn the passing of Art Nowick, a distinguished professor, and Stephen Schneider, a highly honored alum, whose brilliant science careers and service have and will continue to provide extraordinary inspiration for us all.

Please stay in contact, and follow us on Facebook and Twitter!

Best,

Irving P. Herman
Chair, APAM

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Batra and Fazio Receive NSF Fellowships



Arunabh Batra & Teresa Fazio

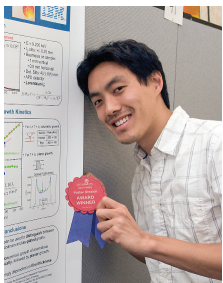
The National Science Foundation (NSF) has awarded two Graduate Student Fellowships to APAM students.

Arunabh Batra, a graduate student in Solid State Physics working with Prof. Latha Venkataraman, received the fellowship this year. The Venkataraman group works to measure fundamental properties of single molecule devices, seeking to understand the interplay of physics, chemistry and engineering at the nanometer scale. The underlying focus of their research is to fabricate single molecule circuits, a molecule attached to two electrodes, with varied functionality, where the circuit structure is defined with atomic precision. Their experiments provide a deeper understanding of the fundamental physics of electron transport, while laying the groundwork for technological advances at the nanometer scale. Arunabh is currently working on new methods of fabricating molecular circuits using carbon nanotube electrodes. This method would provide a new platform for exploring electronic conductance, molecular structure, and coupling between molecules and one-dimensional electrodes.

Batra follows in the footsteps of Teresa Fazio, a graduate student in Materials Science and Engineering working with Prof. Shalom Wind, who is a continuing awardee. Fazio studies protein-DNA interactions which repair cancer-causing mutations. This requires massively parallel single-molecule biophysics experiments. "As a materials science student, I fabricate nanoscale patterns on microscope slides to tether DNA molecules in organized arrays, improving the throughput of these experiments by two orders of magnitude over previous methods. Currently, my work focuses on fluorescently labeling DNA molecules at precise locations to create optical maps of the genome" said Fazio.

The NSF Graduate Research Fellowship Program recognizes outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees in the U.S. and abroad. Fellows share in the prestige and opportunities that become available when they are selected. Fellows benefit from a three-year annual stipend of \$30,000 along with a \$10,500 cost of education allowance for tuition and fees, a one-time \$1,000 international travel allowance and the freedom to conduct their own research at any accredited U.S., or foreign institution of graduate education they choose.

Ying Wins NSLS/CFN Poster Session Award



Andrew Ying

Approximately 500 visiting scientists, staff members, and funding representatives gathered at Brookhaven National Lab from May 24-26, 2010 for the joint Climate Change, Clean Energy Define NSLS/CFN Users' Meeting, which emphasized climate change and the tools scientists are using to combat it.

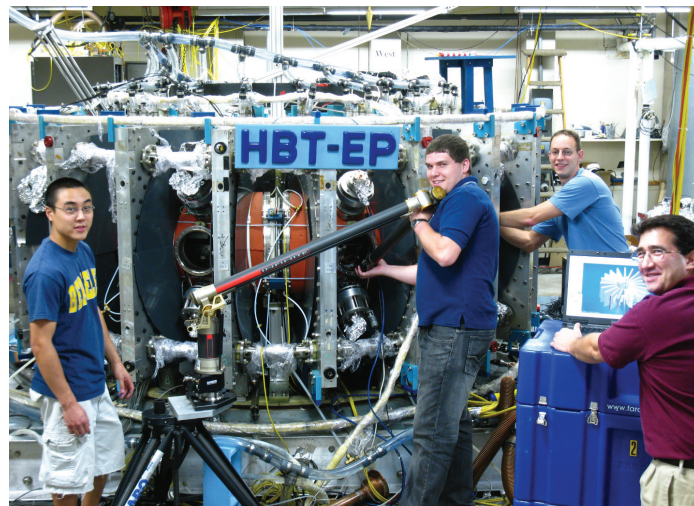
Materials Science and Engineering graduate student, Andrew Ying, who works with Prof. I.C. Noyan and recently earned his Ph.D., was one of the winners of the poster session for his presentation on "X-ray Diffraction Study of Anomalous Recrystallization Kinetics in Electroplated Copper Films".

APAM Students Conduct Novel Experiment

APAM students and scientists conducting the largest applied physics experiment on campus are taking their final steps, as they reassemble the world's most highly instrumented tokamak used to study advanced control methods for fusion energy.

Graduate student Jeff Levesque has been working with APAM professors Michael Mauel and David Maurer, along with metrology experts from the Princeton Plasma Physics Laboratory, to precisely measure the locations of more than 250 sensors and 120 control loops throughout the two-meter diameter of the HBT-EP tokamak. A tokamak is a magnetic confinement device that is the world's most-studied candidate for producing controlled thermonuclear fusion power.

Over the summer, undergraduate and graduate students wound, assembled, wired, installed, calibrated and tested the more than 400 coils that surround the plasma inside the tokamak. The final assembly step required them to make precise measurements on where all of the coils are located. In September, the tokamak was used to heat



APAM graduate students Daisuke Shiraki, far left, and Jeff Levesque, second from right, with Penn State engineering intern Jonnathan Cummings, middle, and Princeton Metrology expert, Steve Raftopoulos, acquire detailed position measurements of the newly installed tokamak sensors and controllers.

hydrogen gas to more than one million degrees and confine the high-temperature ionized gas with strong electromagnets. The tokamak itself is an experiment to see if, as Mauel explains, "our 400 newly installed and precisely aligned coils can be used to control the fine structure of the edge of the million-degree plasma."

The tokamak, located on the first floor of the Mudd building, is used to develop, test and understand methods to control instabilities that may disrupt the operation of future fusion power plants. Mauel and his colleagues, including Maurer and Prof. Gerald Navratil, have pioneered active control techniques that will be used in upcoming experiments in the ITER device (the international fusion experiment, being built in France) that will produce fusion energy at the scale of a power plant.

"This summer has been a terrific opportunity for our students," says Mauel. "They have gained unmatched hands-on experience, learned a lot about interdisciplinary engineering, and developed strong applied science skills."

Haimovich, B.S. '10, Featured in *Engineering News*



Adrian Haimovich

Adrian Haimovich (B.S. Applied Mathematics, '10) was featured in the article "Predicting Diseases" in the Spring 2010 Leaders Making an Impact Issue of *Columbia Engineering News*.

Seven major diseases - diabetes types I and II, bipolar disorder, high cholesterol, coronary artery disease, rheumatoid arthritis, and high blood pressure - may be reliably predicted based on analysis of genome-wide association studies (GWAS), while unlocking complex problems like the biological cause of cancer - the second-leading cause of all deaths.

As researchers delve further into network-based biology, investigators have found themselves increasingly reliant on not only clinical knowledge, but also statistics, computational sciences, and mathematics. Adrian Haimovich '10, an applied mathematics major, has been interested in computational biology since the 9th grade.

By the time he finished high school, he had several years of summer lab experience as well as an academic publication. Upon arriving at Columbia Engineering, he sought out those professors whose work provided the foundation of his own research, including electrical engineering Prof. Dimitris Anastassiou. Anastassiou's genomics research spans seven major diseases and is of a computationally challenging scale. His work applies tools from electrical engineering to problems in quantitative biology.

"While working on those large-scale genomic data, I became interested in applications of Prof. Anastassiou's ideas in information theory to other types of clinically relevant problems," says Haimovich, specifically those that trace physiological responses, in the form of gene expression, to either medical conditions or experimental protocols. By junior year, Haimovich had begun to work with new datasets based on the clinical condition sepsis, which is characterized by severe systemic inflammation.

He looked to extend the work on sepsis under the supervision of Prof. Chris Wiggins of the APAM Department. Wiggins suggested using machine learning methods central to his own lab's work to help Haimovich analyze his data. Working in the Wiggins group, Haimovich applied support vector machine (SVM) techniques using data from patients who were treated with either an endotoxin or placebo. The results from this work indicate genes that are strong classifiers for sepsis. The work continues as Haimovich looks to use SVMs to make clinical studies more efficient.

"Engineering mathematics is a powerful and elegant way to look at a biological problem," says Haimovich, "and computational biology can be used to make great advances in patient care."

2010 SEAS Alumni Reunion & Dean's Days Weekend

SEAS Alumni from all class years visited the Columbia campus as part of the Alumni Reunion and Dean's Days Weekend from June 4-5, 2010. As part of the festivities, the Dean sponsored departmental luncheons. APAM alumni in attendance included:

Sarah Angelini (B.S. '05, Applied Physics) earned her M.S. in Nuclear Science & Engineering at M.I.T. and was employed at Schlumberger. She returned to APAM this fall to start her Ph.D. in Applied Physics.

Ruth Griswold (B.S. '05, Applied Mathematics) is currently working on a Ph.D. at the Mount Sinai School of Medicine.

Rui He (Ph.D. '06, Solid State Physics) is a postdoc working in the Columbia Center for Integrated Science and Engineering (CISE).

John Klinger (B.S., Applied Physics, '70) earned his Ph.D. in Physics from Cornell University in 1978. He is currently a Staff Engineer working on software for unmanned air vehicles at Proxoy Aviation Systems in Germantown, MD.

William Lupatkin, M.D. (Ph.D. '70, Plasma Physics) is currently a pediatrician in Morristown, NJ.

Alumni Updates

Hubert Burke (Ph.D. '95, Solid State Physics) is embarking upon on a second career. He is working on his first movie that he is writing, composing the sound track for, acting in, and directing.

Alex Casti (Ph.D. '99, Applied Mathematics) is an Assistant Research Professor in the Center for Molecular and Behavioral Neuroscience at Rutgers and an APAM Adjunct Associate Professor.

Steffen Kaldor (Ph.D. '02, Materials Science & Engineering) currently works at IBM's advanced 300mm semiconductor fabricator in East Fishkill, NY, as the manager of manufacturing process integration and yield improvement. He and his wife LuAnn, have two sons, Sebastian and Alexander.

Irina Kalish (CVN M.S. '07, Materials Science & Engineering) welcomed daughter, Abigail Lydia Kalish, born on April 15, 2009.

Theodore Moustakas (Ph.D. '74, Solid State Physics) presented a talk at an Optics Seminar this fall at Columbia. He has been a Professor of Electrical and Computer Engineering since '87, a Professor of Physics since '91, and a Faculty Member of the Center for Photonics Research since '94 at Boston University. He is currently the director of the Wide Bandgap Semiconductor Lab. He held research and visiting faculty positions at Harvard, Princeton, MIT, Aristotle University, IBM Watson Research Lab, and Exxon Corporate Research Lab. His research contributions cover a broad spectrum of topics in opto-electronic materials and devices, including nitride semiconductors, amorphous semiconductors and diamond thin films. He is the co-editor of 8 books and the author of more than 300 publications. He has been granted 25 U.S. patents and several are pending. Intellectual property that resulted from his work has been licensed to a number of companies, including major manufactures of blue LEDs and lasers (Cree and Philips LumiLeds in the U.S. and Nichia in Japan). He was elected a Fellow of the American Physical Society in '94 and of the Electrochemical Society in '97. He was awarded an honorary doctoral degree from Aristotle University in '03 and the MBE Innovator Award in '10.

Manju Prakash (Ph.D. '85, Plasma Physics) writes "My Ph.D. in theoretical plasma physics provided me an opportunity to make an impact on unexplored territories of science, both as a scientist and an educator. At SUNY Stony Brook, I produced scholarly research papers in quark-gluon plasmas based on the observational data available at Brookhaven National Lab. I also explored the role of plasma processes in the realms of accreting matter in binary stars. I advanced my career in nano-devices and nanofluids while at Cornell. After gaining some experience in technology/nanotechnology at Intel, I decided to teach advanced placement physics courses at the Maine School of Science and Math and the Wilbraham & Monson Academy. Currently, I am a physics faculty member at Linden Hall in PA."



Steven Sabbagh

Sabbagh Elected APS Fellow

Steven Sabbagh, Adjunct Professor of Applied Physics and APAM Alumnus (Ph.D. '90, Plasma Physics), was elected a Fellow of the American Physical Society upon recommendation from the APS Division of Plasma Physics.

The citation, which will appear on his Fellowship Certificate, will read *"For leadership in advancing the understanding of magnetohydrodynamics equilibrium, stability, rotation damping and active feedback control of high-beta tokamak and low-aspect ratio tokamak plasma"*.

Following his Ph.D., Sabbagh became a research scientist in the APAM Department and also began work on the Tokamak Fusion Test Reactor at the Princeton Plasma Physics Laboratory. He is a world-renowned plasma physicist, author or co-author of over 200 scientific publications, and leader of the NSTX experimental research group on fusion plasma stability.



Christopher Scholz

Scholz Featured in *Columbia News*

Christopher Scholz, Professor of Earth and Environmental Sciences and Professor of Applied Mathematics, was featured in the *Columbia News* article "Like Fireflies, Earthquakes May Fire in Synchrony: Small Stresses Might Bring Big Results". See: www.earth.columbia.edu/articles/view/2702

Columbia Scientists Present Results at 23rd IAEA Fusion Energy Conference

Columbia scientists, adjunct faculty, and alumni recently presented their latest results at the 23rd International Atomic Energy Agency (IAEA) Fusion Energy Conference in Daejeon, Korea from October 11-16, 2010.

Dr. Darren Garnier, APAM Research Scientist, gave a lecture on "Turbulent Particle Pinch in Levitated Superconducting Dipole" and also presented the results from the partner experiment RT-1 located at the University of Tokyo. Dr. Steve Sabbagh, Adjunct Professor of Applied Physics and APAM Alumnus (Ph.D. '90, Plasma Physics), presented a talk entitled "Resistive Wall Mode Stabilization and Plasma Rotation Damping Considerations for Maintaining High Beta Plasma Discharges in NSTX". Dr. Holger Reimerdes, former APAM Research Scientist, presented a lecture on, "Non-ideal Modifications of 3D Equilibrium and Resistive Wall Mode Stability Models in DIII-D". Also making presentations were APAM alumni, Prof. Chris Hegna (Ph.D. '89, Plasma Physics), now at University of Wisconsin, who reported, on "High-beta physics of magnetic islands in 3-D equilibria", and Dr. M.S. Chu (Ph.D. '71, Plasma Physics), now at General Atomics, who presented a report entitled, "Response of a Resistive and Rotating Tokamak to External Magnetic Perturbations Below the Alfvénic Frequency".

This is the largest international fusion conference ever sponsored by the IAEA, indicating the growing world-wide activity to develop environmentally-friendly fusion energy. For more information, please see: www.fec2010.kr/



Adam Sobel

Sobel Wins 2010 Lamont Mentoring Award

Prof. Adam Sobel won the 2010 Mentoring Award given by the Lamont-Doherty Earth Observatory. He was promoted to Full Professor as of July 1, 2010 and was also the 2010 recipient of the American Meteorological Society's Clarence Leroy Meisinger Award.

Sobel holds a joint appointment with the APAM Department and the Earth and Environmental Science Department and is a member of Lamont's Division of Ocean and Climate Physics. His areas of expertise include atmospheric science, geophysical fluid dynamics, tropical meteorology, and climate dynamics.



Richard Osgood

Osgood Graduates his 50th Doctoral Student

Richard M. Osgood, Jr., Higgins Professor of Electrical Engineering and Professor of Applied Physics, recently graduated his 50th doctoral student. This major milestone hallmarks Prof. Osgood's stellar and distinguished career. His latest graduate, Dr. Avishai

Ofan, was an applied physics student who recently deposited his Ph.D. dissertation titled "Physics of Heavily Implanted Single Crystal Complex Oxides". Dr. Ofan is currently working as a postdoctoral scientist at Brookhaven National Lab.



C. Julian Chen

Chen Featured in *New York Times*, *Scientific American*, & *Chronicle*

C. Julian Chen, Adjunct Professor in Applied Physics and Senior Research Scientist, (former student of Prof. Osgood), was featured in *The New York Times* - "Solar-Powered White House No Longer a 'Kooky' Idea", *Scientific American* - "Where Did the Carter White House's

Solar Panels Go?", and *The Chronicle of Higher Education* - "Unity College Gives Solar Panels From Carter White House to China".

The Chronicle of Higher Education states "Unity College, in Maine, will give 2 solar panels to a Chinese solar-energy entrepreneur, to be placed in a museum in China. These aren't just any old solar panels. They are part of an array of 32 panels that once produced hot water for the White House during President Jimmy Carter's administration, but were taken down when Ronald Reagan took office."

Prof. Chen helped arrange the donation of the solar panels to the Solar Science and Technology Museum in China. In *Scientific American* Chen states "In the U.S. everyone already has a hot water system heated by natural gas, oil or electricity. More than 80 percent of Chinese people do not have hot water; they need it. If you start from scratch, the solar water heater is cheaper."

In *The New York Times* he states "The energy problems that trouble other large economies, such as Japan, China and India have made them far more serious about pursuing alternative energy than the United States. For many many decades, the United States was the absolute leader of renewable energy applications, then we let our position slip. It's time to take it back."



Simon Billinge

Billinge Featured in *MRS Bulletin*

Simon Billinge, Professor of Materials Science and Engineering in the APAM Department at Columbia University, and Paul Evans, Associate Professor of Materials Science and Engineering at the University of Wisconsin-Madison, were guest editors and wrote the introductory article for the July 2010 issue of *MRS Bulletin* on "Advances in Scattering Probes for Materials".



This issue discusses developments in structural, imaging, and dynamic probes of materials based on x-ray, neutron, and electron scattering. The cover shows examples of intermediate clusters that were found by the novel LIGA algorithm during the discovery of a successful structure solution of a C60 molecule from neutron pair distribution function data. This was the first example of an *ab initio* nanoparticle structure solution from neutron (or x-ray) diffraction data.

(*MRS Bulletin* cover image courtesy of: Pavol Juhas, Marlene Cameron, and Simon Billinge.)

Billinge Group News:

Juhas Receives EPDIC Prize for Young Scientists

Pavol Juhas, an Associate Research Scientist working with Prof. Billinge, was awarded the 2010 European Powder Diffraction Conference (EPDIC) Prize for young scientists for outstanding achievement in the field of powder diffraction. Juhas received the award for his NSF-funded work on the LIGA structure solving algorithm.

The prize, sponsored by PANalytical includes a monetary prize and an opportunity to present a plenary talk at an EPDIC conference. PANalytical is a proud supporter of EPDIC, the only European conference dedicated to all aspects of diffraction analysis of polycrystalline materials. EPDIC, which was first held in 1991, is a focal point for all researchers involved in the field of powder diffraction.



Chris Wiggins

Wiggins Featured in *Wall Street Journal*, *The Deal Magazine*, *New York Observer*, & *Business Insider*

Prof. Chris Wiggins was featured in the articles "Steering Grads to Start-Ups" by Shira Ovide in the *Wall Street Journal*, "Mecca on the Hudson" by Mary Kathleen Flynn in the *Deal Magazine*, and "Fighting for Number Two: Why Aren't New York Start-Ups Recruiting in Boston?" by Leon Neyfakh in the *NY Observer*. The articles highlight his work with HackNY.org - a "sustainable, repeatable summer program matching computationally and quantitatively expert NYC students with NYC startups" to:

- Assist in funding student summer internships
- Provide pedagogical lectures to develop needed skills which are not obtained in traditional curricula
- Establish a community of NYC tech/entrepreneurship-oriented students
- Strengthen the community of NYC tech-oriented startups
- Strengthen the entrepreneurial community in NYC more generally
- Facilitate quantitative and computational students securing entrepreneurial opportunities post-graduation

Business Insider also named him one of New York's Coolest Tech People in 2010. See below for information about the 2010 Hackathon.

Wiggins Group News:

Dewar Featured in Numerous News Sources

Michael Dewar, a postdoc working with Prof. Wiggins, has done a statistical analysis and visualization of the Afghanistan data from wikileaks.org. This analysis has been picked up by numerous news sources already (*Wired*, *Atlantic Monthly*, *Der Spiegel*, as well as aggregators favored by tech-types such as *Hacker News* and *Reddit*). He and his collaborator (a graduate student at NYU) will soon release video results.

HackNY: Fall 2010 Hackathon

HackNY's fall 2010 hackathon took place on Saturday, October 9, 2010 at New York University's Courant Institute of Mathematical Sciences. The hackathon, which was attended by over 200 students from 33 universities, was the grand finale of the NYU Startup Week (a student organized series of events and panels and hosted by Tech@NYU).

Prof. Chris Wiggins, along with Hilary Mason (bit.ly) and Evan Korth (NYU), founded HackNY in February 2010 and held the first hackathon this past April. Winning teams were selected to present their hacks to more than 700 people at a New York Tech Meetup.

Fourteen companies, such as Aviary, Meetup, and Drop.io, were on hand to demo APIs and datasets to students. David Tisch (TechStars New York), Christopher Poole (4Chan's), Rich Frankel (Track.com) and Michael Myers (Examiner.com) were just some of the volunteer ambassadors available to answer programming questions. Fueled by snacks and caffeine, students hacked all night, working right up to the very end of the 24-hour deadline.

Matylda Czarnecka from TechCrunch reports "From Columbia University, Kui Tang, Zhehao Mao, Tanay Jaiburia, Sid Nair, Cecilia Schudel and Moses Nakamura are building a recommendation engine for groups using Hunch's API as a solution to the tedious question of 'where should we all eat tonight?' The hack assembles the tastes of each group member, balancing them out to recommend something everyone can agree on. The group plans to place more weight on dislikes than likes to avoid suggesting anything a group member might loathe."

For more information about this year's hackathon, see: <http://hackny.org/>

In Memoriam: Arthur S. Nowick, Professor of Metallurgy and Materials Science



Arthur Nowick
1923-2010

Arthur S. Nowick died on July 20 at age 86 of heart arrhythmia while swimming near his home in Newport Beach, California. He was a pioneer in the field of internal friction, anelasticity, and crystal defects.

He is the author of more than 200 publications in a wide range of fields in materials science and solid-state physics. His 1972 book *Anelastic Relaxation in Crystalline Solids*, co-authored with Brian S. Berry, is widely recognized as the definitive treatise on internal friction and anelasticity. He is author of the 1995 book *Crystal Properties via Group Theory*. He

is coeditor of two additional books on diffusion in solids. He was also Ph.D. advisor to nearly 30 students.

Dr. Nowick was the 1994 recipient of the David Turnbull Lectureship, bestowed by the MRS in recognition of career contributions to the fundamental understanding of the science of materials. The award cited his "pioneering work in anelastic and dielectric behavior in fast ion conductors, and in amorphous alloys," his "profound contributions to the understanding of grain boundary motion, morphological stability, the structure of surfaces and interfaces, and flow and diffusion as stochastic phenomena," and "his excellence in teaching and writing." His Turnbull Award Lecture, titled "The Golden Age of Crystal Defects," elucidated the emergence of an understanding of crystal defects and explained his seminal contributions and those of his collaborators.

Dr. Nowick also received the Achievement Award from the American Society for Metals (1963), the A. Frank Golick Lectureship from the University of Missouri, Rolla (1970), and the Gold Medal from the 9th International Conference on Internal Friction and Ultrasonic Attenuation in Solids (1989). He was a Fellow of the American Physical Society and of the Metallurgical Society of AIME. In 1987 he received the Great Teacher Award from Columbia University.

Dr. Nowick received his bachelor's degree in Physics from Brooklyn College in 1943 and his master's and Ph.D. degrees from Columbia University in 1948 and 1950. From 1949-1951 he was a postdoctoral fellow with Clarence Zener at the University of Chicago.

He began his professional career in 1951 as an Assistant, and then Associate, Professor of Metallurgy at Yale University. In 1957, he moved to head the metallurgy group at the new IBM T. J. Watson Research Center. In 1966, Dr. Nowick accepted a position at Columbia University and spent the main part of his career as a Professor of Metallurgy and Materials Science at Columbia University in the Henry Krumb School of Mines, which ultimately became part of the School of Engineering and Applied Science. At the time of his retirement to emeritus status in 1993, he held the Henry Marion Howe Professorship. In 2001, he moved to California, where he held a position of Visiting Researcher in the Department of Chemical Engineering and Materials Science at the University of California, Irvine, until the time of his death.

Dr. Nowick was esteemed by his former students, colleagues, and members of the scientific community. Prof. Harry L. Tuller, of the Department of Materials Science and Engineering at MIT, comments:

"I was one of Art's doctoral students at Columbia graduating in 1973 and until today, nearly 40 years later, I still appreciate his influence on my academic training, my research and my teaching. He was a wonderful role model. What is more, I can honestly say that my present career path, as faculty member at MIT, was directly due to his advice and support."

Prof. Irving P. Herman, Chair of the Department of Applied Physics and Applied Mathematics, and Director of the Materials Research Science and Engineering Center, at Columbia University, recalls his interactions: "When I arrived at Columbia in 1986, Art Nowick was one of the clear leaders in the materials science effort. He also led the Committee on Solid State Science and Engineering, which bound together the efforts in several departments on campus. Since then, solid state and materials physics has been flourishing at Columbia, in part to Art's interdepartmental leadership. I interacted with him many times in this effort, and always found him to be a wise and very kind person." Prof. Richard M. Osgood, Jr., Higgins Professor of Electrical Engineering and Applied Physics at Columbia University, adds: "When I joined Columbia, he was carrying out beautiful experiments showing the physics of ion-mediated conductivity in glass. He also managed to hold together the vision of Columbia's commitment to high-quality, physics-based materials science. He was a real standout in the materials community: a great scientist and a terrific person."

"Art Nowick was one of the clear leaders in the materials science effort. He also led the Committee on Solid State Science and Engineering, which bound together the efforts in several departments on campus. Since then, solid state and materials physics has been flourishing at Columbia, in part to Art's interdepartmental leadership."

- Prof. Irving Herman

Prof. Martin E. Glicksman, Florida 21st Century Scholar in the Department of Materials Science and Engineering at the University of Florida and member of the National Academy of Engineering, remarks: "I've known him for almost 50 years, and admired greatly his works at Columbia University. The world has lost a truly great human being." Prof. Theodore Moustakas (Ph.D. '74, Solid State Physics), of the Departments of Electrical and Computer Engineering and Physics and Director of the Wide Bandgap Semiconductor Laboratory at Boston University, concludes: "Art's care and guidance has truly shaped my professional career. I wish I had the chance to tell him this before he departed."

In addition to being an outstanding materials scientist, Dr. Nowick was also an accomplished pianist, with wide-ranging interests in classical music and jazz. His friends, colleagues and students often enjoyed his in-home concerts.

Dr. Nowick is survived by his wife of 60 years Joan; their sons Jon, Steve, Alan, and James; his sons' respective spouses Pauline, Martha, Irene, and John; and his grandson Jordan.

In Memoriam: Stephen H. Schneider, Ph.D. '71



Stephen Schneider
1945-2010

Stephen H. Schneider (Ph.D. '71, Plasma Physics), professor at Stanford University and a leading researcher in climate change, passed away in July 19, 2010 in London at the age of 65.

Schneider, who grew up on Long Island, earned an undergraduate degree in mechanical engineering in 1966, and a Ph.D. in mechanical engineering and plasma physics in 1971 at Columbia University. He worked with Prof. C.K. Chu during the time when the plasma physics program resided in the Mechanical Engineering Department.

He was a postdoc at the NASA Goddard Institute for Space Studies and the National Center for Atmospheric Research. He joined the Stanford faculty in 1982 and was awarded a MacArthur "genius" Fellowship that same year for his ability to bring global climate issues to the public through lectures, teaching, Congressional testimonies and the news media. At Stanford, he was the Melvin and Joan Lane Professor for Interdisciplinary Environmental Studies, professor of biological sciences, professor (by courtesy) of civil and environmental engineering, and a senior fellow in the Woods Institute for the Environment.

Dr. Schneider authored the books *Science as a Contact Sport: Inside the Battle to Save Earth's Climate*, about his experiences with the public debate over climate change, and *Patient from Hell*, about his battle with mantle cell lymphoma.

He advised the administration of every president from Nixon to Obama and was part of a United Nations panel on climate change that shared the 2007 Nobel Peace Prize with former Vice President Al Gore.

According to his *New York Times* obituary, Mr. Gore has called Dr. Schneider "a prolific researcher and author, co-founder of the journal *Climatic Change* and a wonderful communicator" who greatly contributed "to the advancement of climate science."

Staff News

Welcome Wesley Hattan: Wesley Hattan joined the Department as the Assistant to the Director of Materials Science and Engineering. He comes to us with several years of administrative and managerial experience, most recently as an administrator at Good Shepherd Services, a leading youth development, education and family service agency that serves over 20,000 program participants a year. There he served as the Executive Assistant to the Director for Residential Programs and to the Director of Social Services. He also has a background in physics and mathematics and has taught culinary mathematics at New York City College. We are delighted that he is now a part of the APAM Department administrative team!

Garcia Joins the 25-Year Club: Michael Garcia, the APAM Department Financial Assistant, (pictured below with President Bollinger), joined the Columbia 25-year club this past spring. He joins Dina Amin (Department Administrator), Marlene Arbo (Program Coordinator), and Nick Rivera (Plasma Lab Staff Associate) in this distinction.



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Plasma Lab Runs Half Marathon

Congratulations to the students and faculty of the Plasma Physics Lab who ran the Brooklyn Half Marathon on May 22, 2010! Photo: (front row, left-right) Patrick Byrne, Jeffrey Levesque, Michael Mauel, Gerald Navratil, Daisuke Shiraki, Bryan Debono (back row, left-right) Matt Worstell, Paul Brenner, David Maurer, Nikolaus Rath, Xabier Sarasola-Martin, and Aaron Senter

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