



**Brain power.** Unraveling molecular mysteries. Modeling aging-friendly communities. Wedding digital technology to scholarship. Research at the **University at Albany** is extending the boundaries of knowledge and building a critical mass of expertise to power the 21st Century.



Biosensors that can detect toxins and tiny fuel cells that can power cell phones are two possibilities of tomorrow that are the focus of research efforts today at the University's new Center of Excellence in **Nanoelectronics**.

---

---

---

Established in 2001 with \$100 million in support from IBM and \$50 million from New York State, the Center builds on UAlbany's strength as a research leader in microelectronics and advanced materials and as a resource for high-tech industries.

Nanoelectronics, with its focus on the ever tinier structures that are at the heart of ever-more-powerful computer chips, is considered a vital "enabling" technology for applications in fields as diverse as telecommunications and medicine.

The new \$150 million investment is enabling UAlbany to build the first university-based 300-millimeter computer wafer prototyping and workforce training facility in the world, designed to provide support to the semiconductor industry as it moves to the next generation of computer chips, with their ever tinier transistors, on the 300-millimeter, or 12-inch wafer platform.

The University's new School of Nanosciences and Nanoengineering, the first interdisciplinary school of its kind in the U.S., will be housed in the new facilities now under construction, along with a business incubator. The new school, also established in 2001, will offer cross-disciplinary doctoral and master's degree programs that prepare students for the high-tech challenges ahead in nanotechnology.



The University at Albany has launched a major new effort that will invest more than \$100 million to dramatically expand its capabilities in **life sciences research**.

---

---

---

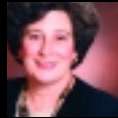
---

Building on the University's research strength in genomics and biomedical sciences, the new Life Sciences Research Initiative will extend and complement work in those areas. UAlbany's expertise in nanotechnology, microelectronics and advanced materials is already being applied to biological and medical problems, and this initiative will also strengthen such cross-disciplinary research efforts. All these collaborative efforts aim to help build the region's biotechnology industry and drive economic growth.

The keystone of this initiative is the University's new \$78 million, 194,000-square-foot Life Sciences Research Building, now rising on campus and scheduled for completion in 2004-05, and the goal is to recruit and retain world-class life sciences researchers and research teams. The building will provide state-of-the-art space and facilities essential to support the collaborative enterprises that characterize so much research today.

Researchers at the University's Center for Comparative Functional Genomics (CCFG) are advancing understanding of genetic processes. With one of its partners, Taconic Biotechnology, Inc., CCFG has established a Mutant Mouse Regional Resource Center, one of only three in the country, funded at \$4.5 million by NIH to advance the use of mice as models for the genetic dissection of such human diseases as cancer, arthritis, and diabetes.

**When IBM pledged \$100 million last year** to support nanosciences research at the University at Albany, it was an historic moment. Not only was it the largest donation ever to the University, but it was also the single largest such donation in IBM's history. IBM's pledge was a dramatic recognition of how we have grown as a research university and of where we are heading. Today, in laboratories and offices across our three campuses, UAlbany faculty are working to reduce medical errors, to design faster, more powerful computer chips, to advance "aging-friendly" communities, to find better cancer therapies, and much more. The breadth of research reflects both established institutional strengths and the new directions we are charting in the 21st Century. Nanosciences and the life sciences are two key areas in which we are strategically building our strengths, in partnership with many businesses and institutions. The research of our faculty is creating new opportunities for our students and the new knowledge so essential to the growth and betterment of our region, state and nation. Our research is powering the future.



Karen R. Hitchcock  
President



Christopher D'Elia  
Vice President for Research



Researchers aim to create models for communities where older citizens can thrive.

### "Aging Friendly" Communities

In 2000, one out of every eight Americans was over the age of 65, but by 2025 that age group is expected to comprise one of every six – and in New York State nearly one of every four. This aging of society impacts everyone from family members to the health care system and communities themselves. One major focus of UAlbany researchers is on identifying specific ways communities can help older citizens enjoy the highest possible quality of life.

UAlbany's School of Social Welfare and its Center for Excellence in Aging Services are leading efforts that focus on the feasibility and desirability of "aging-prepared" communities. With funding from the John A. Hartford

Foundation, they have begun a planning process to identify low-cost initiatives that will sustain aging persons living in the Capital Region community, create new ways for agencies to work together, and benefit from the contributions of aging persons themselves. Pilot projects will be designed to create replicable and sustainable national models for aging-prepared approaches to a better community life for all.

In December 2001, the Hearst Foundation, Inc. designated the School as one of only five social work programs in the nation to receive the William Randolph Hearst Scholarship Fund for Master Degree Social Workers in Aging.

Contact: [mcclion@albany.edu](mailto:mcclion@albany.edu)



Paulette McCormick directs the Center for Comparative Functional Genomics.

### Unraveling the Molecular Basis of Disease

The future of medical science is being driven by molecular medicine, and UAlbany biologist Paulette McCormick is a trailblazer in the field. Over a 20-year career, she has been funded continuously by the National Institutes of Health (NIH) for projects related to cancer and metastases biology as well as mammalian developmental genetics.

Her latest five-year NIH grant, into 2006, continues to support her studies on the use of retinoids – natural and synthetic derivatives of Vitamin A – in cancer therapy and prevention. Her research calls into question the value of the proposed cancer therapies using the histone deacetylase

inhibitor – trichostatinA (TSA) and instead suggests new types of therapeutic regimens.

McCormick's research team at UAlbany's East Campus Center for Comparative Functional Genomics (CCFG) is also investigating the role of cell-surface lysosomal associated membrane protein (LAMP) in tumor progression and metastases – the latter of which causes 90 percent of deaths from solid tumors. McCormick theorizes that an antibody recognizing cell surface LAMP might very well block metastatic cells from spreading, thereby greatly decreasing cancer mortality.

Contact: [www.albany.edu/genomics](http://www.albany.edu/genomics)



How societies around the world absorb immigrants is a focus of Richard Alba's research.

### The Human Experience around the Globe

Does the process of integration for immigrants in the U.S. and other economically advanced nations of the world have common threads? Sociologist Richard Alba, a 2000-2001 Guggenheim Fellow for his work in immigration, race and ethnicity, explores that question in his long-term comparative project "Second Generations in Immigrant Societies."

Supported by a 2002 German Marshall Fund Fellowship and a grant from the Russell Sage Foundation, Alba is shedding light on the individual, family, group, and societal

characteristics of post-immigrant generations that have influenced assimilation into their societies.

Alba is one of 45 UAlbany faculty members conducting research into a wide range of population issues through the Center for Social and Demographic Analysis (CSDA) and the Lewis Mumford Center for Comparative Urban and Regional Research. In 2001 the Mumford Center and its director, John Logan, became national resources for the dissemination of information and interpretation regarding neighborhood segregation patterns in America's urban areas.

Contact: [www.albany.edu/csda](http://www.albany.edu/csda); [www.albany.edu/mumford](http://www.albany.edu/mumford)



Kajal Lahiri's statistical methods and economic models are useful tools for policy makers.

## Using Econometrics to Guide Policy

One of the first steps in finding solutions to the world's pressing economic, social and health problems is to use the right tools. That is often the function of the econometrician, such as Department of Economics Professor Kajal Lahiri. Lahiri's research currently finds him designing economic forecast models for New York State's Office of the Budget and formulating a system of leading economic indicators to monitor the U.S. transportation sector.

Over the past two decades, Lahiri's development of statistical methods to study economics and related subjects has had wide-ranging applications. He has constructed macroeconomic models for developing countries on behalf of the International Monetary Fund. He has analyzed factors

that drive consumer sentiment over time and judged at what point we should pay attention to that sentiment. He established the predictive ability of interest rate spreads as leading indicators for inflation and business cycles in the U.S. and Germany.

Lahiri's health-related projects include weighing socio-economic factors in determining the odds of vaginal delivery after Cesarean sections and studying the effect of smoking on health through a novel sequential self-selection mode of initiation and quitting. In 2001, Lahiri completed a seven-year project for the Social Security Administration which involved modeling its disability insurance programs.

Contact: (518) 442-4758, [klahiri@albany.edu](mailto:klahiri@albany.edu) or [www.albany.edu/~klahiri/](http://www.albany.edu/~klahiri/)



Digital technology brings history to scholars and grade-school pupils alike.

## Wedding Historical Scholarship to Digital Technologies

Paper-based, two-dimensional manuscripts and texts have long been the traditions of historical scholarship and archival research. Now, however, they coexist with dynamic, multiform, digitally coded sources, and material previously available to only a few is widely accessible to a large and expanding public.

UAlbany's Department of History has been a pioneer in wedding historical scholarship and teaching to digital technologies, particularly through its *Journal for Multimedia History* (<http://www.albany.edu/jmmh>) and *Talking History: Aural History Productions* ([http://www.albany.edu/talking history](http://www.albany.edu/talkinghistory)).

In 1998, the JMMH became the first peer-reviewed electronic journal publishing and reviewing multimedia historical scholarship. It now offers scholars opportunities to present and analyze materials impossible to incorporate into traditional text articles and monographs, and to deliver them to professional and lay audiences around the world. In its "pages," audio essays, recordings of conference sessions, and individual speeches are integrated with text. Digital coding and media streaming technology permit scholars to compose essays with extensive images too costly to print and to disseminate rare video and audio primary sources.

*Talking History*, begun in 1997, is a production, distribution, and instructional center for all forms of "aural" history, from interviews to documentaries.

Contact: [gz580@albany.edu](mailto:gz580@albany.edu)



Excavations are yielding new clues about Bronze Age culture in Cyprus.

## Excavating Bronze Age Site in Cyprus

Through archeological expeditions, UAlbany's Institute for Cypriot Studies is shedding new light on Bronze Age culture in Cyprus.

Department of Classics Professor Stuart Swiny, with students from UAlbany, Harvard University and the University of Cyprus, excavated an important archaeological site in Southern Cyprus. The purpose was to further investigate different aspects of the Early Bronze Age as seen at Sotira Kaminoudhia.

Excavations in the 1980s had revealed possible evidence for ritual activities associated with certain areas of the site. A bull's skull made into a mask, spouted bowls for storing and distributing beverages, many drinking cups and numerous gaming boards were concentrated in and around a large open courtyard. Investigations in 2001 found evidence for the manufacture of personal ornaments from semi-precious stone, but no more cultic connections. Further investigations are planned.

Contact: (518) 442-3982 or [swiny@albany.edu](mailto:swiny@albany.edu)



Tomek Strzalkowski designs systems to better support intelligence gathering.

## The Science of Intelligence Gathering

National security depends on accurate, high-quality information being available at the right time to support important policy decisions. A key element of this process is the work of the intelligence analyst, who must – often quickly – produce the right information from a potentially enormous number of sources, reports, documents and databases. Today's information retrieval technology needs to be better tailored to its users to "understand" them and their requests.

Enter High-Quality Interactive Question-Answering (HITIQA), a technology project funded by the federal Advanced Research and Development Activity program and led by Tomek Strzalkowski of the Department of Computer Science.

An expert in computational linguistics, natural-language processing and information retrieval, Strzalkowski has created HITIQA to accept questions in natural language from analysts and other system users and to produce relevant, factual answers or the means to the assistance they require.

Another project led by Strzalkowski aims to develop new technologies to allow European Union and U.S. citizens to automatically access information in their native languages. The project, Automated Multilingual Interaction with Information and Services (AMITIES), will develop, showcase and deploy novel technologies for building empirically induced dialogue processors to support automated multilingual human-computer interaction.

Contact: [tomek@csc.albany.edu](mailto:tomek@csc.albany.edu)



The research led by Kenneth Demerjian will aid the design of effective anti-pollution strategies.

## Fingerprinting New York City Pollution

Where does pollution come from? The U.S. Environmental Protection Agency wanted good, complete answers, and so instituted the Particulate Matter "Supersites" Program to characterize pollution in six of the nation's largest metropolitan areas.

Leading the New York City study is Atmospheric Sciences Research Center (ASRC) director Kenneth L. Demerjian. His UAlbany research group and researchers from other universities, private industry, New York's Department of Environmental Conservation and Department of Health are engaged in comprehensive measurements and analysis of PM2.5 mass, chemical speciation and gaseous precursors at three sites in New York City and two in upstate New York.

The results of the five-year effort, slated to end in December 2004, will be to "fingerprint" the "PM2.5" pollutants – small particles with diameters of 2.5 microns or less – as well as other atmospheric contaminants (so-called precursors) that form particles upon undergoing photochemical reactions. The Demerjian team will establish the sources of these observed concentrations in terms of those locally generated versus those transported in – from as far away as the Buffalo/Toronto and Ohio Valley regions. The researchers will also provide the data to develop cost-effective mitigation strategies, and assess the impact of recent and future emission reductions in terms of emission-control effectiveness.

Contact: ASRC Director Kenneth Demerjian, (518) 437-8705



UAlbany works with the Lebanese Parliament and municipal governments to improve governmental services.

## Rejuvenating Lebanon

Disrupted and disorganized governmental services were among the many consequences of Lebanon's 16-year civil war when, in 1993, the University's Center for Legislative Development (CLD) first began working in the splintered nation to help resurrect basic government institutions.

With funding from the United States Agency for International Development (USAID), CLD staff started systematically helping the national government reorganize and restructure its administrative processes. Those efforts so impressed USAID that in 2001 it awarded the Center a \$17.26 million grant to further its work in that country by rebuilding

Lebanon's more than 700 municipal governments and networking them with the national government.

CLD's current goals in Lebanon are to simplify municipal administrative procedures, standardize municipal budget revenue and expenditures, and utilize information technology to allow municipalities to provide services to their citizens in a transparent, efficient, and accountable manner. CLD is also working with central government oversight agencies and the Lebanese Parliament on updating decentralization laws and improving intergovernmental procedures.

Contact: [www.albany.edu/cld/](http://www.albany.edu/cld/)



The Center for Technology in Government devises solutions that integrate policy, management and technology.

## Designing "Knowledge Networks" to Improve Government Programs

When the National Science Foundation (NSF) sought research for its Knowledge and Distributed Intelligence program in 1999, it found one proposal in a class by itself: "Knowledge Networking in the Public Sector," offered by UAlbany's Center for Technology in Government (CTG). It alone addressed a large and important theme: understanding how knowledge and information sharing across organizational boundaries can lead to more effective and responsive government programs.

Through its three-year "knowledge-networking" study, CTG is investigating seven initiatives of New York State and local

agencies that depend on sharing knowledge and information across multiple organizations. Among these initiatives' goals are assessing the effectiveness of services to homeless people, designing one of the state's key financial systems and determining the information required to make sound investments in new technologies. From the study's findings, the CTG research team will develop an enhanced conceptual model of knowledge-network formation and operation in the public sector, and make recommendations for implementing successful knowledge networks.

Contact: [info@ctg.albany.edu](mailto:info@ctg.albany.edu)



Edward Hannan studies surgical procedures and identifies risk factors related to mortality and complications.

## Reducing Medical Errors

Americans entering medical facilities with serious afflictions have come to expect that the best expertise and decision-making will be marshaled toward improving their conditions. Due to a range of factors, however, such facilities do not always deliver at maximum efficiency. Now, a UAlbany professor is playing a major role in a comprehensive effort to reduce medical errors.

For several years, Edward Hannan of the Department of Health Policy, Management and Behavior has studied a wide variety of surgical procedures, developed and employed clinical databases, and identified risk factors related to mortality and complications. The results have been used to predict occurrences of adverse events,

assess provider performance, and significantly influence clinical quality assessment programs, leading to improved health care outcomes for patients.

In 2001, the New York State Department of Health and UAlbany's School of Public Health were awarded a three-year contract by the federal Agency of Healthcare Research and Quality to reduce medical errors by 50 percent in five years. Hannan was charged with overseeing all of the analyses and evaluations related to the project, which will identify risk-reduction strategies and foster hospital demonstration projects to test and refine quality care initiatives.

Contact: [elh03@health.state.ny.us](mailto:elh03@health.state.ny.us)

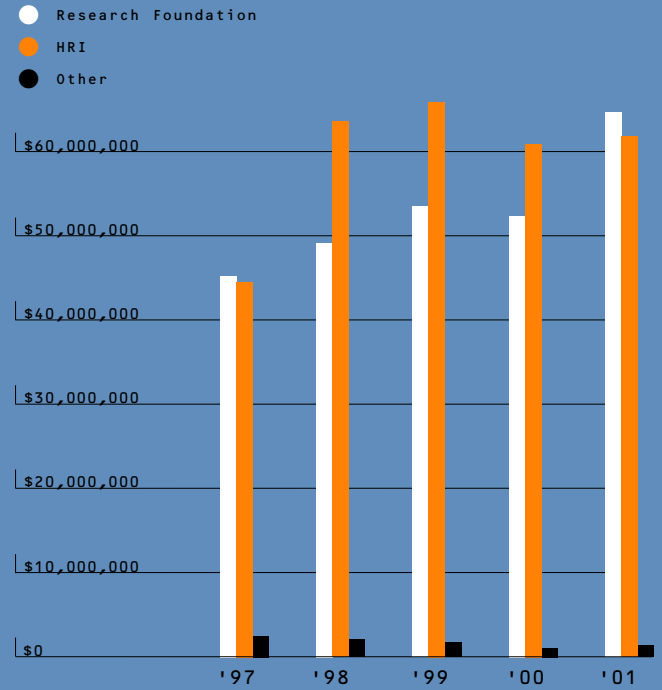
## Awards Received By University at Albany Faculty Fiscal Year '01

Fiscal Agent	Amount
Research Foundation of SUNY for University at Albany	\$64,064,895
Health Research Incorporated*	\$61,331,480
New York State: Office of the Aging Project at the University at Albany	\$134,369
New York State: Institute for the Advancement of Health Care Management	\$15,000
New York State: Center for Technology in Government	\$1,009,991
<b>Total</b>	<b>\$126,555,735</b>

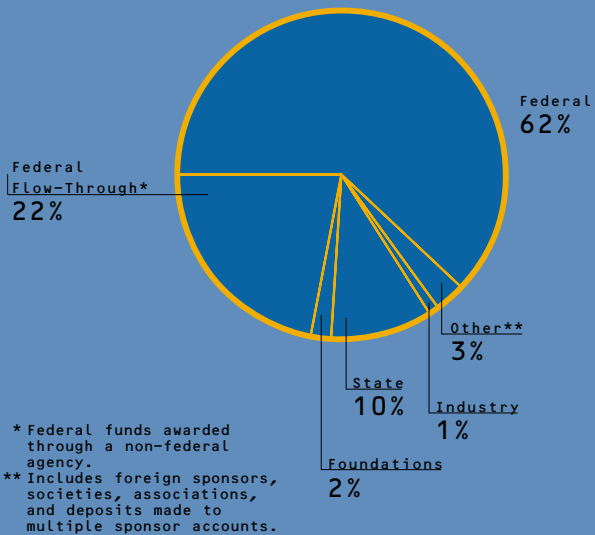
\*Total awards received by Health Research, Inc. for School of Public Health faculty who are employees of the New York State Department of Health. Health Research, Inc. (HRI is a not-for-profit corporation affiliated with the New York State Department of Health.) HRI's mission is to assist the Health Department to effectively solicit and administer financial support for projects and to disseminate the benefits of Health Department expertise through programs such as technology transfer.

The Research Foundation of State University of New York is a private non-profit educational corporation chartered by the State of New York to fiscally manage sponsored awards from external sponsoring agencies on behalf of the State University of New York campuses.

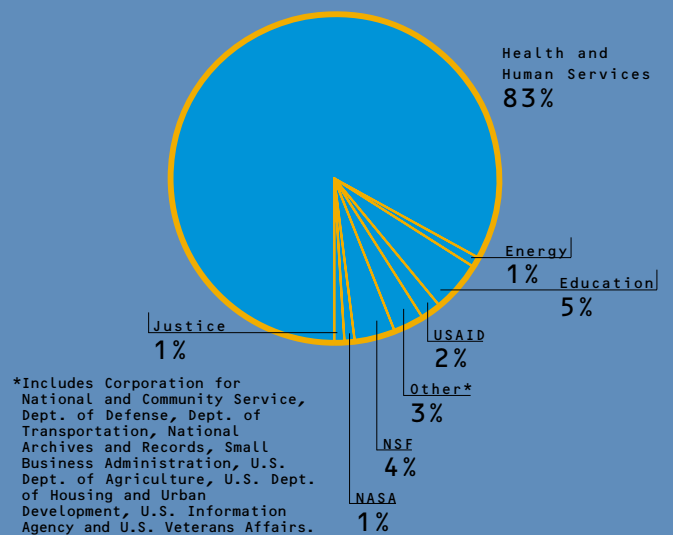
## Total Awards Received by University at Albany Faculty Fiscal Years '97 to '01



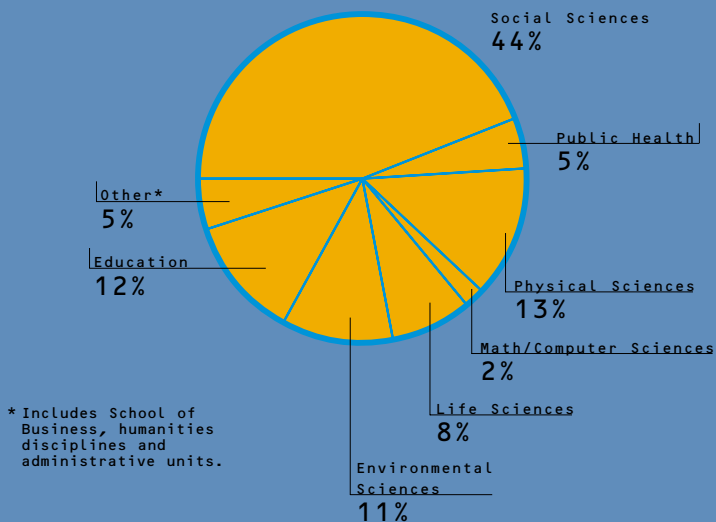
## Awards By Sponsor Type Fiscal Year '01



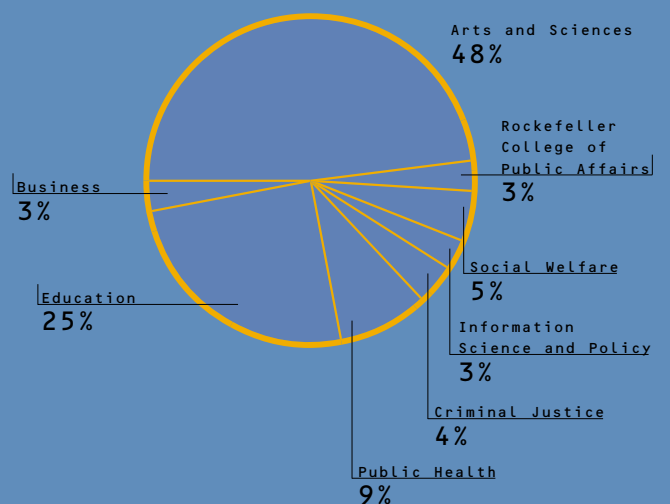
## Federal Sponsorship Research Foundation/Health Research Inc. Fiscal Year '01



## Expenditures by Discipline Fiscal Year '01



## Doctoral Degrees Awarded Fiscal Year '01



## Incubator Companies

Through the co-location of university research faculty, academic programs and private research-driven companies, both UAlbany's East Campus and the Center for Environmental Sciences and Technology Management nurture innovative partnerships that advance the economic vitality of the region and offer distinctive opportunities for students and faculty. Companies located at UAlbany are:

### East Campus

Albany Molecular Research  
AVAX America, Inc.  
Creative Insights  
Cyclics Corporation  
Myomatrix Molecular Technologies, LLC  
Psyche Pharmaceuticals  
SmartGene GmbH  
Synergetics Technology, Inc.  
Taconic Biotechnology, Inc.  
Triage Pharmaceuticals  
Turner Building Services  
VEC Technologies, Inc.  
WR2

### CESTM

Atmospheric Information Services  
AWS Scientific, Inc.  
Evident Technologies, Inc.  
MTI MicroFuel Cells, Inc.  
National Weather Service  
TrueWind Solutions, LLC

For information about UAlbany's business incubators, contact: Eugene Schuler, (518) 525-2764 or [eschuler@uamail.albany.edu](mailto:eschuler@uamail.albany.edu).



### Goldwater Scholars

For Peter Kutchukian (right) and Anna Agyemang (left), UAlbany's opportunities for undergraduate research led to prestigious Barry M. Goldwater Scholarships. Both worked in the laboratory of chemistry Professor Rabi Musah (center), where they carried out research focused on our understanding of cancer and infectious diseases.

## Inventions

Four U.S. patents were issued during the 2000-2001 fiscal year for inventions by faculty in the area of advanced materials. Two patents were for new processes or new materials developed through research at UAlbany's Institute for Materials, which manages the new Center of Excellence in Nanoelectronics and other research centers; two were developed through research collaborations between the Institute for Materials and the Department of Chemistry.

University faculty also submitted eight invention disclosures, and eight patent applications were filed with the U.S. Patent and Trademark Office in the past year. Thirty-nine Confidentiality Agreements were executed.

The four patents issued are:

### Patent No. 6,090,709

"Methods for Chemical Vapor Deposition and Preparation of Conformal Titanium-Based Films," issued on July 18, 2000. Inventors: Alain E. Kaloyeros and Barry C. Arkles.

### Patent No. 6,099,903

"MOCVD Processes Using Precursors Based on Organometalloid Ligands," issued on August 8, 2000. Inventors: Alain E. Kaloyeros, John T. Welch, Paul J. Toscano, Rolf Claessen, Andrei Kornilov, and Kulbinder Kumar Banger.

### Patent No. 6,139,922

"Tantalum and Tantalum-Based Films Formed Using Fluorine-Containing Source Precursors and Methods of Making the Same," issued on October 31, 2000. Inventors: Alain E. Kaloyeros and Barry C. Arkles.

### Patent No. 6,184,403

"MOCVD Precursors Based on Organometalloid Ligands," issued on February 6, 2001. Inventors: John T. Welch, Paul J. Toscano, Rolf Claessen, Andrei Kornilov, and Kulbinder Kumar Banger.

Royalty income totaling \$196,000 was received under various agreements in place during this fiscal year.

UNIVERSITY AT  
**Albany**  
STATE UNIVERSITY OF NEW YORK

For more information about research at the University at Albany, visit our website at [www.albany.edu](http://www.albany.edu) or contact: Christopher D'Elia, Vice President for Research, at (518) 437-4960 or [cdelia@uamail.albany.edu](mailto:cdelia@uamail.albany.edu).

Produced by University at Albany  
Office of Media and Marketing

Editor: Mary Fiess  
Art Direction: Oberlander Design  
Photography: Mark Schmidt, Mark McCarty  
Writer: Vincent Reda