

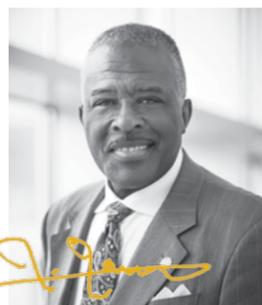
reimagine
RESEARCH 2015

UNIVERSITY AT ALBANY
State University of New York



message from

PRESIDENT ROBERT J. JONES *and*
VICE PRESIDENT FOR RESEARCH JAMES A. DIAS



Robert J. Jones
Robert J. Jones, Ph.D.
PRESIDENT



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James A. Dias, Ph.D.
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ACROSS OUR CAMPUS AND IN OUR COMMUNITIES, University at Albany faculty and student researchers are tackling the challenges of our time to make new discoveries and enhance the well-being of our society.

On a global scale, UAlbany researchers are developing new online platforms for schoolchildren to collaborate across borders, exploring such questions as what happens to society when there is an oversupply of males, and working to strengthen foster care policy in Bosnia and Herzegovina. Right here in the Empire State, our faculty are engaged in studies designed to improve legal counsel for the poor and are developing an advanced statewide network to reinforce New York's weather forecasting capabilities in a new age of extreme weather.

Our many partnerships are spurring local development and fostering innovation. Our

undergraduate students are reaping benefits from their active participation in our research enterprise, whether it's unlocking the mysteries of neuroscience as part of the SUNY BRAIN Initiative, restoring ancient Roman mosaics in Serbia, or joining in numerous other explorations.

Further bolstering our efforts in the years ahead will be the President's Initiatives Fund for Research and Scholarship, a unique program designed to support new and innovative research in targeted areas, including the life sciences and biomedical research, forensic science and cyber security, advanced data analytics, and the liberal arts and humanities.

UAlbany is at the forefront of innovative developments in a wide range of research areas. This report highlights just a few of the many ways UAlbany researchers are having a real impact. ♦

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Threading

STUDENTS COLLABORATE
ACROSS BORDERS THROUGH
NEW ONLINE PLATFORMS

KNOWLEDGE

WHEN ELEMENTARY SCHOOL STUDENTS in Guilderland, N.Y., and Toronto, Canada, studied human body systems, they took a new tack.

Instead of each class following its own traditional curriculum, the students conducted collaborative inquiries across classrooms and borders to learn about the brain, heart, muscles, nutrition, allergies and more.

“They were almost like a research network, with individuals specializing in certain body systems but all contributing their knowledge to the entire group,” said University at Albany researcher Jianwei Zhang, associate

professor in the Department of Educational Theory and Practice.

In their collaborations, the students and their teachers used a tool, Idea Thread Mapper (ITM), created by Zhang and Mei-Hwa Chen of UAlbany’s Department of Computer Science. ITM traces and visualizes threads of ideas growing in extended online discussions.

The ITM tool expands students’ awareness of their community’s knowledge and idea connections, said Zhang, adding that students taking part in ITM-assisted collaborations also demonstrate a shared desire to “continually go deeper.”

Now Zhang is leading a team of researchers in a new project that is building on the ITM technology to create an even stronger infrastructure for online knowledge-building activities and extend it to an international network of classrooms.

Drawing on recent advances in learning analytics, the research team is working to integrate a set of automated analysis tools to discover productive idea threads based on online discourse data, trace student contributions, and nurture idea connections across classrooms. Elementary school teachers and students from Albany, Toronto and Singapore are participating in the project, which is being funded through a \$1.34 million grant from the National Science Foundation.

The project’s research team includes Zhang’s UAlbany departmental colleagues and co-principal investigators Mei-Hwa Chen and Feng Chen; renowned learning scientists and co-principal investigators Carolyn Rosé of Carnegie Mellon University and Marlene Scardamalia of the University of Toronto; and UAlbany’s Siwei Lyu of Computer Science and Alan Oliveira and Yang Sun of Educational Theory and Practice.

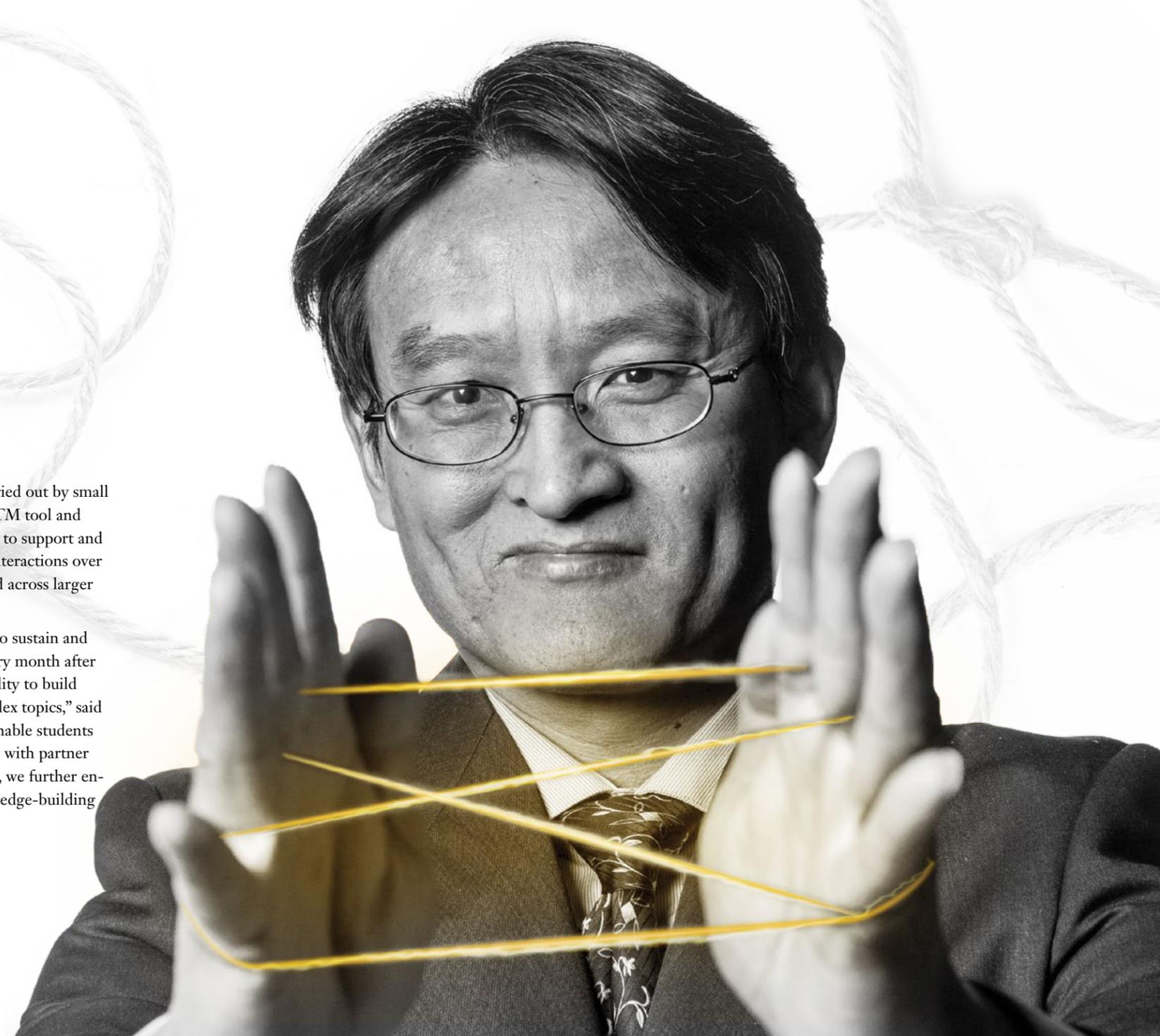
“To prepare students for careers in the 21st century, it is critical to cultivate collaborative inquiry-based practices in our classrooms,” said Zhang.

Typically, collaborative classroom-learning activities are relatively short-term — a few

hours or days — and are carried out by small groups, Zhang noted. The ITM tool and the new project are designed to support and foster knowledge-building interactions over multiple months or years and across larger groups of students.

“When we enable students to sustain and expand their collective inquiry month after month, we enhance their ability to build deep understanding of complex topics,” said Zhang. “And when we also enable students to engage in live interactions with partner classrooms around the globe, we further enrich and catalyze their knowledge-building conversations.” ♦

Jianwei Zhang ▶



POWER PLAYER

Making
Renewable Energy
More Predictable



◀ Qilong Min

A wind farm can be a significant energy producer, except when the winds stop blowing. Its unpredictable output is one of the challenges worldwide in harnessing the full potential of renewable energy sources.

University at Albany researcher Qilong Min wants to make the unpredictable more predictable.

A senior research associate and professor with the Atmospheric Sciences Research Center (ASRC), Min is working to improve forecasting of so-called “energy weather,” the weather that specifically affects the output of such renewable energy sources as wind farms and solar arrays.

“As renewable energy production grows and provides a larger proportion of energy needs, supply fluctuations have a greater impact on the power grid,” noted Min. “Better information about weather variability, however, can help managers predict and balance fluctuations in the grid.”

Min uses numerical models and data available from multiple platforms — satellites, airplanes and balloons, and surface-based sensors — to explore weather and climate phenomena. His project to improve “energy weather” forecasting is a collaborative effort with the China Electric Power Research Institute and is particularly focused on harnessing and integrating satellite data.

“Our goal is to provide the best possible specific weather information for forecasting the energy production of wind and solar power plants both for the next few minutes and the next several days,” said Min. “To that end, we are developing a satellite data assimilation system to help provide that information.” ♦

Out of

BALANCE

How Relative Numbers of Men and Women Affect a Society

As a result of cultural preferences for sons, men significantly outnumber women in India.

This imbalance has existed for decades and persists even in the face of steps to address it. India has laws designed to prevent parents from using ultrasound screenings or other technologies to decide whether to abort a girl. Such laws, however, are widely flouted.

But while the phenomenon of “missing women” is widely recognized, little has been known about its “consequences for family life and health-related and other behaviors,” said Scott South, professor in the University at Albany’s Department of Sociology and researcher with UAlbany’s Center for Social and Demographic Analysis. With research funding provided by the National Institute of Child Health and Human Development, South and colleagues are now shedding light on those consequences.

Using data from censuses and national surveys, South, in conjunction with UAlbany sociology professor Katherine Trent and SUNY New Paltz sociologist Sunita Bose, is examining the impact of an oversupply of males on such issues as mate selection processes, criminal victimization, men’s sexual risk behavior and violence against women.

For a woman, one consequence is a “higher likelihood that she will have little or no say in the selection of her husband and an increased probability she will meet her husband for the first time on her wedding day,” said South. “Men, by contrast, marry later or don’t marry at all, and are more likely to engage in commercial sex.”

Arranged marriages are traditional in India, although the practice has eroded somewhat in recent times due to modernization, westernization and urbanization.

In the face of a surplus of young adult men, however, families are more likely to easily

find suitable husbands for their daughters while they are still young, leaving these daughters with little say over whom they will marry, said South. “Our results portend generally detrimental effects for women’s marital power, autonomy and well-being,” he added.

On the issue of criminal victimization, South and his colleagues have found that a numerical abundance of males in an area “increases the likelihood that Indian households are victimized by theft, breaking and entering, and assault, and increases the probability that young women are harassed in public places.”

“All in all,” said South, “our findings are giving us a better picture of what a society looks like when there is an oversupply of males. A rather simple facet of social structure — the relative numbers of men and women in a population — affects multiple dimensions of family life and population health.” ♦

FOSTERING CARE

Promoting Compassionate Policies for Children in Bosnia-Herzegovina

NEARLY 20 YEARS AFTER A BRUTAL WAR, Bosnia and Herzegovina (BiH) continues to face challenges in forging effective policies to meet citizens’ needs.

Through a project with the University at Albany’s Center for International Development (SUNY/CID), however, BiH state and federation institutions are building legislative and policy-making capabilities in a number of areas. Funded by the U.S. Agency for International Development since 2013, the project has the overarching goal of supporting Bosnia and Herzegovina’s efforts towards Euro-Atlantic integration. SUNY/CID has worked in BiH on legislative development since 2009.

One of the project’s latest initiatives is a comprehensive effort to improve the foster care system in the Federation of Bosnia and Herzegovina (FBiH), one of the country’s two political entities comprising nearly 65 percent of the country’s population.

An estimated 1,300 children are in need of foster care in FBiH; of these, approximately 370 are cared for by relatives (with minimal government support), 130 have been placed with foster families, and the remainder reside in institutions, said Lisa Petter, SUNY/CID project director. Many adults with disabilities are also in need of foster care.

SUNY/CID’s team of experts in Sarajevo partnered with a BiH human rights organization, Rights for All, to provide hands-on training and technical assistance in policy development and subject matter expertise to the FBiH Ministry of Labor and Social Affairs to create one of the country’s first comprehensive public policy documents of its kind. The document catalogued needs, reviewed complex legal and constitutional issues, and explored options for deinstitutionalizing foster care. It then served as the basis for broad public consultations on the options leading to a draft law on foster care, which will be considered by FBiH legislators in the upcoming term. To increase public awareness, SUNY/CID sponsored an award for media coverage of foster care and the Labor Ministry planned to launch a public campaign on the issue.

“Moving forward, our hope is that we will be able to help our partners apply the experience we’ve gained to other public policy issues,” said Petter. “New policies and legislation can be effective only if they are drafted through a transparent process that engages the public. I am very proud that our partners were able to reach out effectively, with our help.” ♦



◀ Lisa Petter

Weather. Proof.

NYS Mesonet Helps Communities Brace for Extreme Storms

The most advanced weather observation system in the nation is under construction in New York State, led by the University at Albany and its partners, the National Weather Service (NWS) and the New York State Division of Homeland Security and Emergency Services.

The system, known as the New York State Mesonet, is a network of 125 state-of-the-art weather stations designed to support better planning for extreme and dangerous weather events. The project is funded through the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program.

The NYS Mesonet system will deliver real-time, high resolution standard observations (i.e., rainfall, temperature, wind speed, wind direction, surface pressure, and humidity), as well as observations critical for flood forecasting (i.e., soil moisture, soil temperature, and snowpack). In addition, the network will observe temperature and winds well above the ground into the atmosphere at a scale and rate that will allow for earlier detection of the ingredients for severe weather.

In the wake of such disastrous storms as hurricanes Irene and Sandy and Tropical Storm Lee, New York Governor Andrew Cuomo called for the development of the mesonet system in order to provide the kind of information that will better prepare state and local communities to respond to future extreme weather events.

UAlbany's Department of Atmospheric and Environmental Sciences (DAES) and the Atmospheric Sciences Research Center (ASRC), which together boast the largest concentration of weather and climate science researchers in New York State and one of the largest in the nation, are spearheading the design, development and implementation of the NYS Mesonet. The University's Albany Visualization and Informatics Lab (AVAIL; see story, page 18) is also providing assistance with network design.

The new system addresses limitations of current weather observation systems, at both the surface level and in the atmosphere.

The NWS in New York relies on 27 automated surface observing system (ASOS) stations across the state to measure weather events. However, the ASOS network does not provide the necessary high-resolution data needed to support monitoring and predictive modeling of mesoscale weather events (intermediate size meteorological phenomenon, usually less than 625 miles in horizontal range) and emerging weather-related risks, including rainfall and floods, heavy snow and ice, and high winds.

The NYS Mesonet's 125 weather stations are being deployed all across New York, with many on SUNY campuses and approximately 25 miles between each station. Seventeen sites are to be enhanced with technology to provide information about evolving weather patterns in three dimensions. This pioneer-

ing technology is capable of measuring the vertical profile of wind speed and direction up to one kilometer above ground, and temperature and humidity up to 10 kilometers above the ground.

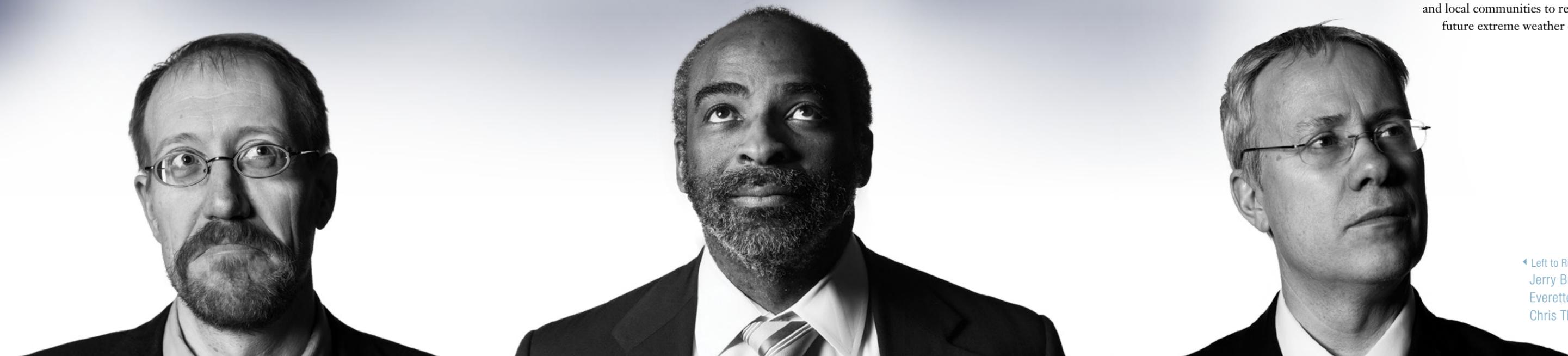
"All data will be collected, archived, and processed in real-time, feeding weather prediction models and decision-support tools for users across the greater New York region," said Everette Joseph, ASRC director and co-principal investigator for the FEMA grant.

"Not only will the system enable emergency management decision-makers to better plan for and mitigate the damaging effects of extreme weather events, but it will also benefit a range of sectors susceptible to weather variability, including road and rail transportation, aviation, energy, agriculture, tourism, and commerce," said Chris Thorncroft, DAES chairman and FEMA grant co-principal investigator.

Supported by \$23.6 million in funding, the NYS Mesonet is expected to be completed in 2017. Project manager for the system is Jerald Brotzge, former managing director and senior scientist at the University of Oklahoma's Center for Analysis and Prediction of Storms.

The NYS Mesonet is one element of the Atmospheric and Environmental Prediction and Innovation Center, which brings together UAlbany's internationally recognized weather and climate science faculty. ♦

◀ Left to Right:
Jerry Brotzge
Everette Joseph
Chris Thorncroft



the EQUALIZER

Improving Legal Counsel for the Poor

All people charged with serious crimes are entitled to be represented by defense attorneys, but one reality of New York State's public defense system is that poor and underserved defendants may be arraigned before they even have a chance to speak with an attorney.

The failure to have counsel at a defendant's first court appearance is one of a number of shortcomings in the state's public defense system that have been highlighted recently and are being addressed through a variety of initiatives.

Assessing how well certain initiatives are working is the focus of a joint research project being carried out by the University at Albany School of Criminal Justice (SCJ) and the New York State Office of Indigent Legal Services (ILS). SCJ Associate Professor Alissa Pollitz Worden and ILS Director of Research Andy Davies are leading the project.

"We know from our existing research that defendants often don't have an attorney at all at their first appearance in court in upstate New York," said Davies. "That means you can be sent straight to jail without ever getting to talk to a lawyer about bail. The county ends up spending money to house you, while you risk losing your job and custody of your children before you've even

met your attorney. We think that if we can connect people with appropriate counsel sooner, we can make the system fairer and more cost-effective."

The project, funded by a \$381,402 National Institute of Justice research grant, is focusing on six upstate New York counties. Part of an ongoing research partnership between SCJ and ILS, the project is designed to assess the impact of \$12 million in funding from ILS to improve counsel at defendants' first court appearances.

"Upstate New York is the perfect place for this project," said Worden. "Almost all of the research on this issue has been conducted in big cities, but the reality of public defense across the nation is that much of it happens in small towns and rural places with lawyers who don't even work in a formal public defender office. We just don't know how to get defenders to people in these areas, so that is what makes this study so valuable.

"Public defense providers in the six very different counties devised their own programs, taking into account their particular geographic, economic and political realities. The local defenders and court officials are leading their initiatives, and we're going to figure out how they work out in improving legal counsel for the poor." ♦



Alissa Pollitz Worden & Andy Davies ▶

This is an Intervention.

Addressing the High Prevalence of Diabetes in the Indo-Guyanese Community

The Indo-Guyanese population is the largest immigrant minority group in Schenectady, New York, with 8,000 individuals constituting 12 percent of the city's total population. It is also a community disproportionately affected by type 2 diabetes.

Akido Hosler, associate professor of epidemiology in the University at Albany's School of Public Health, conducted a community-based study in Schenectady that found nearly twice the prevalence of diagnosed diabetes in Indo-Guyanese adults than in the majority population of non-Hispanic white adults.

Based on those findings, she is partnering with local health services organizations and West Indian community groups to identify and implement accessible, sustainable, and culturally appropriate interventions to improve the control of diabetes among Indo-Guyanese individuals.

In a study of travel distance to proposed diabetes intervention programs, she found that having diabetes intervention at the four most popular faith-based organizations — two Hindu temples and two Christian churches

— and the existing diabetes education center would provide the most collectively accessible arrangement for the Guyanese.

The Indo-Guyanese, who trace their ancestry to Indian indentured servants brought to Guyana, are one of the fastest growing immigrant groups in North America. Hosler said she and her partners anticipate that their work in Schenectady will help other communities where South Asian diasporas have settled to formulate public health action plans that address health disparities.

Hosler's work in this area was recognized with a University at Albany President's Award for Exemplary Community Engagement in 2014. ♦



♦ Akiko Hosler

Cella Interruptus

Leveraging a Unique Germline to Discover Therapies for Disease

Scientists know that abnormal instances of stem cell differentiation, the process by which a less specialized cell becomes a more specialized cell type, can result in degenerative diseases or cancer.

University at Albany biologist and PEW Research Scholar Prashanth Rangan has received a \$1.43 million grant from the National Institutes of Health (NIH) to determine precisely how stem cells control their differentiation, and he is doing so by using the *Drosophila* germline

stem cells as a model system. The results of his investigations may aid in the development of treatments for these afflictions.

“The research I am doing here at the University’s RNA Institute will allow us to intervene in the correct cell type and block specific targets to promote or block differentiation,” said Rangan. “The ability to prevent premature differentiation, in the case of degenerative diseases, or to induce differentiation, in the case of cancer, will have tremendous therapeutic impact.”

Rangan’s work as an outstanding young scientist was recognized through funding from the PEW Charitable Trusts. His current NIH award, from NIH’s National Institute of General Medical Sciences (NIGMS), runs through July 2019. NIGMS supports basic research to increase understanding of biological processes and lay foundations for advances in disease diagnosis, treatment and prevention.

Rangan calls germline cells “the ultimate stem cells,” as they are both totipotent — having the capacity to form an entire organism — and immortal. Thus, paradigms established in the germline can be extended to other stem cell systems. “*Drosophila* is a superior model system to study questions about stem cell self-renewal and differentiation because of the availability of mutants, markers, RNAi technology and targeted expression methods,” said Rangan.

“This work allows us to understand the biology of stem cells, which can help with the design of therapeutics for regenerative therapy,” he said. “The excellent environment and facilities at both the RNA Institute and the Department of Biological Sciences offer us the opportunity to achieve new insights and push the boundaries.” ♦

Prashanth Rangan ▶



Lighting the Way

Using Fluorescence to Help Find & Treat Disease at its Genesis

One of the world's leading medical technology companies is funding researchers at the University at Albany's RNA Institute to develop technology that identifies cells containing specific RNAs. The pioneering effort aims for new RNA-based therapies and an enhanced molecular understanding of RNA's role in disease processes and normal cell changes, such as those occurring during development and aging.

The \$200,000 award from BD (Becton, Dickinson and Company) funds a post-doctoral fellow who is working with assistant professors Maksim Royzen and Mehmet Yigit to create fluorescent chemical tags. These tags allow cells containing specific RNA which are implicated in disease to be sorted and then studied using fluorescent imaging technologies.

◀ Maksim Royzen

One of the key instruments employed by Royzen and Yigit in the development of this technology is a fluorescence-activated cell sorter (FACS). The instrument is typically used by life scientists to sort cells on the basis of proteins — an easier task because, within cells, proteins are abundant, while RNA can be extremely scarce by comparison.

Due to their cellular abundance, proteins are more readily studied and therefore for decades have been the target of drug development for treating disease. However, aberrant as well as normal proteins are cell products of RNA molecules. It follows then that RNA, being in control of protein production, has the promise of treating and curing disease at its origins.

“The challenge of harnessing the promise of RNA therapeutics is like finding a needle in

a haystack,” said Paul F. Agris, the Institute's director. “The challenge is making RNA visible enough to be detected using fluorescent tags. The RNA Institute is creating this technology.”

The technology can be applied to cancer as a diagnostic for visualizing the location and movement of RNA as drugs bind to them in tissues, cells, and organs. According to Agris, researchers can use these RNA fluorescent tags to locate the diseased cells within a mixture. They then can collect enough of the “needles in a haystack” using FACS to study the characteristics of the RNA and how it relates to disease mechanisms, a critical first step in drug discovery.

High-resolution confocal microscopy can then be applied by Institute researchers to show the precise location and movement of the RNA within the cells. Using other advanced equipment in the Institute's Advanced Computational Lab, researchers can see how the

RNA responds to chemical signals in the cell. For example, a therapeutic can be added to the cell to determine how well it treats a malignancy.

Institute biologists who see promise in the use of Royzen's and Yigit's chemical tagging tool include Sally Temple, working on stem cell development; Melinda Larsen, studying salivary gland differentiation; Ben Szaro, researching the regeneration of nerve cells to mitigate spinal cord injuries; and Cara Pager, seeking better treatments for the hepatitis C virus, the foremost cause of liver disease. The technology will also positively impact imaging for MRI diagnostics.

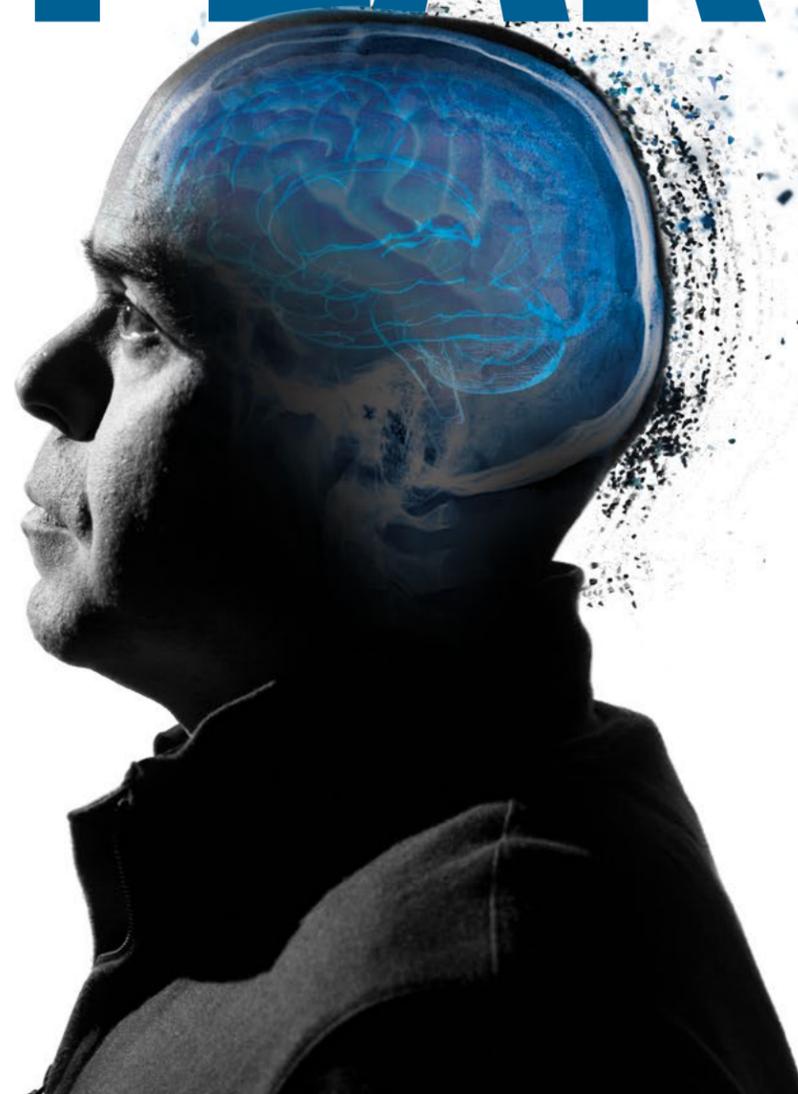
BD will have proprietary rights to license any research results and inventions that arise from this work, including Royzen's and Yigit's groundbreaking chemical tag technology. ♦

Mehmet Yigit ▶

FEAR

Beyond

Memory



Discovering How Forgotten Trauma May Still Cause PTSD

In dealing with post-traumatic stress disorder (PTSD), psychotherapy traditionally tends to heavily focus on the articulation of the patient's memory of traumatic experiences. A study led by University at Albany psychologist and neuroscientist Andrew M. Poulos, however, posits that the brain processes other forms of memory, beyond explicit recollection, that may be the drivers of distress and disability.

The findings of principal investigator Poulos and colleagues from UCLA, published in the August 2014 issue of *Biological Psychiatry* and funded by the National Institutes of Health, suggest that even with no explicit memory of an early childhood trauma, symptoms of PTSD, such as anxiety and heightened fear, can develop in adulthood.

Poulos and fellow researchers examined fear conditioning through early life trauma by exposing juvenile rodents to a single session of unpredictable stress. When the rodents became adults, the researchers tested the animals for their memory of the event and also measured their fear response.

◀ Andrew M. Poulos

"We found that our rodents, which failed to remember the environment in which they were traumatized, showed a persistent increase in anxiety-related behavior and increased learning of new fear situations," said Poulos. "These heightened levels of fear and anxiety corresponded with drastic changes in the daily rhythms of the circulating hormone corticosterone."

Corticosterone, in part, regulates the body's stress response. The experiments by Poulos and the UCLA researchers found that within the amygdala, a brain region crucial for the learning of fear, levels of a receptor for corticosterone were also increased.

"Future experiments in our laboratory will allow us to determine if this increase in glucocorticoid receptors within the amygdala and/or aberrant hormone levels sets up the organism for increased fear and anxiety," said Poulos.

Biological Psychiatry editor John Krystal believes the study may indicate a role in treatment for measuring other dimensions of response, such as physiological arousal, through which other forms of the brain's processing of traumatic experiences are expressed. ♦

Start Start-UP

Providing New Horizons for K-12 Classroom Learning through START-UP NY

ClassBook.com's growing stature

In digital learning and professional development fits right into the design of the University at Albany's participation in the START-UP NY program, whose aim is to form partnerships with companies aligning with campus missions while creating jobs on or near the campuses.

The Castleton, N.Y.-based provider of outsourced curriculum management, technology management and digital content for K-12 classrooms will expand into one of UAlbany's START-UP NY tax-free areas at 418 Broadway in downtown Albany. It is estimated that ClassBook will add 10 new full-time positions in its first year of operation at the new location and more than 60 new employees by the end of its fifth year.

The company's START-UP NY expansion will come primarily from within its software-as-a-service offering, and will be aided by UAlbany's Department of Psychology in assessing the effectiveness of new e-learning materials and methods.

START-UP NY, initiated by Governor Andrew Cuomo in 2014, provides up to a decade of exemptions from both state corporate and sales taxes and state income taxes for employees of new or growing companies with ties to participating New York colleges and universities.

ClassBook was founded by UAlbany alumnus Anthony Pfister, who said, "as a Capital Region native, I am pleased to be able to expand close to home and create new senior-level professional positions and economic growth in the area. The University at Albany, which has rich synergies between its research and academic missions, is the perfect partner."

ClassBook has worked with public and private schools nationwide to adopt and manage digital content. "We understand the challenges schools face when making this transition," said Pfister, "and we look forward to helping these educational institutions improve the student learning experience and to continuing our success right here in New York." ♦



making data Dance

Designing Web Solutions to Handle the World's Data Explosion

In the last half-decade, innovations in technology and data storage have led to the generation of an estimated 90 percent of all the data ever produced. The sheer volume and increased complexity of these data have created unprecedented opportunities, but taking advantage of them requires investment in data science talent that can deliver the innovative tools to meet a client's highly specific needs.

That's why a growing number of scientists, policy makers, researchers, and private enterprises are coming to the University at

Albany's Albany Visualization and Informatics Lab (AVAIL), a data science engineering team that is pioneering web-based solutions that put visualized, organized data at a client's fingertips.

"Show us your data, we'll make it dance," proclaims the lab's website.

In 2014 alone, the AVAIL team, led by Catherine Lawson, associate professor in Geography and Planning and an affiliated faculty member in the informatics Ph.D. program, developed a web-based "Bus Stop Level Transit Demand Modelling" tool suite

for NJTransit and the New Jersey Department of Transportation; a Federal Highway Administration pooled fund study to develop a web-based traffic data analytics module for six state transportation departments (Connecticut, Ohio, Pennsylvania, Texas, North Carolina and Michigan); and a web-based collaborative decision-making tool to facilitate the location of weather instrumentation towers for NYS Mesonet, New York's new early warning extreme weather detection system.

AVAIL also secured a number of projects for 2015, including a statewide traffic bottleneck

map for the New York State Department of Transportation (NYSDOT); a second phase of the NJTransit web-tool suite, and a real-time bus and subway schedule for the Manhattan Transit Authority.

In December 2014, the prestigious Ewing Marion Kauffman Foundation awarded AVAIL a \$200,000 contract to create an Entrepreneurial Landscape Analysis Tool that shows business climate change over time. The tool combines data sets with leading indicator potential, overlaying information visually and geospatially, and so highlights business type distributions, property value, and income.



"This will aid businesses in identifying market gaps, human capital and geographic opportunities," said Lawson, "and it will also help local planners identify policies that encourage entrepreneurship and illuminate important economic trends."

In the Kauffman Foundation project, AVAIL is using a broad analysis of nationally available datasets for understanding economic activity and job creation to develop interdependent visualizations that reveal change in economic activity for Census Urban Areas and also allow comparison of American cities with each other and themselves across a 20-year span (1992 to 2012).

"We will use this data to look in detail at urbanized areas at the zip code and census tract levels to understand the spatial aspects of economic activity, such as industry clustering and employment density," said Lawson.

AVAIL's assets, which include the programming wizardry of Alex Muro (UAlbany class of '06) and the growing computer science talents of several graduate students, are increasingly being sought after by private industry. One of the team's students, Eric Conklin, after receiving his master's in computer science in December 2014, was hired full-time by AVAIL to head up the development of a National Performance Measurement Research Dataset bottleneck map for NYSDOT. Upon completion of this open source software tool, AVAIL expects to expand its use to other state DOTs and metropolitan planning organizations.

AVAIL is also a key partner in an innovative international project to test and calibrate new traffic-counting video camera technologies developed in Poland, with funding from the private Polish Road and Bridge Research Institute. The cameras, developed by a company called Neurosoft, are being deployed at a location in Virginia. AVAIL plans to test the viability of the technology and calibrate the collected data to American transportation data standards. The hope is that the cameras will provide a cheaper and more effective means of collecting transportation data. ♦

◀ Catherine Lawson

Business BUILDER

Alumnus Expedites Pursuit of Entrepreneurial Dreams

IN ORDER TO MAKE POSSIBLE for young entrepreneurs the type of success he has enjoyed, UAlbany alumnus Harvey Patashnick, B.S.'67, M.S.'69, created the Patashnick Entrepreneurial Challenge. Launched in October 2014, it offers stipend support for select UAlbany students who are pursuing dreams of innovative startup companies.

Beginning in the summer of 2015, the selected students will pursue activities aimed at developing new ventures, including research projects that could lead to new startup opportunities. In addition to the stipend, students will have access to experienced mentors and be invited to a series of events and workshops to help them refine their concepts; meet local area entrepreneurs, investors and service providers; and network with like-minded colleagues.

Winners in the Challenge were announced in March 2015, after an assessment team began looking at submissions and providing feedback in late October 2014, accepted and weighed reapplications in December, and then began making final selections through a multi-step judging process.

Patashnick is the founder of Rupprecht & Patashnick Co. Inc., which he built into an industry leader in particle measurement instrumentation. ♦

Harvey Patashnick ▶



Intricacies of the Brain

Undergrads Engage in Neurotechnologies

Two UAlbany students, along with three faculty researchers, were among the first class of the SUNY Research Foundation's Brain Summer Scholars Program, a 2014 initiative to study brain disorders. The program is supported by the National Institutes of Health's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative.

Chosen to participate in the intensive 10-week program were Thomas Yocono '15 and Roi Ankawa '16. Yocono, an honors physics major, studied the functional connectivity of the brain's amygdala in children aged 9-12 with Professor Hoi-Chung Leung of Stony Brook University. The student's findings concluded that prolonged stress and anxiety in this age group increased the risk of developing anxiety disorders and/or depression later in life, similar to the connectivity patterns of young adults.

Ankawa, an honors biochemistry/molecular biology major, supported the research efforts of UAlbany psychologist Ewan McNay on the link between type 2 diabetes and Alzheimer's disease, particularly in regard to the correlation between lack of insulin and brain cell deterioration.

UAlbany biologist Annalisa Scimemi hosted SUNY Oneonta student Marvin Rodriguez for research on "Software development for 3D reconstructions of synapses," and UAlbany neuroscientist Gerwin Schalk worked with Stony Brook student Vyassa Baratham on "Single-Trial Detection of Spatio-temporal Patterns in Brain Signals."

In addition to the BRAIN initiative, UAlbany continued to place students in its annual Summer Research Institute, which offers qualified underrepresented minority undergraduates an enriching seven-week research experience under the direction and guidance of UAlbany faculty members and researchers. ♦

Left to Right: Thomas Yocono, Annalisa Scimemi, Ewan McNay, Roi Ankawa





MERCURY RISING

Restoring an Ancient Roman Mosaic

THE ROMAN EMPEROR **DIOCLETIAN'S NEED** of idolatry may have created it and the Emperor Constantine's need of heat may have despoiled it, but a seventeen-hundred-year-old Serbian mosaic was given new life in 2014 by a restoration team that included two University at Albany art history students.

Lynne Merrihew and Jordan Scott, undergraduates from the Department of Art and Art History, traveled to Serbia as part of a pilot summer internship in 2014 to restore a mosaic pavement depicting the Roman god Mercury in the circa 300 AD-built Sirmium Imperial Palace, located in the town of Sremska Mitrovica.

Merrihew, a junior art history major, and Scott, a sophomore anthropology major, heard about the internship from Art and Art History Professor Michael Werner, a Roman archeologist who received a Fulbright Award to research Serbian sites in 2011-12. Werner was part of the restoration project through a grant from the U.S. State Department.

The students were the first from America to participate in the restoration work in Sremska Mitrovica. They became the toast of local media, but the educational experience was rarer still.

"The Sirmium Roman Mosaic Internship offered our students a unique opportunity

for hands-on experience in restoring ancient art objects under expert tutelage of certified professionals," said Werner. "Few students get access to historic preservation within an ancient imperial palace."

"The internship gave me confidence as a future archaeologist," said Scott, who plans to eventually become a museum curator.

Merrihew, who is looking toward a master's degree in Mediterranean archaeology or art conservation, saw this internship as ideal for gaining experience in both fields. "I have always loved studying ancient Greek and Roman culture, and it was awe-inspiring to be able to work on an ancient Roman palace that Emperor Constantine once lived in," she said.

The UAlbany students learned how to clean and gently sandblast the Mercury Mosaic to remove dirt and debris, and to replace and paint broken tesserae (mosaic tiles).

Sremska Mitrovica lies on the ruins of the ancient Roman city of Sirmium, which was made one of the four capitals of the Roman Empire by Diocletian. The Mercury Mosaic

was a small part of what must have been an imposing palace collection of portraits of pagan gods and goddesses, all severely damaged when a radiant heating system was installed, likely during Constantine's residence in the palace (306 – 337 AD).

The restoration project began as part of the celebration of the 1700th anniversary of the Edict of Milan (313 AD), which legalized Christianity in the Roman Empire. ♦



◀ Left to Right:
Lynne Merrihew
Michael Werner
Jordan Scott

Awards AND Recognition

Block Named American Chemical Society Fellow

Chemistry professor Eric Block was selected as a member of the 2014 class of Fellows of the American Chemical Society (ACS). Recipients are selected based upon documented excellence and leadership in science, the profession and education, and volunteer service in the ACS community. Block was chosen for his contributions to organosulfur and food chemistry. His ACS volunteer service includes 20 years as editorial board member of the ACS *Journal of Agricultural and Food Chemistry*, chair of international symposia, chair of ACS Award selection committees, and promoter of chemistry to the public.

A former chair of the Department of Chemistry, Block was one of the first endowed professors in UAlbany's history. He is also a Fellow of the American Association for the Advancement of Science.

Galebo Awarded Guggenheim Fellowship

Department of Art and Art History professor Phyllis Galebo, whose photographs convey the transformative power of ritual dress in Africa and the Americas, was awarded a John Simon Guggenheim Memorial Foundation Fellowship for 2014. Galebo was among 178 scholars, artists, and scientists honored from a pool of almost 3,000 applicants.

In 2013, Galebo's work was exhibited in Il Palazzo Enciclopedico at la Biennale di Venezia.

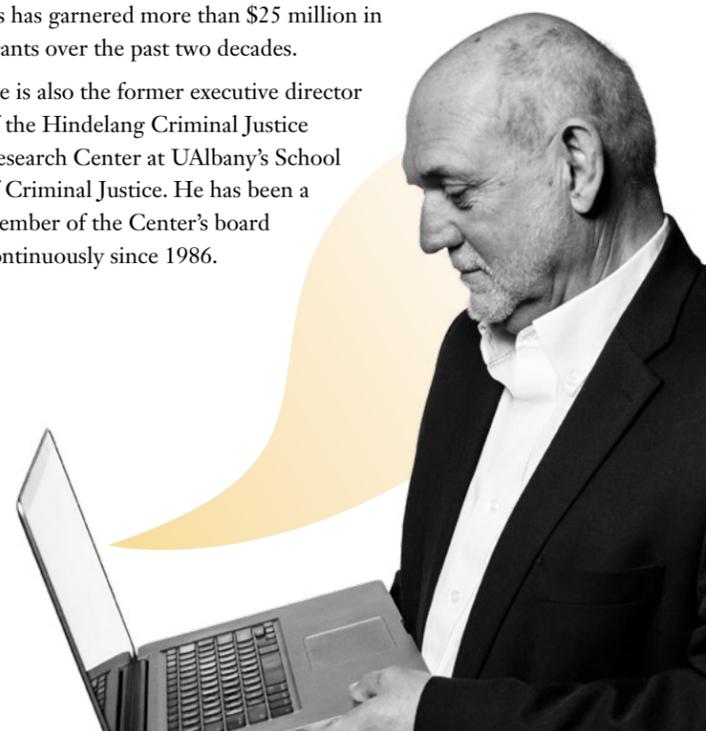
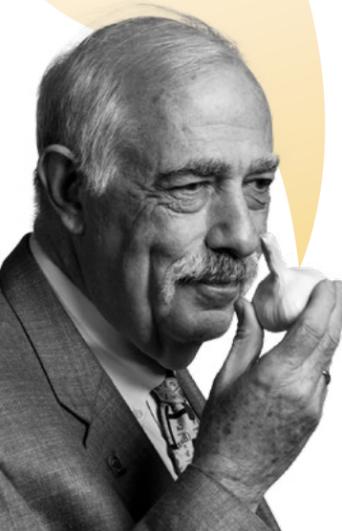
She has also exhibited at the International Center for Photography and the Smithsonian Institution. Her work has been collected by the Library of Congress and the Metropolitan Museum of Art, among others.

Lizotte Named American Society of Criminology Fellow

School of Criminal Justice Dean Alan Lizotte was named a Fellow of the American Society of Criminology (ASC) in fall 2014.

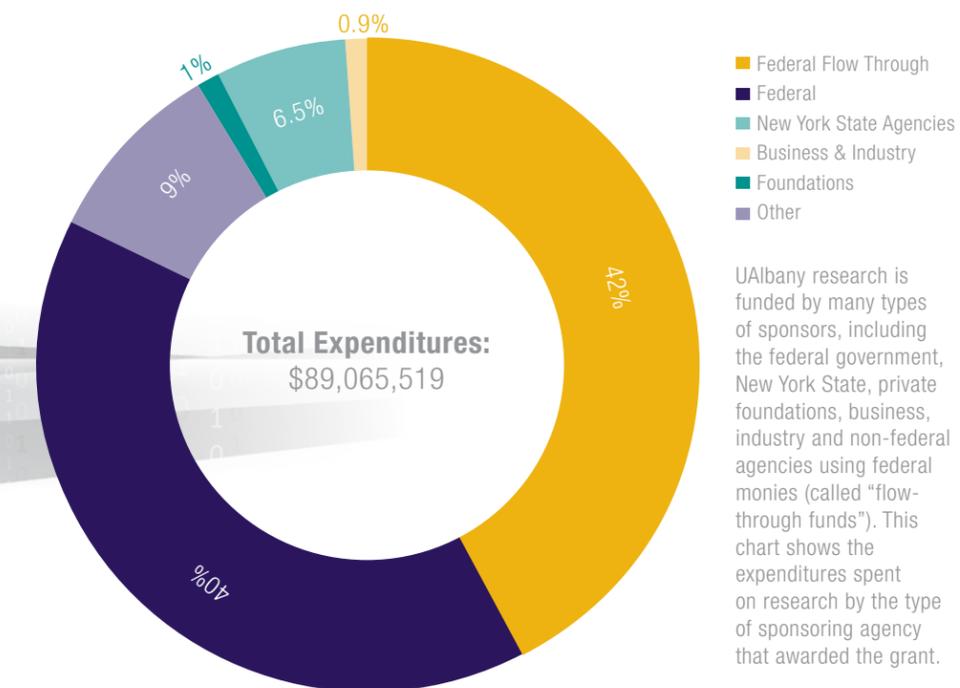
Lizotte is one of the nation's leading experts on gun use and violence, criminology, and juvenile delinquency. He is a founding member and co-principal investigator of the Rochester Youth Development Study (RYDS), where his work on several studies has garnered more than \$25 million in grants over the past two decades.

He is also the former executive director of the Hindelang Criminal Justice Research Center at UAlbany's School of Criminal Justice. He has been a member of the Center's board continuously since 1986.



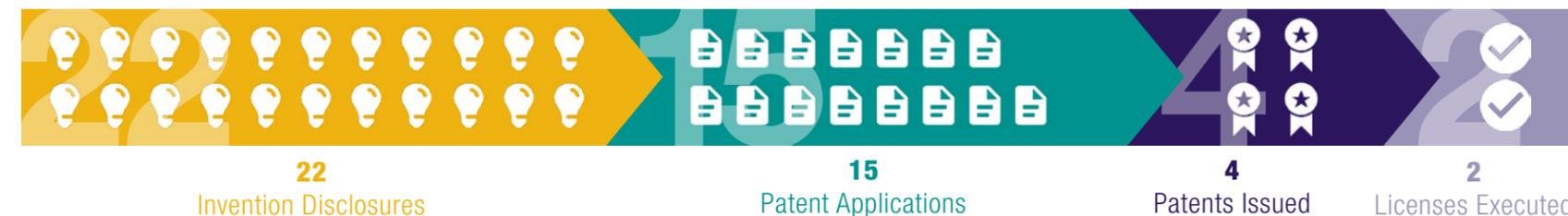
INVESTMENTS & IMPACTS 2014

TOTAL EXPENDITURES BY SPONSOR TYPE



UAlbany research is funded by many types of sponsors, including the federal government, New York State, private foundations, business, industry and non-federal agencies using federal monies (called "flow-through funds"). This chart shows the expenditures spent on research by the type of sponsoring agency that awarded the grant.

UAlbany Patent Activity: KNOWLEDGE CREATION TO MARKET REALITY





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