





Not every day brings a major win, but in 2011, many did. An advance in science, a venture investment, the growth of a company – these kinds of developments, all connected in some way to the catalytic efforts of the Georgia Research Alliance, signaled that Georgia’s technology-rich economy is alive and growing.

And that's good news. Competition among states for economic development and job creation is as intense as ever. Every advantage matters. GRA bolsters Georgia's competitive advantage by expanding university R&D capacity and adding the fuel needed to launch new enterprises.

In GRA, Georgia has a game plan for building the science- and technology-driven economy of tomorrow. And in 2011, that game plan was strengthened when newly elected Governor Nathan Deal moved to align more closely several of Georgia's greatest assets for creating, expanding and attracting companies that foster high-wage jobs.

Beginning in July, GRA partnered with the Georgia Department of Economic Development to determine how the state's seven Centers of Innovation, which help grow strategic industries, can maximize their potential. And the Georgia Cancer Coalition, the state's signature initiative for cancer research and care, was moved under the GRA umbrella.

These and other 2011 events and activities represent a foundation for future advances, investments and economic growth. As such, they are a reminder that it pays to **make every day count.**

JAN 1

Expert in autism named GRA Eminent Scholar



Ami Klin, a psychologist renowned for his research on autism, came to Georgia as a GRA Eminent Scholar and top official at the Marcus Autism Center.

Formerly director of Yale University's autism program, Klin was named the first chief of autism and related disorders at the Marcus Autism Center and director of Emory University's Division of Autism and Related Developmental Disabilities.

One out of every 98 children in Georgia has an autism-type developmental disability, and autism spectrum disorders (ASDs) are the fastest-growing developmental disability in the United States.

Klin's research – much of which involves sophisticated eye-tracking technology – helps identify autism as early in life as six months, so that the course and development of the disorder can be altered. He aims to validate a number of individual markers of autism, which together provide a risk profile for the condition.

Klin's appointment coincided with the 20th anniversary of founder Bernie Marcus' commitment to improving the lives of children with autism and related disorders. The Marcus Autism Center is a wholly owned subsidiary of Children's Healthcare of Atlanta.



JAN 4

GSU lands top researcher in inflammation and immunity

GRA partnered with Georgia State University in recruiting a scientist whose work has shed new light on chronic inflammation, the driver of asthma, rheumatoid arthritis and a host of other diseases.

Jian-Dong Li joined Georgia State University as a GRA Eminent Scholar to launch the Center for Inflammation, Immunity and Infection. He brought with him a start-up company, ROCK Pharmaceuticals, LLC, which develops anti-inflammatory therapies.

Drugs that are used to fight inflammation typically bring serious side effects. Dr. Li discovered that a medication called Vinpocetine, which is prescribed for memory impairment, also reduces inflammation, with fewer side effects.

JAN 11

Collaboration aims to develop new treatment for ovarian cancer

Georgia Tech researchers have proposed a filtration system that could potentially remove free-floating cancer cells that cause secondary tumors. They are collaborating with GRA VentureLab company Sub-Micro to advance the technology toward commercialization.

John McDonald and Ken Scarberry developed the idea for the filtration system, which would reside outside the body and use magnetic nanoparticles to help attract ovarian cancer cells as they metastasize. The scientists and their colleagues at Sub-Micro plan to have a prototype system ready for testing within three years.

JAN 13

Three GRA Eminent Scholars receive top national honors



The American Association for the Advancement of Science elected GRA Eminent Scholars Don Giddens (of Georgia Tech) and Cliff Baile and Roberto Docampo (of the University of Georgia) as 2010 Fellows. The international organization noted that the Fellows are selected for their “contributions to science and technology.” The three join 13 other GRA Eminent Scholars who were elected AAAS fellows in earlier years.

JAN 21

UGA scientist studying parasitic diseases is named GRA Distinguished Investigator

Boris Striepen, a University of Georgia researcher working to find new ways to treat diseases caused by parasites, became a GRA Distinguished Investigator. His appointment is part of a GRA initiative to recruit, retain and support scientists who are “rising stars” in their fields of research.

Striepen’s research focuses on parasites that cause severe disease in infants, small children and individuals with weakened immune systems, such as those suffering from AIDS. His laboratory uses modern genetic approaches to investigate the parasites’ unique biology, so that new drugs can be developed to fight them.



Rick O'Quinn

JAN 23

Researchers explore how interaction of cocaine, HIV/AIDS drugs damage the heart

GRA Eminent Scholar Michael Kuhar is contributing to a new Emory University study on how the combination of cocaine and anti-retroviral medications used to treat HIV/AIDS could damage the heart. Funded by a \$5.7 million grant from the National Institutes of Health, the study examines which biochemical mechanisms behind cocaine and anti-retroviral therapies lead to cardiomyopathy and heart failure.



Phil Jones

Augusta Mayor Deke Copenhaver (left) and GHSU President Ricardo Azziz sign a banner to commemorate the date of the university’s name change.

FEB 1

MCG repositions – and renames

To position itself better as a leading academic health center and top-50 research university, the 183-year-old Medical College of Georgia was officially renamed Georgia Health Sciences University.

“The benefits of the name change will be obvious as we recruit the best minds from across the country and the world,” said President Ricardo Azziz. A national survey of faculty and administrators at health sciences institutions showed that roughly half had never heard of MCG, and most believed it was a stand-alone medical school.

GHSU enrolls 2,400 students in five colleges and is one of Georgia’s top 20 employers.

FEB 11

Investors fuel new growth for Damballa

Network security firm Damballa Inc., the second GRA VentureLab company to receive an investment from GRA Venture Fund, LLC, continued its rapid growth through a \$12 million round of investment.

Damballa's technology, born in the labs of Georgia Tech, combats command-and-control attacks on computers from armies of "bots," or remote computers. The company, which now employs more than 70 people, has raised nearly \$30 million in the past five years.

With the February funding announcement, Val Rahmani, CEO, told a news reporter that Damballa's pipeline was "16 times what it was a year ago."



Damballa

FEB 22

Powerful new microscopes unveiled at Emory



Jack Kearse

An Emory University technology core facility directed by GRA Distinguished Investigator Elizabeth Wright (above) added two ultra-high resolution microscopes, providing researchers with extraordinary new ability to visualize cells and viruses.

The advanced cryo-electron microscopes offer layer-by-layer views of a frozen specimen. One of the microscopes, equipped with phase plate technology, is one of only two such instruments in the United States.

GRA invests in cutting-edge research tools at its partner universities to advance frontier research and development.

MAR 9

GRA VentureLab company makes WSJ "Top 50"

For the second consecutive year, *The Wall Street Journal's* list of the Top 50 Venture-Backed Companies included Suniva, a solar power technology company that received GRA VentureLab investment.

Suniva, which evolved from the research of Georgia Tech professor Ajeet Rohatgi, is the only U.S. manufacturer of high-efficiency, low-cost silicon solar cells. More than 80 percent of its product is exported to Europe and Asia.

To be eligible for the *WSJ* ranking, companies must have received an equity round of financing in the past three years and be valued at less than \$1 billion.

MAR 17

Georgia Tech's Brédas is named one of the decade's top scientists



Billy Howard

Business intelligence powerhouse Thomson Reuters named GRA Eminent Scholar Jean-Luc Brédas one of the top 100 materials scientists of the 2000-2010 decade.

Brédas, a Regents' Professor of Chemistry and Biochemistry at Georgia Tech, was included because of his "impact score," a calculated measure of his influence on the field. His 50 papers published in materials science journals during the decade have been cited nearly 2,200 times by other scientists.

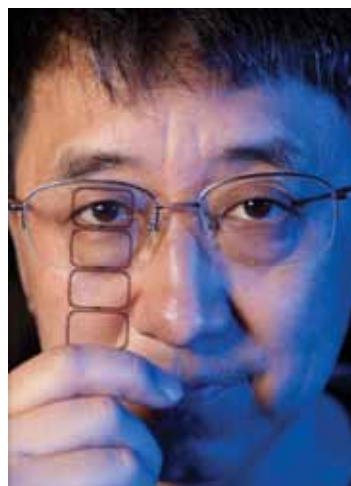
Brédas' research focuses on uncovering the chemical and physical properties of novel organic material, including research on organic solar cells and organic light-emitting diodes for potential use in visual displays and lighting.

MAR 18

GRA Eminent Scholar's work opens door to simple screenings for cancer

A new computational tool designed by a University of Georgia researcher may hold the key to creating simple urine tests to screen for cancer.

Dr. Ying Xu, GRA Eminent Scholar in bioinformatics and computational biology, studied 1,500 proteins that are excreted in urine. By analyzing their characteristics, Xu has provided a starting point to identify proteins whose presence – or absence – in a patient's urine could signal cancer. Xu's research was funded by the National Institutes of Health, the National Science Foundation and the Georgia Cancer Coalition.



University of Georgia

APR 12

Georgia Tech researchers demonstrate the future of TV at national event

Researchers at Georgia Tech's Broadband Institute, led by GRA Eminent Scholar Nikil Jayant, got some valuable feedback on their exploration of "future television" at the National Association of Broadcasters (NAB) convention in Las Vegas.

The researchers were invited to showcase their innovations at the convention's International Research Pavilion. One technology they demonstrated was an iPad and iPhone remote control prototype that allows TV viewers to explore deeper content.

The NAB convention drew 90,000 attendees and exhibitors.



PATH

APR 25

Record registration reached for GRA/CDC/CDC Foundation Research Collaboration Symposium

More than 300 scientists registered for the GRA/CDC/CDC Foundation Research Collaboration Symposium on "Hot Topics in Next-Generation Vaccines R&D."

The Symposium marked the fifth year of programs to promote research collaborations among researchers from Georgia universities and the U.S. Centers for Disease Control and Prevention and to showcase Georgia's strengths in next-generation vaccine research and development.

Featured were sessions on innate immunity, inflammation and infection and systems vaccinology. John Boslego (above) – who leads vaccine development for PATH, an international nonprofit organization promoting global health – was the keynote speaker.



Georgia State University

MAY 16
Leading biochemist recruited to Georgia

World-renowned chemical biologist Peng George Wang joined the faculty of Georgia State University as a GRA Eminent Scholar.

Wang is an expert in glyco-science, the study of carbohydrates, and has joined GSU's new Center for Diagnostics and Therapeutics. His research team creates new sugars that can be incorporated into medicines to make them more effective. They also investigate the role carbohydrates play in illness and disease.



MAY 24
Phone fraud protection company wins business competition

Pindrop Security, a startup that developed technology to prevent phone fraud, won the 2011 Business Launch Competition sponsored by GRA and the Technology Association of Georgia.

Founded by researchers at Georgia Tech, Pindrop detects the inherent noise and packet loss that a phone call encounters as it moves along its route from a particular location. The technology creates a unique "call fingerprint" that can verify the origin of subsequent phone calls and – unlike caller ID – can't be manipulated or faked by would-be criminals.



MAY 25
Gates Foundation grant to help fight devastating poultry disease

Some of the world's poorest people depend on chickens not just for food but as an essential part of their livelihood.

That's why GRA Eminent Scholar Steve Stice of the University of Georgia is using stem cell technology to breed poultry that are resistant to Newcastle Disease, which kills about one-quarter of the chickens in sub-Saharan Africa each year.

In May, Stice received a \$1.6 million grant from the Bill & Melinda Gates Foundation to advance his research.

JUN 7
GRA Eminent Scholar B.C. Wang joins world-class scientists in new fellows program

The nation's top scientific organization for X-ray crystallography named B.C. Wang, a GRA Eminent Scholar at the University of Georgia, to its inaugural class of Fellows.

In receiving the honor from the American Crystallographic Association (ACA), Dr. Wang joined 15 other leading scientists, including several Nobel Prize winners, as an ACA Fellow.

ACA promotes interaction among scientists who study the structure of matter at atomic resolution. The ACA Fellows program recognizes "a high level of excellence" in research, teaching, service and leadership.



JUN 15

**Emory, Children's Healthcare
break ground on research center**

Some 65 top researchers and their teams will explore new therapies for children and adults in a new \$90 million health sciences research building being constructed by Emory University and Children's Healthcare of Atlanta (CHOA).

Scheduled to open in April 2013 on the Emory campus, the 200,000-square-foot facility is being funded with support from GRA and a number of foundations. Scientists from Georgia Tech and Morehouse School of Medicine will collaborate with the Emory-CHOA partnership.

While pediatric research will be the center's primary focus, scientists also will engage in drug discovery and research into adult cancer and immunology.

JUN 19

**Emory neuroscientist Michael Kuhar
celebrated for his life's work**

The nation's most venerable organization targeting drug dependence and abuse presented a lifetime achievement award to GRA Eminent Scholar Michael Kuhar.

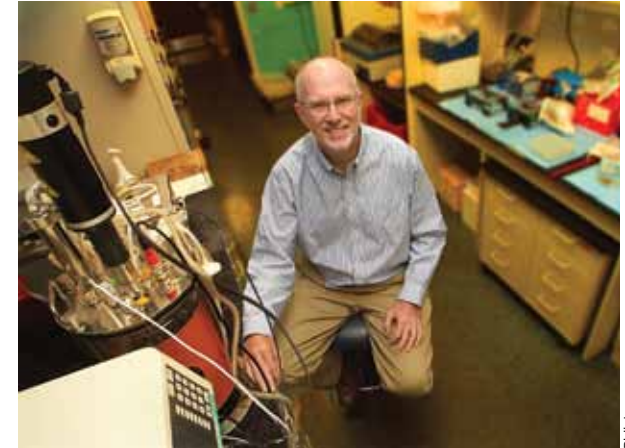
Kuhar, an Emory neuroscientist renowned for his development of techniques that show where drugs act within the brain, received the award from the College on Problems of Drug Dependence (CPDD) at its 73rd annual meeting.



Billy Howard

JUN 28

**GRA Eminent Scholar Dynan
shares in national "top 100"
R&D award**



Phil Jones

Georgia Health Sciences University researchers who helped develop microscopic spheres that hold a variety of materials were among those who captured a "Top 100 R&D Award" this year.

The spheres – measuring half the width of a human hair – have porous walls that can be filled with tiny "microballoons" containing gases and other materials. GHSU researchers, including GRA Eminent Scholar Bill Dynan, are exploring how the spheres might be used as a drug delivery system or a vehicle that holds contrast agents for MRIs.

R&D magazine bestowed the award on a team of scientists that included researchers from Savannah River National Laboratory, Toyota, Mo-Sci Corporation and GHSU. By the end of 2011, the technology had already led to five new patents.

Other technologies that have won this award over the years include the ATM, the halogen lamp, the fax machine, HDTV, the LCD and the Nicoderm anti-smoking patch.



Office of the Governor

Governor Nathan Deal

JUL 1

GRA role in Georgia's economic development strategy expands

GRA's role in growing the Georgia economy expanded in July as the organization forged a closer partnership with the Georgia Department of Economic Development (GDEcD), and the Georgia Cancer Coalition moved toward being formally integrated into GRA. Both actions are key components of Governor Nathan Deal's economic development vision for Georgia.

GRA and GDEcD also began jointly crafting strategies to maximize the impact of Georgia's Centers of Innovation in accelerating the growth of the state's strategic industries.

"We couldn't be more pleased with the opportunity to better connect these outstanding strategic programs with the business community," said GDEcD Commissioner Chris Cummiskey. "This move will further enhance the successful public-private partnership GRA has embodied through the years."

GRA remains an independent nonprofit organization with a unique public-private-academic governing board.

For more on the 2011 activities of the Georgia Cancer Coalition and Centers of Innovation, see pages 14 and 16, respectively.

JUL 13

Georgia Tech reports that start-up DigitalVision may transform eye care



Georgia Tech

Thanks to a GRA VentureLab company, the most fundamental question during an eye exam – "Which is clearer, A or B?" – may become a thing of the past.

The company, DigitalVision, is developing a next-generation instrument that measures vision more precisely and facilitates the custom manufacturing of glasses and contact lenses for better eyesight.

Developed at Georgia Tech, DigitalVision's technology allows optometrists and ophthalmologists to use real images, such as street signs and golf greens, to help patients compare a new prescription with their current one – before lenses are made.

JUL 18

Major HIV/AIDS research consortium led by GRA Eminent Scholar Hunter

GRA Eminent Scholar Eric Hunter of Emory University was chosen to lead a major consortium of scientists working to develop a vaccine for HIV/AIDS.

The effort, funded by a \$26 million NIH grant, involves nine other prominent Emory researchers including GRA Eminent Scholars Rafi Ahmed, Guido Silvestri and Max Cooper. Four other research enterprises in the U.S. are participating in the consortium as well.

Emory's scientists are seeking to develop a vaccine that prevents the first stages of infection from simian immunodeficiency virus (SIV) in non-human primates. By understanding better how SIV is transmitted as well as which immune responses HIV vaccines must generate in humans to block infections, they hope to take steps toward preventing systemic infection.



Emory



Billy Howard

AUG 1
New GRA Eminent Scholar seeks to improve peanut crops

The scientist who led the mapping of the soybean genome arrived at the University of Georgia in August to continue his groundbreaking work as a GRA Eminent Scholar.

At UGA, Scott Jackson will explore ways to produce crops that have higher yields and stronger defenses against pests and disease. Among his first targets is the peanut: Jackson seeks to identify genetic markers that enhance the legume’s nutritional value and reduce or eliminate its allergic threat.

Jackson’s earlier research at Purdue University helped accelerate the tailored breeding of soybeans, clearing the way to optimize growth of the plant for different purposes, including biofuels.

AUG 2
GRA VentureLab company Urjanet secures \$2.2 million Series A financing



For large companies, a small increase in energy rates can mean hundreds of thousands of dollars in added expense. But keeping an eye on small increases can be a big task, as corporations typically have thousands of agreements with energy utilities.

Urjanet – a GRA VentureLab company that in August received a \$2.2 million round of financing – provides big companies with robust intelligence to contain costs and manage energy better.

Born in the labs of Georgia Tech, Urjanet’s technology pulls data from multiple utilities and feeds the information directly into customers’ analytic software.

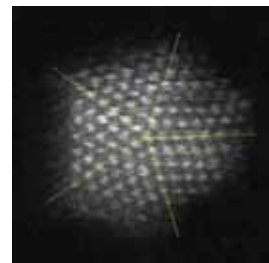
Earlier in the year, Urjanet became the fourth company to receive an investment from GRA Venture Fund, LLC, a private investment fund created to advance promising companies emerging through GRA VentureLab.

AUG 6
University of Georgia discovery could lead to new flu diagnostic

Microscopic particles of gold suspended in liquid proved to be the key to a new technology that can accurately diagnose strains of influenza in mere minutes.

The technology, developed by GRA Eminent Scholar Ralph Tripp and University of Georgia colleague Jeremy Driskell, involves coating the gold nanoparticles with antibodies that bind to specific flu strains – then measuring how the nanoparticles scatter laser light. The scattered light fluctuates in a predictable and measurable pattern, allowing the detection of a flu virus.

The scientists’ detection method was detailed in the August edition of the journal *Analyst*.



Electron microscope image of a gold nanoparticle

AUG 9
Company’s breakthrough in ankle repair device gets FDA clearance

People with ankle joints that are deformed or are degenerating got a new treatment option with the FDA’s clearance in August of an ankle fusion nail developed by MedShape Solutions, a GRA VentureLab company.

The DynaNail device, inserted during surgery, uses MedShape’s patented “shape memory technology.” It increases the odds of a successful ankle fusion, a procedure that is often the last option before amputation.

DynaNail represents an alternative to the bulky frames that surgeons typically use to connect a patient’s lower leg to the foot in ankle fusion surgery. The frames often result in poor fusion of the ankle bones as well as considerable pain for the patient.



Billy Howard

AUG 25
Cutting carbon emissions is the aim of energy project at Georgia Tech

Coal-burning power plants are among the cheapest sources of energy, but reducing their harmful carbon emissions is a complex challenge. A \$2.4 million federal grant awarded in August to a project led by GRA Eminent Scholar Bill Koros (Georgia Tech) will advance discovery of new technology that could reduce the amount of energy needed to capture carbon emissions.

Working with GE Global Research, Koros will focus on developing a new polymer that would help isolate carbon dioxide from other gases before it leaves the coal-burning plant. If successful, the carbon-capture technology could be applied to new and existing power plants.

The U. S. Department of Energy funded the grant.

SEP 14
GRA Eminent Scholar to lead new Atlanta Pediatric Device Consortium

A smartphone attachment for conducting ear examinations at home and a special gel that slows the re-fusion of a child's skull bones after surgery are two of the technologies to be investigated by a consortium focusing on new medical devices that meet the needs of children.

Led by GRA Eminent Scholar Barbara Boyan of Georgia Tech, the Atlanta Pediatric Device Consortium was launched with a \$1.8 million grant from the U.S. Food and Drug Administration.

Adult medical devices are typically used to treat children, but they can perform inadequately because a child's size and immune system are different from an adult's. The consortium seeks to take new pediatric devices from the idea stage to the marketplace.

Georgia Tech, Emory University, Children's Healthcare of Atlanta and Saint Joseph's Translational Research Institute are co-recipients of the grant.

Boyan and Joseph Williams (below) are designing a gel to delay the re-fusion of a child's skull bones after surgery for craniosynostosis.



Gary Meek

SEP 19
CAU cancer research center honored for its contributions

GRA Eminent Scholar Shafiq Khan accepted a proclamation from the Atlanta City Council in September to celebrate the work of Clark Atlanta University's Center for Cancer Research and Therapeutic Development (CCRTD). The center, which Khan heads, is the nation's largest research enterprise dedicated to the study of prostate cancer in the African American community.

Atlanta Mayor Kasim Reed joined Council President Ceasar Mitchell in honoring the CCRTD for its "excellence in research, outreach and instruction." The center continues to advance discovery of potential new treatments for prostate cancer, which has a 65 percent higher incidence among African American men than within the general population.

SEP 26
New insights into cancer therapies emerge at GHSU



Phil Jones

Turning off an enzyme in tumors that suppresses the body's immune response is the target of research by GRA Eminent Scholar Andrew Mellor. In 2011, Mellor and Georgia Health Sciences University colleague David Munn shed new light on the enzyme, IDO, which may help explain why cancer therapeutic vaccines work better in the laboratory than on patients. The scientists' work was featured in a cover story of the *Journal of Immunology*.



Jack Kearse

OCT 1

Emory Vaccine Center joins global partnership to accelerate vaccine development

The Emory Vaccine Center (EVC) in October joined a massive collaborative effort designed to speed the development of next-generation human vaccines.

Led by Novartis, the Advanced Immunization Technologies partnership unites 42 universities and research organizations in 13 countries.

EVC's participation capped a big year for the Center, which is led by GRA Eminent Scholar Rafi Ahmed:

- In July, EVC researchers announced a way to predict whether a person will produce high levels of antibodies against the flu just a few days after vaccination.
- In February, the scientific journal *Nature* reported on the Center's success in designing nanoparticles that induce lifelong immunity in mice. The particles – which mimic how the yellow fever vaccine stimulates immunity – could provide a way to stretch vaccine supply during a pandemic or when a new infection emerges.

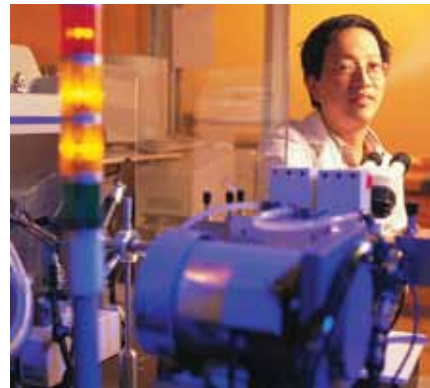
OCT 4

Complications from diabetes are the focus of research by GRA Eminent Scholar Cheng

Generating new understanding of how to treat two of the most common and debilitating complications of diabetes is the aim of new research in 2011 by GRA Eminent Scholar Xiaodong Cheng.

Cheng and colleague Young-Sup Yoon, both of Emory University, are part of a research team that received a \$6.1 million NIH grant to reprogram cells taken from bone marrow or peripheral blood of patients with diabetes. The grant was announced in October.

The team will test how well the reprogrammed cells can ease nerve damage from high blood sugar as well as treat peripheral artery disease, the narrowing of peripheral arteries. Scientists from Georgia Tech, the University of Alabama and the University of California-San Diego are participating in the research.



Billy Howard

OCT 18

VaxyGen enters into license agreement with GSU to speed vaccine and drug development



How to make drug and vaccine development more efficient and economical is a monumental challenge in medicine, but a new collaboration between a GRA VentureLab company and Georgia State University scientists is tackling the challenge head-on.

Through a license agreement between VaxyGen Manufacturing Services and the Georgia State University Research Foundation, the university researchers will provide a new way to produce and purify the proteins needed for developing pharmaceuticals and vaccines.

VaxyGen will also commercialize the expertise of researchers in a GSU biological process laboratory that GRA helped equip.

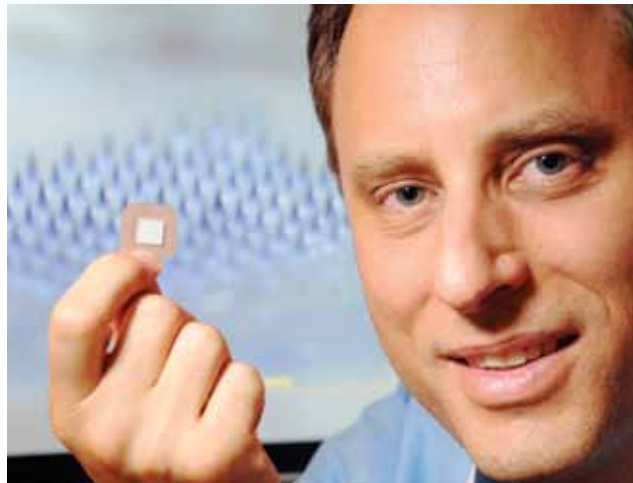
NOV 3

GRA VentureLab companies shine in regional competition

GRA's VentureLab made a strong showing at the 2011 BIO/Plan Competition at Southeast BIO: The contest winner, two of the four finalists, and five of the 10 semifinalists all received GRA VentureLab investment early in their development.

Competition winner Transcatheter Valve Technologies — born in the laboratories of Emory University — is developing a technology that replaces mitral valves in the heart using needle-puncture instead of open incision. Newly launched Viamune, also a finalist, is developing a vaccine for breast cancer based on collaborative research between the University of Georgia and the Mayo Clinic.

Now in its fifth year, the competition is staged at the annual investor forum for SEBIO, which was co-founded by GRA. The 2011 event drew 400 life science entrepreneurs, executives, scientists and investors.



Gary Meek

NOV 7

Gates Foundation backs use of GT-Emory invention to fight polio

The Georgia Tech-Emory invention of a tiny patch that injects vaccines through dissolving needles may be the newest weapon in efforts to eradicate polio.

The microneedle patch, which GRA supported with a VentureLab grant, caught the attention of the Bill & Melinda Gates Foundation. In November, the Foundation awarded Georgia Tech a grant to test the patch as a way to administer the polio vaccine.

Current polio vaccinations are given through injections or oral dosages. However, injections are costly, and oral vaccines can, in rare instances, cause polio. The microneedle patch represents a safer, simpler and more affordable alternative.

Georgia Tech's Mark Prausnitz (above) will collaborate with researchers at the U.S. Centers for Disease Control and Prevention on the project.

NOV 14

GRA Eminent Scholar developing new method to advance stem cell therapy

The process of getting stem cells to the point where they can repair damaged tissue got a boost in 2011 through the research of GRA Eminent Scholar Stephen Dalton.

Dalton (below) and University of Georgia colleague Laura Menendez developed a method to direct pluripotent stem cells to become neural crest cells, the type that are precursors to neurons, bone cells and smooth muscle cells.

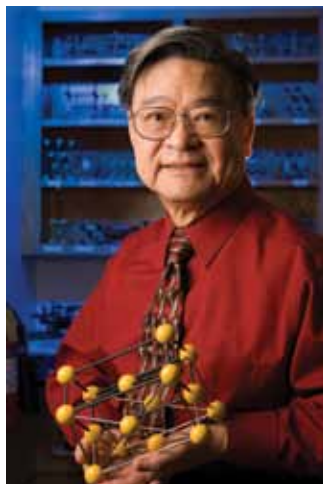
The method cuts in half the time needed to develop neural crest cells, which means more cells will be available for drug testing and cell transplantation.



University of Georgia

NOV 22

Breakthrough technique advances understanding of molecules



University of Georgia

Advances in drug development and insights into patient health are just two of the possible outcomes from a GRA Eminent Scholar's development of a new technique involving X-ray crystallography to analyze the structure of molecules.

Since large molecule crystals are ultimately destroyed while being scanned by X-ray beams, GRA Eminent Scholar B. C. Wang at the University of Georgia used multiple scans obtained with lower doses of radiation to form a composite picture. The lower-dose scans preserve the integrity of the crystal longer, allowing researchers to obtain more accurate and complete data.

DEC 2

Stem cells implanted in pigs yield promising signs for therapies



The future safety of stem cell therapies took a step forward in 2011 with a discovery by GRA Eminent Scholar Steve Stice and colleague Franklin West.

Stice and West, both of the University of Georgia, found that certain stem cells – called induced pluripotent stem cells, or iPSCs – that produce tumors in rodents failed to produce tumors in pigs. Because pigs are genetically more like humans than rodents, the absence of tumors in the 11 pigs studied suggests that iPSCs may be viable to treat disease in humans.

DEC 14

NeurOp gains vote of confidence, additional funding

Pharmaceutical giant Bristol-Myers Squibb announced it would provide GRA VentureLab company NeurOp with funding for an additional year of research into a drug treatment for major depression and neuropathic pain.

The additional funding enables NeurOp to build on a two-year collaboration with Bristol-Myers Squibb and move its research toward development of a drug candidate and human clinical studies. The company was launched based on research at Emory University.

Neuropathic pain is chronic pain that often does not respond to standard pain treatments and can worsen over time.

DEC 19

GRA VentureLab company developing promising vaccine for cancer

Viamune, a start-up launched out of the University of Georgia in 2011 with seed funding from GRA VentureLab, will help commercialize a promising new cancer vaccine and the technologies used to create it.

The vaccine was developed through a partnership between researchers at UGA and the Mayo Clinic in Arizona. It dramatically reduced tumors in a mouse model that mimics 90 percent of human breast and pancreatic cancer cases – including those that resist common treatments.

The researchers used unique mice developed at the Mayo Clinic. As with humans, the mice develop tumors that overexpress a protein known as MUC1 on the surface of their cells.

“This vaccine elicits a very strong immune response,” says UGA researcher Geert-Jan Boons (below), who founded Viamune. “It activates all three components of the immune system to reduce tumor size by an average of 80 percent.”



University of Georgia

THE GEORGIA CANCER COALITION

A year of strategic advance

In July 2011, the Georgia Cancer Coalition (GCC) came into the GRA fold as part of a larger effort to align Georgia's economic development assets. GCC sparks new discovery through its Distinguished Cancer Clinicians and Scientists; promotes cancer prevention and education through six regional coalitions; expands access to cancer clinical trials through its partner enterprise, Georgia CORE; and coordinates development of a statewide tissue and tumor bank.

Like GRA, the Georgia Cancer Coalition had a productive 2011. Following are just a few highlights of the Coalition's work during the year.



Rob Felt

Georgia Tech's Ravi Bellamkonda, a Distinguished Cancer Scientist, directs a research effort to fight pediatric brain tumors. The project received a \$1 million NCI grant in 2011.

Directing brain tumor cells outside a child's brain to increase the odds they can be removed or killed is the aim of a new research project funded in 2011 with a \$1 million National Cancer Institute grant. Scientists at Georgia Tech, Children's Healthcare of Atlanta (CHOA) and Aflac Cancer Center are collaborating on the research, which was seeded by a Georgia Cancer Coalition grant. They are focusing on medulloblastomas – highly malignant brain tumors that account for one out of every five brain tumors in children.

Directing the project is Distinguished Cancer Scientist Ravi Bellamkonda at Georgia Tech. He is joined by fellow Distinguished Cancer Scientist Tobey MacDonald, director of pediatric neuro-oncology at the Aflac Cancer Center and CHOA's Blood Disorder Service, and Barun Brahma, a CHOA pediatric neurosurgeon.

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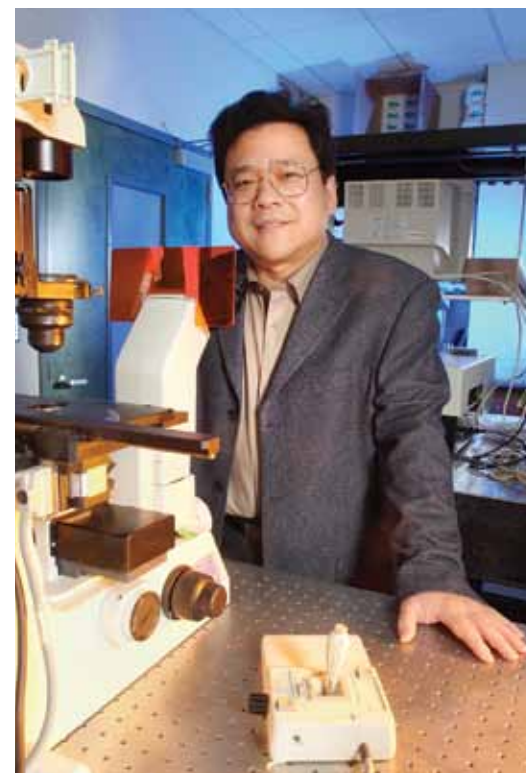
Malignant brain tumors are also the focus of a project launched in 2011 by Distinguished Cancer Scientist and GRA Distinguished Investigator Haian Fu. The Emory Chemical Biology Discovery Center, which Fu directs, received a \$1.5 million grant to **study the genomic alterations of glioblastomas**, the most aggressive and deadliest of adult brain tumors, and interactions among proteins encoded by the tumor's genes. "By targeting these protein-protein interactions, we may be able to disrupt the main pathways involved in glioblastoma formation and progression," Fu said.

...

Cancer Patient Navigators of Georgia, with more than 200 members statewide, held its third annual conference in August. The multi-disciplinary organization connects lay and professional patient navigators as they **help patients, survivors, families and caregivers navigate the many systems** encountered during the cancer diagnosis, treatment and ongoing care process. GCC received a private gift of \$250,000 in 2011 from Tom and Karen Chapman of Atlanta to expand the cancer patient navigation efforts in Georgia. GCC and the Georgia Society of Clinical Oncology co-founded Cancer Patient Navigators of Georgia.

...

The work of Shuming Nie, Distinguished Cancer Scientist and director of the cancer nanotechnology programs at Emory University, led to the launch of SpectroPen, Inc. early in 2011. The start-up company is developing handheld devices and new contrast agents (including nanoparticles) for image-guided surgery. Currently, surgeons must rely on visual inspection of the surgical field to determine how much tissue to remove. **SpectroPen's technology will allow the surgeon to actually see cancer cells** and potentially provide a level of certainty about the margins of a malignancy. The added precision could not only improve patient survival but also reduce the need for post-operative radiation and chemotherapy.



Emory

Tools from newly launched company SpectroPen let surgeons actually see cancer cells. The technology is based on the work of Emory University's Shuming Nie, a Distinguished Cancer Scientist.

...

The Regional Cancer Coalitions of Georgia bring the programs of the Georgia Cancer Coalition close to home for Georgians throughout the state. Focusing on **community-based screening, prevention and education**, the six nonprofit organizations served 130 counties in 2011. The coalitions' programs are tailored to each region's needs and include smoking cessation, colorectal cancer screening, breast cancer screening and patient assistance.

An example: In December 2011, three south Georgia agencies received grants from the Southwest Georgia Cancer Coalition to help address critical needs of cancer patients in their communities. The grants provide emergency aid to help patients and their families buy medication or cover the cost of rent and utilities.

...

The Emory Personalized Immunotherapy Center (EPIC), under the direction of Distinguished Cancer Scientist Jacques Galipeau, launched a new cell handling facility at Emory University Hospital in 2011. EPIC focuses on cellular and biological therapies that use a patient's own cells as a weapon to seek and destroy cells that make a person sick. The new core facility will enable **first-in-human clinical trials of cell therapy platforms** to treat catastrophic conditions, including cancer.



Distinguished Cancer Scientist Jacques Galipeau leads a new Emory center investigating how a patient's own cells might be used as a weapon against other cells that cause illness.

...

Georgia Tech and Emory researchers gained **new understanding of how cells process bits of RNA** (ribonucleic acid) that are embedded in genomic DNA. What makes the findings notable is the increasing evidence that the genomic DNA of cells could be significantly 'contaminated' with RNA.

Francesca Storici, a Distinguished Cancer Scientist at Georgia Tech, and her colleagues sought to determine how cells tolerate the presence of RNA in their DNA – and whether DNA repair mechanisms recognize distortions in RNA/DNA hybrids present in the genome. Their study established that bits of RNA embedded in chromosomal DNA, if not promptly removed, are sources of genetic modification, and that cells use independent repair pathways to remove them. If the mechanisms for removing RNA contaminations from DNA are defective, the risk of mutations is very high.

...

A research seed grant from the Georgia Cancer Coalition to scientists at Georgia Tech helped cement a new research partnership between IBM and the university. Called "One Million Healthy Children," the initiative is applying advanced systems modeling and large-scale data analysis to integrate vast amounts of new information into children's healthcare.

Reaching well beyond laboratory tests, researchers will look at transportation, socio-economic status, food resources, education and myriad other variables – all of which impact children's health but are unknown to doctors. The goal is to **broaden the healthcare view from simply treating disease** to promoting informed long-term wellness and disease prevention. Collaborating on the project are Children's Healthcare of Atlanta, the Georgia Department of Community Health and Emory University.



Gary Meek

Distinguished Cancer Scientist Francesca Storici (center) and graduate students Ying Shen and Kyung Duk Koh, all of Georgia Tech, collaborated with Emory University's Bernard Weiss to develop new insights into how cells process components of RNA.

...

Due in large part to the efforts of the Georgia Center for Oncology Research and Education (Georgia CORE), the number of **oncology clinical trials in Georgia rose to 459** in 2011 – a 41 percent increase from 2009. According to the American Cancer Society, such trials play a key role in increasing life expectancy and improving quality of life for people fighting cancer. The majority of the Georgia clinical trials are in leading forms of cancer – breast, colorectal, lung and prostate. Four out of every 10 clinical trials are offered outside greater Atlanta, a sign that Georgia CORE is bringing clinical treatments to communities throughout the state.

...

The 2011 Georgia Cancer Summit marked two anniversaries – the 40th of the nation's "War on Cancer" and the 10th of the Georgia Cancer Coalition. Held in June, the Summit welcomed John Seffrin, CEO of the American Cancer Society, as keynote speaker and featured panel discussions on federal priorities, presentations on cancer research in Georgia and updates on GCC's 10-year statewide cancer initiatives.

CENTERS OF INNOVATION

Leveraging the past to prepare for the future

Since 2003, Georgia has targeted several industry clusters for growth. For each cluster, the state designated a Center of Innovation to connect companies with industry experts and university researchers. As part of their closer alignment in 2011, GRA and the Georgia Department of Economic Development explored ways to maximize the impact of these centers to accelerate industry growth.

Here is a brief report on select accomplishments and activities of the seven Centers of Innovation.



Albany-based Thrush Aircraft and Middle Georgia College got the help of Georgia's Center of Innovation for Aerospace to purchase technology and start a testing program.

AEROSPACE

Thrush Aircraft needed specialized test flight equipment to get its new 510G model ready for FAA certification. Middle Georgia College in Cochran needed to equip its new Institute for Advanced Aviation Research.

Thanks to the Center of Innovation for Aerospace, both company and college got what they needed.

A seed grant from the center allowed MGC Aviation to purchase flight sensors and a data collection system, which, through a loan agreement, Thrush could use to test its new aircraft. In turn, Thrush provided training for MGC students and faculty, and MGC will have new tools for research and education.

The project also led to 30 new production jobs at Thrush's headquarters in Albany.

Also in 2011: The American Institute of Aeronautics and Astronautics (AIAA) dedicated the original 1940s

buildings of Delta Air Lines World Headquarters as a Historic Aerospace Site. The event culminated 18 months of teamwork between the Center of Innovation for Aerospace and Delta.

Located near Hartsfield-Jackson Atlanta International Airport, the Delta HQ joined nine other sites – including Tranquility Base on the moon – as a designated Historic Aerospace Site. The center worked with Delta to gather data for the nomination, prepare paperwork and promote the nomination to the selection committee.

AIAA is the world's largest technical society dedicated to the global aerospace profession. The Association's Historic Sites program promotes the preservation and importance of significant accomplishments for the aerospace industry.

ENERGY TECHNOLOGY

The Center of Innovation for Energy Technology is a founding partner of the GreenTech Corridor, an area of 700-plus acres in Marietta being redeveloped as a research and development community.

In 2011, the center and other partners advanced the GreenTech Corridor vision by laying vital infrastructure; designing and funding a street widening and beautification project; and converting an old apartment complex into a "green park" for the City of Marietta and a future business park.

The Department of Community Affairs also designated the GreenTech Corridor an opportunity zone, thus making it more attractive to companies in growth or early R&D stages. The kinds of companies

envisioned for the Corridor include those that develop electric technologies, battery technology, electric vehicles, engineering services, alternative energy and waste-to-energy technologies.

ADVANCED MANUFACTURING

Companies large and small tapped Georgia Tech resources in 2011, thanks in part to the Center of Innovation for Advanced Manufacturing.

A matching grant from the center helped ignite an R&D partnership between Georgia Tech and Polymer Aging Concepts, a small, rural manufacturer. Together, the two will work to **design an innovative manufacturing process and specialized equipment** for PAC's revolutionary sensors – which in turn will help the company better meet market demand and expand its workforce and facilities.

For Exide Batteries, a large battery manufacturer headquartered in Milton, the connection with Georgia Tech supported the company's earlier expansion of operations to Columbus, Georgia. The company's growth created 200 new jobs (and the possibility of adding 150 more in the future).

Also in 2011: the Quality Group, which specializes in blended learning systems, partnered with the center to offer a turnkey Lean Six Sigma certification program through Georgia's technical colleges. The certification program is designed to help Georgia manufacturers and service companies easily equip their workforces with the Six Sigma principles leading to increased efficiency and increased profit.

LIFE SCIENCES

When faced with the obstacles involved in testing products with patients in a healthcare setting, the sensing and tracking technology company MedEyes turned to the Center of Innovation for Life Sciences.

MedEyes' technology addresses some of the most urgent problems in medicine, such as hospital-acquired infections and patient falls. Through the center's connections with Georgia Health Sciences University, MedEyes partnered with the university's

Interdisciplinary Simulation Center, which provides true-to-life human models and state-of-the-art simulation services to train future healthcare providers. When the company and the school met, it became clear that both organizations would benefit from MedEyes piloting its technology in the GHSU training facility.

Since the pilot project began, MedEyes has installed its systems in two outpatient clinics in Texas. The Veterans Nursing Home in Milledgeville will also use the MedEyes product in its new Alzheimer's Building.

LOGISTICS

Convening various parties is key to growing Georgia's logistics industry. Early in 2011, the Center of Innovation for Logistics did just that by hosting the Georgia Logistics Summit. **Since 2009, the Summit has tripled in size**, attracting more than 1,200 participants in 2011. Summit attendees came from 21 states and a handful of foreign countries, with 85 percent representing private industry.

Also in 2011: Navigating the special handling requirements for highly regulated healthcare products proved to be a major challenge for Trio Healthcare. The Center of Innovation for Logistics helped the United Kingdom-based company cut through that complexity – and in record time. Thanks to the center's help, Trio gained clarity about how to work with a third-party logistics provider to adhere to regulations. The fast-growing company also took steps toward making Georgia its U.S. headquarters.

BIOENERGY

Deep knowledge of key industry players has enabled the Center of Innovation for Bioenergy to make the right connections at the right time.

Two years ago, the center introduced North Star Development to Stone Workman, who was Georgia manager of rural development for the U.S. Department of Agriculture. North Star was looking to fund a biomass-fired renewable energy facility in Rabun Gap, and Workman brought in Rural Utility Services, which contracted with Multitrade Rabun Gap, LLC to provide long-term debt funding.

The center then helped Multitrade speed conversion of a former Fruit of the Loom manufacturing facility into a producer of electricity, with Green Power EMC as its main customer. Today, Multitrade has **generated 20 direct and 75 indirect jobs in Rabun Gap**.

The center's matchmaking also helped Rollcast Energy meet the people needed to start construction of its Piedmont Green Power facility in Lamar County. When completed, the \$218 million biomass-to-renewable energy project will hire more than two dozen full-time employees, generating up to \$1.5 million in wages annually. John Campbell, Rollcast Energy's managing director, calls the center "a great networking tool" and credits the approach with helping his project reach potential suppliers quickly and efficiently.

AGRIBUSINESS

The Center of Innovation for Agribusiness is helping three companies capitalize on the current trends of "buying local" and focusing on healthy foods made through eco-friendly production.

Georgia Olive Farms, an agricultural cooperative, is working with the center to determine **the viability of Georgia as the primary olive oil producer on the East Coast**. The co-op reached a major milestone in 2011 when it completed the first commercial olive harvest and oil pressing in Georgia in nearly 200 years. An Associated Press story on the milestone ran in media outlets nationwide.

Lauri Jo's Southern Style Canning, LLC is a family-owned business that began as a much loved hobby and recently won the Best of Atlanta Award at the AmericasMart Atlanta Gourmet Market. The Center of Innovation for Agribusiness is helping Lauri Jo's maintain its focus on **using locally grown Georgia produce in specialty food products**, which are now sold in 32 states and internationally.

White Oaks Pastures is a multigenerational family farm producing artisan products that are healthy, safe, nutritious and delicious. Currently, White Oaks is working with the center to complete a research project for establishing a free-range chicken operation.



Georgia's first commercial olive harvest in 200 years was aided in part by the Center of Innovation for Agribusiness. An AP story about Georgia Olive Farms ran nationwide.

MORE ABOUT GRA

Creating leverage to grow the Georgia economy

The Georgia Research Alliance is an independent nonprofit organization working to expand frontier research in Georgia's universities to launch new companies and create high-wage jobs. GRA accomplishes its work in three interrelated ways:

- **Recruiting world-class scientists** to universities as GRA Eminent Scholars®. The research of these scholars focuses on areas vital to growing Georgia's economy – primarily the biosciences, advanced communications, high-performance computing and renewable energy. In coming to Georgia, GRA Eminent Scholars typically bring with them additional research talent and funding.
- **Investing in state-of-the-art infrastructure** for university laboratories. By providing scientists with sophisticated tools and technology needed to perform groundbreaking work, GRA creates leverage to bring in substantial federal and foundation research funding.
- **Helping to commercialize discovery and invention.** By supporting the launch of new companies, GRA moves the most promising research toward the marketplace. GRA's VentureLab program provides seed money in the crucial stage between discovery and launch as well as expertise to help manage the risks associated with science and technology startups.

Georgia's \$560 million investment over the past 20 years has brought a return of more than \$2.6 billion in new federal and private funds for research and startup capital; the launch of more than 230 companies; and the creation of more than 5,700 high-value jobs.

CUMULATIVE GIVING TO THE GEORGIA RESEARCH ALLIANCE

Without gifts from companies, foundations and individuals, GRA wouldn't exist. Private gifts fuel GRA's organizational development and provide the working capital needed to capture strategic opportunities. Funds from the State of Georgia are dedicated to GRA's programs. For more than 20 years, this public/private model has been the foundation of GRA's success.

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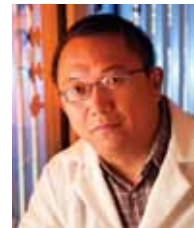
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