

# TechNEWS

CELEBRATING 20 YEARS

NJ Tech Council  
njtechcouncil.org  
October 2016  
Vol. 22 Issue 8  
\$3.50

## 5 John Taylor

Vice President, Public Affairs  
and Communications,  
LG Electronics USA

**NJ Tech Council's Award Winner:  
*Consumer Product  
Company of the Year***



20

16

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— Robert Hippius, Class of 2016

Fall is in full-swing, and we're incredibly busy here at the Tech Council. First, and foremost is our upcoming Awards Celebration on November 17. The companies and universities that make up our region are some of the best in the world, and we're thrilled that every year we're able to shine the spotlight on them.



Also, as we round out the year, we want to call your attention to our upcoming CEO and CFO Peer Networks, which bring together CEOs and CFOs networking, learning and sharing experiences. Join us on the mornings of November 29 and December 8 for these informal, interactive and incredibly useful roundtables.

I look forward to seeing you soon as we round out our 20th Anniversary. It's been a fantastic year as we moved to New Brunswick, added great team members, and launched our second venture fund!

Come visit us at our new office and co-working/workshop space and let's discuss how we can better collaborate to help you succeed! ■

– James C. Barrood, President and CEO, NJ Tech Council

## TechNEWS

October 2016 • VOL. 22 NO. 8  
NJ Tech Council & The Education Foundation  
96 Albany Street  
New Brunswick, NJ 08901  
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To contact a staff member, see the staff box for email addresses. Submissions for New Jersey TechNews are welcome. All editorial copy published is at the discretion of the editor. Send submissions to news@njtc.org. The views expressed in New Jersey TechNews do not necessarily reflect those of the NJ Tech Council or New Jersey TechNews.

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# Q&A with Andrew Gilbert

This year's winner of  
the Legend of Technology Award.



*Andrew Gilbert, Partner, DLA Piper, focuses his practice on corporate finance transactions, mergers and acquisitions and securities law matters. He represents public and private companies primarily in the technology, life sciences and healthcare industries as well as investment firms that serve these sectors. He brings to his clients his extensive background representing issuers, underwriters and venture capital firms regarding both public and private offerings.*

*Andrew is highly experienced in securities law compliance and corporate governance matters. Andrew's transactional experience includes IPOs, PIPEs, registered direct offerings and follow-on offerings, as well as venture capital, private equity, M&A and other strategic transactions. He also has counseled numerous entrepreneurs and emerging growth companies in planning profitable liquidity strategies. Andrew regularly serves as outside general counsel for private and public companies at various stages of development.*

We caught up with Andrew and asked him the following:

## **You have extensive experience representing entrepreneurial companies and venture capital firms – what are some key lessons learned you can share with our members?**

The most successful entrepreneurs are able to build great teams who share the founder's vision and supplement his or her strengths with their core competencies. Companies with a defined corporate culture in which all members of the team have a real sense of ownership in the mission are able to meet the inevitable challenges and bumps in the road.

Some of the key components of a winning culture are transparency and accountability up and down the organization. One consistent theme is that the entrepreneurs who foster such a team culture will be more likely to build a sustainable business and increase value for their stakeholders.

## **We know the tech startup landscape and VC funding has evolved in the last 20 years. As you've had a front row seat, what do you see as the biggest differences in companies you represented 15 years ago and today? Any major similarities?**

Advances in core technologies, such as software tools, data access and storage and computing power and speed have dramatically lowered costs of development. As a result, it generally requires less upfront capital to start a viable company today than 15-20 years ago. With that, however, has come increased competition for early stage and growth capital because there are more startups than ever.

The startup culture is much more of a critical component of the economy than in any time in history. Despite such developments, those businesses who can demonstrate that their technology and business model are truly disruptive while filling a significant market need will always have the best chance at success. That has not changed.

## **For entrepreneurs planning a profitable liquidity strategy, what is your top piece of advice?**

The key to any successful transaction, whether it is an acquisition or a securities offering, is preparation. Entrepreneurs who have their companies in a position to execute on a transaction quickly and efficiently are able to capitalize when market conditions are favorable.

It is also important for each of the stakeholders (founders, management, the Board and the investors) to be aligned in terms of exit timing and valuation goals. Those discussions should be had among those at the table at each investment interval. If there is misalignment, take the time to try and resolve the issue then, rather than kicking the can down the road. Those companies that have a unified group of stakeholders have the best chance of executing a successful exit.

## **Congratulations on the Legend of Technology Award! Please share with our members what the award – and the NJ Tech Council – has meant to you throughout your career.**

The award is very humbling frankly. I am very grateful to my partners and colleagues through the years. The commitment to excellent service to our clients among our team at DLA Piper is very inspiring. Our collaborative team approach makes going to work each day a real pleasure. I am particularly thankful to our clients who entrust our team with their most critical matters and transactions. Many of such clients are NJTC members who have benefitted from their partnership with the Council. I have participated in the Tech Council's events, planning and governance since virtually the beginning of my career. Then as now, the NJTC is a key component of fostering the technology community, from the startups to the established larger companies.

The Council serves a critical role as a hub of activity for the disparate constituents that are necessary for a successful tech ecosystem. While we have serious challenges in NJ, the NJTC's ability to bring our tech talent together with funding capital and promote our region's strengths will enable NJ to continue to compete as a tech leader in a very competitive market. ■

# Spotlight Profile: LG Electronics USA



LG Electronics USA, headquartered in Englewood Cliffs, is being recognized for its commitment to innovation and market leadership. For example, LG OLED TVs created a new category of high-end home entertainment considered “The Holy Grail of TV,” while LG innovations like TWINWash washers and InstaView refrigerators are redefining the home appliance industry. What’s more, LG’s plans for a new world-class North American headquarters campus in Bergen County will be both a prime example of LG’s technology and community leadership, and an economic engine for the Garden State.

**New Jersey-based LG is a cornerstone of consumer electronics, home appliances and mobile phones. What is the biggest shift that you, as a long-time LG executive and industry player, have seen in product demand from consumers?**

“Generally speaking, American consumers today are more tech savvy, more mobile and more focused on what we call “Innovation for a Better Life.” While LG has a 60-year history of innovation around the world, LG is still a relatively new brand in the United States, having been launched here in 2004. In a short period of time, LG has grown to be a powerhouse brand in the U.S. across many product categories. At LG, we listen to consumers. Those insights are the foundation for our product development and marketing efforts. Innovation for a Better Life is seen in our TWINWash system that allows you to wash two loads of laundry at once, or OLED TV that provides the best viewing experience, hands-down.”

**Consumers are more involved than they have been in the past when it comes to purchasing. Can you talk a little bit about that customer evolution and how it has changed the way LG goes to market with products?**

“Traditional sales and marketing models have evolved to meet the evolving expectations of consumers. The majority of consumers now research products online, study product reviews and are armed with more informa-

tion than ever before to aid in their purchase journey. At LG, in addition to traditional marketing programs, we’ve been focusing on digital and in-store marketing efforts to reach consumers with the information they want when and how they want it. A good example is the new “LG Experience Wall” in retail stores this year. It represents a new approach to consumer education about the latest TV innovations, like 4K Ultra HD, high-dynamic range, LG OLED and LG Super UHD technologies.”

**Consumer electronics and home appliance are highly competitive business areas. What do you see as the key tenets for success ten, twenty, fifty years from now, for a company like LG?**

“In our fast-paced business, it’s hard to forecast where the industry is headed even five years down the road. But companies like LG, with an intense focus on the customer and unwavering commitment to driving, will no doubt be leading the way for generations to come. As the pace of change continues to accelerate, successful companies are those who stay close to the customer, understanding their needs, anticipating their wants. Innovation is key. At LG, we know that’s not technology for technology’s sake but ‘Innovation for a Better Life,’ which means products and features that save consumers time, energy and money, that bring your family and friends together, that make you smile.”

John I. Taylor has been LG’s most senior U.S. external relations executive since 2000. In addition to his company responsibilities leading industry affairs, public relations and government affairs, Taylor represents LG on the boards of directors of the Association of Home Appliance Manufacturers, the Video Division of the Consumer Technology Association and the Advanced Television Systems Committee, among others. A former newspaper reporter, Taylor started his career in 1981 at Zenith Electronics, which was acquired by LG in 1999. ■



*John I. Taylor  
Vice President, Public  
Affairs, LG Electronics USA,  
Englewood Cliffs*

*Composite of the planned world-class US  
headquarters of LG Electronics in Bergen County.*

# Using Next-Generation WiFi to Take Your Business Into the Future

WiFi solutions that were previously only available to headquarters and other large office locations are now available to all-sized businesses, including small businesses and enterprise branch locations.

By Dave Dombroski

**T**rends in consumer and employee behavior are causing demand for WiFi to grow exponentially. According to Cisco, WiFi devices will power a majority of all Internet traffic by 2017, and a 2015 study by Tech Pro Research found that 74 percent of businesses are using or are planning to use “bring your own device” (BYOD) policies.

WiFi solutions that were previously only available to headquarters and other large office locations are now available to a wide range of businesses, including small businesses and enterprise branch locations. By leveraging the latest WiFi technology and selecting a solution that provides the following advanced capabilities, you can promote, protect and manage your business as needs and demands evolve:

## Private Network + Guest Network

Customers and patrons have come to expect free wireless service from the companies they do business with, and studies show that free WiFi brings in foot traffic and encourages customers to spend more time and money.

Offering a guest or public WiFi network to your visitors as a convenience and benefit for doing business at your establishment, in conjunction with a private WiFi network that is only made available to employees and authorized users, also provides security benefits. A separate guest WiFi network helps reduce business concerns about data security and bandwidth.

## Made for Marketing

But the latest generation of wireless networks offers capabilities that do more than just protect. Marketing tools such as custom splash or landing pages allow you to speak directly to your customers before they connect to your WiFi and help attract new customers while encouraging repeat business.

“WiFi devices will power a majority of all Internet traffic by 2017.”

Businesses that install WiFi networks with sophisticated data capture and analytics capabilities can capitalize on the wealth of consumer information available from guest networks to target customers with special offers, notifications of sales and special events, or to determine the effectiveness of advertising or signage.

## Bandwidth You Control

WiFi network configuration controls ensure that your business can handle a growing numbers of mobile users, while keeping employees productive and customers happy with their experience. These controls allow you to set schedules that keep unauthorized users off your network by shutting it down at night or on weekends automatically or allocate bandwidth so your customer WiFi never slows down your back-office connection.

## Power in the Palm of Your Hand

Consider cloud-based controls to manage all of your network’s features 24/7, on the device of your choice. A WiFi solution with a management system that can be run centrally on a smart device via a mobile app or online portal enables IT staff to universally apply controls and can reduce network-management overhead.

These advanced WiFi features are only as useful as the broadband infrastructure they rely on. Organizations must be able to adapt and upgrade to changing technology and add new applications and services over time without worrying about network capacity or dependability. It is important to pair your WiFi solution with a network service provider that offers broadband options to accommodate your current and future bandwidth demands and an infrastructure with the uptime and reliability your business needs. ■

**Dave Dombroski is Vice President of Business Services – Comcast Freedom Region. [www.business.comcast.com](http://www.business.comcast.com)**





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# NJ Tech Industry Faces a New Risk Landscape

Whether you choose to view the glass as half-empty or half-full, 2016 is a turning point for the industry.

By Mark Giamo and Jennifer Core

According to the CompTIA 2016 Cyberstates report, New Jersey ranks in the top 10 states nationwide for employment and average wages in the technology industry. Within the state, the tech sector accounts for more than 350,000 jobs – representing 11 percent of New Jersey’s total jobs, the latest numbers from the Bureau of Labor Statistics show.

The technology sector has been an engine of economic growth well beyond New Jersey’s borders. But after an explosive six-year run-up, the industry has hit a speed bump as bellwether stocks falter on disappointing earnings reports and jittery investors. Recent tech IPOs have disappointed: 80 percent of tech companies that debuted in 2014 or 2015 are trading below their first-day trading price.

But while the robust pace of growth of the last few years may be gone, industry growth has not ground to a halt. The tech sector overall has rallied after a rocky start to the year, recovering most of those early losses. U.S. venture funds raised a record \$13 billion in Q1 2016, according to data from *Dow Jones VentureWire* – though both private and public investors are exhibiting more price-consciousness. And although global M&A is down, the tech sector was a standout, totaling \$100.3 billion in deal value, the second highest first quarter on record. Microsoft’s \$26.2 billion takeover values LinkedIn at 79 times the company’s EBITDA – the most expensive all-cash internet deal to date.

Whether you choose to view the glass as half-empty or half-full, 2016 is a turning point for the industry. According to BDO’s ninth annual Technology RiskFactor Report, three-quarters (76 percent) of the 100 largest U.S. public technology companies cite uncertain financial performance as a chief risk in their annual filings – up seven percentage points from last year. Growth is no longer a foregone conclusion, and today’s tech investor is far savvier and more selective. Tighter purse strings mean more compe-



tion to win limited investor dollars – and more pressure to seize the right opportunities and avoid making mistakes.

As the industry responds to market volatility and more stringent rules and regulations, tech companies are reassessing their risk tolerance and buckling down on strategy to determine the best path forward. The top 25 risks from the 2016 *Technology RiskFactor Report* shed light on the challenges New Jersey tech companies can expect to face as we reach the halfway mark through 2016.

The chart on the next page highlights the top 25 risk factors cited by the 100 largest U.S. technology companies.

## Key Insights:

**Cyber Risk Climbs.** All 100 of the largest U.S. public tech companies cite risks related to cyber-

security in their annual filings, up from just 30 percent in 2009. And, as government regulators step up scrutiny of cyber preparedness, 51 percent of companies specifically cite cyber regulations as a risk factor, reflecting not only the growing cyber threat, but potential sanctions for inadequate defense measures. Regulators in the financial services and healthcare industries have issued cybersecurity guidance that could impact tech companies with clients or vendors in those sectors. While vendor risk extends far beyond cybersecurity, the majority of cybercrime is carried out via third parties.

The risk for the tech industry is twofold: 1) technology companies often outsource a number of key business and operational functions that, lacking the proper oversight and controls, may be vulnerable endpoints in the network; and 2) many tech companies are also service providers

2016 Rank	Risk Factors	2016	2015	2014	2013	2012
#1	Breaches of technology security, privacy or theft	100%	96%	91%	81%	71%
#1t	Federal, state or local regulations	100%	100%	98%	96%	98%
#3	Competition in the tech industry, pricing pressures	98%	100%	99%	95%	99%
#3t	Management of current and future M&A and divestitures	98%	99%	94%	88%	88%
#5	Threats to international operations and sales	96%	96%	89%	82%	85%
#6	U.S. general economic conditions	95%	94%	95%	92%	98%
#7	U.S. and foreign supplier/vendor and distribution concerns	92%	90%	93%	84%	88%
#8	Ability to attract or retain key personnel	91%	95%	81%	80%	82%
#9	Predicting customer demand and interest, innovation	90%	90%	92%	83%	91%
#9t	Natural disasters, war, conflicts and terrorist attacks	90%	86%	89%	75%	88%
#11	Corporate copyright, IP infringement, trademark violations	89%	93%	88%	79%	80%
#11t	Legal proceedings, litigation	89%	93%	91%	74%	83%
#13	Failure to properly execute corporate strategy	84%	95%	91%	87%	88%
#14	Accounting, internal controls and compliance standards	83%	92%	79%	65%	69%
#15	Failure to develop or market new products or services	83%	89%	84%	75%	93%
#16	Ability to maintain or implement operational infrastructure	81%	87%	79%	71%	73%
#16t	Equipment failure and product liability	81%	86%	82%	69%	80%
#18	Indebtedness	78%	72%	74%	65%	50%
#19	Cyclical revenue and stock fluctuation	76%	69%	70%	62%	76%
#20	Labor concerns	75%	64%	83%	55%	56%
#21	Goodwill impairment	73%	67%	57%	39%	31%
#22	Inability to acquire capital, credit ratings	69%	68%	74%	57%	69%
#23	Loss of a major customer	61%	44%	45%	25%	N/R
#24	Failure to comply with FCPA, anti-corruption and anti-bribery laws	58%	58%	48%	29%	N/R
#25	Loss or regulation of government contracts and incentives	57%	47%	35%	38%	25%

\*t indicates a tie in the risk factor ranking      \*\*N/R indicates not ranked

to other user entities, and depending on contract terms, may be held liable or embroiled in a lengthy and expensive data breach lawsuit.

**Regulatory Concerns Mount.** Concerns related to federal, state or local regulations tied with cybersecurity as the most frequently cited risk factor this year, listed by all 100 companies analyzed. This aligns with the 2016 BDO Technology Outlook Survey, in which tech CFOs ranked policy and tax changes as one of their biggest challenges in 2016. And with the U.S. election cycle in full swing, a new administration also raises questions about the future of government initiatives and spending plans. This year, 57 percent of technology companies cite the loss of government contracts, spending or incentives as a potential risk, up 10 percentage points from 2015.

**Competition Intensifies.** Nearly all of the largest U.S. technology companies (98 percent) cite risks related to competition in their annual filings. The war for top tech talent continues to heat up as the industry faces an ongoing shortage of skilled tech workers and a tough hiring envi-

ronment. Ninety-one percent of companies cite attracting and retaining key personnel as a risk factor, ranking as the eighth highest risk overall. Competing to innovate is also a top challenge,

**“80 percent of tech companies that debuted in 2014 or 2015 are trading below their first-day trading price.”**

with 83 percent citing the risk of failure to effectively develop or market new products or services and 50 percent citing risks related to entering into new markets and product diversification.

**International Risks Peak.** Among the 100 largest U.S. technology companies in our study, 68 operate in more than 20 countries, and for the first time, we analyzed their unique risks to uncover the growing challenges impacting tech companies with a large, multinational presence. While the top risks (regulations and cybersecurity) are the same across all companies analyzed, threats to

international operations and sales jumped to the third most-cited risk for these global companies, compared to the fifth most-cited overall.

**Compliance Matters.** In the wake of heightened regulatory scrutiny and changing laws, 83 percent of technology companies cite accounting, internal controls and compliance risks in their filings. The Public Company Accounting Oversight Board (PCAOB) has stepped up its scrutiny on internal control procedures and testing, following a significant rise in tax and financial reporting control deficiencies over the last few years. In addition, the Financial Accounting Standards Board (FASB) has announced a number of Accounting Standard Updates that technology companies are in the early stages of implementing. ■

**Mark Giamo is the Assurance Office Managing Partner and Jennifer Core is an Assurance Partner in BDO’s Woodbridge office, BDO USA, LLP, a leading accounting and consulting firm.**  
**Website: <https://www.bdo.com/>**



# 5 Ways to Stop the Technology JOB HOP

This is what the best and brightest wish for in their next employment opportunity.

By Hans Irr

Changing of the guard – how do we attract and retain the next generation of IT Leadership? With IT Leadership maintaining an average tenure of only 4-5 years per company, what can be done to not only attract – but retain the best and brightest in the IT world? As with most leadership roles, change is not only disruptive, but can be costly. Making the right leadership choices and creating a culture that promotes innovation is crucial for maintaining consistency and keeping IT costs from spiraling out of control.

So what is the cause of such a high rate of IT leadership turnover? Research points to lack of alignment between Business Strategy and IT Strategy as a key factor. IT has evolved from a commodity solution, lumped in with HVAC and electricity, to an integral part of business strategy, product development and delivery. Because of this shift, IT leadership needs to be included sooner in the planning and strategic decision making process, instead of just being handed a long list of undeliverable projects, destined for failure. Earlier involvement in the portfolio planning process means expectations of deliverable technology can be managed with a much higher rate of success – thus ensuring satisfaction of both business and IT leadership.

For a moment, let us assume IT has been granted access to and involvement in the business planning process, what else is needed to promote innovation and consistency in today's corporate IT environment? Simply put, the environment itself needs to evolve. No longer is IT just a necessary evil to provide word processing and spreadsheets to corporate executives and fix 'blue screen' system crashes on PCs. Over the past 10 years, technology has grown and changed as it has weaseled its way into the everyday lives of each and every consumer in the

marketplace and now operates well beyond the unseen “nuts and bolts” of everyday functionality. New world IT is now a combination of operational infrastructure mixed with the “bling” of user interface / user experience (UI/UX). Corporate environments need to look to, and mimic, where innovation is currently brewing – college think tanks, Silicon Valley success stories, and innovation labs across the globe. To truly catch the attention of “the next generation of IT leaders” and retain the incoming talent, companies need to create and promote corporate environments genuinely steeped in collaboration, creativity and connectivity. Here is their wish list:

## 1 Tools and Time

*The flexibility to work whenever you want.* The 9am-5pm workday isn't in everyone's DNA. And that's not always bad for an organization. Collaboration is no longer limited to a closed meeting room and a regimented 8-hour work day. Companies are going to have to recognize that inspiration and productivity can happen, unplanned, before or after traditional working hours. Additionally, providing IT innovators with the tools to work wherever and whenever they want will keep companies ahead of the technology curve and help retain top talent.

Today's workforce no longer needs or wants a formal structure to share their revelations. They want to connect instantly with the ability to share and capture concepts in a collaborative, free flowing format. Consider how employees already communicate with their peers, using social media platforms and collaborative environments in real-time. Companies may find that mimicking this structure will not only improve internal communication, but also encourage and

promote the speed, efficiency and adaptation of innovative thinking.

## 2 Adaptable Office Space

Collaboration spaces are certainly very trendy, and for good reason – today's workforce is looking to create the right space for the right application – one that both aesthetically and conceptually blends personal and professional style. Whether employees are more productive working solo or in a group environment – there should be provisions for both. Moveable walls create more flexible and potentially private spaces as needed. Large, wall-mounted monitors with easy plug and play connectivity create the opportunity to share on a moment's notice. Providing an adaptable office environment shows the employer's commitment to creativity, collaboration and innovation.

## 3 BYOT: Bring Your Own Technology

Allowing the use of personal devices and preferred technology applications is another core element in promoting innovation. Why stifle creativity by locking down and limiting the tools used to create? Today's workforce knows what they like – let them bring their own devices and integrate this technology into their role. Companies should avoid forcing their technology preferences on people who don't want it or prefer something different. This generation has grown up with their treasured devices in their hip pocket. These are often a personal choice and may even provide a level of comfort as well as reflect one's personal and professional style. Use of these devices, and the technology that runs on them, should not only be allowed, but explored

for new opportunities leading to improvements and efficiencies in the workplace. Keeping an open mind to BYOT demonstrates to employees that you value their decisions and respect their rights to individualism – both highly attractive traits for hiring and retaining IT talent.

#### 4 I want to make a difference!

Today's workforce wants to work on projects they perceive as worthwhile in an environment where they can be heard. If their role is solely to support an existing process, they want to know that they also have the ability to innovate and create improvement while incorporating new technologies. The ability to transform and make a difference may even supersede salary in the career decision-making process. Employees look for companies with social responsibility woven into the fabric of their culture. Not only do they want their own work to be meaningful, but this generation is looking to their employers to have programs in place that give back to the community. Whether it's putting shoes on the feet of children in Argentina or providing clean drinking water to women around the globe, this

generation wants to feel like the work they do will in some small way make a difference for those in need.

#### 5 Real Time Connectivity

In today's deluge of hyper-social connection, the idea of being separated from personal technology has come to strike both fear and anxiety – being disconnected for any length of time certainly means missing the next big thing! This also translates to the business environment, where communication in rapid-fire format is essential to driving future growth and innovation. While employees want the ability to connect in real time, this is still a big step for many employers who haven't come to fully understand their employees' frenetic ability to multi-task. Today's IT professional is very adept at integrating the latest communication trends into the everyday workplace, helping to keep companies on the cutting edge and providing an open and intriguing environment for the IT professional to stay up to date. And let's face it, this is the reason many of these professionals got into the IT business in the first place.

Not every company or work environment can accommodate the full gamut of the IT professional's wish list. But an understanding of the foundation of their environmental expectations – past experiences, what technologies they chose to incorporate personally, and where they would like to be in the future – is essential in attracting and retaining truly great talent and the future of IT leadership for years to come.

The most successful organizations will be the ones that recognize the need to innovate their corporate environment as they strive to elevate and involve IT in the business strategic planning process. Promoting these trends will be essential to realizing the expectations from both the business and IT, and help to reverse the inconveniently short tenure of today's IT professional. ■

**Hans Irr is a consultant at TayganPoint Consulting Group, (<http://tayganpoint.com>). TayganPoint specializes in business transformation from strategy through execution.**



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Rowan University offers an M.S. in Data Analytics designed to meet the growing need for highly-trained professionals in the field of data science. This 11-course, 30-graduate semester hour program prepares students to:

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The program includes a Health Data Analytics specialization for students seeking careers in the biomedical, hospital, clinical research, tele-health, and pharmaceutical sectors.

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**Learn More | [RowanU.com/Data](http://RowanU.com/Data)**

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# Rowan Engineering, Virtual Reality Center Assists Federal Aviation Administration

**Five Rowan University Engineering students recently designed a drone cage for the FAA that could one day help make air travel safer.**

By Steve Levine and Patricia Quigley

**F**ive Rowan University Henry M. Rowan College of Engineering students recently designed a drone cage for the Federal Aviation Administration (FAA) that could one day help make air travel safer.

The cage, made of tubular aluminum trusses with steel corner bases, was created for the FAA's inaugural Aviation STEM (Science, Technology, Engineering and Math) Day and the Air Traffic Controller Association Technical Center Tuesday events at the William J. Hughes Technical Center in Atlantic City.

## Rowan Designed, FAA Constructed

Measuring 16 feet tall by 20 feet long by 12 feet wide with netting suspended one to two feet from the floor for added safety, the cage was constructed by FAA personnel so that the flight of "drones," or Unmanned Aircraft Systems (UAS) in FAA parlance, could be demonstrated at the FAA events in partnership with Rowan's Virtual Reality Center at the South Jersey Technology Park in Mantua Township.

Recent graduate James Ritchie, an electrical and computer engineering major who served as project coordinator, said the cage contained dozens of paper "markers," black and white locator graphics that enabled the drones to read and transmit their position back to the VR Center.

"As the drone flew in the cage, a camera on-board the drone read markers affixed to the netting, indicating which were in view at any particular time. Custom-written software processed the imagery from the camera, and the FAA relayed the processed information back to Rowan so the flights of the drones could be modeled and simultaneously viewed in virtual reality," Ritchie said.

Ritchie, a former FAA intern who graduated from Rowan May 13, has accepted a full-time

position as an electrical engineer with the FAA. Other members of Rowan's multi-disciplinary design team included ECE majors Michael Paule, Aaron Yangello and Jason Myers and mechanical engineering major Robert Samuel.

## Students Challenged

The students were challenged to design a cage to fit specific safety and technical parameters, to make it modular so it could be easily assembled and disassembled, and to keep construction within a very tight budget.

Paule and Samuel said the best lesson from the experience – aside from the hands-on engineering work – might have been their collaboration with an actual partner.

"It's a little different when you make something for a professor and you're getting a grade on it," Samuel said. "This was real world and it was actually more rewarding."

## Strong Research Ties

The STEM symposium featured demonstrations and presentations highlighting national aviation initiatives and included a college/university day featuring undergraduate aviation research. STEM students from around the nation joined the Rowan students at the symposium, including some from Purdue University, Rutgers University, Drexel University and The Ohio State University.

Karen DiMeo, drone research technical lead for the FAA Tech Center, said a central component of the event was a series of drone demonstrations highlighting Rowan's unique VR Center.

"The FAA and the Henry M. Rowan College of Engineering have strong research ties," said DiMeo, of the FAA's Next Gen Advanced

Concepts and Technology Development Division. "When we found ourselves in the position of needing a drone cage to demonstrate our research, we saw a natural fit in working with Rowan students."

## Making Air Travel Safer, Virtually

George Lecakes, director of Rowan's VR Center and a member of the first cohort of students now seeking a Rowan Ph.D. in engineering, pointed out that as the drone buzzed about the cage, it gauged its location by reading the 30 paper markers placed throughout and relayed information back to Rowan.

"The information helped us produce XYZ coordinates for the drone's position," Lecakes said. "This type of study will help with monitoring drones in the future by researching alternate means for tracking their position."

Cliff Johnson, one of the FAA's drone pilots and also an FAA engineer and Rowan Engineering alumnus, worked on the project directly with the students to ensure the design came to fruition.

## Partnerships

"The real power of this approach is that it showed how government/academia partnerships can really move the aviation industry forward and promote new ways of thinking to solve the challenges of tomorrow," said Johnson.

The method used for tracking the drones' position works in both normal and GPS-degraded/denied environments, and the ability to simulate the outside environment in virtual reality goes far beyond a demonstration.

"To the pilot, the drone could be flying inside the cage, but to the outside observer, it appears that it's really flying in downtown Atlantic City. The possibilities are endless," said Johnson.

With rising concern about an ever-growing number of UASs – drones – and the potential hazard they can pose to other aircraft, studies like these could, ultimately, help make air travel safer, said Lecakes.

### About the Rowan University Virtual Reality Center

The FAA is just one of numerous business, industry and government clients with which the Virtual Reality Center at the South Jersey Technology Park at Rowan University works.

“Our VR Center reflects the University’s commitment to the region and its economy as well as to higher education. The structure will draw businesses and others in need of R&D support to South Jersey and is a major resource for Rowan’s existing partners, including those in engineering, science, medicine, and technology,” Lecakes said.

The expanded Center, which opened last summer, provides a wide range of state-of-the-art research capabilities via its original R&D VR

lab, data wall for programing and design development, and prototyping capabilities and its year-old custom-designed, 15,000+ cubic-foot VR collaborative environment, which features a 7-foot-high by 40-foot-wide curved wall of screens that provides an area for collaborative projects. The new one-of-a-kind laboratory is home for high-level research for clients in engineering, science, medicine and more. In that immersive environment, up to 25 people can work in 3D, using space for real-time planning, designing and visualization. There, researchers can launch video, graphics, charts and more, overlaying a wide range of data from public and private sources from around the globe.

In the new lab – funded with close to \$1 million from the New Jersey Higher Education Technology Infrastructure Fund and matched by the University – physicians, engineers, scientists and others can and do conduct cutting-edge research.

Rowan teams already have undertaken studies for the U.S. Navy, the U.S. Economic Development

Authority, Swedish corporation Elekta and AT&T, in addition to the FAA and others. Among recent projects the VR staff and students have handled are:

- Truck driving simulation (how long is too long for truckers to be behind the wheel)
- Medical visualization of the human body (layering images from CT scans, MRIs, PET scans and more to get a comprehensive virtual look at the human body for diagnostic and treatment purposes)
- Flooding (simulating both how to address such catastrophes as Hurricane Sandy hitting the Jersey Shore or how heavy rains impact the City of Camden and elsewhere, causing storm water management concerns). ■

**To learn more about the VR Center, contact Janine Papasso, marketing and business development manager, at [Papasso@rowan.edu](mailto:Papasso@rowan.edu) or 856-256-5778 or visit: [www.rowan.edu/vrlab](http://www.rowan.edu/vrlab)**

# TECH DAY

## GLOBAL COMMERCIALIZATION DATA SUMMIT



**December 6, 2016 ■ 9am-4pm**  
**Rutgers, New Brunswick**

# Teaching, *Transformed*



**How tech, plus a human touch, are upgrading the Stevens student experience – and helping prepare New Jersey’s workforce.**

By Paul Karr

There’s little debate that today’s college and university students are the lifeblood of tomorrow’s economy. It’s critical to economic and workforce development that New Jersey’s university students reap the benefits of technical and STEM educations grounded in real-world experiences, then enter careers to build and support future enterprise.

Faced with the ongoing challenge of keeping students engaged – while training them for a rapidly changing work environment, and determined to leverage new digital technologies – Stevens Institute of Technology has responded with ingenuity and technical expertise to teach differently and more effectively.

“We are making significant headway in developing powerful new teaching technologies, ideas, tools and methods,” says Provost and University Vice President George Korfiatis. “We are making great strides toward becoming a leader in a digital age.”

Indeed, during the past year and a half, the university has rolled up its sleeves and rebooted its physical campus, equipping faculty and students with the latest digital tools with which to teach and learn – some developed at, and unique to, Stevens.

## Clickers, Teams, Software and Self-study: the New Calculus

Calculus is a difficult subject. To fight attrition and boost learning retention, Stevens has forged a two-pronged strategy: high tech, plus a new way of teaching.

Each course is now split into half-semester modules to make the material more digestible. During class lectures, instructors distribute “clickers” (small handheld transmitters); students use them to feed live answers to math problems to the instructor, allowing discussions to pivot in real time. And some problems are tackled workshop-style, in groups, by the students – simulating a corporate team environment.

Stevens faculty also invented and patented a new software called Gradarius to enhance calculus teaching. The new platform manages homework, administers and grades quizzes, monitors self-study and provides feedback – showing how a solution might be partially correct and hinting at new pathways to complete it, for instance.

The result? Student retention, grades and learning in Stevens’ calculus classes have all soared since the new strategy and software were rolled out, and the number of students struggling with the subject has been more than cut in half.

## IRIS: An Experiment in Classroom Crowdsourcing

Theodoros “Ted” Lappas, a professor of information systems in the School of Business, teaches a rigorous graduate course in data analytics to approximately 90 students per semester.

“This is a technical course,” explains Lappas, “in which students must code daily in languages such as Python. Some students begin the course very far ahead of others.”

To help students learn and help each other learn, Lappas and postdoctoral researcher Georgios Valkanas created IRIS (Interactively Refined Instructional System). Still in the testing and development phase, IRIS delivers resources such as videos, web pages and question-and-answer forums to students working software-coding problems.

It works like this: Students receive rewards for creating resources and links as they work, and for evaluating the helpfulness of others’ links and resources. Then, using an algorithm, IRIS propagates the most useful resources during future queries. The software can even personalize the resources delivered to each student based on usage history, problem-solving history and additional factors.

The system feeds back data to instructors, who can adjust lectures and quizzes to target problem areas, notes Lappas, who will continue to analyze data from the project.

## National Support for New Ways of Teaching STEM at Stevens

Stevens is also changing the way in which courses are conceived of and taught.

Last September, Stevens was awarded \$2.8 million by the National Science Foundation's (NSF) Improving Undergraduate STEM Education program to help faculty learn to adapt their teaching of STEM topics – particularly introductory courses during the freshman and sophomore years – to approaches that can lead to deeper, more transferable learning.

The five-year project will create a new Foundations Program drawing on many areas of the university, including engineering, business, STEM education, academic planning and diversity and inclusion. Stevens will implement new evidence-based teaching approaches that can increase student engagement and improve outcomes.

In addition, the university will perform original research to measure and examine the new methods' effectiveness – and recognize and reward faculty and instructors who implement the new approaches.

## Thinking Like a Startup: Freshmen as Entrepreneurs

Stevens also continues to offer unique coursework, curricula and resources aimed at teaching students to think more broadly and creatively – then contribute to real-world innovation right out of the box post-graduation.

One mandatory course, Introduction to Entrepreneurial Thinking, has operated successfully at Stevens since 2013. The course, taught by innovation expert Peter Koen and ten fellow faculty, challenges freshmen engineering students to think differently, develop new ideas and solve problems from the outset of their college careers. It's one of only a handful of such undergraduate courses in the nation, and concludes with students pitching ideas and products to classmates, *Shark Tank*-style.

While their entrepreneurial experiences may begin with an introductory course, over time it could extend to participation in the new Stevens Venture Center, which will launch in a corporate space on the Hoboken waterfront this fall.



The Center will advise promising student and faculty projects and ventures, make workspaces available for qualifying startups and connect new ventures with funding opportunities and other resources.

## Delivering Critical Software from the Cloud in a Flash

High-end, specialized educational software at the click of a mouse or the touch of any screen, instantly, from any wired-up classroom, home or coffee shop?

At Stevens, it's happening.

The Stevens Virtual Learning Environment (Stevens VLE), unveiled last August, has revolutionized the way Stevens students access soft-

**“Introduction to Entrepreneurial Thinking challenges freshmen engineering students to think differently, develop new ideas and solve problems. It's one of only a handful of such undergraduate courses in the nation.”**

ware. Created with support from the New Jersey Educational Facilities Authority through a grant program administered by the state's Office of the Secretary of Higher Education, the Stevens VLE stores more than 45 software applications and packages in a private cloud, updates them automatically and pushes them securely to students, faculty and staff immediately upon request.

“We are one of a very small number of higher ed institutions doing this,” explains David Dodd, Stevens' vice president for information technology and chief information officer.

Stevens modified the idea of virtualized learning from industry leaders such as Boeing, NASA and Sikorsky, who have been deploying it for some time.

The applications – everything from the Adobe Creative Cloud suite, Photoshop and Microsoft Office to heavy-lifting software like SOLIDWORKS, Mathematica, MatLab and Mimics – work on nearly all devices, including minimal-memory netbooks, laptops, tablets and smartphones. All operating systems are supported, including Android, Windows, Linux and Mac. The need for students and faculty to utilize faster, more powerful computers with large storage capacities has been eliminated.

“This enhances the student and faculty experience, controls our computing infrastruc-

ture costs and frees up vital resources for more strategic purposes,” explains Dodd. “It is truly a win-win.”

## Cooperative Experiences, Capstone Design Projects

Stevens continues to refine its unique curriculum, as well, which blends rigorous technical training with humanities education – a blend that has proven exceptionally attractive to local and national recruiters and employers.

The university offers an unusually generous number of opportunities for internships, cooperative experiences and five-year programs. And a capstone senior-year design project requires teams of seniors to address pressing technical challenges, perform original research and create new products and ventures.

Those capstone projects culminate in the annual Stevens Innovation Expo, a day-long colloquium and presentation of student research and innovation. The 2016 Expo, conducted in April, showcased dozens of projects, including a heart-monitoring system for drivers that can deactivate a car during a medical emergency that may incapacitate the driver; a wireless bridge-monitoring system that can detect flaws in structures; a new type of bulk cargo carrier that uses wind power; a ‘green’ architecture plan to absorb and drain excess, overflowing rainwater during heavy storms; and a data-solutions website for a Fortune 50 healthcare firm.

A number of these Stevens senior design projects have since spun off into successful post-graduation startups with venture capital backing.

## Enhanced Preparation Serves Both Graduates and Employers

Stevens' renewed focus on students and technology are clearly making a difference. Both the university's first-year retention rate (94 percent) and six-year graduation rate (82 percent) are at or near historic highs.

Graduates' eventual career and salary outcomes are also at historic highs. Class of 2015 graduates entered the workforce with an average starting salary of \$66,600, and 95 percent secured their desired outcomes within six months of graduation. Companies hiring at least three members of the new class included Amazon, Citigroup, Credit Suisse, Ernst & Young, ExxonMobil, Goldman Sachs, Honeywell, Johnson & Johnson, JPMorgan Chase, L'Oreal, Lockheed Martin and Walt Disney World.

Both entry-level and mid-career salaries of Stevens' graduates rank among the very best in U.S. higher education, as well, and the university has attained elite rankings in metrics of lifetime return on tuition investment (ROI).

“The broad-based education that Stevens students receive,” concludes Lynn Insley, executive director of the Stevens Career Center, “makes them highly desirable to employers seeking well-rounded, work-ready individuals who can provide innovative solutions and long-term value.” ■



## NJ TECH COUNCIL AWARDS CELEBRATION

The NJ Tech Council's 20th annual Awards Celebration recognizes and celebrates tech and life sciences companies for their accomplishments in leadership, collaboration and innovation.

### Super Awards

Master Technology Award

**Juniper Networks**

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### Innovation Awards

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 **Lumeta**

# Tech Industry Awards

Trailblazer Award

**Admera**

*Sponsored by Marketsmith*



Outstanding Technology Development Award

**Princeton Identity**

*Sponsored by New Jersey Institute of Technology*



Rising Star Award

**Tripod Technologies LLC**

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Consumer Product Award

**LG Electronics, US**

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Beacon of Light Award

**Chromocell**

*Sponsored by Morgan Lewis*



## Individual Awards

Martinson-Ballen Tech Supporter Award

**Donald Katz,**

**Founder and CEO of Audible, Inc.**

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Legend of Technology Award

**Andrew Gilbert,**

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## Knowledge is Power Award

**Kean University**

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## FinTech Conference September 15, 2016



## Tech Forecast

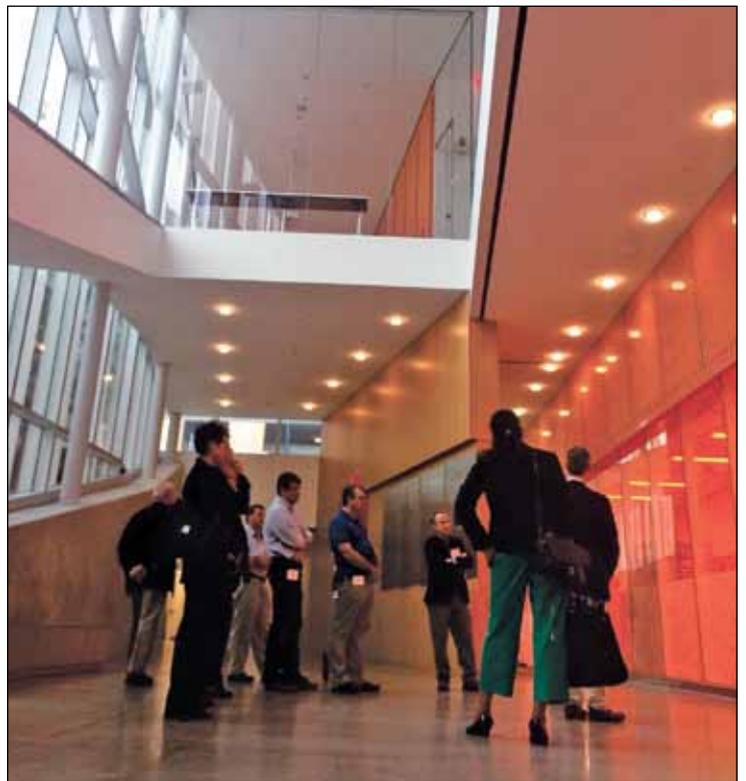


# Leadership Summit October 5, 2016



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## UPenn Nanotech Tour



**October 13**

**ICT Industry Forecast and Partnering Session  
Alliant Tech, Morristown**

The Tech Council's and NJIT's fifth ICT Forecast surveyed over 200 companies from around the world to gauge the current climate of the information technology and communications industry in the mid-Atlantic region of the US, as well as other regions across the globe.

**October 18**

**Summer Intern and Research Projects  
EisnerAmper, Philadelphia**

The Tech Council will showcase submissions from select student and intern research projects conducted over the summer. Join us to hear about their experience researching in the life science, IT, electric, telecom and energy and sustainability sectors. We will be surveying the audience for the best presentation!

**October 20**

**Competing for Talent: Keeping  
Tech Jobs in North New Jersey  
Lincoln Tech Institute, Paramus**

Join us as we discuss how to make the investment our nation needs to best shape the next generation of innovators who will discover, invent and commercialize new technologies. Together, we can move our local region and nation into a better future. Join us for a panel that will explore solutions to this problem.

**October 25**

**Faster Than the Speed of Thought  
– The Digital Boom  
BakerHostetler, NYC**

Please join the NJ Tech Council, in partnership with BakerHostetler and ObjectFrontier, to explore how to leverage digital technologies to succeed in a rapidly changing environment.

**October 27**

**Sustainability and Smart City  
Design Challenge  
MSU, Montclair**

This event is scheduled at Montclair's new Center for Environmental and Life Sciences. Attendance

will be comprised of technology and governmental executives, technology provider managers, education professionals and others.

**November 17**

**2016 Awards Celebration  
The Palace, Somerset**

This year the Tech Council celebrates its 20th year with its annual Awards Celebration. The Tech Council will recognize and celebrate tech and life sciences companies in the region for their business accomplishments in leadership, innovation and collaboration.

**November 29**

**CFO Forum: Enhancing Your CEO  
and Board Relationships  
EY, Iselin**

The CFO Peer Network brings together CFOs of technology and life sciences companies for networking, learning and sharing experiences.

**December 6**

**TechDay  
Rutgers Student Center, New Brunswick**

We have combined two of our signature events into one exciting day of tech! This year's Tech Day will offer a day of keynotes and panels discussing the latest trends in tech transfer, commercialization and data analytics and science. In addition, there will be demos and exhibits which will focus on AI/VR/AR as well as robotics. Come to one or stay for both events!

**December 8**

**CEO Forum: How to Recruit –  
Identifying, Attracting, Hiring and  
Retaining Technical Staff  
Morgan Lewis, Princeton**

The CEO Peer Network brings together CEOs of technology and life sciences companies for networking, learning and sharing experiences.

## Joining the NJ Tech Council

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For updated information or to  
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**November 17, 2016  
The Palace at Somerset**



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Master Technology  
Company of the Year  
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New Jersey Tech Council provides education, networking, recognition and advocacy for the state and region's technology businesses. By collectively representing tech, life science and tech related companies and organizations as well as the service companies that support them, the Tech Council has the unique ability to:

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- Provide access to financing sources and resources
- Recognize and promote innovation and leadership
- Advocate on behalf of our communities and workforce
- Support public policy which helps strengthen our ecosystems

A full range of programs and activities are offered to our members including over 80 events a year ranging from small workshops to large conferences, meetings and celebrations. Specific programs are offered for individual industries including IT/Software; Life Sciences; Telecommunications/Media; Electronics, Advanced Materials and Manufacturing; and Enviro/Energy. Programs are also offered for peer groups which include CEOs, CFOs, CIOs and Innovation Leaders.

The Jumpstart NJ Angel Network is dedicated to investing in emerging technology companies in the Mid-Atlantic region. In addition, the NJTC Venture Fund has been devoted to investing in early-stage technology companies.

The Council publishes TechNews, a magazine exploring the business of technology and life sciences in New Jersey and the region.

The Tech Council's Education Foundation forges connections among companies, organizations and educational institutions to support development of New Jersey's tech and STEM workforce and improve education at all levels.

Founded in 1996, the Council is among the largest, most respected organizations of its kind nationwide.

Membership in the New Jersey Tech Council is open to tech, tech-enabled, life science companies, entrepreneurs and organizations as well as tech related service providers. The Council's programs are designed to help you and your company grow. Members enjoy a wide variety of member benefits and access to a network of like-minded leaders. Membership categories are company-wide so that you and your colleagues can take advantage of the Council's educational and networking events and discount programs.

Learn more at  
[njtechcouncil.org](http://njtechcouncil.org)

732.456.5700

96 Albany St., New Brunswick, NJ



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## Who helped Advaxis keep its innovative pipeline flowing?



**eda**  
**WAS HERE**

The world is now recognizing the potential of Advaxis, a Princeton-based clinical-stage public biotechnology company that develops innovative cancer immunotherapies. The New Jersey Economic Development Authority (EDA) recognized their potential much earlier.

Advaxis graduated from the Commercialization Center for Innovative Technologies (CCIT), the EDA's life sciences incubator in North Brunswick, where they had access to a multitude of resources vital to their growth. Through EDA's Technology Business Tax Certificate Transfer (NOL) Program, Advaxis was able to sell research and development tax credits to raise non-dilutive cash at a critical time to continue their breakthrough innovations.

These programs, along with matching loan opportunities, tax credits for angel investors, real estate and networking access to the investment community, are just a few examples of the specialized support EDA offers New Jersey technology and life sciences companies.

**To find out how the EDA can help your business realize its potential, call 609-858-6767 or visit [NJEDA.com/TLS](http://NJEDA.com/TLS).**

