

# RESEARCH at RIT

The Rochester Institute of Technology Research Report

Fall/Winter 2015-16

SPOTLIGHT ON

## ECONOMIC DEVELOPMENT

### Integrated Photonics

RIT helping to  
establish a national  
photonics center

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The Rochester Institute of Technology  
Research Report—Fall/Winter 2015-16

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# Economic Development

Whether it's the U.S. building up its manufacturing capabilities in industries such as integrated photonics and additive manufacturing or RIT students and alumni aspiring to be entrepreneurs, both are looking to RIT to help them achieve their economic development goals.



Innovation and entrepreneurship are perhaps two of the most overused words in academia today. Countless articles are being written about the importance of experiential education, career focused education, working more closely with industry, and universities as important drivers of economic development. One could ask if this troubles me as it appears that others are waking up to what has been a traditional secret to RIT's success. Not at all. In fact, the wider realization of the importance of these attributes has been a major driver of many of the amazing opportunities that RIT has been capitalizing upon.

For example, in 2012 President Barack Obama announced the National Network for Manufacturing Innovation (NNMI). The NNMI provides a manufacturing research infrastructure where U.S. industry and academia collaborate to solve industry-relevant problems. It is a network of institutes that each has a unique focus, but a common goal to create, showcase, and deploy new capabilities and new manufacturing processes. So far, the federal government has established seven such institutes and awarded amounts up to \$100 million for their operation. RIT is a tier-one partner on three of these institutes and a silver member on a fourth! This amazing success of the biggest competitive prizes afforded to academia is a testament to the role that RIT has and hopefully will continue to play on U.S. economic development.

Tech.Mic published an interesting

article on school rankings with regards to technology, innovation and creativity. Taking into account a variety of criteria, including ranking, research facilities, important technological discoveries, notable faculty and alumni, cost and relationships with the private sector, it ranked RIT third among universities that are likely to yield "the next Steve Jobs." RIT ranked ahead of such prestigious international schools as Imperial College London, Technion-Israel Institute of Technology, and Delft University of Technology.

Similarly, for students hoping to secure a job in the technology field, RIT is one of the top colleges in the nation to target, according to StartClass. The college research website ranked RIT 10th among the top 20 schools for getting a job in the tech industry, outstripping some notables as RPI, Cornell, and Georgia Tech.

In this issue, it is our pleasure to show you some of RIT's outstanding efforts driving economic development for which we are being increasingly recognized. From our MAGIC Spell Studios to our Venture Creations incubator to RIT's Center for Urban Entrepreneurship to our NNMI support for Fortune 500 companies, I think you will see that the economic development ecosystem certainly has a lot to offer.

Best regards,

Ryne Raffaele  
Vice President for Research  
and Associate Provost

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RIT is part of a multimillion-dollar federal investment to create a national photonics center in Rochester, N.Y. RIT has contributed to advances in the design, fabrication, and manufacturing of electronic and photonic devices for more than 30 years.



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RIT's Center for Urban Entrepreneurship (CUE) has a new home in the center of downtown Rochester. CUE will serve as a central resource for urban entrepreneurial programs and research.



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### START-UP NY

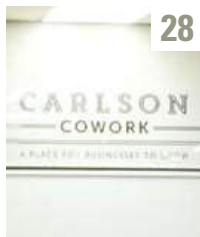
RIT has helped several companies expand or locate in New York state as part of its participation in the START-UP NY program. The statewide initiative creates tax-free areas associated with colleges and universities and promotes job creation.



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### Boosting Finger Lakes Region into the Breadbasket of New York

An economic development project spearheaded by RIT's Center for Integrated Manufacturing Studies is leveraging the growth potential of food production and processing in the Finger Lakes region.

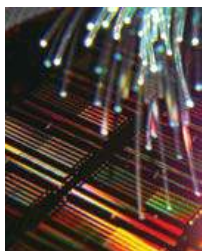


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### Helping Rochester Reimagine the Business Landscape

Rochester has a new co-working space for entrepreneurs that goes beyond sharing of office space and equipment. Called Carlson Cowork, the space is filling up with companies, many with connections to RIT.

## On the Cover cover



### On the Cover

A working integrated photonic wafer made by RIT researchers (led by Stefan Preble), with optical fibers that are used to interface with each chip. Photo credit: Zihao Wang

## Research Awards and Honors 32 - 33



RIT's faculty have received significant national and international recognition for their research in a host of fields. A summary of awards and honors is provided.

**Growing the Digital Media Industry:**  
RIT students Nick Rabb (front) and Wes Rockholz hope to start their own game studio. A public-private partnership will help expand RIT's MAGIC Spell Studios' efforts to grow the digital media industry in the Rochester region.



# Game Changer: Propelling Rochester to become a Digital Media Hub

by Kelly Sorensen

RIT students Wes Rockholz and Nick Rabb hope to one day run their own commercial game studio. University, government, and industry leaders are working together to attract and keep talent like Rockholz and Rabb in the Rochester region with MAGIC Spell Studios, a university program that will connect RIT's internationally ranked academic programs with state-of-the-art facilities needed to commercialize gaming, film and animation, graphic design, and imaging science projects.



**MAGIC Spell Studios:** Rendering of MAGIC Spell Studios facility to be built on the RIT campus. The facility will include a state-of-the-art studio and soundstage. *Rendering by hbt Architects.*

## MAGIC Spell Studios

The MAGIC (Media, Arts, Games, Interaction, and Creativity) Center and MAGIC Spell Studios launched at RIT in 2013, but a public-private partnership will help expand its efforts and culminate with a new building on the RIT campus that is expected to open in fall of 2018. The building will include a state-of-the-art studio, pre-incubation coaching space, and soundstage. Funding to date is at more than \$30 million, including \$13.5 million from New York state, \$12.4 million from Cisco Systems Inc., \$3 million from Dell, and \$1.5 million from The Wegman Family Charitable Foundation. MAGIC Spell Studios is expected to create 35 to 50

jobs in the first five years, with a goal of 100 jobs over the next 10 years. The goal is to help RIT students launch their own businesses and keep those businesses in Rochester.

“This new facility will be a nexus to bring students from various programs under one roof,” said Andrew Phelps, director of the MAGIC Center. “MAGIC Spell Studios is leading the charge in bridging the students’ academic work into commercialized products. We want to ingrain these students into the Rochester community as soon as they start their academic careers and help them to make professional connections they need so that they have the tools to start their own companies in Rochester.”



**Adventure Guild:** Rabb and Rockholz have created the fantasy, role-playing game (RPG) *Adventure Guild*. Players work together to battle goblins and monsters. They plan to launch the game on iOS and Android devices by the end of the year.

## Yes and Games

Phelps says that Rockholz and Rabb's company, Yes and Games, has tremendous potential to evolve into a commercial studio some day. Rockholz, a fourth-year game design and development student from Brookfield, Conn., and Rabb, a fourth-year computer science major from Fairport, N.Y., spent the summer developing their game *Adventure Guild* as part of Co-Up, a program offered through MAGIC and the Simone Center for Student Innovation and Entrepreneurship. The program gave them co-up experience and \$10,000 in funding to bring their video game to reality.

*Adventure Guild* is a social, fantasy role-playing game (RPG) for iOS and Android. Up to four players create a party of brave adventurers and take turns exploring a fantasy world filled with monsters and spells.



**Success Story:** Following graduation, a group of RIT student who started Darkwind Media while in college setup the company's headquarters in Rochester. Darkwind Media recently moved downtown to 40 Franklin Street from RIT's Venture Creations.

“MAGIC brings in people from the game industry who give us feedback on our user interface and on marketing the game,” said Rabb. “It’s been so beneficial to get industry insights on how to make our game better.”

Rockholz believes MAGIC Spell Studios will be a big draw for future students looking to start their own companies.

“What this new center is going to become is a hive of students who can breed game studios, not just student projects,” said Rockholz. “For me, it was the gaming labs that were the draw for me to attend RIT. And RIT not only provides you a great education, but a great portfolio. Everyone gets jobs.”

### **Darkwind Media Stays in Rochester**

Darkwind Media is a gaming software company in Rochester founded by RIT alumni Colin Doody, Matt Mikuszewski, Brian Johnstone, and Scott Flynn. The company develops gaming software and provides consulting services to other

game development studios. Doody and Mikuszewski graduated from RIT’s new media interactive development program, and Johnstone and Flynn were software engineering majors. Doody also earned his master’s degree in game design and development from RIT. Darkwind Media recently became a START-UP NY company and moved from RIT’s Venture Creations business incubator to the RIT Downtown Center at 40 Franklin Street (see START-UP NY story on page 23).

Doody says that if the Rochester region builds a reputation as an area where games are being made, then more startup game studios would be willing to stay.

“I think that with MAGIC Spell Studios, there is a much larger opportunity to do production-level work that will gain recognition and to incubate games that will be those small studio success stories,” said Doody. “Once those stories get out there, people will recognize Rochester as a place to be and I think that makes studios less likely to leave.”

### **Convergence of Games and Films**

It’s becoming more common for the top movie studios to produce and distribute a blockbuster film and a tie-in video game. For example, Walt Disney Animation Studios produced the 2013 Academy Award-winning animated film “Frozen” along with dozens of Frozen-themed video games. Phelps says the new RIT facility will capitalize on this convergence between the film/animation and gaming industries, and encourage multidisciplinary production-level projects among the students.

MAGIC Spell Studios will be a sandbox for gaming students to work with students from RIT’s nationally recognized graphic design program and film and animation programs. This will further prepare students to work on commercially distributed films and games. Several alumni of RIT’s School of Film Animation work at Walt Disney Animation Studios and contributed to “Frozen”—the highest grossing animated film of all time.



**Showcase Soundstage:** A 7,000-square-foot soundstage, similar in size to the one pictured above, will be a feature of the new MAGIC Spell Studios facility.

Graduates of the film school have also gone on to work on blockbuster films such as “Spiderman,” “The Life of Pi,” “Coraline,” and “Tangled.”

### New Soundstage

A 7,000-square-foot soundstage will be a feature of MAGIC Spell Studios that will allow RIT digital media artists and programmers the opportunity to create professional products and launch their own businesses.

Original plans called for a 3,400-square-foot soundstage, but thanks to a \$1.5 million gift from The Wegman Family Charitable Foundation, the university was able to more than double the size. The larger soundstage will offer a wider range of opportunities for RIT students working on digital media projects and provide them with such production amenities as “green screen” cyclorama, motion capture for animation, and a full complement of the lighting, set, and camera support needed for studio production.

The larger soundstage will also be a draw for independent filmmakers, allowing them to apply for tax incentives through The New York State Film Tax Credit Program. The tax incentives are designed to increase the film production and post-production industry presence and overall positive impact on the state’s economy.

“A large, modern, professional soundstage will give us greater opportunity to attract independent film productions, which is not only economically beneficial to the region, but also provides incredible work experiences for our students,” said Malcolm Spaul, administrative chair of RIT’s School of Film and Animation. “We believe this new facility, with its connection to RIT’s film school, and now with the availability of tax credits, will be very attractive to producers.”

### RIT’s MAGIC Center to host New Media Consortium

MAGIC will be the host site for the annual New Media Consortium (NMC), an international conference that draws top new media and technology experts from universities, colleges, museums, and research centers. The conference will be held June 14-16, 2016, on the RIT campus and at the Rochester Riverside Convention Center. A series of RIT presentations at the Rochester Riverside Convention Center is planned. RIT is the first university to host NMC since 2011. Registration is open and papers are being accepted. For details go to [www.nmc.org](http://www.nmc.org).

### On the Web

**MAGIC Center**  
[magic.rit.edu](http://magic.rit.edu)

**RIT’s School of Film and Animation**  
[cias.rit.edu/schools/film-animation](http://cias.rit.edu/schools/film-animation)



**Integrated Photonics:** Seth Hubbard, director of RIT's NanoPower Research Laboratories (left); Karl Hirschman, director of RIT's Semiconductor and Microsystems Fabrication Laboratory (center); and Stefan Preble, director of RIT's Nanophotonics Group (right); fabricate integrated photonic wafers in the Semiconductor and Microsystems Fabrication Laboratory.



# Harnessing Light: Integrated Photonics is the Future

by Stefan Preble

The creation of a national photonics center in Rochester, N.Y.—the American Institute for Manufacturing Integrated Photonics, or AIM Photonics—will bring the nation’s leading companies, universities, and federal research institutions together to realize the scalable manufacturing of integrated photonic circuits. The Institute will leverage the history of optics and imaging in Rochester and its skilled workforce to lead to a future in which photonic technologies are as ubiquitous as electronics are today.



**Advancing Photonics Capabilities:** In July, Vice President Joe Biden announced a new national institute for integrated photonics. The Institute, to be headquartered in Rochester, N.Y., is part of the federal government’s National Network for Manufacturing and Innovation.

## Historic Announcement

Vice President Joe Biden and New York Gov. Andrew Cuomo announced the \$600 million public-private partnership on July 27. The federal government pledged \$110 million for the Institute under the federal government’s National Network for Manufacturing and Innovation (NNMI) with another \$500 million coming from a consortium of state and local governments, corporations, universities, community colleges, and nonprofit organizations across the country.

AIM Photonics will be led by the State University of New York Polytechnic Institute (SUNY Poly). RIT; University of Rochester; Columbia University; MIT; University of California at Santa Barbara; University of California, Davis; and University of Arizona are the other

Tier 1 academic partners with a total of 20 universities and 33 community colleges involved. Top industry partners include IBM, Cisco, Intel, General Electric, and HP. The U.S. Department of Defense, U.S. Department of Energy, NASA, and New York state are just some of the government partners. The establishment of the NNMI in photonics is to better position the United States as a global leader in the manufacturing of integrated photonics.

## What is Integrated Photonics?

Integrated photonics is the intersection of microelectronics and photonics. Microelectronics (design and fabrication of electronic devices, systems, and subsystems using extremely small components) has been the driver of technology and the world’s economy for several decades. Its success is a direct result of the integrated circuit where billions of electrical components (transistors, wires,

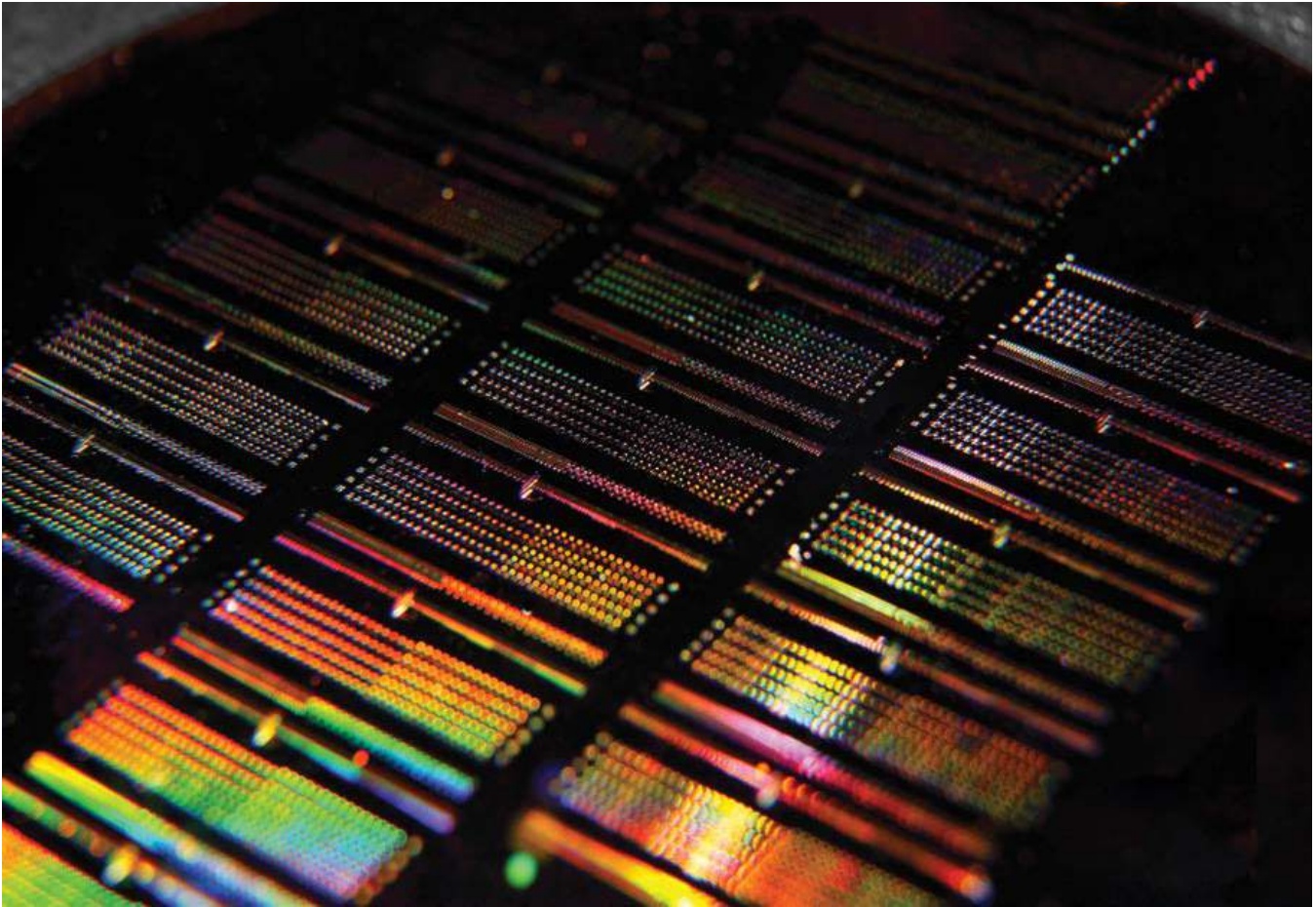
resistors, capacitors, etc.) are seamlessly integrated together on silicon wafers using manufacturing processes that have followed the scaling trends of Moore’s law.

Photonic technologies are now at a point similar to where microelectronics was in the early 1970s—where just a relatively small number of components were tediously integrated together. By leveraging the manufacturing equipment and techniques that made microelectronics a success, it is now beginning to be possible to realize the same economies of scale to make integrated photonic circuits. Since similar manufacturing technologies are being used, photonics and electronics can be directly integrated together to make both the electronic and photonic elements of the circuits function better—not only reducing size, weight, and power but enabling entirely new applications, many of which have not been envisioned.

In order to understand how integrated photonics works, it is important to first define the broader area of photonics which is the study of the generation, manipulation, and detection of light. Light is made up of photons, similar to how electric current is made up of individual electrons. However, photons have the distinct advantage that they travel at the speed of light and don’t consume any power during their propagation. For example, photons routinely travel across the entire universe (albeit after approximately 13 billion years)



**Integrated Photonic Chip:** Scanning electron microscope image of an integrated photonic chip with many types of silicon waveguide devices and ring resonator filters (colored).



**Photonic Wafer:** A working integrated photonic wafer made by RIT researchers. It contains thousands of integrated photonic devices including waveguides, filters, fiber-chip couplers, modulators, and more. These devices will make computers, Internet communications, and sensors operate at a much higher performance and at a much lower cost than what is available today.

with just the energy required to initially produce them. Photons are also very efficient information carriers. They are electromagnetic waves (just like a radio wave) that oscillate at very high frequencies, and as a result can easily encode terabytes/second of information in their amplitude, phase, and/or polarization.

There have been many platforms for photonics over the decades, such as fiber optic networks, where discrete components (lasers, the actual fiber optic cable that transmits light, and detectors) are separately manufactured and put together.

In the early 2000s the promise of silicon as an integrated photonics platform emerged. It is ideal for manufacturing since silicon wafers are also used to make the vast majority of integrated electronic circuits. Early on,

though, it was not clear how well silicon would work for photonics. But after multiple breakthroughs over the past decade it's proven to excel at controlling light. Specifically, silicon is excellent at guiding light in "photonic wires," known as waveguides, because it has a very high refractive index that tightly confines light and easily supports total internal reflection—even for a ~90-degree bend.

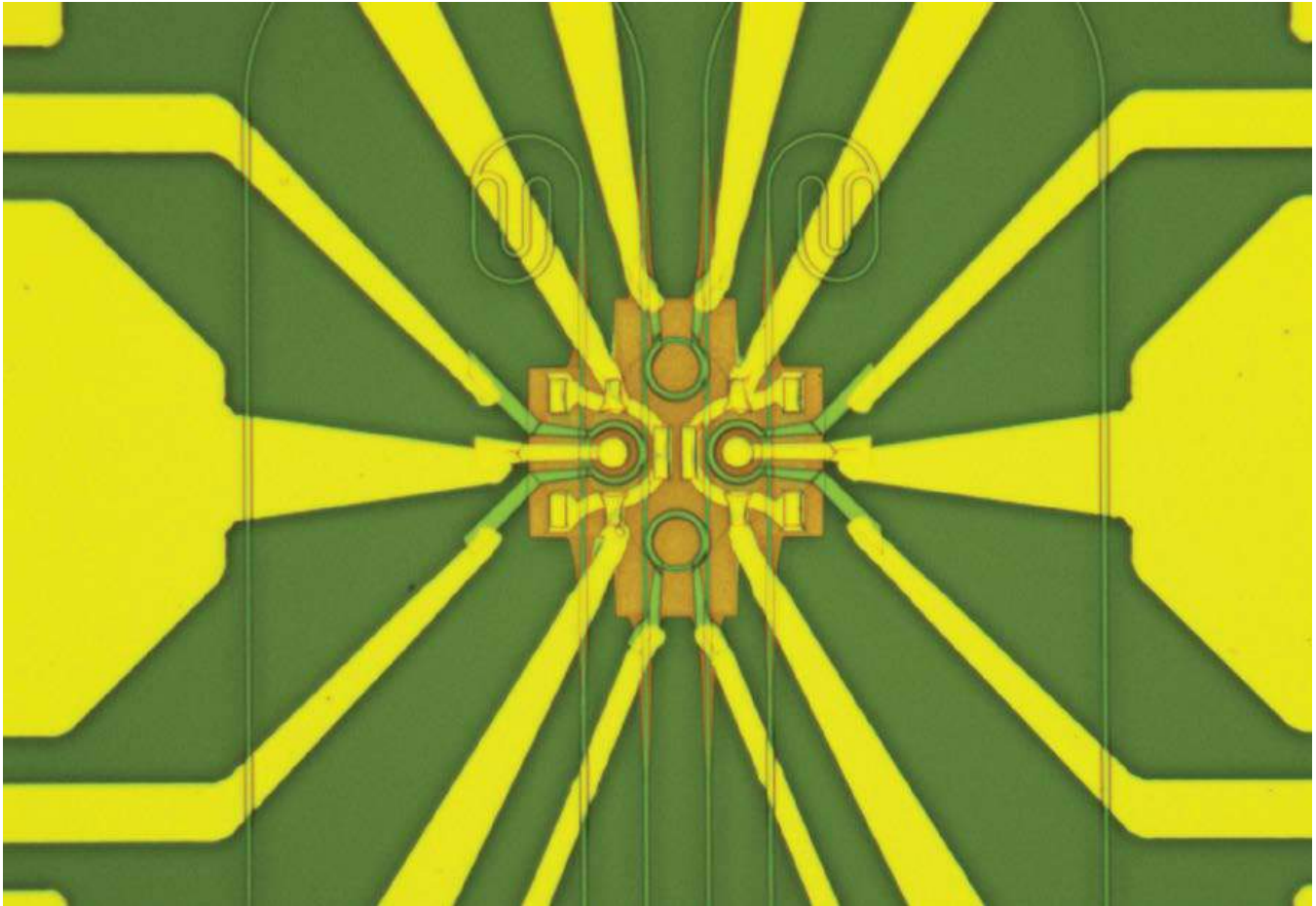
Consequently, it is possible to realize very complex integrated photonic circuits that are now rapidly growing in density. Furthermore, silicon is transparent at the same wavelengths used for fiber optics, enabling direct interfacing of silicon photonic chips with optical fibers, which is key for many applications.

However, for silicon to be the integrated photonics platform of the future, it also needed the ability to

generate, control, and detect light.

Silicon itself is not ideal in these roles as it is an indirect bandgap semiconductor. In contrast, many III-V semiconductors (named from the groups on the periodic table), such as gallium arsenide and indium phosphide, are direct bandgap semiconductors and can easily be made into lasers. Fortunately, it is now possible to bond or even grow III-V lasers directly onto silicon through advances in manufacturing technology. III-Vs can also be used to detect light, but the most commonly used detector material is germanium, because it is straightforward to grow on silicon and is already used to make silicon transistors operate faster while using less power.

It is now possible to also actively encode information on light by combining photonics and microelectronics. Light is



**Combining Photonics and Microelectronics:** This image shows an on-chip circuit that converts electrical data into photons. This combination allows information to be transmitted at much higher rates with much lower power.

sensitive to the same electrons and holes that microelectronic devices excel at controlling. Specifically, free-carriers change the refractive index and absorption of silicon. As a result, by combining silicon photonic waveguides with PN diodes it is possible to change the transmission of the light electrically. These electro-optic modulator devices are now able to switch the light on/off at staggeringly high rates of greater than 40 GigaBits/second, while using incredibly low amounts of energy of less than 1 femtoJoule and have the potential to approach the same energy used by just a few state-of-the-art transistors.

With all of the key components now in place the potential of silicon photonics is enormous. In just the last few years the number of devices that have been integrated together has rapidly grown to over 10,000. The natural application of

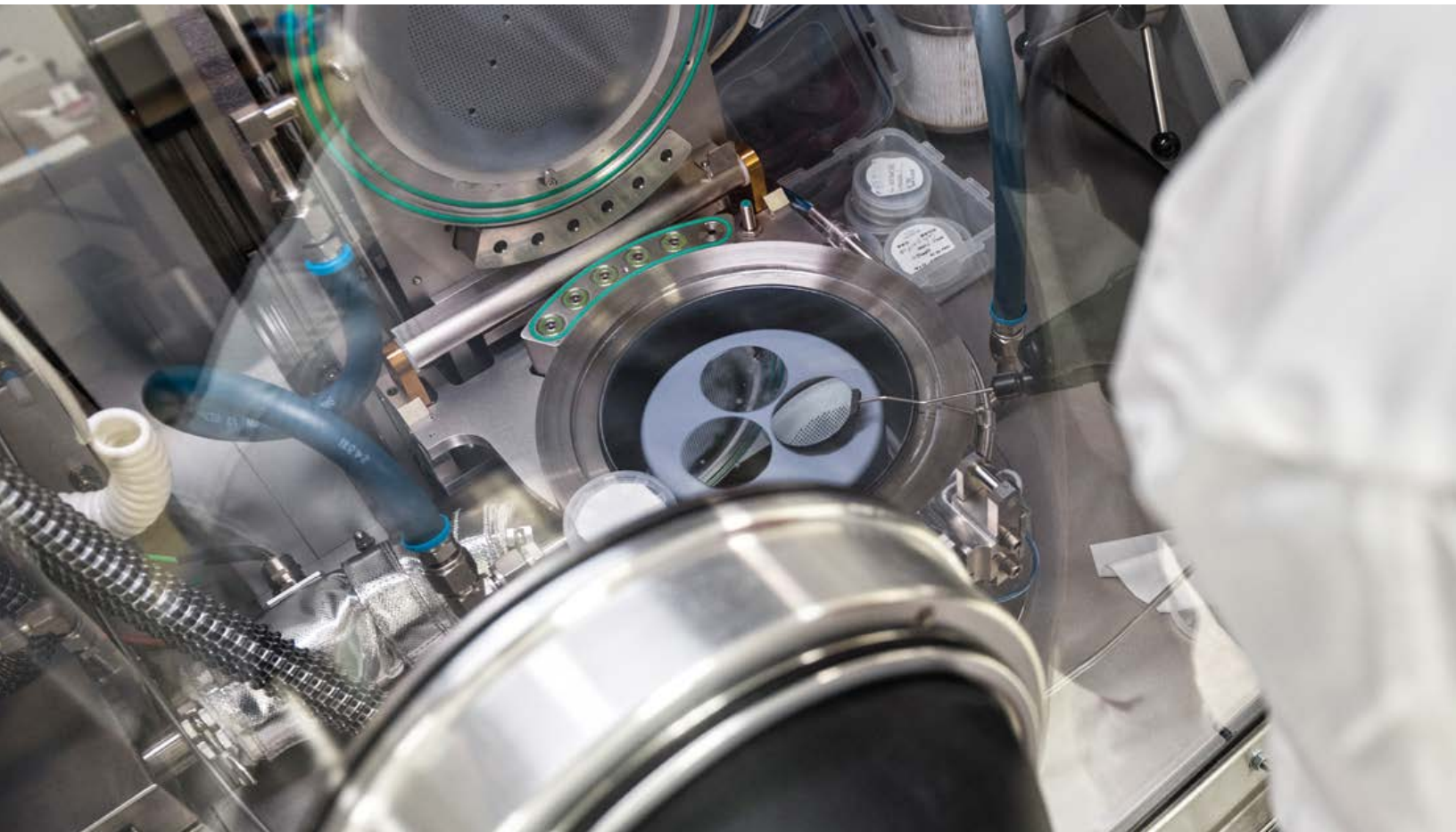
these integrated photonic circuits is high bandwidth communications, particularly since data centers are expected to consume a few percent of the entire power generated in the United States and a vast majority of that power usage is used to simply move data around. Consequently, the integration of all of the previously used discrete components onto silicon photonic chips will yield dramatic reductions in power along with orders of magnitude improvements in bandwidth.

Challenges remain, however, with the biggest being the ability to cost-effectively package photonic chips. Packaging currently accounts for most of the cost because optical fibers must be precisely positioned to the waveguides using time-consuming procedures. However, solutions based on micro-fabrication are now being realized and



**Quantum Computing:** Integrated photonics will enable computers and secure communication systems to exploit the quantum properties of light (commonly known as qubits) to reach new paradigms in technology.

will dramatically improve packaging throughput and reliability.



**MOVPE Capabilities:** RIT recently acquired a metal organic vapor-phase epitaxy system (MOVPE) in the Semiconductor Microsystems and Fabrication Laboratory. The tool will be used to grow III-V lasers that will be integrated onto silicon photonic wafers.

### RIT's Role and Assets

Packaging photonic chips will be one of RIT's main roles in standing up the Institute. RIT will work with AIM Photonics to establish a manufacturing center for packaging integrated photonics systems in Rochester with the help of RIT's Center for Electronics Manufacturing and Assembly. As part of AIM Photonics, RIT will also produce III-V lasers and detectors for integration with the multiproject wafers produced at SUNY Poly's College of Nanoscale Science and Engineering. RIT recently acquired a metal organic vapor-phase epitaxy system (MOVPE) in the university's clean room facility, the Semiconductor and Microsystems Fabrication Laboratory (SMFL).

Among its many uses, the MOVPE will be used to grow III-V lasers that will be integrated onto silicon photonic wafers.

RIT will also support education and workforce development, leveraging its longstanding degree and training programs. The university has contributed to advances in the design, fabrication, and manufacturing of electronic and photonic devices for more than 30 years as technology has progressed from the micron-scale to the nano-scale. RIT created the nation's first bachelor of science microelectronics program specializing in the fabrication of semiconductor devices and integrated circuits. The bachelor's degree launched in 1982 and RIT began its microsystems engineering Ph.D. program in 2002.

"I'm tremendously excited that this effort has come to upstate New York and specifically to Rochester," said Ryne Raffaele, RIT vice president for research and associate provost. "It will allow RIT to leverage its heritage in research and workforce development in photonics and microelectronics to play a major role in the integrated photonics revolution."

### Photonics Applications

The photonics revolution is akin to the improvements seen in computers, where cell phones now have the same performance as the discrete-component supercomputers that took up entire warehouses decades ago.

Silicon photonics is also likely to lead to many new applications, some



**Workforce Development** for integrated electronics and photonics has been a hallmark of RIT for decades, including K-12 and community college outreach, undergraduate and graduate courses and curricula development. As part of RIT's role in AIM Photonics, the university will offer continuing education courses in integrated photonics, manufacturing, packaging, and testing.

of which can be imagined now. Circuits are already being developed for processing analog radio-frequency signals, particularly for the frequencies ranges that are difficult to control electrically. These are likely to yield ultra-stable oscillators, analog communication systems, or high-sensitivity Terahertz imagers (like the ones currently used in airports but with improved sensitivity). It is also possible to steer light beams emitting from the chip by controlling the relative phase of the light (e.g., phased arrays), which will be particularly useful to robotics or self-driving cars. Photons can also be used to realize sensors that, when implemented with other biological or chemical technologies, can be used to detect minute changes in the environment,

which will benefit fields from health care to security. And one of the ultimate goals of photonics has always been to realize an optical computer. While this still remains very far off due to limitations of photons (they do not interact strongly with each other), there are future computing technologies that photons may benefit, such as quantum computing.

The applications for integrated photonics are endless and will have direct impact on future supercomputers, improved health care, faster telecommunications, and longer lasting cell phones. As the integrated photonics efforts in the Rochester region ramp up, there will be tremendous opportunities for research, innovation, education, and commercialization.

## RIT a Key Player in Four of the Nation's Manufacturing Initiatives

RIT is currently contributing work to four of the National Network for Manufacturing Innovation (NNMI) Institutes.

In 2012 President Barack Obama announced the NNMI—an initiative focused on bringing together government, industry, and academia to advance U.S. leadership in manufacturing. There are seven Institutes to date. In addition to AIM Photonics, RIT is part of the NNMI consortia on flexible electronics (Flex Tech Alliance), additive manufacturing (America Makes), and digital manufacturing (Digital Manufacturing and Design Innovation Institute or DMDII).

RIT's Golisano Institute for Sustainability (GIS), led by Nabil Nasr, associate provost and director of GIS, is part of the DMDII, drawing on its extensive expertise and research in the advanced manufacturing and sustainable manufacturing areas. In addition to strengthening the nation's manufacturing, the Institute also supports improvements to Department of Defense effectiveness, including integration of design data across product lifecycles and reducing manufacturing costs and development time.

RIT's contributions to the Flex Tech Alliance are led by Denis Cormier, the Earl W. Brinkman Professor of Industrial and Systems Engineering, and Shu Chang, the Melbert B. Cary Jr. Distinguished Professor in RIT's College of Imaging Arts and Sciences. Cormier's research is on printed electronics, specifically the synthesis of printable nanoinks, the development or enhancement of printing processes, and the design of novel printed electronic devices. He also is an expert in the area of additive manufacturing and multifunctional printing. Chang's research identifies techniques to bridge the system and material aspects of conventional digital printing to the rapidly growing field of additive manufacturing.

## On the Web

**RIT Nanophotonics Group**  
[www.rit.edu/kgcoe/nanophotonics](http://www.rit.edu/kgcoe/nanophotonics)

**Semiconductor & Microsystems Fabrication Laboratory**  
[www.smfl.rit.edu](http://www.smfl.rit.edu)

**NanoPower Research Laboratory**  
[www.rit.edu/gis/research-centers/nanopower](http://www.rit.edu/gis/research-centers/nanopower)

**Coaching and Mentoring:** As part of its services, Venture Creations helps its member companies navigate through the startup process. Venture Creations Interim Director Rich Notargiacomo (right) mentors Les Moore, owner of TourBlend, which offers a travel app to people visiting the Rochester region.



# Venture Creations Helps Entrepreneurs Make Their Dreams Come True

by Jane E. Sutter

Transformative experiences happen at Venture Creations, where ideas are nurtured, challenged, and developed into successful startups. Venture Creations' experienced leaders also help entrepreneurs make valuable connections, including finding investors or top-shelf talent. The end result is businesses that create jobs and continue growing after graduating.

## A Supportive Launch Pad

When successful entrepreneur Melanie Shapiro ('07 BFA, '08 MBA) dreamed up her latest adventure, she knew just where to turn to develop and execute her idea. She called Bill Jones, then executive director of Venture Creations, RIT's business incubator located on Tech Park Drive near campus.

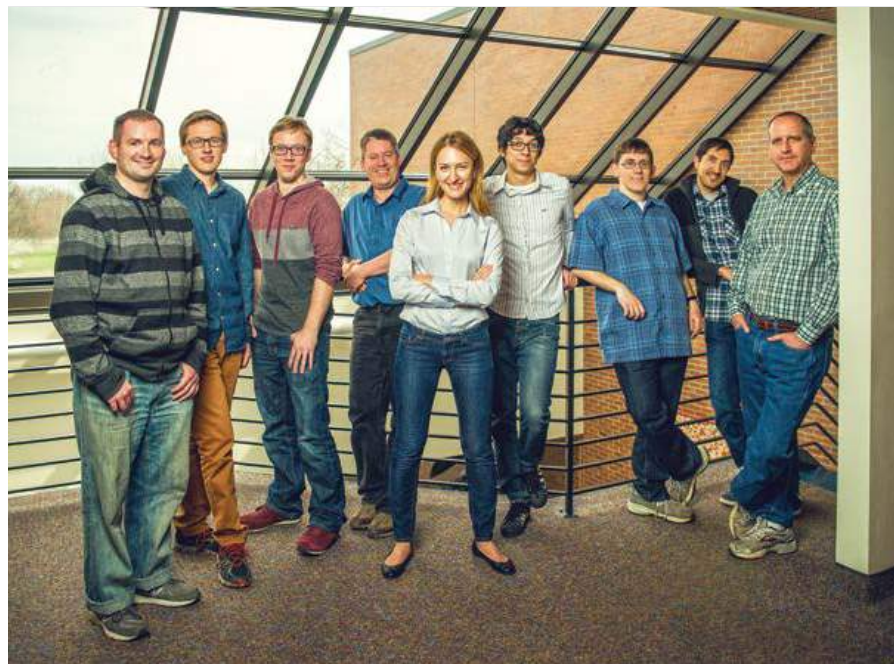
She was ready, Shapiro told him, to return to Rochester and the supportive environment that she and husband Steve Shapiro '04 (information technology) had found at Venture Creations when they developed and launched a social networking/instant messaging tool called Digsby. They sold the company in 2011.

"When I got the idea to start this (new) company, I was attracted to the RIT community because we have a really great network here and they are incredibly supportive," said Melanie Shapiro. This time around, Shapiro wanted to develop a secure wallet for using the digital currency Bitcoin.

Shapiro is effusive in her praise of what Venture Creations has to offer: dedicated office space; introductions to potential funders; access to RIT talent; and opportunities to learn from experienced business people.

Those attributes of Venture Creations make it an "active model" of a business incubator, Richard Notargiacomo, interim director, explained.

Notargiacomo uses a manufacturing analogy to explain Venture Creations. "You've got raw material going in, you've got products coming out that are more



**Valuable Connections:** Melanie Shapiro (center), CEO of Case, and Steve Schultz (fourth from left), CTO of Case, with their team of employees. Shapiro returned to Venture Creations to help launch another business because of the incredible support and expertise she had previously received.

valuable than the raw material, and you have some transformative processes inside the factory."

Each company's leaders are required to set quarterly goals and is assigned a coach from the Venture Creations staff, who meets with them regularly. The coach can help a company's leaders think through ideas and challenge them, while recognizing that goals may change as the entrepreneurs learn, develop, and adjust their plans. A key, Notargiacomo explained, is that "we recognize the

path from idea to startup to successful business is not linear."

While the numbers vary as companies come and go, on average there are about 22 companies housed at or affiliated with Venture Creations at any given time. Companies pay rent and have access to copiers, conference rooms, etc.

Venture Creations' track record is strong, having graduated 31 companies since 2003, creating more than 450 new jobs, and working with the entrepreneurs to get more than \$65 million in investments.



**Assembly Operation:** The Blast Gauge System is assembled, tested, and shipped from Venture Creations. Blackbox Biometrics assembles about 1,200 Blast Gauges daily.



**Monitoring Head Injuries on the Field:** David Gillette '14 (electrical engineering) shows off BlackBox Biometric's sports impact-monitoring system, Linx IAS.

*Here's a look at three companies with connections to RIT that have found incubation success at Venture Creations:*

**BlackBox Biometrics, Inc.**

“Measuring the unseen” is an apt motto for this company, which is making its mark in the world of brain injury science. Thanks to the company’s Blast Gauge System®, U.S. soldiers can get faster and more accurate treatment after suffering from a concussive event.

The Blast Gauge System is actually three sensors worn on the shoulder, chest, and helmet, which record pressure and acceleration from exposure to an explosive blast. By pressing a button, the sensor emits a green, yellow, or red light to indicate the level of exposure. Medical personnel can analyze data collected to determine any necessary treatment.

BlackBox Biometrics President Joe Bridgeford said the company is in the early stage of market penetration with

the Blast Gauge System. The biggest client is the federal government, including a \$9.4 million contract from the Department of Defense. BlackBox Biometrics also sells to other countries, including Australia, Sweden, Canada, and the United Kingdom to name a few.

The company employs about 20 people in some 4,000 square feet at Venture Creations, where the Blast Gauge devices are assembled, tested, and shipped.

Another BlackBox Biometrics product, the Linx IAS™ (Impact Assessment System), identifies player exposure to impact events and leads to better treatments of athletes suffering a concussion. The sensor weighs about the same as a nickel and is fitted in a skullcap or headband. Green, yellow, and red lights indicate the severity of the impact for quick assessment on the playing field. The sensor also transmits data that’s available via a smartphone or tablet app, so coaches and parents are alerted

to all impacts to the head.

“You can correlate that data with what you are observing on symptoms and injuries, so I think we’re enabling a whole new level of research in the science of traumatic brain injury and concussions,” Bridgeford said.

The Linx IAS is being demonstrated on sports teams at the youth, high school, and collegiate levels, and is expected to go to market in 2016.

Venture Creations’ affiliation with RIT has been a big advantage to the company, Bridgeford said. Not only does BlackBox Biometrics have strong ties to RIT through its founder, David Borkholder '92 (microelectronic engineering), but the company has had more than seven RIT students participate in co-ops, and more than half of its staff in the last four years have been RIT grads. BlackBox Biometrics also utilizes other RIT resources such as its Center for Electronics Manufacturing and Assembly.





**Case** developed a product by the same name that is a device the size of a credit card that can be used to store, send, and receive the digital currency Bitcoin.

### **Case**

The digital currency bitcoin is difficult to use and harder to secure, according to Case CEO Melanie Shapiro. She knows first-hand, having been a victim of bitcoin theft. Shapiro saw two key problems with bitcoin that needed to be solved: security and ease of use, because bitcoin transactions are irreversible.

Shapiro and Steve Schultz, Case Chief Technology Officer '89 (computer science) and their team developed a product called Case, a device the size of a credit card that can be used to store, send, and receive bitcoin. Using Case involves three simple steps: pressing a button, scanning a QR code, and swiping a finger.

The security aspect involves three keys. One key is embedded on the device. When a user initiates a transaction, the device signs it with its key, and broadcasts that with minutia from the fingerprint to the Case server. Once the server verifies the fingerprint, the server signs the trans-

action with its key to complete the transaction. If the device should be lost, a third key sits in an offline vault, which is used to recover the bitcoins.

A key motivator for Shapiro in starting Case was ultimately to help people in countries with emerging markets that don't have a stable financial system.

"There are a lot of people in Africa and South America who want to be paid in U.S. dollars or euros or pounds because it's a stable currency," Shapiro explained. "What if you had a currency that these people could use and oh, by the way, they could use their mobile device to exchange the currency." By using a digital currency like bitcoin, people can carry their wealth with them.

Shapiro's device can also facilitate other types of transactions, such as a notary or transferring stocks. Case's initial offering of 1,000 devices, which are made in Upstate New York, sold out during the summer.

### **FluxData**

From transmitting images from space in order to help North Dakota farmers, to assisting in research to aid rheumatoid arthritis sufferers, FluxData's cameras focus on finding solutions.

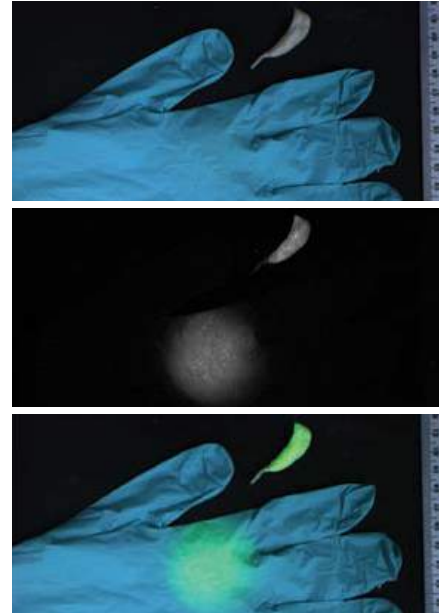
FluxData designs and manufactures multispectral and polarimetric imaging systems for a variety of markets, including defense, medical, agriculture, and environment. Located in the Village Gate complex in Rochester, FluxData graduated from Venture Creations in 2013.

FluxData was founded and is still led by a trio of RIT graduates: Pano Spiliotis, president and CEO ('99 imaging science and '01 MBA); his wife, Tracie Spiliotis, CFO ('99 accounting and '01 MBA); and Lawrence Taplin, vice president and CTO ('01 MS in color science).

When the company began, much of its business came from the Department of Defense and its contractors, due to the



**FluxData Founders are RIT Alumni:** Three RIT graduates launched FluxData in 2006 and still presently run the company. Pictured left to right: Lawrence Taplin, Tracie Spiliotis, and Pano Spiliotis.



**Making the Invisible Visible:** The FluxData Multispectral Imaging system permits seeing objects hidden from view below the surface of tissue. To demonstrate this, two pieces of fluorescent plastic were placed before the system, one a plastic disk hidden from view in a glove (top image). When excited with a low-intensity near infrared light, the plastic objects shine invisibly at wavelengths detected by the FluxData system (middle image). The hidden object is visualized by pseudocoloring the image seen with the naked eye (bottom image). The medical applications include visualizing organs, organ function, tissue perfusion, and medical devices placed below the surface of the skin. Credit: U of R School of Medicine.

wars in Iraq and Afghanistan. While defense work is still a significant part of its business, FluxData has expanded into other markets, particularly medicine.

Several years ago, a University of Rochester medical researcher studying near infrared fluorescence imaging saw FluxData's exhibit at Imagine RIT. A collaboration was born, and the result is a clinical trial to begin in the fall. Rheumatoid arthritis sufferers will have dye injected into their hands, and a FluxData camera will be used to illuminate the inside of the hands. "Our camera is very sensitive compared to the commercially available medical imaging systems that are out there today, and ours is not laser based," which alleviates concerns about safety, Spiliotis said.

A notable success for FluxData occurred in 2011, when FluxData camera technology was used in the International Space Station Agriculture Camera (ISSAC) to take images of vegetated areas and transmit them to University of North Dakota faculty and students who developed ISSAC. The data was then used to help improve fertilizer use and invasive species management, among other issues. Although that project ended, the camera remains on the space station and NASA is considering using it again, Spiliotis said.

FluxData now has a number of customers in China, to the point that Spiliotis is hiring a director of operations to focus on maintaining clients' automation color measurement systems.

FluxData currently has 11 employees but Spiliotis plans a major expansion within the next two years, doubling or tripling the current staff of six engineers, plus growing the current office space to 10,000 square feet.

#### On the Web

**Venture Creations**  
<https://www.rit.edu/research/vc/>

**Case**  
[choosecase.com](http://choosecase.com)

**Blackbox Biometrics**  
[b3inc.com](http://b3inc.com)

**FluxData**  
[www.fluxdata.com](http://www.fluxdata.com)

# Bold Vision

by Marcia Morphy

Jacqueline Mozrall, the new Dean of Saunders College of Business, discusses her future plans for the business school as a central hub within a leading institute of technology.



Jacqueline Mozrall

## How does Saunders being a part of RIT make it different from other business schools?

**Mozrall:** We live in a technical world and RIT prepares students to live, work, and succeed in this world. Saunders is uniquely positioned to deliver degree programs that reside at the intersections of business and technology—fields such as management information systems, technology management, digital business, supply chain management, and computational finance.

## What is your vision for building corporate partnerships?

**Mozrall:** I have a long history of working in cooperation with our career services division and establishing strong relationships with employers and corporations, both big and small, across a wide array of industries—understanding their needs and then ensuring our students are prepared to meet their needs.

## What is your vision as to how Saunders College can help faculty and students across the university with their innovation and entrepreneurship aspirations?

**Mozrall:** Saunders College offers and promotes a variety of courses, events, and (in partnership with the Simone Center for Student Innovation and Entrepreneurship) multidisciplinary experiential activities in innovation and entrepreneurship. The college is very supportive of activities that link our business students with technology, design/art, and humanities students promoting entrepreneurial outcomes. These multidisciplinary activities broaden the educational experiences of all participating RIT students.

RIT offers an applied learning environment. Many of our experiential activities link industry mentors with student teams. These types of activities assist our efforts to integrate practice and theory into educational outcomes. It makes our innovation and entre-

preneurship programs unique.

One of our best-known programs is the Saunders Summer Start-up—a full-time accelerator program for student teams with high value concepts. This program not only provides lifelong learning experiences, but also viable and fundable businesses. These teams develop, present, and vet their projects to a panel of “venture capitalists.” Strong Arm Technologies, which participated as a Summer Start-up Project to develop advanced injury-prevention equipment, recently received a strategic investment from 3M. This is one example, but there are many more.

## What will the new MS in computational finance degree offer to incoming students?

**Mozrall:** RIT’s master of science in computational finance leverages the combined strengths of Saunders College of Business, including a Top 50 finance program, and the expertise of our School of Mathematical Sciences. Also referred to as “Quants,” or financial engineers, individuals in these positions use their strengths in business, modeling, and data analysis to understand, develop, and use complex financial models. This is necessary in a wide array of industries well beyond just the financial industry.

## Where do you view the business school’s role with STEM disciplines?

**Mozrall:** While preparing our business students to lead in this technical world, we are also preparing individuals with technical backgrounds to develop knowledge of business processes so that they can also be effective decision makers in their respective fields.

**Center for Urban Entrepreneurship (CUE)** has been inspiring creativity, fostering innovation, and helping to shape the regional economy within Rochester's urban community since 2012. Today, the center continues its mission in its new home—a 5,000-square-foot business development hub on the first floor of the historic Rochester Savings Bank building at 40 Franklin St.



# A Valuable Resource for Urban Entrepreneurs

by Vienna McGrain

RIT's Center for Urban Entrepreneurship (CUE) in the center of downtown Rochester marks a poignant return to the heart of the city where the university's rich history began more than a century ago.



**Consulting Resource:** Ebony Miller (right), CUE interim director, discusses business strategy with Tess Padmore, owner of Egghead Soques® apparel, a division of her e-business, Wolf Clan LLC, based in Rochester. Padmore has participated in the CUE's Capacity Building Program.

## **CUE Welcomes a New Generation of Young Entrepreneurs**

From working to develop the passion of entrepreneurship in the city's youngest residents to maximizing the potential of current business owners, CUE is positioned to be a leader within the urban community and a central resource for urban entrepreneurial programs and research.

Ebony Miller, CUE's interim director, believes the center's strength lies in providing business and consulting resources—and much-needed encouragement—to urban entrepreneurs and anyone with an existing business or hoping to launch a new business within the urban area.

“Experiential learning is especially important to the overall mission of the center,” said Miller. “The people who take

advantage of the resources that we provide will walk away with the tools to succeed. We are the convener, a one-stop shop when it comes to giving the community what they need. After all, we are associated with one of the top academic institutions in the country. We are RIT—and we are positioned to provide the best possible learning environment for our business owners and those dreaming of one day becoming entrepreneurs by connecting them to the resources provided by our faculty, staff, students, and community partners.”

This past summer marked the first time CUE hosted nearly 200 Monroe County youngsters in a local iteration of the nationally recognized Lemonade Day program, teaching the city's youngest



**Lemonade Day:** CUE hosted nearly 200 Monroe County youngsters for Lemonade Day, a 14-step process that teaches young people how to design and execute business plans. Paired with adult mentors, the children manned lemonade booths at the culmination of the program on June 6 at more than a dozen locations around the county.

entrepreneurs how to turn “lemons into lemonade.”

Founded in Houston in 2007, Lemonade Day is a 14-step process that walks youth from a dream to a business plan and teaches the same principles that are required to start a big company. Paired with adult mentors, the children manned lemonade booths at more than a dozen locations around the county. The profits they earned were theirs to keep.

“While the program inspires youngsters to work hard and make a profit, they are also taught to spend some, save some, and share some by giving back to their community,” said Miller. “CUE is proud

to offer a helping hand to build self-worth and confidence, which are so important for our young people to succeed. And, the looks on their faces are simply priceless when they realize the power they hold to make a difference in their communities.”

Kayla Rizzo, a 16-year-old senior at Rochester Early College International High School, heard about CUE’s Future Business Leaders and Entrepreneurs 10-week summer program from her school counselor. Throughout the program, high school students work with RIT student mentors to identify organizations needing help to solve real-world business dilemmas and learn the “tools of



**Future Business Leaders and Entrepreneurs Program (FBLE):** Kayla Rizzo, Tommie Nguyen, and Giovanni Hall (left to right) participated in CUE’s FBLE 10-week summer program. They presented their team’s ideas at a ceremony on August 15.

the trade” along the way. At the end of the program, the high school students present their business plans to the organizations.

“For me, the most valuable part of the



**Building Rochester's Ecosystem:** Myneco Ramirez (right), founder and CEO of MBR Concepts, LLC, and developer of Rochester Tech StartUp Expo, a one-day networking event, mentored Rizzo and her team in the FBLE program.

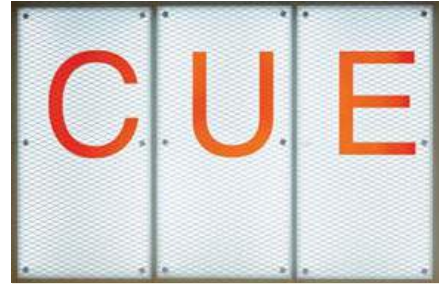
summer program was listening to all of the presentations about finances, management, and so many other aspects of business," she said. "There are many things that they don't teach you in high school that are so valuable and that you will need when you get to college, like managing your money."

Rizzo, who hopes to attend RIT and major in astrophysics, also offered young entrepreneurs a bit of advice after successfully completing the program.

"Networking," she said. "You have to reach out to people who will support you and connect with people who will help build you up along the way."

### Inspiring Urban Revitalization

Myneco Ramirez proudly calls Rochester home. The RIT alumna ('09 information technology), Chicago native, and small-business owner was anxious to put down roots in Rochester following graduation, based on the promise of a resurgence in innovation. She rents a downtown apartment with her husband, Brandon, also an RIT graduate, so they can be part of Rochester's city-living revitalization. And with support from CUE, Ramirez and other local business owners have become key players in building Rochester's new ecosystem and shaping the city's startup business culture.



### A Brief History of CUE

- RIT's Center for Urban Entrepreneurship occupies about 5,000 square feet on the first floor of the 47,000-square-foot building at 40 Franklin St., in downtown Rochester. The space will also serve as a multi-use venue for other RIT activities. The opening of the center marks the official return of RIT to downtown Rochester since vacating office space on Main Street in the 1990s.
- The building, built in 1927 by the Rochester Savings Bank, was donated to RIT by Rochester Historic Ventures, which comprises of members of the Leenhouts, Tait, and Tones families, along with members of the Broadstone management team.
- Since 1972, the building has been listed on the U.S. National Register of Historic Places and has historic significance in art, architecture, and commerce.
- Building renovations began in 2013 and RIT has estimated that it cost about \$8 million in capital improvements to refurbish parts of the building, as well as preparing the building for programmatic needs. RIT secured funding from the federal and state governments and other sources to leverage the university's investment in repurposing the building.
- Current infrastructure includes office space for CUE staff, four meeting rooms for client meetings, one large shared workspace, a 70-person room for classes or functions, and wireless technology throughout the space.



**Multifunctional Space:** A large room that can be used for meetings or classes is part of the amenities on the CUE's first floor.

CUE has been playing an integral role in helping Ramirez to build her business strategy. Ramirez was a member of the first class of CUE's Capacity Building Program, an intensive six-month customized training program designed for fledgling entrepreneurs that assesses the business' structure, teaches business owners key skills like finance, marketing, and selling, among others, and stresses growth stimulation. The advice she received would prove valuable later when Ramirez launched her company.

"I learned so much about myself and what I was truly passionate about," she said. "I learned how to work, how to manage, how to be a business owner. In fact, many of the business principles I learned at the CUE were new to me because I was so focused on the 'technology' part of IT in college. I graduated from that program armed with the knowledge that I needed to make a fresh start."

Today, Ramirez is a successful IT consultant and founder and CEO of MBR Concepts LLC. She is also in a position to give back to the center

that jump-started her career by partnering with CUE to teach young people about entrepreneurship and give them an opportunity to use their skills to solve real-world business problems in the Future Business Leaders and Entrepreneurs program.

Always looking ahead to what's next, Ramirez smiles when she considers how she is able to use her business and her experience as an entrepreneur to re-position her adopted home as a hub for encouraging and educating new business owners.

"When most people attend college, they learn about career options—doctor, lawyer, IT professional," Ramirez said. "But there is another option on the table—starting your own business. I just knew that I didn't fit into that traditional 9-to-5 mold. And I suspect that there are so many others who feel the same way. I envision a great future for the CUE. It's a phenomenal resource for people like me—and there's nothing better than having unwavering support right in your backyard."

### Miller Named CUE Interim Director

Ebony Miller has been named interim director of RIT's Center for Urban



Ebony Miller

Entrepreneurship. Miller previously served as the CUE's program manager.

In her new role, Miller will be responsible for advancing the center's mission, which includes

providing business and consulting resources and encouragement to urban entrepreneurs and anyone with an existing business or hoping to launch a new business within the urban area. She will also lead the center's efforts to raise funds to provide critical assistance to underserved businesses in high-growth sectors, and foster outreach and collaboration with the Rochester City School District and entrepreneurship education for dislocated workers. She will also maintain partnerships with entrepreneurship and training efforts currently found within RIT's Simone Center for Student Innovation and Entrepreneurship, Venture Creations business incubator, Center for Bioscience Education and Technology, the Clean Energy Incubator, and the New York State Pollution Prevention Institute.

Miller came to RIT in 2011 as a senior staff specialist for the Kate Gleason College of Engineering. She became program manager for CUE in 2013. In her most recent role, she created CUE's Capacity Building Program, raised the funds to implement Lemonade Day in Monroe County, and built relationships with partnering organizations.

"I am both excited and humbled as I embark upon this new role," said Miller. "I look forward to continuing to cultivate our urban entrepreneurial ecosystem through our service and program offerings and constant assessment in collaboration with our partnering organizations."

Miller earned a bachelor's degree in communication and a master's degree in informatics from University at Buffalo.

### On the Web

Center for Urban Entrepreneurship  
[www.rit.edu/cue](http://www.rit.edu/cue)





**Datto Inc.** was one of the first companies to join the START-UP NY program. Datto's Rochester office is on the fourth floor of the RIT Downtown Center at 40 Franklin Street.

## Accelerating Job Creation Across New York State

by Kelly Sorensen

RIT is part of START-UP NY, New York state's business development program launched in 2014 to create high-tech jobs. RIT was the first private university admitted to START-UP NY and has presented four approved applicant companies to the program.

### **START-UP NY**

Portions of two RIT-owned properties—40 Franklin Street in downtown Rochester and 125 Tech Park Drive in Henrietta—have been approved for the START-UP NY program. To create entrepreneurial synergy, the 40 Franklin Street space is also home to the Center for Urban Entrepreneurship while 125 Tech Park Drive houses RIT's Venture Creations

business incubator.

Under START-UP NY, businesses that create net new jobs may obtain New York state approval to operate tax-free for 10 years—paying no state income, business, corporate, local, sales, or property taxes or franchise fees. New employees may be eligible for New York state personal income tax credits. State officials say the tax benefits will help

accelerate entrepreneurialism and job creation across the state on a large scale. These companies are helping to retain more RIT alumni in upstate New York and creating additional co-op opportunities for RIT students and employment possibilities for graduates.

“RIT is proud to be part of this state program that will stimulate economic development in the Rochester region



**Datto Founder and CEO:** Austin McChord, an alumnus of RIT's bioinformatics program, founded Datto Inc., a backup and disaster recovery firm, in 2007.



**On the Move:** Darkwind Media, founded by four RIT students, recently moved to its new location at the RIT Downtown Center from the Venture Creations business incubator.

and foster further innovation in New York state," said Ryne Raffaele, vice president for research at RIT and associate provost at RIT. "The university anticipates that its sponsored companies will generate technical, high-paying jobs for the Rochester region."

Here are the four companies accepted into RIT's START-UP NY program:

#### **Datto Inc.**

Datto Inc., a backup and disaster recovery firm launched in 2007, was the brainchild of Austin McChord, who started the company while finishing his bioinformatics degree at RIT. Datto, headquartered in Norwalk, Conn., has more than 550 employees worldwide spread across seven different offices including Rochester. It's a vendor of award-winning hybrid cloud-based intelligent business continuity and disaster recovery solutions. Datto was one of the first companies to join the START-UP NY program in June 2014. The company occupies the fourth floor of the RIT Downtown Center at 40 Franklin Street, site of the historic former Rochester Savings Bank.

"RIT has been an enormous help to Datto by guiding us through the START-UP NY process," said McChord. "As an RIT graduate, I am connected to the Rochester community so the combination of RIT with START-UP NY made Datto's continued expansion in Rochester an easy decision. Our goal is to be the best employer in the Rochester area and to continue recruiting top talent from RIT and the surrounding region."

In conjunction with the START-UP NY initiative, Datto is committed to creating more than 70 jobs in Rochester over the next few years.

#### **Darkwind Media**

Another company launched by RIT students that is part of START-UP NY is Darkwind Media, a game development studio that also provides consulting services to other game development studios. Colin Doody, Matt Mikuszewski, Brian Johnstone, and Scott Flynn founded Darkwind Media in 2007. Darkwind Media recently moved from Venture Creations to 40 Franklin Street.

"Our new space is triple the size, which is great for us as we get ready

for some upcoming hiring phases," said Mikuszewski. "START-UP NY will be a helpful recruiting tool for us."

Darkwind Media's philosophy has been to grow its company slowly and methodically. The company currently has 17 employees. All of its work is generated solely by word of mouth. Darkwind Media has clients all over the world, including London, South Africa, and Seattle.

Factors such as quality of life and the cost of the living had an impact on the company's decision to stay in Rochester. Doody says Darkwind Media wants to have an impact on Rochester.

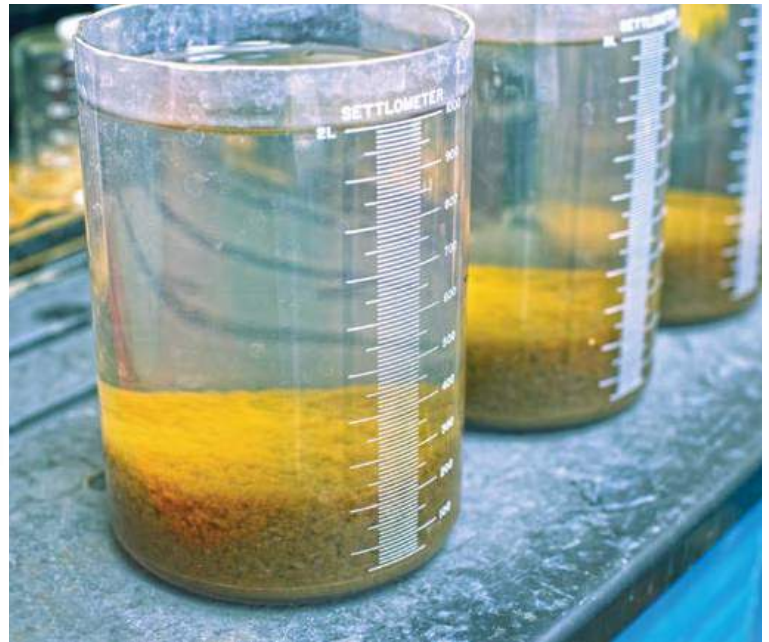
"We are really excited about the new space in downtown Rochester," said Doody. "Everybody wants to see our industry grow in a community downtown. We are trying to do our part and put our stamp on the community."

#### **Optel Inc.**

Optel Inc. became a START-UP NY participating company in spring of 2015. Jay Eastman co-founded the company with his son, Zach, a 2004 graduate of RIT's mechanical engineering program.



**Medical Device Design:** Optel Inc. provided engineering assistance to Vital Motion, Inc., with the product styling and mechanical design of this FDA Class 1 therapeutic medical device that can provide symptom relief for people suffering from the effects of fibromyalgia and chronic fatigue syndrome.



**Wastewater Treatment Process:** Samples of sludge taken from ClearCove Systems' prototype. ClearCove Systems was started by two RIT alumni, Greg Westbrook and Terry Wright.

Jay Eastman describes himself as an “addicted entrepreneur”—Optel is his fourth startup company.

“I think START-UP NY is going to be a great magnet for hiring,” said Jay Eastman. “We plan to start hiring early next year. When you tell people about the tax breaks that are associated with START-UP NY, particularly that they are in effect for 10 years, that’s a big draw for employees.”

Housed in Venture Creations, Optel provides a variety of consulting services to companies designing and manufacturing proprietary medical devices. Optel ensures compliance with the requirements of the U.S. Food and Drug Administration’s current Good Manufacturing Practices (GMP) and other medical device manufacturing requirements throughout concept, design, and manufacturing phases. Optel manufactures a microscope objective—a sophisticated magnifying lens that allows the iPhone to image individual cells—to measure the quality of dairy milk. Eastman says that dairy farmers are paid based on the quality of milk the cows produce and one of the criteria that determines its

quality is the milk’s somatic cell count. Levels of somatic cells that are too high indicate an infection in the cow.

In addition to this manufacturing project and other design work, Optel is redesigning two devices for the ophthalmology industry.

Zach Eastman says Optel has already targeted people to bring on board in the next few months.

“There are several people currently on our radar who have degrees in optics, electrical engineering, and mechanical engineering,” said Zach Eastman. “Their expertise would nicely round out our company’s capabilities and two of those potential hires are RIT graduates.”

### ClearCove Systems

ClearCove Systems is a renewable energy company that reduces municipal costs and creates potential revenue by using biomass to produce energy. Greg Westbrook is an RIT alumnus who co-founded ClearCove Systems with Terry Wright, his former roommate at RIT. Westbrook and Wright were 1981 graduates of the civil engineering technology program.

Because of the company’s growth after

coming into the START-UP NY program in 2015, ClearCove Systems exceeded the size of available space. RIT helped facilitate ClearCove’s transfer to Finger Lakes Community College.

“As a result of engagement with RIT at all levels of the university, we are delighted to announce our first significant orders from municipal and industrial customers,” said Westbrook, ClearCove Systems CEO. “We could never have gotten there without RIT’s assistance.”

Westbrook says ClearCove Systems has created seven new jobs to date in 2015 and expects to exceed that number before year’s end.

### On the Web

**START-UP NY**  
startup.ny.gov

**Datto**  
www.datto.com

**Darkwind Media**  
www.darkwindmedia.com

**Optel**  
http://www.optel-inc.com

**ClearCove Systems**  
www.clearcovesystems.com

# Food Cluster Initiative Boosts Region into the Breadbasket of New York

by Rich Kiley

In the four years since the Obama administration announced more than \$1.5 million for RIT as a result of the U.S. Department of Labor and Innovation Accelerator Challenge, the economic development program targeting businesses in food production—or “farm to fork”—has helped to further spur the Finger Lakes region into the breadbasket of New York.

## Customized Training:

Kentt Montealeone, a batch operator at Alpina Foods, was one of 15 employees who went through the training program in July 2012 as the company prepared to open its Batavia location. Montealeone's training included Lean Six Sigma classes. Cleaning the tanks used for Alpina's yogurt production and ensuring the pH levels are maintained are part of Montealeone's job responsibilities.

## Food Industry a Star

The Finger Lakes Food Processing Cluster Initiative, an economic development project spearheaded by RIT's Center for Integrated Manufacturing Studies (CIMS), and the New York State Pollution Prevention Institute (NYSP2I), has taken direct aim at advancing the regional competitiveness of the nine-county Finger Lakes region by leveraging the growth potential of food production and processing.

“This has to be the best collaborative effort across the region that I have seen in my 15 years here at RIT,” said Andy Harlan, assistant director of operations at



CIMS and the Golisano Institute for Sustainability (GIS). “The networking, collaboration, and working for the betterment of economic development in the region have been tremendous.”

The food production industry has been a bright star in the Finger Lakes region’s manufacturing sector. Unlike other segments, the industry is not cyclical—employment and wages increased during the recession and projections point to more growth in New York over the next seven years. Nationally, food production sales revenues are projected to double.

The Finger Lakes regional food system has all the main ingredients to support the industry’s growth—plentiful raw material production, ready sites and infrastructure, abundant fresh water, competitive workforce, major food production companies, and headquarters to major production and retailers—all a recipe for success.

RIT also has worked with more than 50 companies to reduce food waste, an issue that has been at the forefront with the state Department of Environmental Conservation (DEC) and part of Gov. Andrew Cuomo’s comprehensive plan to advance the region. New laws against food waste also are gaining traction in New York City and states like Vermont, Connecticut, and Massachusetts, with RIT poised to collaborate on solutions.

In addition, the Finger Lakes Regional Economic Development Council’s Upstate Revitalization Plan includes the food industry as a pillar.

### Initiative a National First

Announced in 2011, the food cluster initiative marked an innovative way for federal investment to provide food industry companies the tools and resources to grow in the Finger Lakes region.

The initiative is a three-pronged effort to provide practical, hands-on assistance programs, training, and partnerships. It was designed to assist the region’s food processing and agricultural businesses to identify and implement technical improvements and sustainable manufacturing process technologies to reduce operating costs, minimize environmental impacts, open market opportunities, and retain and grow jobs.

The awarding of the program to RIT was the result of a competitive application process through the Department of Labor’s Employment and Training Administration, the Department of Commerce’s Economic Development Administration, and the Small Business Administration.

RIT received \$997,470 from the Department of Labor’s Employee and Training Administration for the four-year program. The Small Business Administration awarded RIT \$150,000 over two years. The Department of Commerce’s Economic Development Administration awarded RIT \$400,000, which was matched by the state DEC through NYS2I, a state-wide pollution prevention institute located at RIT. Of 125 applicants nationwide, only 20 were approved for funding.

“This grant is unique—the first in the nation—because of the multi-agency cooperation,” Harlan said. “The training and direct assistance this initiative offers has enabled food companies to connect the dots by helping them develop new processes or identify better and more efficient ways to streamline operations.”

One of those companies is O-AT-KA Milk Products Cooperative, Inc., a manufacturer of milk and dairy products in Batavia, N.Y.

“We wanted to develop our employees’ skills and make them more knowledgeable when it came to operating equipment and learning new processes,” said Ashlee Leaton, human resources coordinator.

Leaton added that O-AT-KA Milk’s experience working with the program has “exceeded our expectations.”

“The grant has supported our organization’s growth and many of our new employees have benefited from the training provided, resulting in a stronger and more knowledgeable workforce,” she said.

While agri-business has always been a foundation of the region’s economy, developments in recent years have only brought it more to the forefront. A prominent example is two multinational companies building major facilities for production of the popular Greek-style yogurt in Batavia. Alpina Foods, the U.S. arm of a South American dairy company, opened a \$20 million plant producing Greek-style yogurt topped with granola. It created 50 jobs initially.

The food cluster initiative has offered customized training programs for workers at Alpina, according to Harlan. CIMS began working with Alpina to train workers even before its plant opened, he added.

In order to grow, these companies need more skilled workers, which can be more difficult to find in more rural areas.



**From Farm to Fork:** Local companies such as Alpina, Barilla, Zweigle’s, Yancey’s Fancy, Müller, and Baldwin Richardson participated in the Finger Lakes Food Processing Cluster Initiative Program.

The food cluster initiative has taken on the challenge of devising training programs to provide specific skills as well as the basics of how business functions.

While the initiative was scheduled to end in October, Harlan is optimistic that the program will receive a one-year extension.

“We still have funding available since there has been cost sharing with companies, who we find are more invested in the outcomes that way,” he said.

### On the Web

Finger Lakes Food Processing Cluster Initiative  
[www.rit.edu/gis/flfpci](http://www.rit.edu/gis/flfpci)



# RIT Alumni, Advisers Help Rochester Reimagine the Business Landscape

by Suzette Norris

An iconic building in Rochester, formerly home to Kodak and Xerox, is now drawing in small business owners who want to be part of an entrepreneurial ecosystem. The facility, called Carlson Cowork, has created a subculture of entrepreneurs who can collaborate with each other as they grow their businesses.

## **Power of Small Businesses Under One Roof**

Barry Strauber, who teaches advertising and campaign management and planning at RIT's School of Communication in the College of Liberal Arts, believes supporting these independent innovators will help Rochester re-imagine its business landscape.

"We have a younger generation coming up that sees a shared economy, and has a holistic view of understanding the world and how work should be done," he said.

"We need to figure out ways to facilitate the great brain trust here. We need to do something purposeful to appeal to them and get them to believe that Rochester is their place."

Strauber is part of a new entity in Rochester called Carlson Cowork that has an informal (but passionate) connection with RIT through its alumni, students, and advisers.

Co-working spaces exist in New York, Boston and other cities, but Strauber

saw the concept could stretch beyond sharing office space and equipment. "What's really interesting is the power of community that comes from bringing creative people together in one space."

Strauber took his idea to James Goff, president and chief executive officer of Landsman Development Corp. and an RIT alumnus who serves on the RIT President's Roundtable and whose wife, Marianne Goff, is an RIT trustee. Landsman manages an 800,000-square-

**Co-working Space:** Carlson Cowork, located in Rochester, N.Y., brings entrepreneurs together under one roof. As part of its 800,000-square-foot facility there is a common area to promote collaboration among its tenants.



foot facility on Carlson Road in Rochester that Goff and Kurt Ziemendorf (Landsman's vice president of operations) are looking to fill.

While a co-working facility was not exactly what they had in mind, the concept was interesting, and has shown some success in places like New York, Boston, Indianapolis, Boulder, and Palo Alto. Landsman renovated a 16,000-square-foot section of the building into a flexible working space for small business owners with big ideas.

### **Fostering a Collaborative Community**

As the landlord, Landsman provides Carlson Cowork members with flexible workspaces, Internet, parking, a community café, shared work spaces to foster collaboration, and a conference/boardroom. Members pay rent monthly—no long-term lease required. There also are Wednesday noon lunch “jams” and Friday input meetings to encourage members to share expertise.

Co-working focuses on providing entrepreneurs a long-term place to work, grow, and collaborate with other entrepre-



**Amenities Offered:** A café with tables, a piano, and a foosball table are among the amenities that are offered to the Carlson Cowork entrepreneurs.

neers. And, Goff points out, there's plenty of space if a business eventually wants to expand and/or even manufacture a product.

“Since the grand opening in April

we've grown to 45 companies without any advertising—all through word of mouth,” he said. And not one of the companies “has bailed on us,” added Ziemendorf.

**Monster Film Production:** John David Vincent, director, cinematographer, and FX artist, is creating The Jack Monster, an animatronic rod puppet that will be the star in a live action horror film, "Mind Rip." Vincent hopes to start shooting in spring 2016. Vincent, who attended RIT in 1983, was the first tenant of Carlson Cowork. He says the other Carlson Cowork tenants have provided him with a pool of resources.







### Planting Seeds to Grow a Sustainable World

After 24 years of developing innovative community food projects and learning gardens within Rochester city schools, Rochester Roots, Inc. (ROOTS), a not-for-profit organization led by RIT alumna Jan McDonald, opened an Urban Sustainability Laboratory in 2014 at the Rochester City School District's Montessori Academy near the Rochester Public Market. The laboratory provides Pre-K through 6th grade students with a collaborative approach to sustainability education. The program brings students, teachers, residents, college students, Ph.D.s, and businesses to learn together. ROOTS' students learn from nature through hands-on experiences with soil, seed, plants, composting, nutrient cycles, and natural resources and then apply science and technology to support their living systems sustainability.

McDonald, who recently moved her office to Carlson Cowork, wants students to see firsthand how businesses collaborate. She regularly brings students in to speak with entrepreneurs and make connections within the community.

ROOTS collaborates with Sustainable Intelligence, whose CEO and founder Don Sweet is an adviser to RIT's Saunders College of Business and has extensive intrapreneur and entrepreneur experience that helps support ROOTS student businesses. Sweet also has an office at Carlson Cowork. Sweet helps make connections between ROOTS and teams of multidisciplinary senior design engineering students at RIT's Kate Gleason College of Engineering. The college provides up to 20 undergraduate students annually to work with ROOTS students to engineer agricultural systems and technologies.

"It's interesting to see how the synergy, diversity and expertise found at Carlson Cowork complements how we work with students on personal development, sustainability education, and entrepreneurship," McDonald said. "We're finding our RIT colleagues and Carlson members can learn as much from ROOTS students as ROOTS students learn from them."

#### On the Web

**Rochester Roots**  
[www.rochesterroots.org](http://www.rochesterroots.org)

"Because we're not leasing a desk, we believe we've created a culture for people and businesses to grow." As an increasing number of people work from home, many are finding access to a separate space allows them to avoid conflicts between work and family. Landsman plans to expand Carlson Cowork as more businesses come on board, Ziemendorf said.

#### Carlson Cowork Early Tenants

Strauber, who owns a branding and marketing company called Rising, was one of the first tenants along with John David Vincent, who studied animation at RIT. Vincent decided to relocate his film company, Philrose Productions, to Carlson Cowork, saying the flexibility allowed him to open a small studio where he creates monster sculptures for animation. Chris Cooley, who owns brand development and management agency Cooley Creative LLC, was another early tenant.

"We said, 'Let's get all of our social media networks together and let people know this is going on,'" said Strauber, who currently has RIT students working on a marketing campaign and media plan for Carlson Cowork as part of the courses he is teaching.

As the word spreads, the RIT connections continue. Josh Pies, an RIT alumnus who produces feature and short films, television shows, music videos, and corporate works, moved in. And Jan McDonald, an RIT alumna and executive director of the not-for-profit organization Rochester Roots, has moved her office into Carlson Cowork, viewing it as an opportunity to help school-age students learn about entrepreneurship (see sidebar).

"This whole place is about collaboration," Goff said. "The feature film guy connects with the finance guy in the corner and things start happening. We have been business connections here in Rochester and as far away as Haiti."

#### On the Web

**Carlson Cowork**  
[www.carlsoncowork.com](http://www.carlsoncowork.com)

# Faculty Achievements

RIT values the research contributions of its faculty. Below are some members of the RIT community who have received recent international, national and university recognition.



**Poorna Kushalnagar**, professor in RIT's Chester F. Carlson Center for Imaging Science, has been awarded two grants from the National Institutes for Health that will total \$2 million. The first award, Inclusion of Deaf Patients in Disability and Outcomes Research (\$1.6 M), looks at how to improve patient-reported outcomes among deaf and hard-of-hearing patients across their lifespan. For the second NIH grant, Deaf Signers' Experiences in Seeking Health Information, Kushalnagar will investigate the trends in health information usage among deaf adults who use ASL.



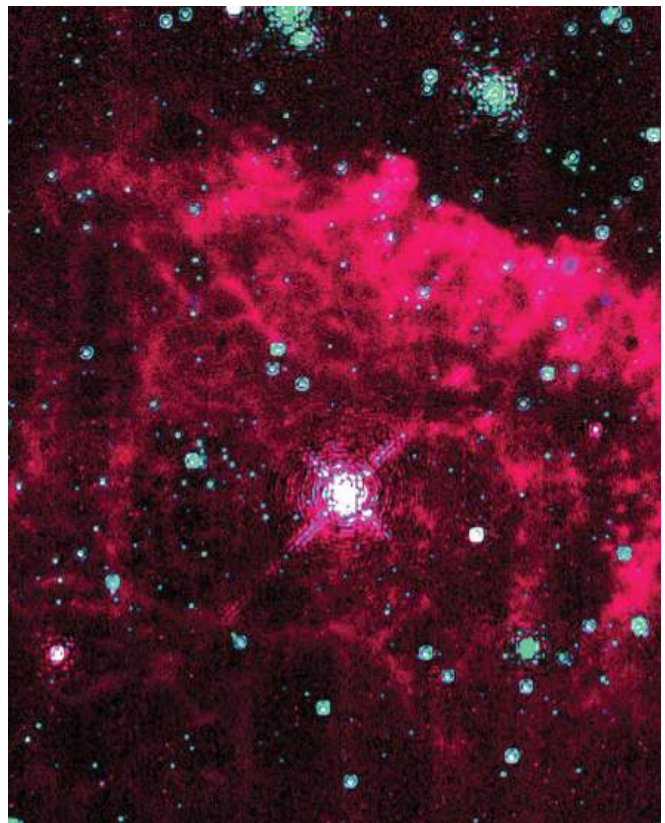
**Behnaz Ghoraani**, assistant professor in RIT's biomedical engineering department, was awarded a \$456,000 grant from the National Institutes for Health for "Catheter Guidance Algorithm for Identification of Atrial Fibrillation Ablation." Ghoraani is collaborating with Elizabeth Cherry, associate professor in RIT's School of Mathematical Sciences, as well as clinicians at UR Medical Center and scientists at SUNY Upstate Medical University. The team is developing a novel low-risk, low-cost algorithm allowing improved and patient-specific localization of electrical disturbance sites to improve clinical intervention for atrial fibrillation.



**R. Roger Remington**, the Vignelli Distinguished Professor of Design, received the Ladislav Sutnar Prize from the University of West Bohemia in Pilsen, Czech Republic, last month. The prize honors outstanding international designers, educators, artists, and institutions for their contributions to the world of design and art. Remington has written four books on graphic design history.



Considered to be one of the brightest stars in the Milky Way, The Pistol Star, detected by RIT's **Don Figer** nearly 20 years ago, is now part of a set of British postal stamps. The stamps commemorate the 25th anniversary of NASA's Hubble Space telescope. Figer, director of RIT's Center for Detectors, was an astronomer at UCLA when he imaged the star in 1997. His discovery landed him on the front page of *The New York Times* and on *ABC Nightly News*.



**Stamp of Approval:** The Pistol Star, a star detected by Don Figer, director of RIT's Center for Detectors, is part of a set of British postal stamps commemorating the 25th anniversary of NASA's Hubble Space Telescope. Credit: NASA and Don F. Figer (UCLA)



**David Messinger**, professor in RIT's Chester F. Carlson Center for Imaging Science, has been named the center's director. His expertise in image processing helped produce useful imagery for crisis managers following the 2010 earthquake in Haiti, and the Japanese nuclear disaster in Fukushima Daiichi after the earthquake and tsunami in 2011. His research activity includes more than 100 scholarly articles, and significant grants, national and international collaborations, editorial activities, and organizing of scientific expeditions.



RIT leads a consortium of universities and corporations to establish a New York State Center for Advanced Technology in Additive Manufacturing and Functional Printing. **Denis Cormier**, RIT's Earl W. Brinkman Professor and a national expert on 3D printing and additive manufacturing, will lead the AMPrint Center.

The state award, announced by Empire State Development, is almost \$1 million per year for an expected 10-year program. The AMPrint Center for Advanced Technology will be based at RIT. It will conduct research and development in 3D printing and additive manufacturing, an industry seen as a key economic driver for the Finger Lakes region because of its application to a wide range of companies and products.

The consortium's university partners include RIT, Clarkson University, and SUNY New Paltz, and corporate partners Xerox Corp., GE Research, Corning Inc., Eastman Kodak Co., and MakerBot. Smaller, regional companies will also collaborate with the center.



**AMPrint Center:** A consortium of universities and corporations led by RIT has been chosen to receive a state grant to establish a New York State Center for Advanced Technology in Additive Manufacturing and Functional Printing.



**Talila A. Lewis**, faculty member in liberal studies in RIT's National Technical Institute for the Deaf, activist, and attorney, is one of nine disability advocates nationwide selected for the White House's Champions of Change program. The program was created as an opportunity for the White House to feature individuals doing extraordinary things to empower and inspire members of their communities. Lewis' research focuses primarily on creating equal access to the legal system for individuals who are deaf and for people with disabilities. She created a national database of deaf prisoners and is working on deaf wrongful conviction cases.



**Reginald Rogers**, assistant professor in RIT's chemical engineering program, received the Joseph N. Cannon Award in Chemical Engineering from the National Organization for the Professional Advancement of Black Chemists and Engineers. Rogers was recognized as an outstanding faculty-scholar, for his mentoring activities with students and his involvement in campus organizations.



**Lea Vacca Michel**, associate professor of chemistry in RIT's School of Chemistry and Materials Science, was chosen as a recipient of the INSIGHT Into Diversity 2015 Inspiring Women in STEM Award. The national award honors 100 women in STEM professions who inspire and encourage young women to consider careers in science, technology, engineering, and math through mentoring, teaching, and research. Michel is chair of the Women in Science program in RIT's College of Science.

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Rochester Institute of Technology is internationally recognized for academic leadership in computing, engineering, imaging technology, sustainability, and fine and applied arts, in addition to unparalleled support services for deaf and hard-of-hearing students.

For two decades, *U.S. News & World Report* has ranked RIT among the nation’s leading comprehensive universities. RIT is featured in *The Princeton Review’s* 2016 edition of *The Best 380 Colleges* as well as its 2015 *Guide to 353 Green Colleges*. *The Fiske Guide to Colleges 2014* describes RIT as “strong in anything related to computing, art and design, and engineering.”

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To learn more about research opportunities on campus, contact us directly or through the RIT research website at [www.rit.edu/research](http://www.rit.edu/research).

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