Feature


10 technology leaders under 40 help pave the way for a more connected society.

Trailblazers. Innovators. Pioneers. These are the people others look to for inspiration, direction, and motivation. When it comes to the ways IoT (Internet of Things) technology can revolutionize life and business, pioneers look not only at the here and now but also to the future. These individuals, groups, companies, and organizations think outside of the box, they don't take "no" for an answer, they look for novel ways to solve age–old dilemmas, and they anticipate what's coming next. In this way, they stay a step (or two, or 10) ahead of the rest. By being ahead of the game, pioneers help bring about the next generation of technology solutions.

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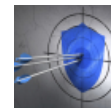
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On an individual level, an IoT pioneer often recognizes the game-changing potential of realtime data when applied to real-world problems. He or she has a vision of what the world could be like if the IoT reached its full potential. And he is excited to share this vision with anyone who will listen. An IoT pioneer often has an adventurous, innovative spirit. She inspires others to share her vision and help her execute on it.

There are many things an IoT pioneer may be and many backgrounds he or she may have, but there is no age requirement. This year, *Connected World* magazine honors 10 young pioneers in M2M and the IoT who are making or have already made their mark on this vibrant, evolving space. Editors have selected pioneers aged 40 and under from a large pool of contenders; we found them at universities, startup companies, and established corporations working in a broad range of industries. They've shared with *Connected World* how they got to their current roles, what obstacles they've faced so far in their careers, and what their visions are for themselves, their companies, and the IoT space as a whole.

Please join us in congratulating the 2018 M2M Pioneers: Branko Kerkez, Aaron Levie, Russ Malangen, Meredith Perry, DeAnna Robear, Austin Russell, Andrew Scheuermann, David Thai, Andrew Thomas, and Dan Work. May they continue to push the boundaries of what's possible with the help of technology.

Bethanie Hestermann, editor-at-large and Peggy Smedley, editorial director, Connected World magazine.

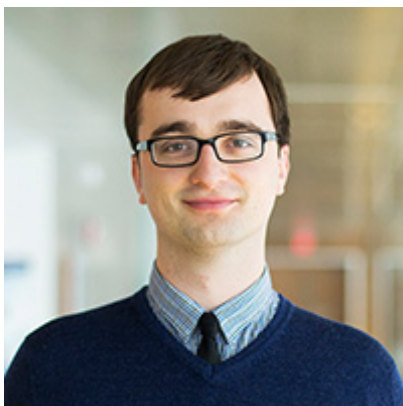Remote Monitoring: Not If, But When In Manufacturing
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Solving Real-World Problems with the IoT

Branko Kerkez

Assistant Professor

Dept. of Civil and Environmental Engineering, University of Michigan

umich.edu

As an assistant professor in the Dept. of Civil and Environmental Engineering at the University of Michigan, Branko Kerkez teaches and conducts research on "smart" and connected water systems. Because he is dual-trained in water and technology, Kerkez, alongside his students, approach today's water problems from a non-traditional vantage point—one that leverages the IoT to unlock critical, decision-enhancing data. "The goal of our lab is to enable the next generation of smart-water systems, which use streaming sensor data and adapt themselves to changing inputs via realtime control," Kerkez says. "Controlling flooding (is) one example, whereby we use sensors and valves to reconfigure or 'redesign' urban watersheds in realtime."

Kerkez, 33, and his lab are on a mission to convince people that smart-water systems are a safe alternative for cities that do not have the funds to build new infrastructure from scratch. Instead, he says cities can use what they have in a more effective manner by implementing sensor-driven IoT systems. Kerkez says he's been fortunate to have role models who taught him to think big. "I was very lucky to have many mentors along the way. This started in high school and college and took shape in grad school when I was surrounded by advisers who did things their own way," he explains. "They taught me to trust my ideas and solve problems in a way that I thought was important. This is basically how we ended up mixing water with technology."

So far in his career, Kerkez is most proud of his lab's real-world sensor deployments and the number of people that use that data to enhance their daily decisionmaking. To be a transformative force in the IoT, he says: "I think the most important thing is to be application-aware. In other words, the 'T' in IoT gets

often overlooked. I believe the best IoT solutions start from the bottom up, whereby the application selects the appropriate technologies and not the other way around."

In addition to his academic role at the University of Michigan, Kerkez is a cofounder of Metronome Systems, http://metronomesystems.com, a provider of intelligent, self-assembling, and self-healing ultra-low-power wireless sensor networks. Through Metronome Systems, Kerkez helps companies quickly develop and deploy wireless mesh networks for measurement and control applications. Through his work at the University of Michigan, Kerkez helps enable smart-water systems that don't require all new infrastructures. Perhaps most importantly, he inspires students to do what his own mentors taught him to do: leverage IoT solutions and the data these solutions deliver to solve real-world problems.

Thinking outside the Box

Aaron Levie

Cofounder, CEO, and Chairman

Box

www.box.com

Every once in a while, a product, service, or solution comes along that changes how things are done. Box, a cloud-based file-storage service, is one such solution. Of course, game-changing products, services, and solutions like Box don't literally just "come along," they are brought about by visionary people who have creative ideas, the drive to build something from scratch, and the follow through to make an idea successful.

Aaron Levie, 31, is the visionary behind Box, and he embodies all of this and more. Self-described as a

"restless" child who was full of energy and curious about how things worked, Levie transitioned into an enterprise-minded teenager who dreamt up ideas for businesses, from a real-estate Website to creating his own search engine. While he didn't hit on any really good ideas in high school, Levie's chance to make a name for himself came while he was attending the University of Southern California.

The story may sound familiar to those who follow tech startups. Levie dropped out of college in 2005 so that he could focus full-time on his new idea—an idea that would eventually turn into a multi-billion-dollar company. He and his cofounders, including Dylan Smith, moved into a garage in Berkeley, where they slept on yoga mats and lived off of cheap food. In these conditions, the young entrepreneurs worked tirelessly on a solution that would leverage the cloud to transform the way people work. In the age of USB drives and FTP sites, Box's cloud-based file storage was a breath of fresh air.

As a young pioneer who had hit on something big, Levie faced some challenges. In an interview with *Business Insider* on the podcast "Success! How I Did It," Levie said he had to reshape his ideas about what it meant to run a company, who he should surround himself with, and what type of culture he wanted to create. He also describes being dealt "lots of different blows" before the company got where it is now. For instance, Levie says the Box team had funding rounds where they were turned down by dozens of investors before finally finding a match.

It did find that first match, which led to more matches, and, today, millions of users rely on Box's platform to upload files to the cloud and share and collaborate online. Now that Box has grown up, gone public, and changed the nature of work for millions of people across hundreds of thousands of businesses, Levie remains focused on the future. He's dedicated to doing what he can to continue to make the company successful in the years to come.

Staying 10 Steps Ahead of the Game

Russ Malangen

Founder and CEO

LX Innovative Solutions

www.lxinnovativesolutions.com

The magnanimous 21-year-old Russ Malangen believes the IoT is the be-all-end-all of future tech. In fact, he says the IoT will be the centerpiece for creating the types of futuristic solutions showcased in today's sci-fi movies. Malangen sees it as part of his life mission to help democratize technology so that everyone may benefit from it. As a serial entrepreneur with a passion for and background in robotics, IoT, and manufacturing engineering, Malangen is currently pursuing his goals as CEO of LX Innovative Solutions, a hardware technology startup he founded in the Philippines at the age of 18. The company produces modules and IoT-based solutions for different sectors, including agriculture, healthcare, marketing and advertising, education, and the blockchain industry.

As CEO, Malangen spearheads the development of projects that help solve the problems of today with the solutions of tomorrow, often by delivering options to automate clients' processes. Malangen and the LX Innovative Solutions team aim to leverage tech to create social and technological progress and positively impact people's lives. For instance, the company recently formed a partnership with the Southern Taiwan University of Science and Technology for co-development and bilateral cooperation of an IoT-powered uterine contraction monitoring device, which will help pregnant women in remote areas of the Philippines and parts of Taiwan.

Though he is young and the space is crowded, Malangen is confident he and his company will have an impact. "There are a lot of players in the space as of the

moment," he says. "Most companies just focus on one product, and that's why they fail. In the IoT industry, it rarely works out when we put all our eggs in one basket. My company's competitive edge is that we develop solutions on the go for smaller-scale clients, and as we see the need for the initial system that we created increase, we standardize and commercialize it for bigger consumers. Most companies want to raise a huge amount of money in the beginning. For us, by starting out small first, we're able to 'validate' the products that we create, and we adjust to the market based on how it turns out."

Malangen's vision for 2018 and beyond is to future-proof his company by integrating IoT with blockchain technology. On a personal level, he wants to inspire other young entrepreneurs to go out there, create value for the people they work with, and become a catalyst for change in their respective areas. "It's a good time to be an entrepreneur these days, as there are a lot of problems yet to be solved as you step outside of your home," Malangen says.

But entrepreneurship isn't always easy. "Before I built credibility, it was pretty hard to be taken seriously, even by my own friends and family," Malangen admits. "We couldn't afford to invest any capital in my startup, so I had to rely solely on my talent as an innovator and charm as an entrepreneur to be able to work up some magic that would enable me to create these projects for clients with zero money."

Malangen is dedicated to staying 10 steps ahead of the game. He puts his mental energy toward thinking about what's going to be relevant 5–10 years from now, which has helped put him in a position to be a pioneer in the industry. "The age of digitalization challenges us to be constantly on our feet," he explains. "Those who evolve will continue to live, while those who don't will become extinct."

An Unorthodox Approach to Wireless Power

Meredith Perry

*Founder and
CEO*

uBeam

ubeam.com

Sometimes, taking the hard road is only the way forward.
For Meredith Perry, a 27-year-old inventor and founder
and CEO of uBeam, spending time on an incremental
improvement to technologies that existed five years ago
wouldn't be worth the time, because it wouldn't really
being adding value to the world; it wouldn't push the
envelope. What *does* push the envelope, however, is
uBeam, a technology that uses ultrasound to transmit
power over the air. Using a patented system, uBeam can
safely charge multiple electronic devices wirelessly at a
distance.

Perry studied paleobiology and astrobiology at the
University of Pennsylvania, where she served as a
student ambassador for NASA, worked on technology to
detect life on Mars, experimented in zero gravity, and
researched and published papers in astrobiology and
medicine. "I've always been very interested in solving
really hard science problems," Perry says, "which is sort
of a common denominator between astrobiology and
what I'm doing now."

The catalyst for coming up with uBeam technology was
an invention competition. "I was basically just keeping my
eye out for problems that I could potentially solve," Perry
explains. "And so (as I was) wrapping up my laptop
charger for my wireless laptop, I realized 'wait a second,
why do I need this 15-foot umbilical cord attached to my
device?' At the time I didn't know anything about
wireless power; I didn't even know it was a term. I was
just excited to figure out 'okay, is there a way that we
can transmit power through the air so that we don't need
a cord?'"

Thanks to Perry, the answer is yes. She settled on
ultrasound technology, a pretty unorthodox approach to

wireless power, and Perry says five years later uBeam is still the only company tackling this problem using a type of energy that's not on the electromagnetic spectrum. "We firmly believe that (ultrasound) is the right approach for a Wi–Fi–like experience of power, because of the safety, regulatory, and interference issues of other types of technology that could be used for wireless power," she explains.

As CEO of her company, Perry must balance her excitement about inventing something that solves real–world problems with the needs of a startup technology business, especially when it comes to developing a product roadmap. "We need to bring this technology into the world in a way that is sustainable for the company, in a way that sets a path for us to be successful down the road and not just with a quick win," she says. "So you have to balance the most practical approach to … success and value with making sure that what you do deliver first isn't just an incremental solution or a point–in–time solution that would create a dead end."

As an inventor and innovator, Perry has learned the value of time. "I came in with expectations that weren't realistic," she admits. "So with my 21–year–old brain never having created a product before and never having a job, I thought that we could easily make a product in like, four months. Five years later, you realize that's not how it works, especially when you have to invent new components."

Thankfully, Perry is up to the challenge. "Even though it has taken longer, right now is … when companies are looking to figure out 'okay, what technology is going to be the standard, what technology are we going to include in our product roadmaps over the next two–plus years?' And so I think we've got a real shot at it."

Conceiving the Previously Inconceivable

DeAnna Robear

Partner Enablement Engineer

PTC

www.ptc.com

DeAnna Robear's interest in industrial consumer products like cars and airplanes evolved into a mechanical engineering degree and, eventually, a career in the IoT. Robear first got a taste of her future when her electrical engineering professor offered a wearable electronics tutorial on the weekends, which fueled her obsession with creating new wearables and autonomous vehicles. "I became engrossed with circuit design/analysis and Arduino programming, making the need for cross-disciplinary education apparent," Robear explains. She helped form a student-run innovation lab at her university before launching into a career at PTC as an application engineer. Her current role as a partner enablement engineer allows Robear to work side by side with PTC's partners, helping them develop real-world IoT solutions.

Robear's experience so far in the space has confirmed her belief that the physical and digital worlds have converged. "I see our partners changing the way they design, manufacture, and service products firsthand," she says. "We've become a leader in driving this transformation by offering a variety of tools and solutions in the application enablement, augmented reality, and machine learning spaces. I see PTC continuing to make transformative changes that fundamentally improve the way we create and interact with our world."

The 23-year-old is beginning to form her own legacy in part by simply saying "yes" to leadership roles on available projects on her team. For instance, Robear recently led a POC (proof of concept) with Samsung and loved being able drive the outcome to fit her vision. "I design solutions that help people and products operate in a way previously inconceivable," she says. For

instance, Robear develops servicing solutions that revolutionize the way companies service home appliances and other machines using remote monitoring, machine learning, anomaly detection, and AR (augmented reality) technologies. "I think the key to being transformative in this space is to be a great listener," Robear adds. "Talking with partners, taking their feedback, and being open minded allows me to understand their challenges and subsequently use my knowledge, skills, and creativity to solve problems in new and unique ways."

Robear's path has not been without hurdles. "One of the obstacles I constantly face stems from not having been officially trained in the software space; this is especially difficult when coupled with the fact that I'm a young woman in a male–dominated field," she says. "When I first meet with a partner/customer, my credentials are often challenged; sometimes not using the right language or having the right experience has made people question my capabilities. I've been able to tackle this with the support of my amazing teammates/managers who consistently take time out of their day to coach me and answer all my questions—even the stupid ones."

By being persistent, confident, and analytical in her work, Robear has started down a path of influence in her current sphere that will only grow with time and experience. "Being an engineer has taught me to understand how 'things' work and has allowed me to solve problems in virtually every aspect of life," she says. "It has also taught me to derive motivation from the challenges I face."

Taking the Guesswork out of Autonomy

Austin Russell

Founder and CEO

Luminar Technologies

www.luminartech.com

When most people are in their 20s, they focus on building the foundation for a career, exploring the world, forming relationships that may last a lifetime, and, hopefully, having some fun in the process. Austin Russell, 22, is a few steps ahead of most, at least in the career department. Russell is the founder and CEO of Luminar Technologies, a company he started in 2012 based on his vision to raise the bar for autonomous vehicle technology.

An accomplished applied physicist, Russell began his journey at 16 by conducting independent research at the Beckman Laser Institute, www.bli.uci.edu. He attended Stanford University, but didn't graduate, instead accepting the Thiel Fellowship, which awards $100,000 to pioneering students under 23 who want to leave school to pursue other goals. After tinkering on various projects in the photonics industry, including custom 3D mapping sensors, Russell honed in on developing a new type of LiDAR (light detection and ranging) technology for the autonomous vehicle industry. The Thiel Fellowship gave him the opportunity to do so by focusing on building Luminar.

With Russell at the helm, Luminar is shooting for the stars, aiming to remove the guesswork from autonomy. Rather than taking the traditional route, Russell and his team have spent the past five years designing a new LiDAR system from the bottom up. While Luminar's system promises to deliver 40 times the laser power, 10 times the range, and 50 times the resolution of other LiDAR sensors on the market, this kind of revolutionary step forward takes time and a lot of hard work. Though it has meant spending years behind the scenes, the result is a system that can "see" farther than 200 meters at less than 10% reflectivity. For the industry, this means

autonomous vehicles equipped with Luminar's LiDAR
have more time to react safely, even at highway speeds.

Russell is dedicated to creating the safest possible
technology for the next generation of self–driving
vehicles, and the industry should thank him for it. In fact,
he says his greatest fear is that people will prematurely
deploy autonomous cars that are unsafe, and he says
some of today's cheap vehicle sensors are more suited
for a Roomba than a self–driving car. However, like a
true pioneer, Russell isn't sitting back and hoping for the
best; rather, he's doing something to qualm his fears,
surrounding himself with a team of other visionaries who
can help bring his LiDAR dreams to fruition. If Russell's
long–term vision for safer autonomous vehicles comes to
pass, roads will be safer, and society will be better off
for his efforts.

Enabling a More Connected, Sustainable Earth

*Andrew
Scheuermann*

*Cofounder and
CEO*

Arch Systems

archsys.io

He may be under 30, but Andrew Scheuermann has
already accomplished a great deal, and he shows no sign
of slowing down. Scheuermann, 29, earned a PhD in
semiconductor electronics from Stanford University, has
published more than a dozen papers, and holds the world
record in silicon photo anode efficiency. He also helped
build StartX, https://startx.com, a startup accelerator
that has invested more than $140 million across
hundreds of companies. While building StartX,
Scheuermann worked with scores of early–wave IoT
companies, giving him a unique view into early
technology attempts, including what was working and

what was missing. Thanks in part to this experience, Scheuermann says he is passionate about the IoT and its potential to enable a more connected and sustainable world.

Scheuermann has always straddled business and engineering, and, after spending a decade doing research and engineering on energy and power systems, including work on batteries, fuel cells, solar, and nuclear, he continues to do so as CEO of Arch Systems. Arch Systems builds performance sensors for legacy machines; its tech makes it significantly faster and cheaper to build new sensor systems.

The company began out of Tanzania, building cloud-connected water systems to provide clean drinking water to rural villages. "The biggest opportunity for IoT, in our opinion, is in the developing world, where new wireless low-power systems can leapfrog traditional control systems and create new connected and sustainable systems," Scheuermann explains. "Our mission is to empower innovators everywhere to design and deploy their own IoT. Nowhere will this be more pronounced than in the developing world."

As Arch's CEO, Scheuermann brings a technical background spanning silicon electronics, software, and systems engineering to the table, alongside his experience in economics and as an entrepreneur with connections in Silicon Valley. He has clear-cut goals for himself and his company for 2018 and beyond, including driving the expansion of Arch's core business in retrofitting legacy machines and joining forces with as many partners in the IoT community as possible. He says in order to be a transforming force in the IoT, it takes a careful balance of vision and pragmatism. "Industry is a child of pragmatism, but only vision can reshape it," Scheuermann explains. "If you are not completely grounded about how things are done, nothing will be transformed. Many generations of hard work, blood, sweat, and tears, have gone in to creating the efficiency we enjoy today. Yet, if you cannot bring fresh vision, perspective, and diversity to the table, we will never progress."

Already in his career, Scheuermann is in a position to help eliminate waste, master nature, and usher in a new age of intelligence and transparency. "(The) IoT can fundamentally reshape the way resources are produced, moved, and consumed on Planet Earth," he says. "We endeavor every day to fight the good fight of building new and disruptive technology, while also keeping our passion focused on building a more connected and sustainable Earth."

Democratizing IoT

David Thai

Founder and CEO

Medium One

mediumone.com

The IoT is evolving, and David Thai says innovators in the space must look at the world today and then imagine what it could be with the IoT. "(IoT) is an expansive discipline that encompasses many segments and use cases," Thai says. "Understanding the potential of IoT is key but also its innovation challenges. Discover new value, build compelling applications, create useful products. It's the difference between being a leader or a follower. You should strive to break new ground to further IoT adoption."

Thai, 40, is founder and CEO of Medium One, which integrates realtime stream processing, big data analytics, machine learning, and edge intelligence into a unified IoT platform. His goal is to create innovative products that have a real impact. "I want to be known for breaking major barriers and enabling our customers to build wonderful things," says Thai. "I want my company to play

a major role in our customers' IoT roadmaps, and if we can help them achieve their vision, I'll be happy."

Thai got his start in the semiconductor industry, designing ICs (integrated circuits) manually by handcrafting gates on silicon. After a few years in hardware engineering, he made the natural transition into software engineering where he worked at a startup revolutionizing the way ICs were designed, using intelligent software to automatically build chips. From there, he made another natural progression into AI (artificial intelligence), machine learning, big data, and cloud-based systems. By working at technology companies and startups, many on the leading edge of their industries, Thai learned how to map company value to the customer's problem by solving their issues with the latest technology. "In a market such as IoT, which is continually evolving and consists of a broad technology stack requiring broad technical expertise, it's essential to map the right value in our technology and product offering to the customer's need," he explains.

In 2018, Thai plans to focus on building awareness of Medium One's brand as an end-to-end IoT platform that is easy to implement without the overhead found in existing options. His strategy focuses on democratizing the IoT for everyone, leveraging the technology's potential, and furthering the cause of an IoT world. "I see our company as a disrupter in the way people build smart, connected products today," Thai says. "How does that transform the IoT marketplace? Well, it allows companies to focus keenly on the value their IoT product brings to the marketplace without worrying about the details of getting there. That's the job of my IoT platform. We've already answered all the tough questions they will face, from connectivity to communication, cloud to big data analytics, security to identity management, and much more. We've created a seamless experience that, for some companies, is the difference between doing IoT or not."

Even in his down time, Thai has IoT on his mind. During the years he's owned a vacation rental property, for instance, Thai has come up with several IoT-enabled ways to manage the property remotely. One of his pet projects is coming up with ways to polish these remote-

management solutions to help other homeowners do the same.

Vision, Determination, Execution

Andrew Thomas

Cofounder and CRO

SkyBell Technologies

www.skybell.com

At 33-years-old, Andrew Thomas has already cofounded an IoT company and helped it grow by closing deals with Fortune 100 companies and raising tens of millions of dollars in funding, starting with a $600,000 crowdfunding campaign on Indiegogo, www.indiegogo.com. Thomas began his career at Google, www.google.com, before branching out as a consultant providing SEO (search engine optimization) and Web/mobile design services, and then cofounding SkyBell Technologies, which pioneered the smart video doorbell.

As chief revenue officer at SkyBell, Thomas wears a number of hats that have helped the company develop a leading IoT smart home product that resonates with customers. He is in charge of identifying market opportunities and building business development relationships that create revenue. As an IoT executive, Thomas has the vision to see where the technology, the market, and consumer preference is shifting, and to develop the technologies that fit the intersection of all three.

Thomas' expectation is that his company will evolve beyond hardware and help pioneer a future in which

smart home products begin to think for themselves. "We expect to use facial recognition, AI, and machine learning to help identify trends in data sets and take action to help make homes and neighborhoods safer," he says. "You should also expect to see more solutions around home access control. We will also have more hardware to help execute that vision. So many of these products and solutions are included in the patent portfolio we've amassed, which includes 74 issued patents to date. We'll certainly continue to invent in 2018."

Success as a leader and entrepreneur is in the continual process of becoming a better version of yourself, according to Thomas, who has battled depression and says he is stronger because of it. "After living someone else's life for four years, I realized that my purpose was to be an entrepreneur and I needed to embrace my purpose," Thomas explains. "I gave up my career as a financial planner, changed my personal circumstances, and dove headfirst into self–growth. After two years, I knew in my soul clearly I needed to be a tech entrepreneur. Shortly thereafter, my cofounder presented the idea for a video doorbell and we started the next week. The rest is history. I would not be here today if I did not experience depression. It's amazing how quickly you can completely change your life."

To be transformative in IoT, Thomas says it takes a combination of vision, determination, and execution. "You must be able to see where the market is going, along with the advancement in technology. If you can see where things are going, you can be there first. Determination boils down to the ability to refuse to quit. So many people told us we couldn't make a video doorbell—and now it's (in) hundreds of thousands of homes around the world. Finally, execution is key. You must be able to execute on the process of turning vision into reality."

Thomas' inspiration comes from the idea that anyone can create anything they want to experience. "I'm inspired that I get to wake up each day, see a vision of how we can help others with our products, and then create that new reality," he says. "I'm also inspired by the opportunity of living. Life is short, and we'll regret the moments and years that we don't pursue the things that

make us happy or feel empowered. I'm empowered when
I'm creating. That's what drives me every day."

Changing the Paradigm in Transportation

Dan Work

*Associate
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*Dept. of Civil
and
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Dept. of
Electrical and Computer Engineering, and the
Coordinated Science Laboratory, University of
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If the IoT is going to disrupt society in all the positive
ways it's expected to, Dan Work says the industry will
need a diverse set of ideas and perspectives. Academia
can help provide this diversity, and Work believes
academia will play a role in helping the IoT fully realize
its potential. "I think there is an important role for
academics to play to prepare the next generation of
engineers for the IoT future they will be responsible for
further advancing," he says.

Work, 34, is currently an associate professor in Civil and
Environmental Engineering, Electrical and Computer
Engineering, and the Coordinated Science Lab at the
University of Illinois at Urbana Champaign. Before
joining the university in 2010, Work spent time at
Microsoft Research and Nokia Research Center Palo Alto
as a guest researcher. His early work at Berkeley and
Nokia included the development of the first smartphone–
based traffic monitoring system, which was the
precursor to the traffic/navigation apps that are widely
available on smartphones today.

Recently at the University of Illinois, Work's team was the first to experimentally demonstrate that the introduction of even a relatively few self-driving cars may bring benefits to the overall traffic flow long before the full vehicle fleet is automated and connected. He hopes this is a precursor for the next generation of traffic management in an era of connected and automated vehicles. "Broadly, my team develops methods to improve transportation systems by exploiting the rapid advances in sensing, communication, and computing that are now becoming integrated into our physical infrastructure," Work explains. "The sea change is occurring with the introduction of vehicular automation and connectivity, shared mobility systems, and large-scale urban sensor networks. We leverage these trends to understand and improve how people and goods move at societally significant scales."

Work's goal is to better understand the feedback loops between the deployment of IoT technologies and the people who they are ultimately designed to serve. "This is particularly urgent with the deployment of self-driving cars, which have (the) potential to fundamentally alter total vehicle miles traveled, congestion levels, mode choices, and urban planning," he says. "We know transportation IoT technologies will eventually be deployed, but predicting how we will respond individually and as a society is a hard problem we need to be exploring."

In the IoT, Work says it's imperative to surround oneself with creative, innovative people. "The technical skillset is becoming so large that it is impossible for one person to see and understand the full picture," he says. "I was very fortunate to work with visionary researchers at the time when mobile phones were just beginning to go through a similar disruption (to what) we are seeing now in the transportation IoT space. The mix of industry and academic perspectives helped me see the value of working on both theoretical and practical research problems that are necessary to change the paradigm."

Work recognizes and appreciates the importance of timing when it comes to changing a paradigm. "Timing matters," he says. "If you are too early, the environment might not be right to adopt a good idea, or the

technology might not be mature enough to build something substantial. If you are too late, someone else will eat your lunch."

By Connected World Staff | 12/1/2017

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