IEEE Spark

IEEE

ENGINEERING INSIDE:

2016 ISSUE 4

WEARABLES

Wearing Your Tech on Your Sleeve

November 2016

by Robin Hegg

Imagine a world where the clothes and jewelry you wear play a role far beyond keeping you warm or making you look good. Imagine that on top of this, your accessories let you know when you were receiving a phone call, tell it's time to leave for an appointment, warn you that the area you were in might trigger an asthma attack. With wearable technology, all of this—and more—can be possible.

Meet Dr. Katrin Reitsma!

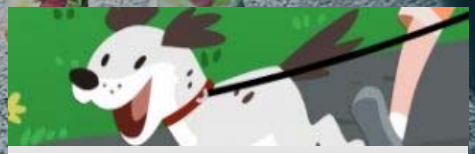
November 2016

Dr. Katrin Reitsma has over 15 years of Research & Development experience in industry, government, and academia and is a proven innovator with 8 US patents, many international publications and contributions to wireless & mobility standards. Her general research interests are cyber security and cryptography and she currently works on user friendly solutions to secure all kinds of connected devices.

Explore VR with Anaglyph 3D Technology

November 2016

Anaglyph technology, like that used in 3D movies, uses stereo images that are encoded using different colors. 3D glasses with different colored lenses filter the images, allowing each eye to see a different image. In this activity, you will make your own 3D glasses and create a 3D image using anaglyph technology.



Dog Trainer

See what the Spark crew is up to in this issue!

IEEE Spark Challenge

Think you know IEEE Spark? Test your knowledge of engineering, computing and technology with the IEEE Spark Challenge! Answer questions correctly to help your team move to the top of the leaderboard.

TIPS AND ADVICE

Explore Wearables with Hands-On Kits and Camps

Want to try making your own wearable device? There are kits that can help you build or program your own wearable.

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IEEE SPOTLIGHT

Sharing and Securing Wearable Tech

The IEEE and its members have been at the forefront of wearable technology.

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Imagine a world where the clothes and jewelry you wear play a role far beyond keeping you warm or making you look good. Imagine that on top of this, your accessories let you know when you were receiving a phone call, tell it's time to leave for an appointment, warn you that the area you were in might trigger an asthma attack. With wearable technology, all of this—and more—can be possible.

Wearables include clothing and accessories that incorporate electronic and computer technologies. Since they are worn on the body, wearables require the integration of design, fashion, and technology at a whole new level. In addition to connecting us to our smartphones in a more seamless and unobtrusive way, wearable tech combines technology with fashion in a whole new, sometimes whimsical, way. The **Hug Shirt**, designed by **CuteCircuit**, allows one wearer to feel what another wearer is feeling. The **HB Ring**, designed by TheTouch, allows you to see and feel the heartbeat of your partner who is wearing the connected ring. CuteCircuit also created costumes for singer Katy Perry that featured LED lights so the outfits could change color during her concerts.

Wearables are growing quickly in popularity, with sales picking up speed in 2013. Much of wearable technology is able to piggyback on existing smart phone technology, meaning new and smaller tech companies are able to create wearable tech, speeding innovation and growth. According to a 2014 report, one out of five American adults have a wearable device, and experts predict that by 2018 there will be more than 780 million wearable devices, worth more than $8.36 billion. Excitement for wearables really began with the creation of Google Glass.

While Glass and other optical head-mounted display technology never did take off (because of a high price point and, perhaps, a society that wasn't quite ready to accept it), smart watches and activity trackers have become very popular.

All areas of our lives may soon be affected by wearables. They can streamline everyday data and impact healthcare, athletics, safety, education, and work.

IN THIS ISSUE:

In this issue of IEEE Spark, get connected to the wonderful world of wearable technology. Meet a wearables security engineer, design your own 3D glasses, learn how IEEE is advancing the field, and jump into wearables camps and online activities.
Read this issue!

Some wearables, like smart watches, serve as miniature versions of your smart phone. They alert you when you have a phone call, text message, or email, delivering you the data you need right where you are, saving you the time and disruption of checking your phone. Predictive technology, like Google Now, can also offer up data before you ask for it. It can tell you when you need to leave to get to an appointment, send you directions, and offer a list of places to eat when you get there. Other, more streamlined wearables, can deliver only specific smartphone notifications without even requiring a screen. The **Embrace+** is a bracelet with LEDs inside it that flashes a different color depending on the type of notification. It might flash red for a call from your mom, or blue for a text message from your best friend.

GOOGLE GLASS

Wearables have been widely embraced by athletes and people trying to increase their fitness. Fitness trackers like **Fitbit** and **Nike+** devices have become hugely popular. These devices use sensors to provide users with feedback on their workouts and their corresponding apps allow them to track and share their progress. Nike+ also has shoes with sensors that can measure speed, jumps, and more. **Under Armour** created a shirt with a removable biometric sensor called the E39. It measured heart rate, speed, acceleration, power, and G-forces. The shirt was too expensive and never took off, but the company continues to work toward athletic wear that can track performance and provide feedback. In January of 2016, Under Armour announced a $400 kit with a scale, wearable activity tracker, and chest strap, all of which connect to their apps.

In addition to providing performance feedback, two head-up displays designed by **Recon Instruments** allow users to access their smart phones without having to stop their activity. **Recon Snow** is a heads-up display for skiers and snowboarders that shows speed, altitude and vertical descent. It can use its built-in GPS to show the user's location on a resort map, and be used as a camera. Bluetooth also allows the user to answer phone calls, view text messages, and play music. A similar device called **Recon Jet**, designed for cyclists, uses voice control and gaze detection to allow hands-free use. With wearables providing this kind of complex performance data, coaches and athletes can improve training, evaluate fitness, and set goals.

Beyond fitness, wearable technology is already impacting healthcare and promises to change the way patients track their health and communicate with doctors and health insurance companies. Wearable devices and smart fabrics can track vital signs and even warn users of potential health risks, like increased stress or environmental allergens and pollutants. Wearables are already being used to help the hearing impaired through smart hearing aids and the visually impaired with smart shoes. Smart fabrics may even be able to analyze body fluids through non-invasive biochemical sensing. This technology can be incredibly helpful for those users with ongoing health problems and can also provide security for those whose health and safety requires monitoring. Ambient assisted living tools can allow those who might otherwise need to be living in a nursing home to live more independently while still having their health closely monitored.

Wearables can increase safety in other ways as well, particularly when it comes to children. Wearables have been invented to track missing children, with dormant technology that is activated in an emergency. Two-way communicating

watches can also provide young children with a safer, more limited alternative to a smart phone. These watches allow parents to see where their children are and to know they can reach their children, but strangers can't.


GOOGLE EXPEDITIONS

Wearable technology will change the way we learn and work. Programs like Google's **Expeditions** can allow children to experience virtual field trips. And software has the potential to allow more personalized education, with programs adapting themselves to the learner's pace and providing useful feedback. Industrial wearables are changing the way manufacturing works, managing and monitoring workflow, supply-chain logistics, maintenance, and employee safety.

The popularity of wearables has increased the need for materials engineering and e-textiles. The development of smart fabric—fabric that performs or responds in a new way—promises to bring wearable technology to a new level. By weaving self-charging sensors into garments, it's possible to have clothing that can monitor vital signs or environmental factors. Fabric could also be developed that doesn't need to be washed, respond to its environment by changing color, or kills bacteria. Making sure smart fabrics remain washable and don't get too expensive presents a challenge, however. Engineers are looking to the printed electronics industry to see if they can use advancements in electronic ink technology to develop smart fabric. **DuoSkin** is a paint-on temporary tattoo developed by MIT Media Lab and Microsoft Research. It includes circuitry that turns the tattoo into an on-skin interface. Made from gold leaf and using near-field communication, it works as a trackpad, a display, and can hold data. DuoSkin has the potential to respond to your body and could replace things like movie tickets and boarding passes.

Wearable technology presents engineers with a number of new challenges. Wearables require long battery life, need to be small in size, and costs must be kept down. But possibly the greatest challenge is the need to combine technology and fashion. For the first time, tech companies are competing with fashion companies in areas like jewelry, wristwatches, and glasses. Since wearables are displayed on a user's body, they need something people want to be seen wearing. Beyond being pretty, they need to be fashionable. This means they need to be not only socially appealing, they need to appeal to a person's desire to appear unique. Apple has already hired executives from Burberry, Levi Strauss, and Yves Saint Laurent.

The other major challenge when it comes to wearable tech is security. Wearables collect a large amount of personal data, which is often networked and even integrated with social networks. Wearable data could be used to pinpoint a user's location, learn about their health, or even judge their credit worthiness. Because of the relatively small size and low price point of wearables, strong security measure can be hard to implement. And as with all Internet of Things devices, wearables will create an incredibly large amount of data that will need to be managed and secured.

Wearables are already providing us with data that has the potential to improve our health, our productivity, our education, and our performance. They're moving our connected lives away from smartphones and into the real world, putting the information we need right where we need it. It's integrating with fashion, adding function to our accessories and style to our technology. As

wearable technology grows, it's possible that these devices may soon move from being worn on our bodies to being embedded or implantable inside our bodies, integrating technology, the internet, and big data into our lives on a whole new level.

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ENGINEERING INSIDE:

WEARABLES

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Meet Dr. Katrin Reitsma!

November 2016

DR. KATRIN REITSMA

Dr. Katrin Reitsma has over 15 years of Research & Development experience in industry, government, and academia and is a proven innovator with 8 US patents, many international publications and contributions to wireless & mobility standards. Katrin received her PhD degree in Electrical & Computer Engineering from the University of Waterloo, Canada and her MASc degree in Electrical Engineering from the Ruhr University in Bochum, Germany. Katrin worked as a Guest Researcher at the National Institute of Standards and Technology (NIST), Gaithersburg, MD. She joined Motorola Labs in Schaumburg, IL in 2009 and is now a distinguished member of the technical staff in Motorola Solutions Chief Technology Office in Chicago. Her general research interests are cyber security and cryptography and she currently works on user friendly solutions to secure all kinds of connected devices.

Why did you choose to study the engineering field?

My favorite courses in high school were math and physics. Knowing no engineers at this point in my life, I naturally assumed that I would become a math and physics teacher. However, in my last year in high school I attended an event hosted by the electrical engineering department of a university. While there, the dean talked about how engineers APPLY math and science to solve real world problems, improving our quality of life, expanding humankind's horizon and sometimes even saving lives. This suddenly gave my love for math and physics a purpose and I was "sold".

Do you have a simple definition of "wearables"?

Generally speaking, I consider "wearables" as any device that is worn on a body (human, animal, or even robot) and is able to communicate with the outside world via another more powerful device that is connected to the wearables via a short-range wireless link like Bluetooth. Wearables can be simple single-purpose sensors such as a body worn heart rate monitor periodically reporting vitals to a host device; or a more complex multi-purpose smart device such as smart

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Motorola Digital Evidence Management Solutions
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Motorola: High-tech future for police includes smartbelts and drones
Wikipedia: MacGyver

EDUCATIONAL BACKGROUND:

PhD, Electrical & Computer Engineering, University of Waterloo
MASc, Electrical Engineering, Ruhr University

ADVICE TO STUDENTS:

Try to actually build some of your ideas. Sensors, development boards and mobile devices are relatively inexpensive and open source software tools are widely available. Start with a concrete problem, then solve it. Keep it simple. Show your prototype to your friends and improve it based on their feedback. Then bring your prototype to your next job or internship interview and talk through your design process.

watches that have some stand-alone functionality but are still connected to more powerful devices for full functionality as well as data storage & analysis.

Can you please describe the work you personally do, especially as related to "wearables?"

I am a security research engineer, and as such I perform threat analyses of products and solutions, e.g., to identify vulnerabilities that could be exploited by an attacker to gain access to sensitive information or to shut down a service in a denial of service (DoS) attack. Here it is important to determine the likelihood and impact of each attack to appropriately prioritize the implementation of mitigating steps (Note: there are no 100% secure solutions). In addition, I help designing new secure products, to ensure security is build in from scratch and not just as an afterthought. With respect to wearables it is very important to ensure that secure links are established between wearable(s) and host device(s), which often requires the successful authentication of both (all) devices to each other. This sounds easier than it often is, e.g., a malicious device/user could "pretend" to be an authorized device. All data collected on a wearable need to be securely communicated to host device, which often requires the communication to be encrypted. Finally, all data stored on a wearable need to be protected which is often challenging given the resource constraints of many wearables. As a result, security engineers like me design and oversee the secure implementation of authentication, key establishment and encryption protocols to protect wearables.

What do you love about engineering?

I love that no project is ever the same. Every problem has a different solution depending on customers' specific work environments (try using a smartphone in a burning building), expectations (such as usability even in high stress situations, like a foot chase), and requirements (e.g., collecting massive amounts of data while meeting privacy regulations). Sometimes I work on improving existing solutions, but my favorite activity is exploring new ways to solve a problem, e.g., by leveraging emerging technologies from another field.

How did you first get involved with wearables….was there a project of effort that kickstarted your focus in this area? Share a project or inspiration with us please that prompted your involvement…

At work, we envision the Police Officer of the Future, a future concept that uses a number of body worn sensors and devices to enable them to do their job more efficiently and safely. The team is very diverse (User experience designer, RF engineers, data analysts, SW developers, etc.) and my role as a security engineer is to make sure that all data is protected. For example, we have been working on body-worn cameras. Here it is important that video streams are securely uploaded to a server such that the video can be used as digital evidence. This and other data collected by wearables used in Public Safety need to be protected such that data cannot get lost, fall into false hands or get tampered with. Other wearables for the police officer of the future include bio monitors that can report officer's vitals to the control center (e.g., to trigger an alarm if an officer is in distress), smart glasses offering an augmented reality view (e.g., to automatically scan license plates in view), and gun holster sensor to record events whenever the gun is drawn and trigger an appropriate response such as sending back up. All this data is sensitive and, thus, needs to be protected.

MOTOROLA SOLUTIONS CONNECTED POLICE OFFICER OF THE FUTURE WITH MANY WEARABLES. @MSI 2016

Can you explain a little about how you think wearables will impact everyday products or the world in general?

Right now, consumer wearables are mostly smart watches and bracelets used for tracking physical activities and fitness. However, as with a lot of popular technologies, wearables will become cheaper, smaller, smarter and, with the advent of new applications, more ubiquitous. In the future wearables will be used by everyone everywhere in an intuitive way (i.e., we won't sometimes even know that were are interacting with them). We are still in what I call an exploratory phase where we play with what can be done, before we start working on what should be done. One current trend is to make wearables smarter, so that they provide stand-alone functionality, e.g., smart watches work even in the absence of a smartphone now. A natural progression of wearables are implantables or even things that we swallow.

Is there a particular application or industry that you think could benefit the most from wearables in the future? Medical, entertainment, security?

Healthcare and elderly care are fields that can immediately benefit from using wearables by providing a cost efficient way to remotely monitor health. In the security space, wearables can be used to make user authentication more user friendly and sometimes even stronger. For example, whenever a known smartwatch is in proximity of a user's smartphone the screen does not lock because it can be inferred that the user is also in close proximity. Vitals recorded by my smart wristband could be used as a biometric authentication credential that authenticates me to unlock my laptop. Other body worn sensor can be used to open physical locks like doors that are equipped with the counterpart device that recognizes the signature of my sensor. Ideally user interaction is kept to a minimum.

What are the current challenges to advances in wearables technology?

The biggest hurdle is not necessary technical but rather creating a good user experience. For example, I love the idea of "living" in an augmented reality as long as it doesn't involve wearing awkward looking glasses that constantly need to be recharged. In addition to the form factor, it is important to find user friendly non-intrusive and safe ways to interact with wearables. For instance,

looking down at a screen or interacting with a touchscreen may be disruptive or even dangerous in many situations. This is why I work on so-called "eyes up, hands free" solutions to keep our customers safe.

Whom do you admire and why?

KATRIN REITSMA AT THE MOTOROLA SOLUTIONS FIRE TRAINING AT THE ILLINOIS FIRE SERVICE INSTITUTE @KATRIN REITSMA 2016 (USING MOBILE COMMUNICATION EQUIPMENT IN REAL EXTREME CONDITIONS)

MacGyver (an American action-adventure television series character) is my childhood hero because he did not use any weapons but rather his knowledge of science and real-time problem solving skills to get out of difficult situations, often times only using duct tape, a swiss army knife and anything else he could find in his immediate surroundings. A true engineer!

How has the engineering field changed since you've started?

Even though we had some major shifts in technology since I went to grad school, I feel the biggest change is how we use technology and how we interact with it. So for example, just because I understand how social media apps work (using some pretty old Internet protocols), doesn't mean I get why we need video chats with strangers 🙂 While you constantly need to keep up with new technologies, it's all strangely familiar. The key is to be able to recognize how a known technology can be applied to a new field or application. This is much more often the case than is inventing something completely novel.

Additionally, the number of women in engineering is still disappointingly low. I was hoping this would change much faster, but just as when I attended university twenty years ago, women are still a minority in most STEM fields.

What's the most important thing you've learned through your work with wearables?

The hardest thing is interoperability because we cannot simply design a solution from scratch and assume a single vendor will provide all pieces of the ecosystem. A lot of wearable technology is already available today but most of it does not necessarily work with each other out of the box. For this reason, standardization of protocols and interfaces is paramount to drive more use cases.

What advice would you give to recent graduates interested in working to develop improved wearable technology in the future?

Try to actually build some of your ideas. Sensors, development boards and mobile devices are relatively inexpensive and open source software tools are widely available. Start with a concrete problem, then solve it. Keep it simple. Show your prototype to your friends and improve it based on their feedback. Then bring your prototype to your next job or internship interview and talk through your design process.

If you weren't in the engineering field, what would you be doing?

I would be a psychologist, at least that was my second choice when I finished high school. I think I would always do something that requires problem solving.

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Explore VR with Anaglyph 3D Technology

November 2016

by Robin Hegg

With advances in computer graphic technology and the development of quality, affordable head-mounted displays (HMDs), Virtual Reality (VR) headsets (like the Oculus Rift, HTC Vive, Samsung VR Gear, Microsoft HoloLens, and Playstation VR) have become a modern reality. Virtual reality uses software to create realistic environments using images, sounds and other sensations in a way that allows the user to interact with the environment. VR headsets use stereo images to create the illusion of three dimensions. This means the headsets are projecting two different images, one to each eye. Just like our eyes view each real-life object from slightly different angles, stereo images allow otherwise flat images to be viewed differently by each eye. Our brains put these two images together creating the illusion of three dimensions.

Anaglyph technology, like that used in 3D movies, uses stereo images that are encoded using different colors. 3D glasses with different colored lenses filter the images, allowing each eye to see a different image.

In this activity, you will make your own 3D glasses and create a 3D image using anaglyph technology.

Materials

Cardstock or cardboard

Scissors

Acetate/cellophane in blue and red

Or, clear acetate/cellophane

Permanent markers in blue and red

Tape

White paper

Black pen

Three clear transparency sheets

Steps

DID YOU KNOW?

Considered one of the first wearables , the abacus ring, developed in 17th century China, allowed one to do simple calculations without paper.

Google Glass is being used to help children with autism understand how to read emotion.

The Pebble Time smartwatch raised 20 million dollars in funding on Kickstarter, the highest to date.

FIND OUT MORE:

You can also visit **TryEngineering.org** to explore other engineering activities and resources. Additional activities and lessons can be found **here**.

1. Create your own 3D glasses (or skip this step if you already have some). Draw the shape of a pair of glasses on the cardstock or cardboard. Use your scissors to cut out the shape and cut out two holes for your eyes.

2. Cut out circles of the acetate to make lenses to cover the holes in your glasses. You will need one red lens and one blue lens. If you have clear acetate, use the permanent markers to color the circles of clear acetate.

3. Use the tape or glue to attach the two circles of the colored acetate to your glasses. Attach the red acetate to the lens that will cover your left eye and the blue acetate to the lens that will cover your right eye.

4. Decide on a simple image that you'd like to to convert into three dimensions. Draw the image in black on the white piece of paper.

5. Next, you'll be creating the stereo images in two different colors. Place one of the transparency sheets over the white paper and trace over your drawing with the red permanent marker. Repeat this step with a new transparency sheet and trace the image with the blue marker.

6. Place the two transparency sheets on top of one another so the images overlap exactly. Look at the image with your 3D glasses.

7. Slowly move the images apart and watch for when the image "pops" into 3D. When the image appears to become 3D, stop and measure the distance between the two images. Try moving the images apart in both directions and see what happens.

Questions

1. How far did you have to move the images apart before the 3D effect took place? What do you think is the significance of this distance? What might it correspond to?

2. Did moving the images apart in the other direction change the effect? Why do you think that is?

3. If you turn your glasses around so the colors are on the opposite eyes, do they still work the same? Why do you think that is?

4. How do you think anaglyph technology relates to computer-generated virtual reality environments? How does what you learned about 3D glasses relate to VR headsets?

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Explore Wearables with Hands-On Kits and Camps

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Want to try making your own wearable device? There are kits that can help you build or program your own wearable. Or, if you want a more immersive experience, check out a tech camp or workshop to give wearable design a try.

Jewelbots are a modern take on friendship bracelets. They are powered by **Arduino Gemma** microcontrollers, allowing kids to program the bracelets themselves. The bracelets can alert the wearer when one of their friends is nearby and lets friends send each other secret messages.

The **Fiat Lux Kit** allows you to create and program your own device. The kit's microcontroller features an on-board buzzer, Pixelite, push-button, photocell, on-off switch, and LED indicators.

Tech camps can be a wonderful way to get hands-on experience while working with experts, making friends, and maybe even gaining a mentor.

Digital Media Academy, which holds camps through the United States and Canada, hosts a camp called **Wearable Tech and Fashion Design Made by Girls**.

JC Fab Lab, based in Jersey City, NJ, hosts a camp called **Textiles, Wearables & Accessories Camp**.

Kristen Railey, a mechanical engineer who runs **Girls Who Build**, runs workshops for high school girls at MIT's Lincoln Laboratory. In 2014, she hosted the Girls Who Build: Make Your Own Wearables workshop and plans to run the workshop again. You can also follow Girls Who Build on **Facebook** or **Twitter** to learn about more opportunities.

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Sharing and Securing Wearable Tech

November 2016

by Robin Hegg

The IEEE and its members have been at the forefront of wearable technology, working to share advancements and research, highlight security concerns, and develop standards for wearable development, communication, and security. In June of 2015, IEEE published a **special report on wearables** and in February of 2016 it released a report entitled WearFit: Security Design Analysis of a Wearable Fitness Tracker. In this report, the **Center for Secure Design** examined how the top 10 software design flaws can be approached using a made-up wearable fitness tracker (the WearFit) as an example.

The **IEEE Systems, Man, and Cybernetics Society (SMC)** started a **Technical Committee on Interactive and Wearable Computing Devices**. They state that IWD (interactive and wearable device) is "very multi-disciplinary" with research areas including "user interface, multimodal interaction, smart sensors and actuators, body area networks, mobile computing, ambient intelligence, communications, user safety, security, minimization, and others." The committee aims to provide a platform for researchers and developers to collaborate and exchange research and ideas.

The IEEE **Engineering in Medicine and Biology (EMB) Society** started a **Technical Committee on Wearable Biomedical Sensors and Systems** to promote the field of wearable and implantable body sensors within the biomedical community. In addition to providing content about wearable biomedical technology and organizing conferences and workshops, they also assist international governing bodies on standards for use and acceptance of wearable biomedical sensors and systems.

In 2015, the IEEE Computer Society hosted the **Rock Stars of Wearables** event in Austin, Texas. The event brought together experts in wearable technology to discuss the future of the industry and how it will affect our daily lives and potentially disrupt our current technology systems and habits.

The **IEEE Standards Association** also works to develop standards for the emerging wearable technology industry. Standard **P360**, "gives overview, terminology and categorization for Wearable Consumer Electronic Devices (or

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Wearables in short). It further outlines an architecture for a series of standard specifications that define technical requirements and testing methods for different aspects of Wearables, from basic security and suitableness of wear, to various functional areas like health, fitness and infotainment etc.”

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IEEE Spark Challenge: Wearables

Think you know IEEE Spark? Test your knowledge of engineering, computing and technology with the IEEE Spark Challenge!

1) Wearables have applications in:
    a. Sports
    b. Education
    c. Fashion
    d. Communication
    e. all of the above

2) Which professional organization developed the wearable standard P360?
    a. ASCE
    b. ASME
    c. IEEE
    d. NSTA

3) Which is not a challenge of designing wearables?
    a. Battery life
    b. Size
    c. Stylishness
    d. Security
    e. All are challenges

4) Technology that can offer up data before you ask for it is known as:
    a. Crystal ball technology
    b. Forecasting technology
    c. Predictive technology
    d. Inferential technology

5) Wearables available today can tell you what another person is thinking.
    a. True
    b. False

6) Fabric that performs or responds in a new way is known as:
    a. Flexible fabric
    b. Wireless fabric
    c. Future fabric
    d. Smart fabric

7) Which pop star partnered with CuteCircuit to develop color changing concert costumes?
    a. Lady Gaga
    b. Katy Perry
    c. Beyoncé
    d. Rihanna

8) Wearables can analyze bodily fluids such as sweat.
    a. True
    b. False

9) Potential applications of wearable tech tattoos include:
    a. Medical monitoring
    b. Serving as your airplane boarding pass
    c. Paying for your lunch
    d. Fitness tracking
    e. all of the above

10) Wearables can let another person send you a hug that you can feel.
    a. True
    b. False

IEEE Spark Challenge: Wearables
Answer Key

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