



**Smart Fabrics PROGRAM**  
with E-Textiles Workshop  
Advanced Textiles Conference  
Begins Sept. 26  
Show Floor | Sept. 27-29

**IFAI** Industrial Fabrics Association International

E-Textiles, Sensors, Communications for Medical Wearable's

William J. Miller



LEARN MORE

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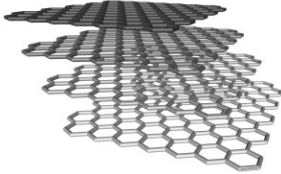
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### What is Graphene?

- Will Graphene disrupt the textile industry?
- A truly amazing advanced material



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### Graphene

- It is a Carbon 2-dimensional nano material
- Amazing that it came from pencils
- However, requiring special manufacturing
- It has taken time to make it in bulk
- However, new products will be coming on the market

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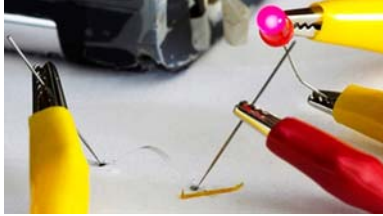
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### Graphene-coated fibers make a good fit for wearable electronics



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### Graphene dress



- The fibers can now be a dress  
– Photonic Spectra Magazine  
Sept. 2017

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### Low Level Laser Neural Vibration Detection



- Graphene enables healthcare monitoring and treatment



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**Graphene capabilities**

- Allows a battery to be recharged in seconds
- Fabric hundreds of times stronger than steel
- The fabric can be extra light
- The sensors are part of the fabric
- The antenna can be the fabric
- The fabric can even automatically change color and shape with incredible flexibility
- It can even be invisible

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**Graphene fabrics**

- Now you can monitor your condition
- Power devices such as a heart monitor
- Low power batteries can be used
- Fabric integration is an excellent application for medical wearable
- E-Textile integration is coming

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**Protect your Privacy**

- With this incredible capability you must be even more aware of your privacy
- The vulnerabilities in today's IoT devices for healthcare applications must protect your personal identity
- It must be able to share data with your doctor or care provider

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## IEEE Standards

- IEEE P1451-99  
IoT Harmonization
  - Offers a means to bridge devices with different protocols via a federated service
- IEEE P21451-1-4  
XMPP Smart Transducer Interface
  - Offers instant sensor messaging
  - And a means to protect your privacy
  - As well as share your sensor data

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**Thank You!**

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