AATCC California Chapter Technical Section Meeting-Wearable Technology

March 13, 2019  6:00 PM at Levi’s in San Francisco

Start of Meeting 6:18 PM

Introductions by Trish Hayes-Danitz-AATCC California Section Wearable Technology Pillar Chair

- Gus Jones
  - Technical Service Consultant for Dupont
  - 12 years’ experience across the printed electronics value chain
  - Has led a variety of projects including Nano Silicon inks for photovoltaics
  - Most recent project has included application engineering for Dupont IntexarTM for fitness, heating, and healthcare applications

- Meg Grant
  - Creative Soft Circuit Technologist at BeBop Sensors
  - Worked with Google’s Project Jacquard in 2013
  - Currently working at BeBop sensors, a Berkeley startup, which specializes in textile-based pressure sensing technology

- Valerie Root
  - Senior Environmental Health and Safety Specialist
  - 10 years in hazardous waste management expertise
    - Supports clients in end of life waste management and practices for Biomedical and other industries

Presentations

- Gus Jones-Technology at Dupont
  - 80 years in the textile industry working on materials such as Nylon, Kevlar, etc.
  - Highly involved in electronics
    - Not many consumers know this
  - 95% of smart devices
    - Electronic materials
  - Allows you to put wiring in to allow functionality in smart garments
    - Two films
      - A conductive paste, heat transfer, the inks are screen printed
      - Manufacturing ready
      - It’s washable and fabric like (has hand feel/drape)
      - Two silver inks
      - The carbon sensor acts as a protective layer in the sensor area
      - Base film used to heat press
        - Seam tape
        - TPU film used for washing and environmental protection
  - Electrical Performance
    - There is a change in resistance when stretched
    - Regular wire has no stretch
      - Resistance-no change
    - Dupont materials-the ink moves
      - Allows for stretch and conductive polymer ink
- Washable
  - AATCC 135 cold wash, air dry
  - After 50 washes, it had minimal increase

- 3 Markets
  - Fitness
    - Bodyplus
    - Sports bras, men’s shirts
    - Silver pads to make body contact
    - Silver trace in center, makes connection to a dock
    - Tracks heart rate and sends information to phone
  - Heat
    - Ralph Lauren Winter Olympics
    - Carbon used as a resister and gives off heat
    - Usually a waste product, but was useful in this garment
    - By 160 seconds, the whole panel heats up
    - Maintains heating profile up to 2,000 cycles
  - Health
    - Owlet Brand
      - Connects with expectant mothers with their children

- Questions?
  - When washing items with the silver particles in them, how does it react with our water?
    - The silver particles and resin stay together and on the TPU, so there is no free silver to enter water system.
  - There is an increase in resistance over washes, why is it increasing?
    - The particles are not washing off, but more of a mechanical damage.
    - Tested with Heat? AATCC 135
      - Yes, survives up to 25.
  - Can you build batteries in textiles?
    - No screen-printed solution for batteries. You can put a battery pack into a garment. High power applications can use wiring.

- Meg Grant Presentation
  - E-Textile Product Developer
  - LED Matrix
    - See-through-me garment
      - Simulates the look of light being shined through you
  - Automate work?
    - Conductive lace, press on lace sensor and a poem is read through speakers.
  - Optic Fibers, stripped coatings, to pull light from the environment, tiny solar panel and the end bundles, generate some electricity
  - TE Connectivity
    - Project Jacquard with Google/Levi’s
    - Commuter jacket with sensor embedded in the sleeve
      - Allowed the used to make phone calls, swipe music, etc.
  - Seismic Inc.
    - SRI International’s robotics program developing powered clothing
    - Developed for DARPA, soldiers to carry things longer.
• Electro-mechanical muscles across the body, helps support walking.
  o BeBop Sensors
    • Textile-based pressure sensing technology
    • Textile in circuit, you can measure deformity
    • Example:
      • Car seat- measure pressure, fatigue and who’s been sitting in the seat
      • Can be used in shoes/sports apparel industry
      • Data glove—was recognized in Time Magazine as product of the year in 2018 in that category

  o Textile Waste/Environmental Affects
    • As developers, we need to start thinking of this
    • Institute for the Unstable Media
      • E-waste topics provided by Andrea’s work
        o Annual used apparel waste estimated at 16M tonnes
        o 95% of landfill textiles could be recycled or reused
        o Smartphone production tripled from 2000-2014
        o Worldwide E-waste volumes expected to surpass 65M tonnes in 2017
        o Design phase impact: waste prevention by design is a far better strategy than end-of-life treatment and recycling
          • Amount of materials
          • Choice of materials
          • Scarcity and “special waste”
          • Copper is 1.4% of the eco-costs of silver
          • Secondary effects: aluminum, PET, etc.

  o Questions
    • The question of privacy in these products?
      • Data is a resource and the user should be able to choose to share, not mandatory.

• Valerie Root Presentation
  o Senior Environmental Health and Safety Specialist
  o Experience in hazardous waste
    • Universal waste is a subset of hazardous waste, which includes electronic waste
      • Toxic metals such as lead and mercury
  o California E-Waste Regulations
    • Electronic Waste Recycling Act 2004
      • A program for consumers to return, recycle and ensure safe and environmentally sound disposal of electric devices
      • When you purchase a TV, you pay $6-$10 for the disposal fee
  o Purpose of E-Waste Laws in CA
    • To limit the amount of toxic substances in certain electronic products sold in California
    • To establish a funding system for the collection and recycling of discarded covered electronic devices
  o Recycling Electronics
    • Take it apart and remove batteries
      • Take this into design thoughts
- Shredding/granulating
  - Consider the Source
    - Toxic In-Toxic Out
      - Is the material recycled/recovered or now?
      - Is there a lower hazard alternative?
      - Is it manufactured in a safe way?
      - Is it necessary?
  - Questions
    - What are the most hazardous materials?
      - Lead and Mercury (soil, atmosphere)
      - Circuit Boards, screens
      - Disposal-certified recycling-using acids
    - What do you do with biohazard/medical waste?
      - Blood/infectious items/chemo drugs/pharma items
        - Needs disinfected with bleach and put down the sewed
      - Solid waste put in red bags and incinerated
    - Any long-term research done on lead from e-waste that accumulates in the body?
      - Studies are done through blood.
      - Lead levels are currently down, especially when less present in our environments
        - No more lead in paints, gasoline
    - Any companies that design backwards with the end in mind?
      - Example is Patagonia!
  - Panel Discussion
    - Are there any AATCC Committees looking at environmental waste?
      - Sustainability Pillar-recycling/reducing
      - Carol-2019 conference focused on soil/sea in October
        - Regenerative farming
    - What methods are still needed to evaluate E-textiles?
      - Everyone has slightly different needs
      - One standard published EP13
    - Hemp legalization and usage in textiles?
      - The processing of hemp is higher and uses more water
      - HIGG Index is a resourceful tool (MSI)-free
        - You can compare materials on there
    - Privacy in medical devices?
      - Data shouldn’t be stored on that specific device but uploaded to a cloud
      - Designed for theft
        - Example
          - Temporary data tattoo that monitors the baby during pregnancy
            - Who owns the data? Women or hospital?
            - Many medical device companies comply heavily with HIPA
    - I know certain machinery has had to be utilized in order to execute a new process (i.e. to make the lace that read a poem), but how often is a whole new machine needed in order to create a new process that is effective?
▪ Machinery is built very often, usually in house and on the spot in order to create new processes.
  o April 15th Student Engagement Pillar Chair Meeting
    ▪ Students interviewing Textile Sustainability Professionals
  • End of Meeting 8:01 PM