

IEEE Sensors 2013 Industrial Panel:

Wearable Sensors

The Good, The Bad, and The Alluring ...

Session Goal: To facilitate a discussion between Industry and Academia about the future, challenges and promise of wearable sensor technology.

Panelists

- Ross Alcazar, XM Squared
- Abhi Chavan, Corventis
- Tori Hanna, Under Armour
- Amar Kendale, MC10
- Maurizio Macagno , Heapsylon
- Babak Parviz, Google

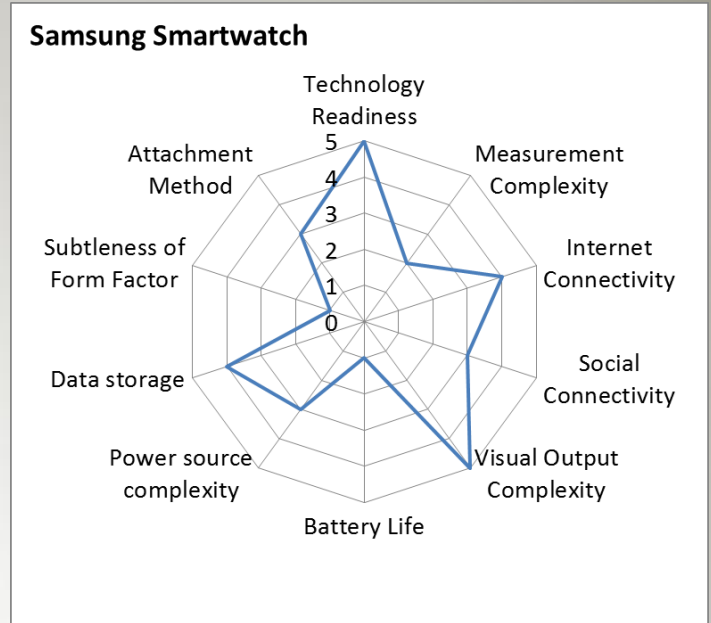
Session Co-Chairs

- Andrew DeHennis, Senseonics
- Brian Jamieson, SB Microsystems

The Session Overview

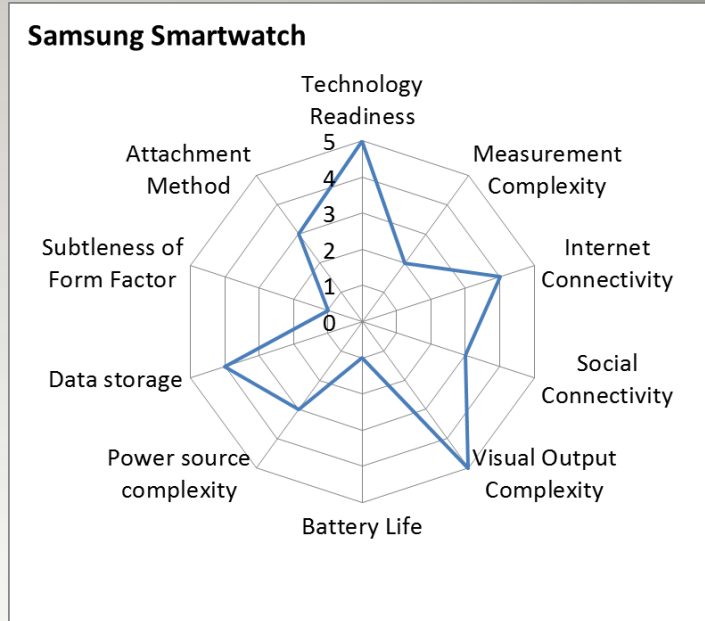
- **Panelist Opening Statements (5min each)**
- **Planned Discussion and Questions**
- **Questions from the Floor**
- **Closing Statements**

The Metrics



Factor	1	2	3	4	5
Readiness: Launch Target	5 yrs	3 yrs	1 yr	Imminent	On the Market
Measurement Complexity	none	Qualitative Activity	Quantitative Activity	External Bioinformatics	External and Internal bioinformatics
Internet Connectivity	none	→			Wifi + Cellular
Social Connectivity	No		Web Community		Information Sharing
Visual Output Complexity	no display	→			HD Video

The Metrics



Factor	1	2	3	4	5
Battery Life	~8 hrs	~1 day	~3 days	~1week	~1month
Power source complexity	Single cell		Rechargeable		Energy Harvesting
Data storage	KB or less range	→			Cloud + On Device
Subtleness of Form Factor	Attention Getter	Obvious accessory	Part of Attire	Non-obvious under clothes	Undetectable
Attachment Method	Adhesive		Accessory		Part of clothes

The Panelists

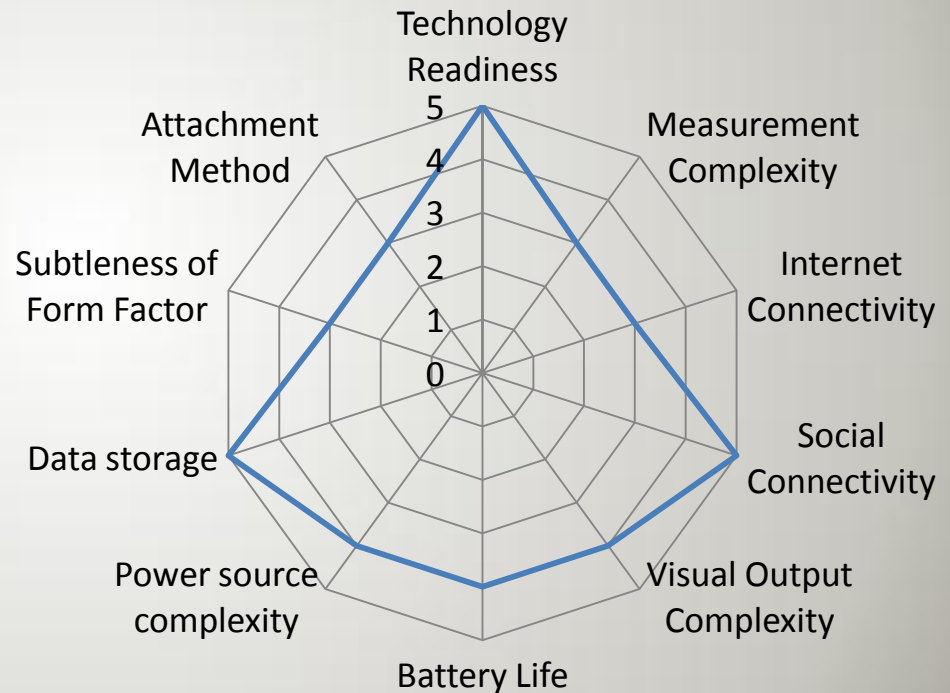
Ross Alcazar

XM-Squared – Founder/CEO



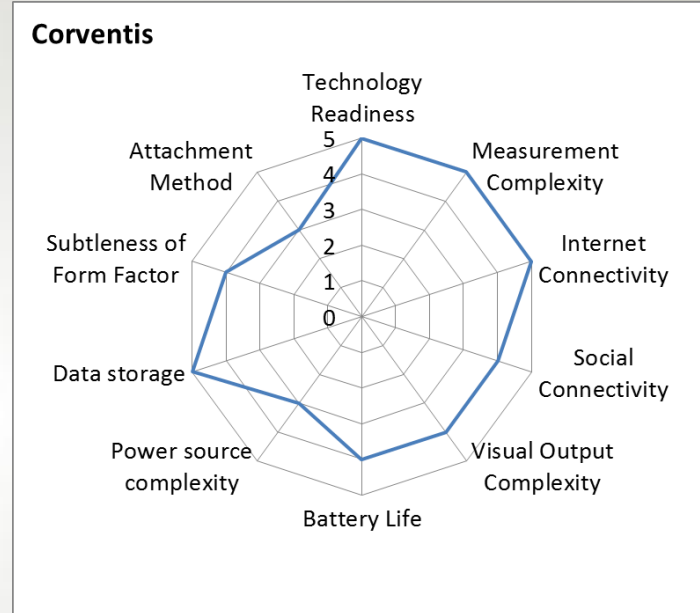
XM G-Series

- Ross Alcazar
- Founder/CEO XM-Squared



Abhi Chavan

Corventis – Vice-President of R & D



- Actionable Medical Data
- Discrete
- High Compliance
- Easy to Use



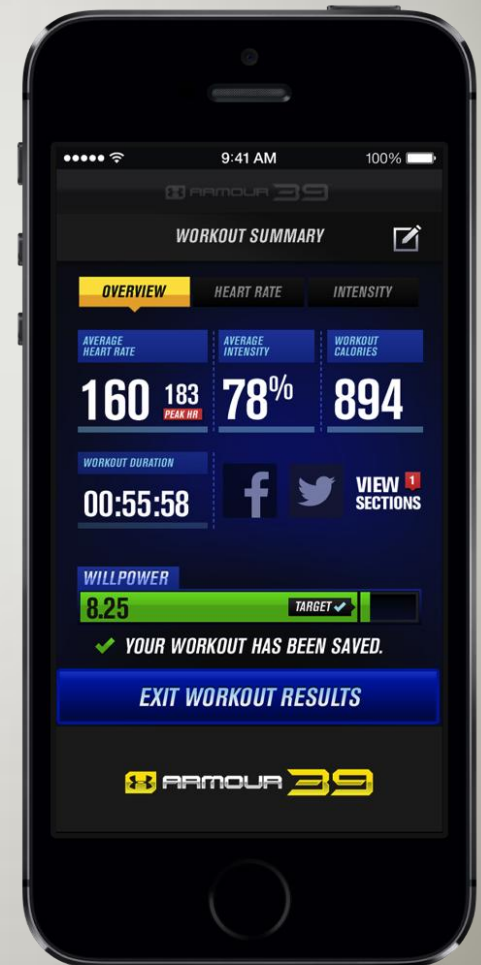
Tori Hanna

UNDER ARMOUR | Digital Sport Director



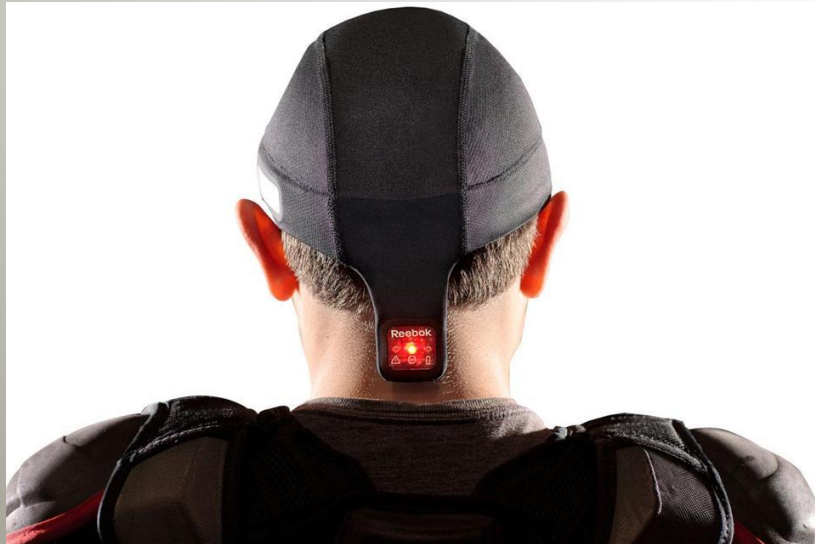
ARMOUR39 Performance Heart-Rate Monitor

- Built for interval training
- Watch OR iOS BLE enabled device
- 4 Key metrics (HR, R-T Intensity, Calories, WILLpower)
- Armour39 Future Show

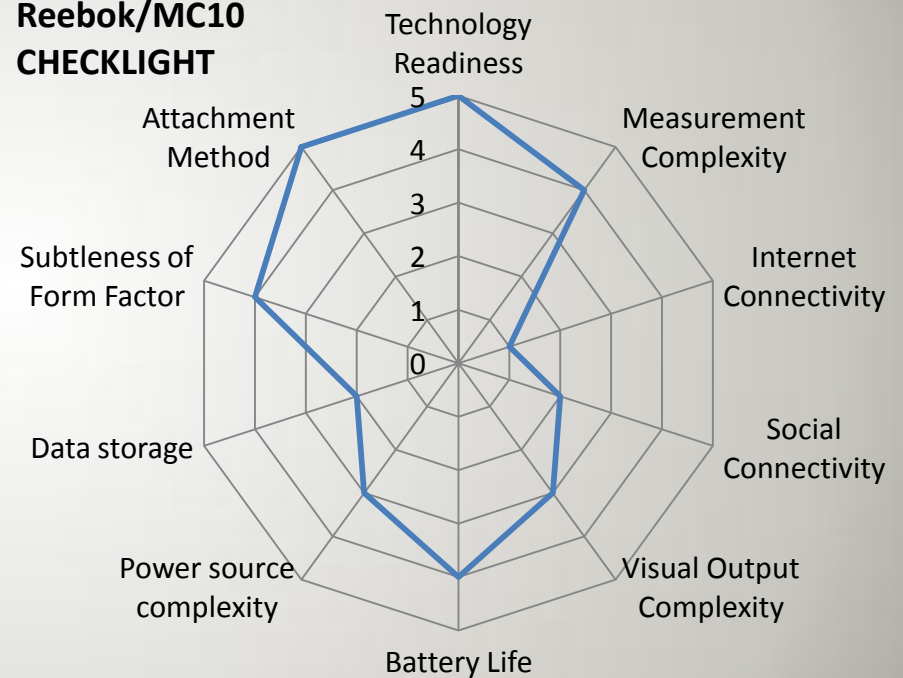


Amar Kendale

MC10- VP of Marketing

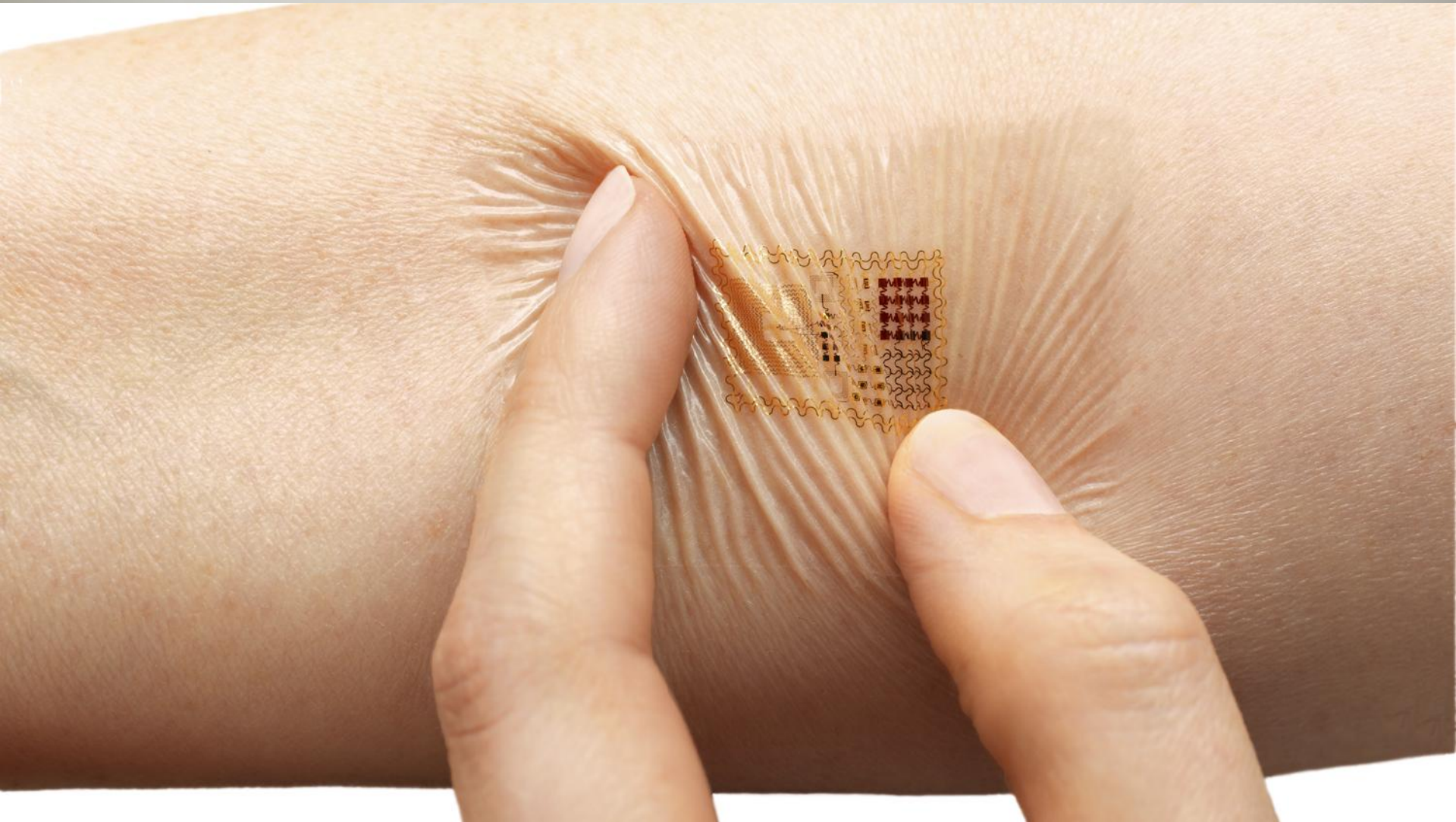


Reebok/MC10 CHECKLIGHT



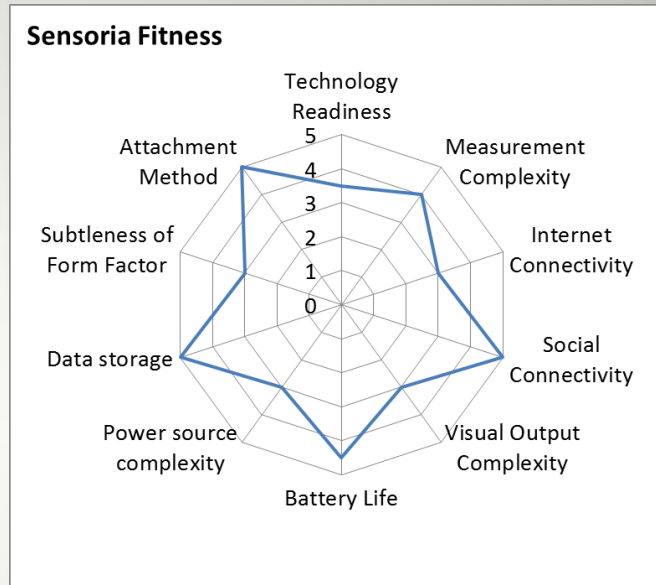
Amar Kendale

MC10- VP of Marketing



Maurizio Macagno

Heapsylon – VP of Development

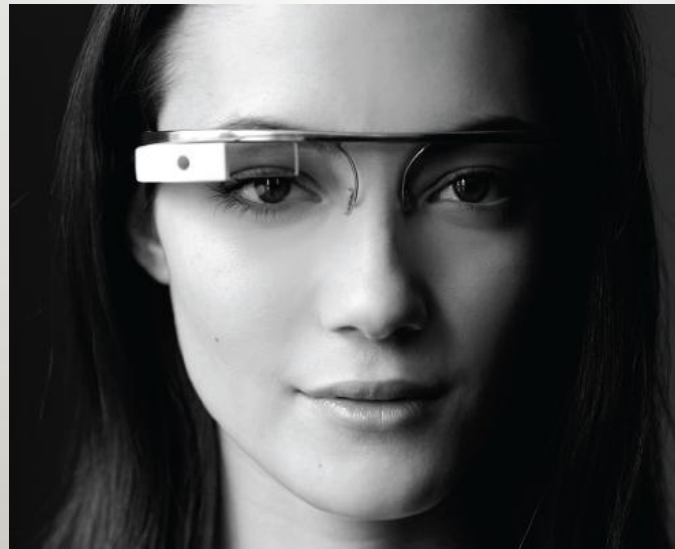


- Connected Smart Garments
- Textile Sensors. Microelectronics. Software.
- Heart rate, GSR, Force/Pressure...
- Do not disrupt consumer workflow

Babak Parviz

Creator of Google Glass and Director at Google X

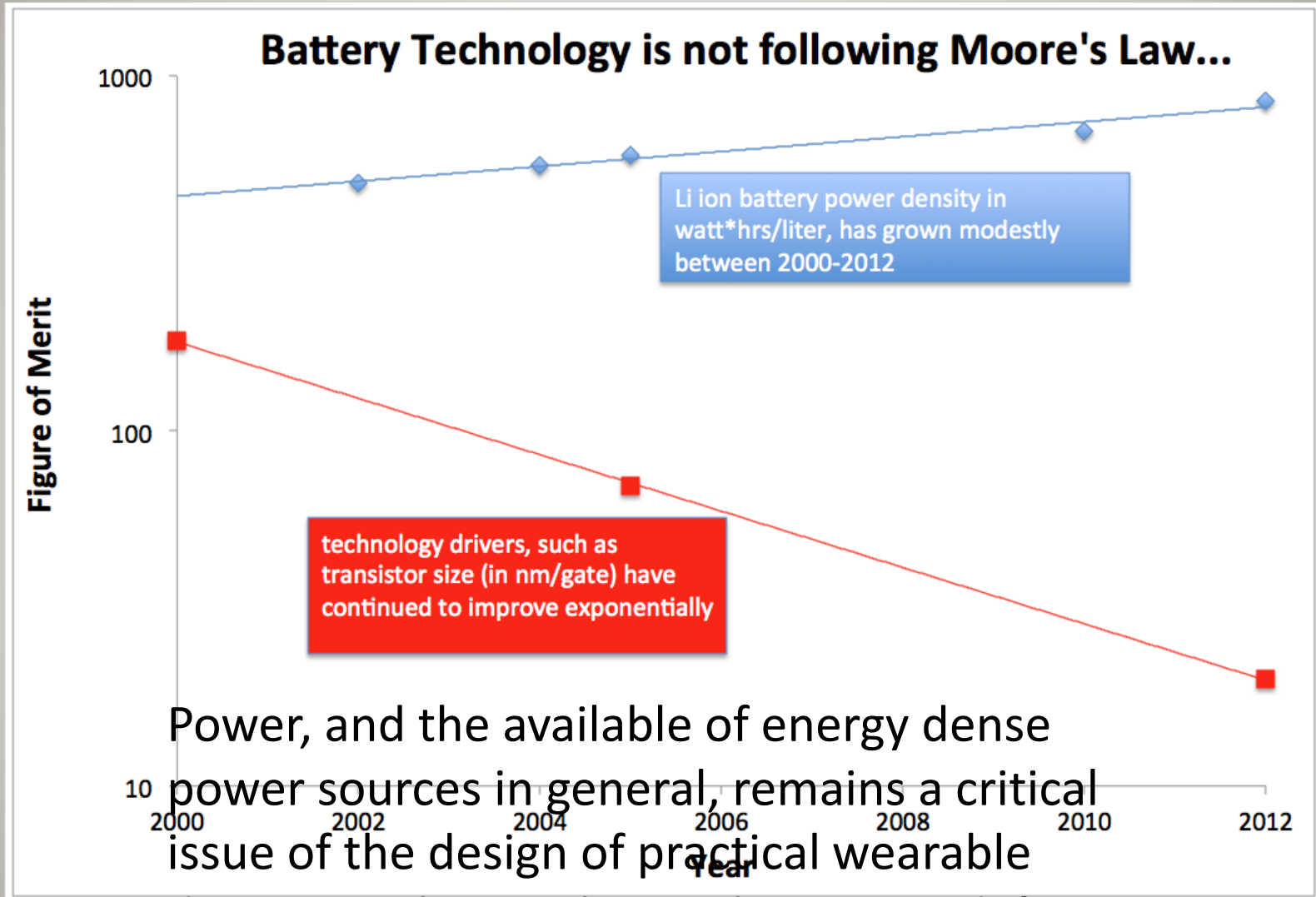
- + Evolution of computing
- + Evolution of access to information
- + Evolution of modes of communication
- + Unique aspects of wearables:
device awareness of the users, co-presence, displays



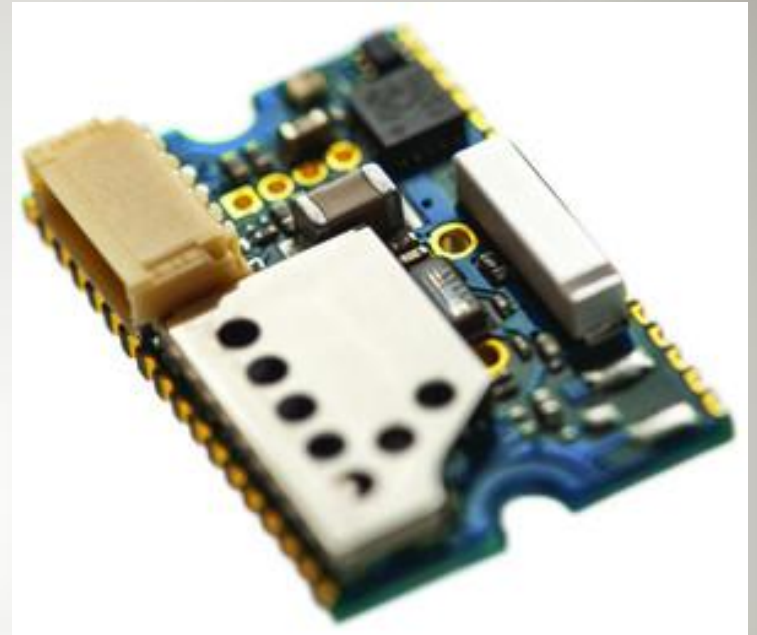
The Panel Questions

Dr. Brian Jamieson
President, SB Microsystems

The Bad



The Good



Complete turnkey machine-to-machine cell phone modems (such as this multi-tech iCell with IPstack) left, or ConnectBlue's low power bluetooth module (right) speed time to market

What are some of the key potential sub-modules that can (or could if they existed) enable streamlined Wearable Sensor development?

The Alluring (or still working on that)



How can we better incorporate Industrial Design in early stages of Wearable Sensor Development?

The Desirable



What wearable device do you most wish you could buy and use right now?

The Market



Who are your most important early customers, and what are you doing to identify and get the attention of early adopters?

The Difference



What differentiates your technology / approach / application from what is currently on the market? Or do you see yourselves as first-to-market, solving an existing and unanswered need?

The Catalyst



The tipping point for cell phones came in the late 1990's, when cell phone use expanded at an astronomical rate and passed 50% penetration worldwide. When do you think the tipping point for wearables will come, and what device do you guess might lead the charge?

The Language



Example of a Wireless Connectivity for Embedded Devices (WICED) device and developing standard

What role will communication standards play in connecting wearable devices?

The Recent Benefits



Photographic example of University run labs that train students on various cleanroom technologies

What recent changes have you seen from academic programs (students or technology) that have made an impact in your development?

The Talent



What is your biggest technical problem area in terms of recruiting and harnessing engineering horsepower. In other words, "I wish we could find more people who are excellent at _____"?

The Open Questions

Audience ???