

INDIANA UNIVERSITY
**INTERNET OF THINGS
WEARABLES IN MOTION SYMPOSIUM**

#IU-IoT

The Indiana University School of Informatics, Computing, and Engineering—in close collaboration with Innovate Indiana, the IU Research and Technology Corp., The Mill and the Indiana IoT Lab—will host academic and industrial experts to discuss wearables and the Internet of Things (IoT).

The symposium will bring together thought leaders and innovative product developers that design IoT wearables for fashion, athletics, medical, and military applications. Topics to be addressed include novel sensors and actuators, scalable and secure cyberinfrastructures, ownership of generated data, fashion trends in wearables, visual analytics of IoT data, and more.

We gratefully acknowledge financial and in-kind support for this event: Cyberinfrastructure for Network Science Center; Indiana University School of Informatics, Computing, and Engineering; Innovate Indiana; the IU Research and Technology Corp.; The Mill; the Regional Economic Development (RED) Fund; and the Indiana IoT Lab.

Organizers



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Tony Armstrong
President and CEO, IU Research and Technology Corporation



Katy Börner
Victor H. Yngve Distinguished Professor of Engineering and Information Science, School of Informatics, Computing, and Engineering; Director, Cyberinfrastructure for Network Science Center; Curator, Mapping Science exhibit; Indiana University



Lisel Record
Associate Director, Cyberinfrastructure for Network Science; Curator, Mapping Science exhibit; Indiana University



Jason Whitney
Manager of Strategic Partnerships, Indiana University Philanthropic Venture Fund



John Wechsler
Founder, Launch Fishers and Indiana IoT Lab

Participants



Rudy Banerjee, PhD
Associate Professor,
Geography & GISc, SLA
IUPUI



Philip Beesley
Living Architecture Group,
Toronto, Canada



Andreas Bueckle
Ph.D. Candidate in
Information Science
Cyberinfrastructure for
Network Science Center,
Department of Intelligent
Systems Engineering
Department of Information
& Library Science
School of Informatics,
Computing, & Engineering
Indiana University



Bo Choi
Visiting Lecturer, Fashion
Design, School of Art,
Architecture + Design



Kay Connelly
Associate Dean for
Research
Professor in Informatics
School of Informatics,
Computing, and
Engineering
Indiana University,
Bloomington



Mike Dodd
Director of Business
Development, Indiana
Innovation Institute (IN3)



Shawn Goodwin
IU Center for Elite Athlete
Development



Mike Hu
M.S Candidate in HCI/d
Cyberinfrastructure for
Network Science Center,
Department of Intelligent
Systems Engineering
Department of Informatics
School of Informatics,
Computing, & Engineering
Indiana University

Participants



Florence Hudson
Special Advisor, NSF
Cybersecurity Center for
Excellence, Indiana
University



Christian McKay
Director, 3D Fabrication +
Design Inquiry Labs
Professor in Informatics
School of Informatics,
Computing, and
Engineering
Indiana University,
Bloomington



Mitch Parker
Executive Director,
Information Security &
Compliance, IU Health



Jason Pennington
Executive Director, Indiana
IOT Lab Fishers



Karthik Ramani
Donald W. Feddersen
Professor of Mechanical
Engineering
Professor of Electrical and
Computer Engineering (by
courtesy)
Professor of Educational
Studies, College of
Education (by courtesy)



John Wechsler
Founder, Launch Fishers
and Indiana IoT Lab



Matt Wyatt
President/CEO, Recovery
Force

Terrell Glenn
IoT & interactive interfaces space.





Use of IoT in Retail

prismatic

Benefits of Integrating IoT Systems into Logistics Management





ANALYTICS	ARTIFICIAL INTELLIGENCE	APPLICATIONS	CAPABILITIES	COMPUTING	CONNECTIVITY
Advanced Analytics	Artificial Intelligence (AI)	Connected Customer	Automation Digitalization	Cloud Computing	<i>Subcategory:</i> WIRELESS
Analytics of Things (AoT)	Augmented Reality (AR)	Connected Factory	Digitization	Cognitive Computing	Botnet
Big Data Analytics	Automation Chat(ter)bot	Connected Vehicle	Legacy Optimization	Edge Computing	Connectivity
Descriptive Analytics	Cognitive Computing	Smart City	Real Time	Fog Computing	Geofencing
Predictive Analytics	Deep Learning	Smart Grid	Ubiquitous	Grid Computing	GPS
Prescriptive Analytics	Facial Recognition	Smart Home			Internet of Everything (IoE)
SAS Analytics for IoT	Machine Learning				Interoperability
SAS Event Stream Processing (ESP)	Machine-To-Machine (M2M)				Mirai
SAS Visual Analytics (VA)	Neural Network				Network
SAS Visual Statistics (VS)	Speech Recognition				Platform
Streaming Analytics	Vehicle-To-Vehicle (V2V)				Protocol
	Virtual Reality (VR)				Proximity Network
	Voice Assistant				RFID
					Standards



DATA



DIGITAL CURRENCY



INDUSTRIES



PEOPLE



THINGS



WIRELESS

Subcategory:

ANALYTICS

Subcategory:

COMPUTING

Algorithm

Big Data

Data Lake

Data Streaming

Digitalization

Digitization

Governance

Monetization

Privacy

Quality

Security

Yottabyte

Bitcoin

Blockchain

Cryptocurrency

Digital Currency

Ethereum

Health Care

Industrial IoT (IIoT)

Manufacturing

Retail

Tele-communications

Transportation

Utilities

Connected Customer

Data Scientist

Hacker

Innovation

Jobs

Kevin Ashton

Talent

Drone

Mobile Device

Quantified Self

Sensor

Things

Wearables

Xcoffee

4G LTE

Bluetooth

LoRa

Mesh Networking

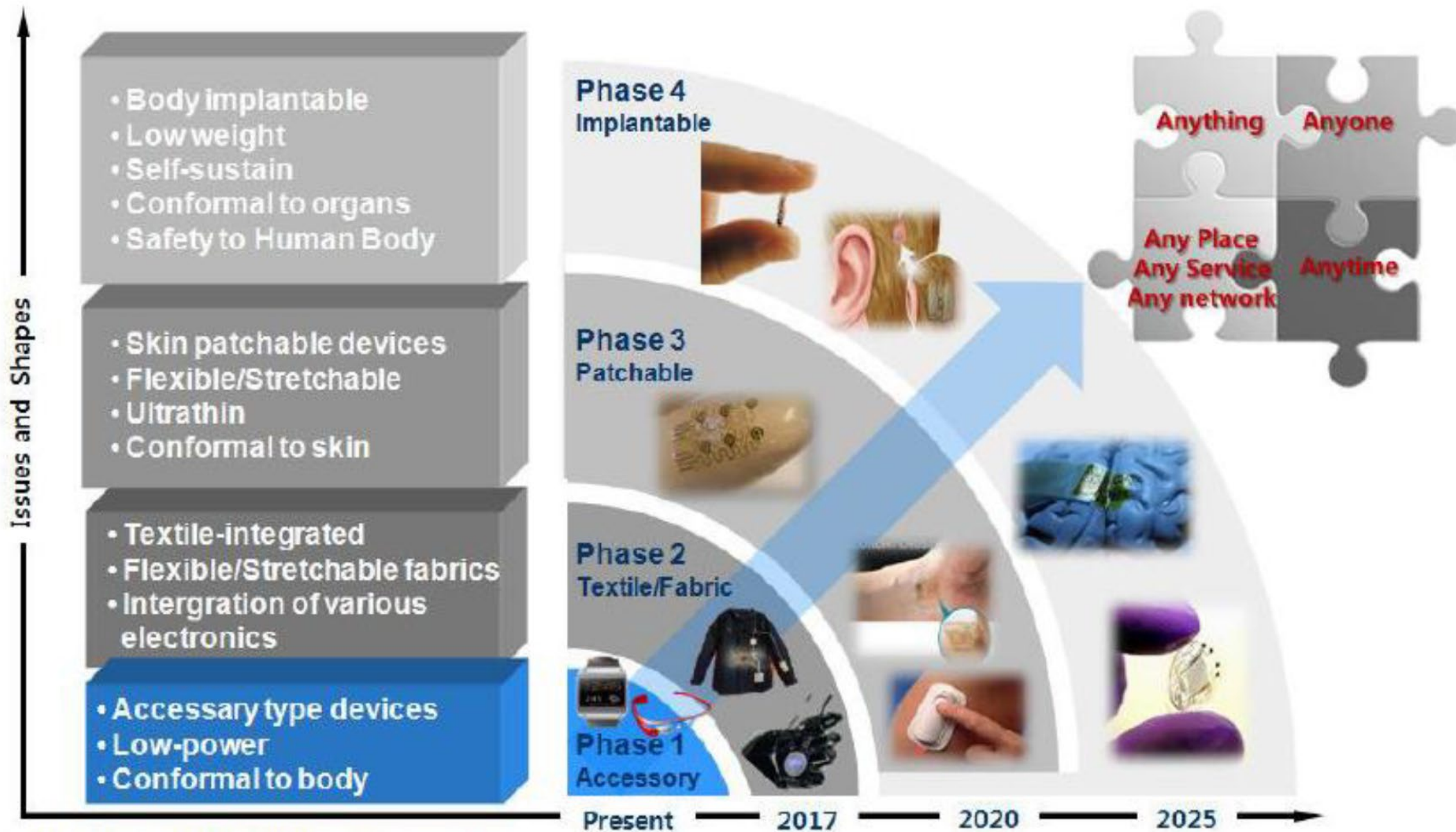
WiFi

Wireless

Zigbee

Z-wave

Wearables vs. Robots vs. Smart Environments



source : Ministry of Trade, Industry & Energy of Korea

Agenda



Day 1 – Thursday, April 25, 2019: Academic Focus

- 12:00pm Welcome by Organizers (Luddy 3006)
- 12:30pm Brief Presentations of R&D by Participants (Luddy 3006)
- 1:30pm *Social Networking Break* (Luddy 3006)
- 2:00pm Keynote ★ (Luddy 3166)
 - John Wechsler & Jason Pennington**, Indiana IOT, "Lab Engagement, Skills Development, and the Future of IoT in Indiana"
- 3:00pm Speakers (Luddy 3006)
 - Kay Connelly**, Indiana University
 - Karthik Ramani**, Purdue University
 - Bo Choi**, Indiana University, "Fashion Trends and Collaboration with Art & Design and Wearable Technology"
- 4:00pm *Social Networking Break* (Luddy 3006)
- 4:30pm Brainstorm: Opportunities & Challenges (Luddy 3006)
- 6:00pm ***Reception at The Mill*** ★

Day 2 – Friday, April 26, 2019: Corporate Focus



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8:30am *Breakfast* (Luddy, 4th Floor)

9:00am Tour to showcase campus research facilities and capabilities (Luddy 4150)

Christian McKay, SICE Maker Spaces

- ISE Fab Lab
- Proto Lab II
- Protolab: Design Research Cafe

Andreas Bueckle, ISE Vis Lab

10:30am Speakers (Luddy 4063)

Matt Wyatt, CEO of **Recovery Force** “Wearable Technology in Health and Sport”

Florence Hudson & Mitch Parker, Center for Applied Cybersecurity Research and IU Health,
“Protecting Health Wearables from Cyber Attack”

Mike Dodd, IN3, “Wearable Devices for Warfighter Health”

Shawn Goodwin, IU Center for Elite Athlete Development, “Data Visualization in Elite Athlete Performance”

12:30pm *Lunch* (Luddy 4063)

1:30pm Keynote ★ (Luddy 0117)

Philip Beesley, Living Architecture Group, Toronto, Canada, "Diffusive Architecture: Pluripotent Fate-mapping" ⓘ

2:30pm *Social Networking Break* (Luddy 4063)

3:00pm Second Best Ideas (Luddy 4063)

1:30pm Keynote ★ (Luddy 0117)

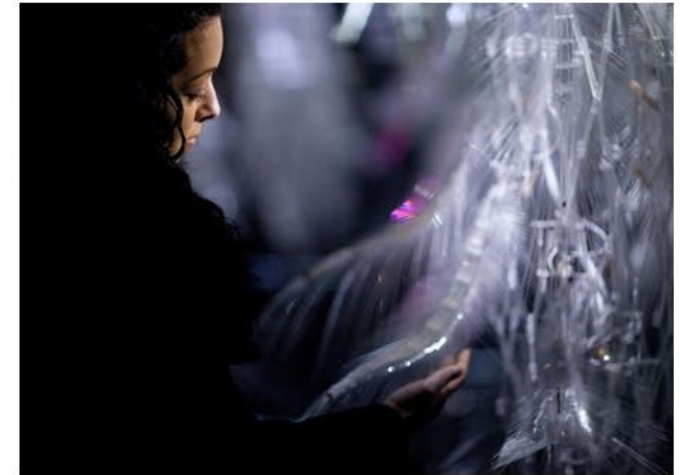
Philip Beesley, Living Architecture Group, Toronto, Canada, "Diffusive Architecture: Pluripotent Fate-mapping" ⓘ

This presentation offers a particular kind of form language rooted within and around our bodies. The work ranges from intimate couture to large public scales. I argue for the use of diffusive and dissipative forms in architectural design. Building with this renewed language, a series of immersive built installation projects will be illustrated, designed by the author in collaboration with multiple disciplines of the Living Architecture Systems Group.

This approach stands distinctly against the Modern preference for stripped, minimal stages devoted to autonomous, objective freedom. Instead of autonomy, the language I argue for pursues tangible and unapologetically emotional involvement. In this discussion I will search for renewed kinds of emplacement, pursuing relationships affording subtle phenomena and expanded physiologies, embodying the forms of diffusion and dissipation. These projects approach living qualities.

Control systems that integrate machinic curiosity are integrated with lightweight scaffolds that are designed to tremble and resonate with surrounding forces. Deliberate ambivalence is inherent to the approach, yielding qualities where things convulse and stutter in emerging vitality. I seek intense mutual relationships of exchange. Qualities from biology will be used as examples for this new kind of architecture. When we look at stem cells—cells that have not yet divided and specialized into dedicated parts of an organism—, we can see their pluripotency. That term to refer to the process by which a cell specializes, divides, and grows guided not only by its preprogrammed DNA, but also by the extra-cellular matrix manifested around it. There is a sense of being pulled into the future by the interactions with the chemical gradients in the extra-cellular matrix. The cell creates its own fate through its behaviour, in a way that is not fully preordained by its instruction set. I love this sense that there can be a deep, constant flux between circumstance, the vectors of prior causes, and the set of ingredients that are both inside and outside any given situation. This means that the future is a fundamental medium for our work.

An undulating, quasiperiodic metabolism is evoked by the projects illustrated within this talk. The fields of this working method oscillate and include both centrally controlled and emergent, incremental models of organization.



5:00pm

Reception in Luddy Hall ★ (Luddy, 4th Floor)

IU's First Lady Welcome

Laurie Burns McRobbie, Indiana University's First Lady

Deans' Welcome

Raj Acharya, Dean, School of Informatics, Computing, and Engineering

Peg Faimon, Founding Dean, School of Art, Architecture + Design

David B. Allison, Dean, School of Public Health

Demonstrations featuring IoT wearables throughout the Fourth Floor

Vafa Andalibi, Joshua Streiff, Sanchari Das, SPICE, IU, "Securtle: The Security Turtle"

Rudy Banerjee, Geography & GISc, IUPUI, "One Trillion Drone Trips. Are you Ready?"

Andreas Bueckle, ISE, IU, "TAVOLA IoT Data Visualizations"

Weizhe Chen, Zheng Chen, Malintha Fernando, Pavan Saranguhewa, Junhong Xu & Lantao Liu, ISE, IU, "Vehicle Autonomy and Intelligence"

Mike Hu, IU, "**Amatria** Sentient Architecture"

Gwen Law, IU Opera and Ballet Theater, IU, "Beasts of the Amazon" (*Florenxia en el Amazonas*)

Gregory F. Lewis, Shyam Shah, Sujata Punait, Britain Taylor & Logan G. Holmes, ISE, IU, "Noncontact Sensing"

Christian McKay, Informatics, IU, "Speaker Project"

Joshua Streiff, Olivia Kenny, Sanchari Das, Andrew Leeth, and L. Jean Camp, SPICE, IU, "Who's Watching Your Child? Smart Toy Bear"



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Acknowledgements

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- Matt Martindale (event coordination)
- Medina Sydykanova (event coordination)
- Leonard Cross (website and print materials)
- Tracey Theriault (signage)

We gratefully acknowledge financial and in-kind support for this event: Cyberinfrastructure for Network Science Center; Indiana University School of Informatics, Computing, and Engineering; Innovate Indiana; the IU Research and Technology Corp.; The Mill; the Regional Economic Development (RED) Fund; and the Indiana IoT Lab.