



## 2024 MeTRIC Symposium Device Gallery

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## Examples of Mobile Technologies Used in Research



A small selection of wearable and nearable devices displayed at the 2024 University of Michigan's [MeTRIC Symposium](#). View full article at: <https://michmed.org/efdc-kb>.

***Click on each image caption to read the pros & cons of each device.***



### 1 - Abbott Freestyle Libre 3 & 3 Plus

*Main Features:*

- 24/7 estimated blood glucose, 1-minute refreshes
- Worn on back of the arm
- Lasts 14-days (Libre 3) or 15 days (Libre 3 Plus)
- Can transmit data to smartphones (NFC and Bluetooth required) or optional receiver

*Pros:*

- Compatible with some insulin pumps loops (3 Plus)
- Very small sensor, painless insertion, comfortable

*Cons:*

- Insertion and setup can be difficult for those with limited dexterity
- Limited water resistance
- Virtually no integration with third parties despite API

Device provided by: Sam Chuisano (PM&R) (Libre 3), Gabriel Mongefranco (EFDC) (Libre 3 Plus)

Product webpage: <https://www.freestyle.abbott/us-en/products/freestyle-libre-3.html>



### 2 - Blue Spark TempTraq TT100 24hr

*Main Features:*

- Continuous axillary temperature (converted to oral equivalent) every 2 minutes, over the life of the patch
- Available in 24, 48 and 72 hour versions

*Pros:*

- *Integration with EHR systems via HL7*
- *Data available for download via clinic web app*
- *Comfortable to wear (though a little big - about the size of a credit card)*

*Cons:*

- *Requires a prescription and a clinic; not available through typical commercial channels*
- *Silicon adhesive is comfortable but can sometimes slide off the body*
- *No integration with Google/Apple or other consumer-oriented health apps*
- *Although app is easy to use, sync over Bluetooth can be a little complicated*

*Device provided by: Michelle Rozwadowski (MM Pediatrics, Hematology/Oncology)*

*Product webpage: <https://temptrag.healthcare/>*



### **3 - Condor Instruments ActLumus Actigraph**

*Main Features:*

- *Actigraph with Melanopic and Photopic measurements (Melanopic EDI and Photopic Lux estimation)*
- *Can be worn on wrist for actigraphy, or chest for ambient light*
- *Activity, light, skin contact, and skin temperature sensors*

*Pros:*

- *Software is free*
- *Possible alternative to Fitbit for sleep tracking*

*Cons:*

- *Not available through typical commercial channels*
- *High cost for both hardware and per-device cloud service*
- *No integration with Google/Apple or other consumer-oriented health apps*

*Device provided by: Helen Burgess and Allie Rodgers (MM Psychiatry, Sleep & Circadian Lab)*

*Product webpage: <https://condorinst.com/en/actlumus-actigraph/>*



#### **4 - Fitbit Charge 6**

*Main Features:*

- *Sleep tracking, stages*
- *Heart rate, SPO2, skin temperature (variation only), stress, ECG (phone app required)*
- *PPG, EDA, ambient light, altimeter, compass, GPS*

*Pros:*

- *Compatible with many study management systems, third-party apps, and Google Health Connect*
- *Lower price point than similar devices*
- *Easy to use*
- *Battery can last 3-7 days depending on 24/7 features turned on*

*Cons:*

- *Setup can be difficult*
- *Requires a personal Gmail account - does not work with Google Workspace / Google Apps accounts*
- *No integration with Apple Health*
- *Uncomfortable to wear; many participants have reported skin reactions*

Device provided by: Eisenberg Family Depression Center

Product webpage: [https://store.google.com/us/product/fitbit\\_charge\\_6](https://store.google.com/us/product/fitbit_charge_6)



#### 5 - Fitbit Inspire 3

Main Features:

- Sleep tracking, stages
- 24/7 heart rate, SPO2, skin temperature (variation only)
- PPG, ambient light

Pros:

- Compatible with many study management systems, third-party apps, and Google Health Connect
- One of the lowest price points for fitness trackers
- Easy to use, lightweight, and comfortable to wear
- Battery can last 3-10 days depending on features being used

Cons:

- Requires a personal Gmail account - does not work with Google Workspace / Google Apps accounts
- No integration with Apple Health

Device provided by: Reema Kadri (PM&R / MICHRI)

Product webpage: [https://store.google.com/us/product/fitbit\\_inspire\\_3](https://store.google.com/us/product/fitbit_inspire_3)



#### **6 - FirmTech TechRing**

##### *Main Features:*

- *Measures nocturnal penile tumescence via two separate pressure sensors*
- *Can record erection detection, firmness and duration data during intercourse or overnight*

##### *Pros:*

- *Comfortable, easy to use, and adjustable*
- *App includes self-reporting features that are saved to the cloud along with sensor data*
- *Raw sensor data is available upon request*

##### *Cons:*

- *Users complain of difficulty pairing over Bluetooth*
- *Must be thoroughly cleaned and fully recharged daily*
- *No integration with third parties yet (however, being a first-in-class device means that data models are not yet available in consumer health apps)*

*Device provided by: Riley Daily (FirmTech Inc.)*

*Product webpage: <https://myfirmtech.com/products/the-tech-ring>*



#### **7 - Dexcom G7 Sensor & Reader**

##### **Main Features:**

- *24/7 estimated blood glucose, 5-minute refreshes*
- *Worn on back of the arm (adults) or upper buttocks (children)*
- *Lasts 10-days (plus a 12-hour "grace period")*
- *Can transmit data to smartphones (Bluetooth required), Apple Watch, or optional receiver*

##### **Pros:**

- *Compatible with some insulin pumps loops*
- *Comfortable to wear*
- *Can be used during swimming*
- *Plenty of 3rd party integrations, including Google/Apple/Glooko/Tidepool*

##### **Cons:**

- *Insertion and over patch placement can be difficult for those with limited dexterity*
- *Requires permission to use in research studies (depending on industry partner)*
- *Insertion can be painful*

*Device provided by: Gabriel Mongefranco (EFDC)*

*Product webpage: <https://www.dexcom.com/en-us/g7-cgm-system>*



#### 8 - **Garmin Vivoactive 4 & 5**

*Main Features:*

- *Sleep tracking, stages, naps*
- *Heart rate, 24/7 SPO2, stress*
- *PPG, EDA, altimeter, compass, GPS, gyroscope*

*Pros:*

- *Raw sensor data available via SDK*
- *ATN+ for additional sensors and gym equipment*
- *Well-documented API plus integration with Google*
- *Long battery life (3-7 days)*
- *Can sync via Wi-Fi (on-demand), through app, or via included USB cable*

*Cons:*

- *Setup and use have low-medium difficulty*
- *Overwhelming amounts of data and options in the app*
- *Integration with Apple is read-only*

*Device provided by: Gabriel Mongefranco (4) and Eisenberg Family Depression Center (5)*

*Product webpage (4): <https://www.garmin.com/en-US/p/643382>*

*Product webpage (5): <https://www.garmin.com/en-US/p/1057989>*



9 - **Omron Evolv (Upper Arm)**

*Main Features:*

- *One-piece blood pressure monitor*
- *On-demand blood pressure readings, with option to schedule reminders*
- *Automatically syncs data when smartphone is in range (with app running in background)*

*Pros:*

- *Extremely easy to setup and use*
- *Batteries (AAA) can last several months*
- *Very lightweight and comfortable*
- *Spring-loaded cuff ensures correct fit with minimal adjustments*
- *Many third-party integrations including Google/Apple*

*Cons:*

- *Battery compartment can be difficult to open*

*Device provided by: Eisenberg Family Depression Center*

*Product webpage: <https://omronhealthcare.com/products/evolv-wireless-upper-arm-blood-pressure-monitor-bp7000/>*



#### **10 - Roche Accu-Chek Guide & Guide Me**

##### **Main Features:**

- Measures blood glucose and syncs to phone automatically over Bluetooth
- Available over-the-counter, and sometimes covered by prescription or medical (DME) health plans

##### **Pros:**

- Fast readings (<4 seconds) with minimal amount of blood needed
- Integrations with many clinical trial management systems, third-party health apps, and Google/Apple/Glooko/Tidepool
- Easy to use and to setup
- Long-lasting batteries (>3 months)
- Can store a large number of readings to be retrieved via USB if needed

##### **Cons:**

- Non-continuous glucose readings

*Devices provided by: Gabriel Mongefranco (EFDC)*

*Product webpage (Accu-Chek Guide): <https://www.accu-check.com/products/meters/guide>*

*Product webpage (Accu-Chek Guide Me): <https://www.accu-check.com/products/meters/guide-me>*



### **11 - Samsung Galaxy Watch6**

#### *Main Features:*

- *Sleep tracking, stages*
- *Heart rate (10 second intervals), SPO2, skin temperature, stress, body composition (via EDA)*
- *PPG, EDA, ambient light, speaker, mic, altimeter, compass, gyroscope*

#### *Pros:*

- *Access to raw sensor data via SDK*
- *Can be used while swimming*
- *Integration with Google*

#### *Cons:*

- *Setup can be difficult, and day-to-day use can be confusing due to WearOS permissions*
- *Very short battery life (14-28 hours)*
- *Requires Android, and works best with Galaxy Phone*

*Device provided by: Eisenberg Family Depression Center*

*Product webpage: <https://www.samsung.com/us/watches/galaxy-watch6>*



## 12 - Smart Human Dynamics Pregnancy Coach

*Main Features:*

- *Sleep tracking, stages, heart rate, body position during sleep*
- *Raw position sensor data available in standard export*
- *Vibration alerts to prevent supine sleep during pregnancy*
- *Can be worn with clip-on or adhesive patch*

*Pros:*

- *Raw sensor data available*
- *Easy to use and comfortable to wear*
- *Long battery life (5 days)*

*Cons:*

- *Only 30 adhesive patches included*
- *No third-party integrations yet*

*Device provided by: Louise O'Brien (Neurology / Obstetrics & Gynecology)*

*Product webpage: <https://www.pregnancycoach.com/pregnancy-coach/>*



### 13 - **Withings Body Comp**

Main Features:

- Tracks body weight, fat mass, water mass, bone mass, muscle mass, visceral fat, and heart rate
- EDA, pulse wave velocity, HR

Pros:

- Easy to use and setup
- Long battery life (12-18 months)
- Many third-party integrations, including Google/Apple
- Syncs automatically via Wi-Fi

Cons:

- Setup requires smartphone and Wi-Fi password

Device provided by: Gabriel Mongefranco (EFDC)

Product webpage: <https://www.withings.com/us/en/body-comp>



### 14 - **Withings SLEEP**

Main Features:

- Sleep tracking, stages

- *Heart rate, snoring detection*
- *Mat is placed under a standard mattress and plugged into included USB charger*

*Pros:*

- *Syncs automatically via Wi-Fi*
- *Easy to use*
- *Clinical-grade reports for providers*
- *Many third-party integrations, including Google/Apple*

*Cons:*

- *Setup requires a smartphone, Wi-Fi password, and 10-minute calibration*

*Device provided by: Eisenberg Family Depression Center*

*Product webpage: <https://www.withings.com/us/en/sleep>*

*Learn more at: <https://michmed.org/W4G3N>*

#### ***Disclaimer:***

*The Eisenberg Family Depression Center does not recommend any specific brands or devices. The information in this article is purely for informational purposes only. Product images are covered under Creative Commons license and belong to their respective owners.*

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