

# EE523: Smart Alignment

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## Smart Alignment

Smart alignment passively improves posture by notifying the user's spine curvature. This product is based on existing [uprightpose](#) solution, however it is composed of common devices available through Arduino. Smart Alignment consists of two modes depending on the user's preferences. Mode 1 will operate in runtime only and collect data for an allowed window, approximately 5 minutes. Mode 2 extends data collection across multiple days for monitoring progress. Ultimately, this design will create a cheap, open-source alternative to Uprightpose.

## Devices

### [Arduino Nano 33 BLE](#)

Form Factor	45 x 18 mm
Sensor	9 axis inertial measurement unit

### [I2C OLED Display Module](#)

Form Factor	38 x 12 mm
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### Uprightpose



### Uprightpose



### [Arduino Nano 33 BLE](#)



### [Silicone Case](#)

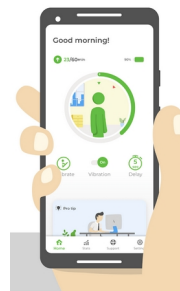


### [OLED](#)



## App

Arduino Nano transmits measurements on OLED and to the app via Bluetooth. Main display will consist of a person and a dial indicating the current spine curvature from 0 to 90 degrees. Main display is responsible for mode 1 (runtime only). Additional display shows single day metrics over time and as distribution. Large timeline view includes monthly calendar with daily average stats. Goal is to complete mode 1 functionality and stretch goal is to complete mode 2.



## Timeline

TODO	Date
Display IMU on OLED	July 24, 2021
Configure app Bluetooth and storage	July 31, 2021
Display IMU on app (no visuals)	Aug 07, 2021
Create mode 1 screen	Aug 14, 2021

Completed	Date
Purchased all components	July 07, 2021
Layout OLED pin connection	July 09, 2021

## Challenges and Obstacles

- 1) Determine power source that balances form factor and longevity. Must provide 3.3V input to Arduino Nano.
- 2) Determine necklace design. The position of the device is critical for accurate measurements.
- 3) Compare different health trackers. Provide

graphs/visuals for tracking goals.

- 4) Calculate device lifespan with chosen power source.
- 5) Accumulate data strategically to not waste storage. Also determine maximum number of days to store.
- 6) Determine notification frequency/ summary reports.