Microcontoller Options – some of Jon's favorites

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The list below summarizes some commercially available options that are likely viable for your Electronics project. There are many, many options out there; new modules pop up every few months. This list was selected based on my experience working with many of these over the past several years. Specs to keep an eye on as you consider which module may be appropriate for your project:

- Processor: For example, some Feather boards come loaded with an old Atmega 32u4 (venerable model with not much RAM and slow clock, some come with the SAMD21 Cortex M0 (more RAM & flash, faster clock speed, etc). Teensy uses blazing fast Freescale processors (4.1 runs at 600 MHz!)
- Logic level: Check if it is 3.3V or 5V logic. Is this compatible with your sensors and motors?
- Peripherals: how many UART, SPI, I2C, Analog Inputs, Digital outputs do you need?
- Power options: Does it have native LiPo charging circuitry? Do you even want that?
- Wireless options: BLE (Bluetooth low energy), LoRa, Wifi are all options out there.
- SD data logging: do you need to store data for later? If so, look for a dev board with native SD card slots. You could always add one too.

Microcontroller Options

1. Teensy. Pretty much an Arduino on steroids—faster computation, more peripheral ports, better ADC, on-board microSD storage, smaller physical footprint, etc. Programs interface is the same as Arduino IDE, using a small library add-on called Teensyduino. No built-in wireless capability; requires additional wireless module, if needed. Note there are several different models – Teensy LC, Teensy 3.2 and Teensy 3.6. Links:

- https://www.pjrc.com/teensy/ (Paul Stoffregen who developed the Teensy was one of the core contributors to the Arduino libraries; his website doesn't look awesome, but I assure you his product is)
- Teensyduino getting started
- https://www.adafruit.com/product/2756
- Teensy 3.6

2. Adafruit Feather Series: Adafruit has developed their own line of boards. These are brand new and look rock-soild. Adafruit products typically are. They are attractive because they are

USB native (can plug into a computer, but also have wireless built in). There are many models in the Feather series, such as:

- https://www.adafruit.com/product/2829 (Straight from the horse's mouth: *This is the Adafruit Feather 32u4 Bluefruit - our take on an 'all-in-one' Arduino-compatible + Bluetooth Low Energy with built in USB and battery charging. Its an Adafruit Feather 32u4 with a BTLE module, ready to rock!*)
- https://www.adafruit.com/product/2995 (MCU +BLE, high speed M0 processor)
- https://www.adafruit.com/product/2796 (USB native, can add wireless module. Has a native microSD card for storage which can be great for testing and verification)

4. **Sparkfun Artemis**. Released last year, these boards are powerful processors (Cortex M4) and Bluetooth all in one.

- https://www.sparkfun.com/artemis

5. ESP8266. All-in-one MCU + WiFi module, the darling of the maker world the past couple of years. Relatively easy to program, though historically documentation was not greatSparkfun and Adafruit both make nice breakout boards. Small, cheap, mostly just works. Note that WiFi makes this chip power hungry, so really only worth a look if you need WiFI high data rates.

- https://www.adafruit.com/product/2471
- https://www.adafruit.com/product/2821
- https://www.sparkfun.com/products/13804
- http://espressif.com/en/support/explore/get-started/esp8266/getting-started-guide

6. Particle Photon/Boron. Photon was one of the original kickstarter projects in MCU + WiFi that grew up, not blew up. The hardware and support ecosystem have really matured over the past couple of years. This module is meant to be programmed OTA, so it has the same pro/con as with the BlueBean (see above). I haven't used this module recently, but many people report is performance is rock solid. Documentation excellent too. All that said, this is a power hungry WiFI module that will drain a battery relatively quickly. The Boron offers LTE cellular network connectivity

- https://docs.particle.io/guide/getting-started/start/photon/
- https://www.sparkfun.com/products/13774
- Particle Photon module
- Particle Boron module

7. Arduino boards: The original classic. There are many variants of Arduino boards: Uno, Duemilanove, Micro, Nano, etc.   Choose one that is small, has ready wireless add-on capability, such as the ones below. See the entire selection guide here:

- https://www.arduino.cc/en/main/products
- https://www.sparkfun.com/standard_arduino_comparison_guide

8. **Tiny boards**: If size is a factor, check out these small footprint boards!

- Tinyduino/TinyLily: https://tinycircuits.com/collections/tinylily-platform/products/tinylily-starter-kit and https://tinycircuits.com/collections/tinyduino-platform

- Adafruit Trinket: https://www.adafruit.com/product/3500

- Arduino nano 33: https://store.arduino.cc/usa/nano-33-ble-sense

- Seeeduino xiao: https://www.robotshop.com/en/seeeduino-xiao-arduino-microcontroller---samd21-cortex-m0.html