

# Fernando A. Pascual

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## Skills

- **Programming Languages:** Proficiency in Java; Knowledge of Python, Ruby, C, HTML, CSS, JavaScript, Assembly
- **Technologies and Frameworks:** Ruby on Rails, React.js, JQuery, Bootstrap, Object-Oriented Programming, Embedded Systems, Heroku Cloud Web Services, UNIX/Linux Environment (Mac OS, Ubuntu), Git, SQL Databases (MySQL, PostgreSQL)
- **Languages:** Native Fluency in English and Spanish, Intermediate Portuguese, Basic Japanese

## Projects

- Subbit ([www.subbit.net](http://www.subbit.net))** October 2019 – Present
- Leveraged RESTful API/MVC architecture with Ruby on Rails to create user generated pages of events occurring near subway stops
  - Created API of backend data with version control to allow state management with React.js frontend
  - Used data modeling to create PostgreSQL database of subway stops utilizing data from Metropolitan Transportation Authority
  - Manipulated database relationships between users and their comments and posts
  - Applied object oriented design paradigms to handle instances of database models
  - Utilized Bootstrap CSS to create aesthetic frontend UX/UI and create minimal confusion for users
  - Incorporated Google Maps JavaScript API to display subway stop locations and provide navigation for users
- PID Feedback Control of DC Motor** December 2018
- Applied C language to manipulate speed of a DC motor under PID feedback control with microcomputer
  - Programmed functions to alert user of operational sensor readings and errors displayed on LEDs
  - Controlled output of digital PWM signal to create a trapezoidal velocity profile for smooth motor acceleration and deceleration
  - Measured analog velocity and compared to setpoint in code to modulate velocity profile to maintain desired motor speed
- Assembly On/Off Control of Solenoid** November 2018
- Employed assembly code system design to manipulate current output of two transistors feeding a solenoid
  - Learned about bit manipulation to control digital logic on an embedded system
  - Program management of four modes of operation while refactoring code to increase readability and reusability
- Thermodynamic Optimization of Condenser** March 2018
- Optimized heat transfer for a condenser in Python using CoolProp thermodynamic data library
  - Applied iterative functions to maximize performance of the condenser based on limiting factors such as Reynolds number
  - Maintained initial input values as variables to allow reusability of code for other condensers and input values

## Professional Experience

- NORESCO, United Technologies Corporation** New York, New York  
*Engineer I* October 2019 – Present
- Developed strong relationship with clients through communication of project needs and troubleshoot solutions for energy savings
  - Selected to perform survey on HVAC system at the Library of Congress to determine areas for energy improvements
- Final Frontier Design Space Suit Research and Development** Brooklyn, New York  
*Engineering Intern* June – August 2018
- Redesigned EVA spacesuit wrist bearings to decrease manufacturing costs 10% and reduce the number of components
  - Researched and synthesized crucial technical data for SBIR contract for development of Life Support System sublimator plates
- Polymer Exploration Group, LLC – National Science Foundation** Ashland, Virginia  
*Engineering Intern* June – August 2016 & 2017
- Designed and constructed roll-to-roll manufacturing oven that increased product production by 1200%
  - **Publication** - Wei Zhang, W.\*, Brinn, C., Cook, A., Pascual-Marquez, F. (2017) "Ice-Release and Erosion Resistant Materials for Wind Turbines." Journal of Physics: Conf. Series.
- NASA Langley Research Center** Langley, Virginia  
*Summer Residential Governor's School Mentee* July – August 2014
- Debugged tensile testing machine for research and test of mechanical properties of experimental polymers to classify their elastic properties

## Leadership and Activities

- Cooling Lead and Systems Integration, Formula SAE EV** Fall 2018 – Spring 2019
- Design, test and CNC programming of motor and inverter mount, sprocket, and sprocket holder
  - Utilized Solidworks FEA to iterate on designs and validate design choices for safety and ease of manufacture
- Buchla 100 Series Synthesizer Restoration Project, Columbia Prof. Vallancourt** Fall 2017 – Spring 2019
- Analyzed circuitry to determine solutions to defunct modules and electronic components while maintaining historical integrity
  - Developed multi-year rocket development plan to test and learn about propulsion, aerodynamics, and materials

## Education

### Columbia University School of Engineering and Applied Science

*Bachelor of Science in Mechanical Engineering, Completed May 2019, GPA: 3.1*

Relevant Coursework: Data Structures and algorithms in Java; Mechatronics and Embedded Microcomputer Control; Python Computer Science Fundamentals; Intro to Electrical Engineering; Intro to Human Spaceflight; Thermodynamics and Heat Transfer; Mechanics of Fluids; Statics; Dynamics; Vibrations; Control Systems; Mechanical Engineering Lab