

Tighe Costa

tighecosta.com

Engineer, designer, and artist specializing in R&D of extreme-environment mechatronic systems. Unusually talented at synthesizing complex requirements to find creative solutions and rapidly developing high-fidelity functional prototypes.

Professional Background

Honeybee Robotics | Exploration Technologies Division in Altadena, CA Fall 2017 - Current

Lead, Robotic Systems Group. Systems engineer for LAMPS, a Phase A NASA GCD program to design a 10kW vertically deployable solar array for lunar habitation. Systems engineer and project lead for KArLE, a TRL6 sample handling system for lunar exploration with NASA GSFC. Developing novel method for solid-state sample analysis and manipulation for integration into robotic sampling systems for Europa with JPL. Directing knowledge sharing and processes improvement efforts.

Robotics Engineer III. Design lead for two (of four) sample acquisition and handling subsystems in Phase A of New Frontiers 4 mission Dragonfly; also led testing, integration, and configuration management. Rapidly matured technology from TRL1 to TRL5 in 16mo. Worked closely with APL and NASA clients, won mission selection (2026 launch), and helped secure Honeybee's largest contract to-date. Developed piezo-pneumatic excavation approach for CLPS payload LISTER.

Project Engineer. Project lead for two SBIR contracts with JPL; development of thermo-mechanical drilling techniques for Europa led to multiple new contracts under NASA's PICASSO and SESAME programs.

Alta Motors | New York, NY and Brisbane, CA Summer 2016 - Fall 2017

Automation Consultant. Prototype development of low-cost robotic solutions for automating an assembly line, such as smart assembly fixtures, automated testing equipment, and real-time inventory management.

Robotics Intern in the Battery Manufacturing (Pico) Group. Developed and integrated first mechatronic technologies required for ramp to production into assembly line. Improved work holding, assembly quality and efficiency, operator safety.

SpaceX | Los Angeles, CA Summer 2015

Mechanical Intern in the Remote In/Out (RIO) Group, Avionics Department. Developed a low-TRL coaxial connector for point-to-point valve and CAN bus connections. Investigated sheet metal electronics enclosures. Assisted test engineers.

Columbia University | New York, NY Summers 2013, 2014

Research Assistant at the Neurotrauma and Repair Laboratory. Invented first flexible bottomed 96-well plate for mass production. Developed high-throughput neuron injury device for large scale traumatic brain injury drug testing.

Parametric Dining | Philadelphia, PA Fall 2013 - Spring 2014

Mechanical Design Consultant. Designed prototype modular charging docks for tablets specialized for customer self-checkout at premium dining venues. Manufactured and assembled end-products for delivery to clients.

Teaching Assistant, University of Pennsylvania | Philadelphia, PA Spring 2013 - Fall 2016

Design of Mechatronic Systems. Taught 117x students principles of mechanical design, electronics (basic circuits, filters, op amps, discrete logic, mechelements), and computing (analog interfacing, microprocessor technology, programming in C).

Feedback Control Design and Analysis. Designed, built, and ran lab projects for 60x students. Developed platform based on augmented Lego trains for testing closed loop follow-the-leader control.

Integrated CAD, CAM, CAE. Taught manufacturing techniques (CNC milling and turning, urethane casting, composite layup), DFM, integrated design, rendering. Recognized for "Impact on MEAM Undergraduates."

Max-Planck Institute for Particle Physics | Munich, Germany Summer 2012

Research Volunteer in the Future Accelerators Laboratory. Assisted with preliminary stages of developing a plasma-Wakefield accelerator. Designed and built diagnostic tools for measuring the density of a high-speed plasma.

Education

University of Pennsylvania | Philadelphia, PA December 2016
M.S.E. in Robotics, GRASP Lab
GPA: 3.70/4.00

University of Pennsylvania | Philadelphia, PA December 2016
B.S.E. Cum Laude in Mechanical Engineering
and Applied Mechanics
GPA: 3.57/4.00

Collegiate School for Boys | New York, NY May 2012
Cum Laude High School Diploma

Honors + Awards

Dean's List (2015, 2016), Intel-Cornell Cup Finalist (2016), Penn Engineering Senior Design Competition: 3rd Place (2016), William K. Gemill Memorial Prize for Outstanding Creativity (2016), Cum Laude Honors Society (2012, 2016)

Skills

Software	SolidWorks, Inventor, NX, SolidCAM, COMSOL, Altium, Eagle, Maple, Adobe Suite, DaVinci Resolve
Programming	Python, MATLAB, C, C++, VBA, LaTeX
Manufacturing	CNC/manual mills and lathes, composite layup, PCB assembly, sheet metal, urethane casting, 3D printing, laser cutting, soldering, EB/arc/MIG welding, harnessing, electroforming, chemical etching, woodworking
Sensor Types	thermocouple, RTD, pressure, encoder/potentiometer, Hall effect, accelerometer/gyroscope, ultrasonic/laser distance, capacitive/inductive proximity, phototransistor, strain gauge, camera, fluid mass flow
Actuator Types	BLDC/BDC, servo, stepper motors, piezo, solenoid, direct/indirect valve, pneumatic cylinder
µControllers/DAQ	Raspberry Pi, Particle Photon, Arduino, MAEVARM, Teensy, LabJack, NI-DAQ, Copley
Other	Customer interfacing, technical documentation/writing, photography, graphic design