James Farmer (The Peddie School Class of 2027) - Activities List

TIKO - Independent Project Grade 9, 10, 11
12 hrs/wk, 40 wks/yr

- Iterated versions of the affordable prosthetic hand in Onshape and Inventor using servo-actuated tendons for finger control
- Programmed an Arduino control system in C to enable size-based hand positioning, and incorporated Electromyography (EMG) sensor for less-invasive control movement
- Current version: Integrated multiple degrees of freedom on the thumb for individual finger opposition; PLA, compliant TPU, and steel used for both rigidity and dexterity

Researcher & Scholarship Recipient, Cambridge Centre for International Research Grade 10, 11
30 hrs/wk, 12 wks/yr

- Trained under Dr. Arsen Abdulali and Dr. Ibragim Atadjanov on reinforcement learning-based robots in PyBullet and MuJoCo
- Invited to return as co-author on research investigating mechanical optimization for gentle grasping using gecko-inspired adhesive grippers
- Designed a precision mechanical testing setup, developed the reduced-order model to characterize system behavior, and analyzed key performance tradeoffs

Founder, The Gansu Engineering Access Project Grade 9, 10, 11
40 hrs/wk, 8 wks/yr

- Independently initiated and raised funds to bring engineering education to 40 students in rural Gansu, China
- Taught coding & wiring workshops; guided student teams to build functional robotic hands capable of rock-paper-scissors
- Designed online CAD and 3D printing tutorials for provided computers and 3D printers, establishing lasting educational resources for students

Subsystem Design Lead, Peddie FRC Team 5895 Grade 9, 10, 11
28 hrs/wk, 20 wks/yr

- Collaborated with the Drive Team to develop match strategy and perform 30 pre-match system checks, including setting robot orientation to ensure consistent performance
- Lead a team of four to develop game piece manipulation subsystem through 20 prototype designs and 4 machined iterations
- Laser cut plywood and polycarbonate, rout polycarbonate, and self-strengthen polypropylene; credited by judges for the World Championship win due to its versatility with both game pieces at high levels of play

Founder, Outdoors Club Grade 9, 10, 11
3 hrs/wk, 30 wks/yr

- Co-lead a student club that fosters outdoor engagement and community building through weekend hikes, seasonal activities like pumpkin carving, and bonfires with s'mores
- Coordinated three day-trips every fall in nearby trails; organized the spring spikeball tournament; spearheaded Peddie's first overnight camping trip since 2019
- Revitalized dormant school camping resources unused for four years, and re-established a sustainable framework for future programming

Player & Manager, Varsity Soccer Grade 9, 10, 11
12 hrs/wk, 16 wks/yr

- Led warmup routines as starting striker during practices and before games; gave speeches before games to instill confidence
- Mentored JV players in technique and in-game strategy, hoping to motivate them to eventually make it on the varsity team

- Chose to become manager junior year to support the team behind the scenes: organize equipment, coordinate game plans, and cheer the loudest on the sidelines

Intern, ROBOTERA
30 hrs/wk, 4 wks/yr Grade 10
- Conducted research on tendon-driven hands with multi-tendons incorporated per finger; synthesized findings into a 16-page technical design specification document
- Created a compact design by packing all motors in the forearm, matching ROBOTERA's flagship functionality
- Prototyped and validated novel 21-degree-of-freedom hand through testing and function benchmarking against previous versions

Student Researcher, Engineering Summer Academy at Penn (ESAP) Grade 10
50 hrs/wk, 3 wks/yr
- Gained hands-on experience with Scanning Electron Microscopy and Atomic Force Microscopy; practiced lithography techniques in a Class 100 cleanroom
- Researched nanofabrication of gecko-inspired adhesives and produced functional soft robotic grippers
- Delivered presentations on over-exposure effects in microfluidics and microprinting; the highest score of the cohort

Student Leader, International Student Organization Grade 9, 10, 11
12 hrs/wk, 8 wks/yr
- Facilitated a smooth transition to Peddie community for the new cohort of international students during the campus move-in period
- Organized ice breaker activities, group dinners, and prepared incoming freshmen for high school expectations
- Serve as an ongoing resource for international students navigating academic systems and cultural adjustment in a new country

Vice President, Peddie Debate Team Grade 9, 10
2 *hrs/wk,* 20 *wks/yr*
- Led Public Forum Debate practice sessions developing critical thinking, rhetoric, and logical reasoning
- Mentored new debaters in research methodologies and source verification techniques, establishing a foundation for evidence-based argumentation
- Cultivated supportive team culture that helped hesitant speakers build confidence, drawing on personal experience overcoming public speaking challenges

Founder, A Capeddies Grade 10, 11
1 hrs/wk, 20 wks/yr
- Developed vocal arrangements by layering harmonies and beatboxing, driven by the principle that harmonization elevates anything
- Contributed to memorable student moments by performing personalized a cappella serenades for campus events and special occasions

Awards and Publication

- **Farmer. J**, Maximizing van der Waals Contact in Gecko-Inspired Grippers for Complex Object Geometries via Compliant Backing, *IEEE International Conference on Soft Robotics*
- 2026 Mercer County Science & Engineering Fair: First Place in Biomedical Engineering
- 2025 FIRST Robotics World Championship Division Winner and Einstein Field Qualifier
- 2024 FIRST Robotics World Championship Division Finalist
- 2026 Diamond Challenge: Semifinalist and Ambassador