Name of project: GPU Server for Teaching AI Classes

Requestee: Systems Department/ETS

Amount requested: $35K

Breakdown of cost:

1 Supermicro server with 1L40S GPU - ~$18K, 1 Supermicro server with 3 L40S GPUs - ~35K, 1 Supermicro server with RTX 6000 pro Blackwell GPU card (the blackwell is the successor of the L40S) - ~36K .

About their ask:

One of the 6 key strategic priorities in Dean Allen's list is AI. This year the college hired 5 new faculty focused on AI and will be hiring a 5 more next year. These faculty will be teaching courses focused on AI. For ex. Tim Hansen is planning to teach "Applied AI for Power Systems" and "Computational Applications to Power Systems". Both the courses will require GPUs to develop the models. They will require dedicated resources that are not used by others. Our existing clusters - Asha and Cashew will not work in this case. There might be long waiting times on these clusters and these would not work for an academic course. The other option - general purpose linux compute servers with GPUs will also not be ideal since those are general purpose computers and are heavily utilized. For these AI courses, one needsGPU servers that can be dedicated to a course for a semester so that the students can do some model development/training and benchmarking. These servers will be used by the AI courses that will be taught during the semester. In case there is no AI course being taught during a specific semester, then they can be added to the general purpose linux compute server pool for that semester. In the next section, I am providing costs for servers with 1, 2 or 3 GPUs. Having a couple of servers with multiple GPUs would help.

Name of project: MECH Undergraduate Teaching Labs

Requestee: Justin Hollis, Gabriela Gritz Moya, Adam Shatila, Nelson Isaacson

Amount requested: $63,265

Breakdown of cost:

Total Funding Requested: $12,027.24

Item	Quantity	Unit Cost	Total
HP Z2 G9 Workstations	6	$1779.27	$10,675.62
HP E27 G5 27" Monitors	6	$224.27	$1,346.00

Total Funding Requested: $4,151.68

Item	Quantity	Unit Cost	Total
Samsung 43" Displays	4	$681.67	$2,726.68
AV Carts with Monitor Attachments	3	$475.00	$1,425.00

Total Funding Requested: $3,520.00

Item	**Quantity**	**Unit Cost**	**Total**
Mark-10 MESURgauge Plus Software Licenses	6	-	$3,520.00

Total Funding Requested: $6,974.10

Item	**Quantity**	**Unit Cost**	**Total**
SP1-12 Sensors	6	$258.01	$1,548.06
Pressure Transducers	6	$173.74	$1042.44
Packs of 10 Strain Gauges	6	$131.85	$791.10
Force Sensors	6	$598.75	$3,592.50

Total Funding Requested: $6,296.00

Item	**Quantity**	**Unit Cost**	**Total**
NI-9211 Data Acquisition (DAQ) Modules	8	$787.00	$6,296.00

Total Funding Requested: $2,787.60

Item	**Quantity**	**Unit Cost**	**Total**
Cool Muscle CM1-C-23L20C Servo Motors	4	$696.90	$2,787.60

Total Funding Requested: $7,434.00

Item	Quantity	Unit Cost	Total
NI-9211 DAQ Cards	4	$787.00	$3,148.00
NI USB-6001 DAQ Devices	2	$344.00	$688.00
NI USB-6423 mioDAQ Devices	2	$1,799.00	$3,598.00

Total Funding Requested: $4,171.24

Item	Quantity	Unit Cost	Total
HP ProBook 460 G11 16" Notebooks	4	$1,042.81	$4,171.24

Total Funding Requested: $3,869.62

Item	Quantity	Unit Cost	Total
Hantek DSO2D15 Oscilloscopes	6	$233.99	$1,403.94
Rigol DP712 Programmable Linear DC Power Supplies	6	$329.00	$1,974.00
Klein Digital Multimeters	10	$29.98	$299.80
RioRand Oscilloscope Probes	12	$15.99	$191.88

Total Funding Requested: $5,622.64

Item	Quantity	Unit Cost	Total
Thermo Scientific Cimarec+ Hot Plates	8	$702.83	$5,622.64

Total Funding Requested: $4,000.00

Item	Quantity	Unit Cost	Total
PCB Piezotronics K2004E01 SmartShaker System	1	$4000.00	$4000.00

Total Funding Requested: $1,810.00

Item	Quantity	Unit Cost	Total
PCB Piezotronics 086C02 Modal Impact Hammers	2	$905.00	$1810.00

About their ask:

Enhancing Instructional Computing and Accessibility in Mechanical Engineering Undergraduate Teaching Labs: The Mechanical Engineering undergraduate teaching laboratories rely heavily on high-performance computing resources to support instruction, data acquisition, and design work across multiple courses, including Engineering Experimentation, Engineering Materials, Mechatronics, Vibrations & Dynamics, and Thermal/Fluids Sciences. To strengthen our instructional computing infrastructure and ensure consistent student access to technology, we propose the purchase of six HP Z2 G9 Workstations and six HP E27 G5 27" monitors.

Enhancing Instructional and Outreach Capabilities through Display and AV Equipment Upgrades: This proposal requests funding for four Samsung 43-inch displays and three AV carts with monitor attachments to enhance instructional and outreach capabilities across the undergraduate Mechanical Engineering teaching laboratories. These displays will be utilized to support lab instruction, Senior Design and Senior Research presentations, department tours, and outreach events. The AV carts will provide mobile flexibility, allowing displays to be shared across multiple lab spaces for demonstrations, data visualization, and collaborative learning opportunities.

Enhancing Laboratory Measurement and Data Analysis through Mark-10 MESURgauge Plus Software: The MECH 331 Introduction to Engineering Materials and associated Senior Design and Senior Research projects rely on Mark-10 force and torque measurement hardware for a variety of experimental setups. Currently, these systems operate with limited software capability, restricting the depth of analysis and data management possible during student experiments. This proposal requests funding for six licenses of Mark-10 MESURgauge Plus Software to enhance the functionality of the existing hardware. The upgraded software provides advanced graphing, statistical, and export tools that enable students to visualize, analyze, and report experimental data with professional precision.

Expanding Student Access to Measurement Technology through Sensor Upgrades across MECH Laboratories: Across all undergraduate Mechanical Engineering laboratories from MECH 231 Engineering Experimentation, MECH 331 Introduction to Engineering Materials, MECH 324 Dynamics of Machines, and MECH 425 Mechanical Engineering Vibrations, students rely on a variety of sensors to collect accurate, high-resolution experimental data. This proposal requests funding to purchase a comprehensive set of new and replacement sensors to improve precision and reliability of laboratory measurements. The requested items include SP1-12 sensors for position measurement, pressure transducers for fluid system labs, strain gauges for structural testing, and force sensors for load measurement. These additions will expand capacity to support larger class sections as well as Senior Design and Research projects.

Expanding Laboratory Capacity and Enhancing Student Experience through Additional NI-9211 Data Acquisition Modules: The NI-9211 thermocouple input module is an essential component of the data acquisition (DAQ) systems used throughout the Mechanical Engineering undergraduate teaching laboratories. These devices enable students to measure and analyze temperature data in real time across multiple experimental setups, reinforcing key concepts in heat transfer, thermodynamics, and measurement systems. This proposal requests funding for eight additional NI-9211 DAQ modules to expand and reconfigure existing lab systems.

Expanding Motion Analysis Capability in MECH 324 through Additional Cool Muscle Servo Motors: The MECH 324 Dynamics of Machines laboratory provides students with hands-on experience in the analysis of mechanisms, linkages, and cam-follower systems. A key element of this course is the motion analysis experiment, where students use servo-driven assemblies to study kinematic and dynamic relationships in rotating and translating components. This proposal requests funding for four Cool Muscle CM1-C-23L20C servo motors to expand the number of student workstations in the MECH 324 laboratory. These additional motors will increase the total number of active Test Cube stations, allowing more teams to perform experiments simultaneously and directly support over 250 students annually.

Enhancing Senior Design and Research Capabilities through Expanded Data Acquisition Resources: Senior Design and Senior Research provide students with critical hands-on experience integrating experimental design, data acquisition, and system analysis. This proposal requests funding for a combination of NI-9211 thermocouple modules, NI USB-6001 multifunction DAQs, and NI USB-6423 mioDAQ systems to expand the department's pool of portable instrumentation. These devices will support both MECH Senior Design and Senior Research students, allowing them to build, test, and validate experimental systems with industry-grade hardware. By expanding access to modular and portable DAQ systems, this initiative enhances student accessibility to modern measurement tools, reduces equipment scheduling bottlenecks, and improves the quality of experimental outcomes.

Expanding Student Accessibility and Mobility for Senior Design through Shared Laptop Resources: The Mechanical Engineering Senior Design Program engages more than 200 students annually across approximately 50 interdisciplinary projects that require access to computing resources for design, simulation, and documentation. This proposal requests funding for four HP ProBook 460 G11 16" laptops to expand student accessibility to computing resources. These laptops will be maintained and managed through the Undergraduate Teaching Labs and made available for checkout to Senior Design project teams. Providing shared mobile computing equipment will enhance accessibility for students without high-performance personal devices, support equitable participation, and enable continuity of work during off-site testing or lab maintenance.

Upgrading Electrical Measurement and Instrumentation Equipment for Mechatronics and Senior Projects: The MECH 207 – Mechatronics I and MECH 307 – Mechatronics II courses are

foundational in introducing students to embedded systems, control electronics, and integrated mechanical-electrical design. This proposal requests funding for additional oscilloscopes, programmable power supplies, digital multimeters, and probes to expand the department's instrumentation capabilities, improve students access to technology, and allow for smaller groups during instruction and hands-on activities, allowing for a more equitable learning environment. The requested additional equipment includes:

- Hantek DSO2D15 Oscilloscopes for waveform capture and circuit diagnostics.
- Rigol DP712 Programmable Linear DC Power Supplies for safe, flexible power delivery during circuit testing.
- Klein Digital Multimeters for basic circuit measurement and troubleshooting.
- RioRand Oscilloscope Probes for enhanced signal acquisition and compatibility across lab stations.

Upgrading Laboratory Heating Equipment with Thermo Scientific Cimarec+ Hot Plates: The MECH 331 – Introduction to Engineering Materials Laboratory provides students with hands-on experience exploring the fundamentals of material properties. Students perform several experiments involving heat transfer, fluid mechanics, and energy systems through a series of controlled thermal experiments. The current laboratory hot plates in use are aging, offer limited temperature stability, and do not meet the precision or safety standards expected in modern engineering laboratories. This proposal requests funding for eight Thermo Scientific Cimarec+ Hot Plates to upgrade and modernize the heating equipment used across MECH 331, Senior Design, and Senior Research projects. The Cimarec+ models feature enhanced temperature accuracy, improved thermal uniformity, and integrated safety controls, making them both safer and more reliable for instructional use. These replacements will not only improve the precision and repeatability of experiments but will also reduce maintenance costs and safety risks associated with older models. The new hot plates will allow more teams to conduct concurrent experiments, increasing lab throughput and supporting a better overall student experience.

Expanding Vibratory Testing Capabilities with a PCB PiezotronicsK2004E01 SmartShaker System: The MECH 425 Mechanical Engineering Vibrations provides students with practical experience in dynamic system response, vibration testing, and modal analysis. Current laboratory capabilities, while sufficient for basic instructional experiments, lack the equipment necessary to perform advanced vibratory analysis and fatigue testing representative of industry and research environments. This proposal requests funding for one PCB Piezotronics K2004E01 SmartShaker System, a compact, high-performance electrodynamic shaker designed for structural excitation and vibratory analysis. The SmartShaker will enable both instructional modernization and research-level testing for undergraduate students, allowing direct control of vibration amplitude and frequency while collecting high-fidelity response data.

Upgrading Experimental Modal Analysis Capabilities for MECH 425 and Senior Projects: The MECH 425, Mechanical Engineering Vibration, introduces students to advanced techniques for analyzing dynamic response and vibration behavior in mechanical systems. Central to this course is experimental modal analysis, where students excite a structure and measure its response to determine natural frequencies, damping ratios, and mode shapes. This proposal requests funding

for two PCB Piezotronics 086C02 Modal Impact Hammers to replace aging and limited-capacity equipment currently used in MECH 425. These upgraded instruments will provide improved signal fidelity, calibration accuracy, and reliability, directly enhancing the quality of data collected in student labs. The new hammers will also support Senior Design and Senior Research students conducting vibration testing and structural characterization.

Name of project: MECH i2P

Requestee: Caroline Van Tiggelen

Amount requested: $19,939

Breakdown of cost:

Total Funding Requested: $13,938.00

Item	Quantity	Unit Cost	Total
Prusa HT90 3D Printer	1	$12,299.00	$12,299.00
High-Temperature Print Sheet	1	$150.00	$150.00
High-Temperature Print Head	1	$909.00	$909.00
ThermaX PEI 1010 (1 kg spool)	1	$195.00	$195.00
PEEK Filament (500 g spool)	1	$385.00	$385.00

Total Funding Requested: $6,000.00

Item	Quantity	Unit Cost	Total
Standard Filaments	180	$12.50	$2,250.00
Continuous Fiber Materials (CFF)	TBD	$750.00	$750.00
High-Performance Engineering Materials	TBD	$2,000.00	$2,000.00
High-Temperature Resin	TBD	$525.00	$525.00
Formlabs Engineering Resins and Tank	1	$475.00	$475.00

About their ask:

Student Accessible Advanced Material 3D Printing (Prusa HT90): The Idea2Product (I2P) Lab is Colorado State University's open-access fabrication lab, providing training, equipment, and resources for students to bring their ideas to life. The lab supports hands-on learning, interdisciplinary projects, and faculty research by making additive manufacturing tools

accessible to the broader CSU community. This proposal seeks funding for a Prusa HT90 high-temperature 3D printer, essential accessories, and high-performance materials to expand I2P's capabilities in advanced materials and high-performance prototyping.The Prusa HT90's actively heated chamber, swappable print heads, and 500 °C nozzle enable printing with engineering-grade polymers such as PEEK, PEKK, and PEI (Ultem). These materials are commonly used in aerospace, automotive, and biomedical applications for their exceptional strength, heat resistance, and durability. Access to this technology will allow CSU engineering students to experience materials previously limited to industry and research settings.

High-performance thermoplastics like PEEK, PEKK, and PEI are renowned for their:

- Extreme mechanical strength and temperature resistance
- Electrical insulation and stability
- Chemical and wear resistance
- Biocompatibility, making them suitable for biomedical prototypes

By integrating this printer into I2P's training and support toolbox, students will gain direct experience with the materials and manufacturing processes used in industry. This will enhance coursework, senior design projects, and research efforts, empowering students to move toward truly functional, testable designs while developing industry-relevant experience and technical proficiency. The addition of the HT90 directly supports the College of Engineering's educational mission by broadening access to advanced fabrication technology and fostering innovation through hands-on learning.

Student Access to 3D Printing Materials for Engineering Education: The Idea2Product (I2P) Lab is rapidly expanding its capabilities and use within the Walter Scott, Jr. College of Engineering. As more courses integrate I2P into their curriculum and new technologies are introduced, access to engineering-grade materials has become a growing limitation. With the integration of training in ENGR 111, first-year students are introduced to the lab early in their academic journey, creating a growing and consistent user base. Currently, only students involved in design teams or research projects with larger budgets can afford higher-cost materials, limiting access for the broader student population.This proposal seeks funding to ensure all engineering students can participate in hands-on learning and material discovery, not just those with project funding. The requested support will allow I2P to continue providing low-cost access to standard filaments (PLA and PETG) for foundational coursework while expanding access to high-performance and continuous-fiber materials (PEI, PEEK, PPSU, PCTG, Onyx, carbon fiber, fiberglass, etc.). High-temperature and Formlabs engineering resins will also enable new training and manufacturing opportunities, such as printing injection mold inserts for capstone and research projects.

Name of project: ECE Creator Space Upgrades

Requestee: Elaine Linde

Amount requested: $17,766.80

Breakdown of cost:

Voltera V-One, $3,499 Pick and Place Machine

$4,999 Keysight EDU34450A DMM, $939.25 for 1

$1,768.00 for 2 Keysight EDU36311A DC Power Supply

$1,127.95 for 1, $2,123.20 for 2 Keysight EDU33212A Function Generator,

$1,233.35 for 1, $2,321.60 for 2 Keysight DSOX1202A Oscilloscope

$1,623.50 for 1, $3,056.00 for 2

About their ask:

This proposal is to increase the capability of prototyping and testing circuit boards in the ECE CreatorSpace. This will benefit both undergraduate and graduate students by allowing them to prototype and test their designs rapidly. It will support student projects for classes and organizations. For proprietary development, this is especially important since intellectual property will not need to be sent to outside entities. The proposal is for two machines to build Printed Circuit Boards and Assemblies and electrical test equipment for prototyping and projects.

Name of project: Ram Racing IC

Requestee: Brendan Hoy, Danny Shireman, Aidan Farley

Amount requested: $9,820

Breakdown of cost:

Aero Pressure Sensor: ~$1500

Data Acquisition & Sensors $2,220

Strain Gauges C4A-06-125SLA-350-39P strain gauges 5 (comes in packs of 10) at 113.57 $800

Simulation computer Titan A375 - Dual AMD EPYC Rome up to 128 Cores - Scientific Research Workstation PC: $5300

About their ask:

Strain gauges for forces acting on vehicle: Ram Racing has been trying to validate their vehicle force model on suspension linkages

Aerodynamics Data Acquisition: We would like to obtain an aerodynamic pressure sensor to allow us to validate our CFD simulations. Proper validation is critical for good design especially when using CFD. This will help future teams create an even better race car to represent Colorado State University at the international competition every year.

Data acquisition for CSU's student FSAE team, Ram Racing: This proposal seeks funding to enhance Colorado State University's Formula SAE team, Ram Racing, through the purchase of a motorsport-grade data logger and an array of advanced sensors, including internal tire temperature and pressure sensors, laser ride height sensors, and multiple IMUs. These additions will enable high-resolution measurement of critical vehicle parameters, allowing students to directly compare design predictions with real-world data and improve the overall engineering rigor of the team's design process. From an educational standpoint, these systems provide a unique platform for students to learn the fundamentals of vehicle dynamics, controls, and data analysis. Tire temperature and pressure sensors allow students to study tire behavior, load transfer, and camber effects. Laser ride height sensors enable the investigation of suspension kinematics and aerodynamic platform control while IMUs add another dimension, allowing for in-depth study of transient responses such as pitch, roll, and yaw — critical to understanding vehicle handling and stability. From a competition perspective, the data collected through this enhanced system will allow Ram Racing to more effectively validate design decisions, leading to measurable improvements in lap time consistency, reliability, and performance. Because Formula SAE heavily rewards teams that can justify their design choices with empirical data, this project directly supports the team's competitiveness at both the Design and Dynamic events. Overall, the proposed equipment will enrich the hands-on learning experience for a wide cross-section of engineering students while elevating Colorado State University's presence on the Formula SAE stage.

Computers for Ram Racing: Formula SAE teams require capable computers to run high-fidelity simulations. Powerful workstations enable complex CFD and FEA simulations with higher mesh resolution and more iterations, yielding to a better designed race car much quicker. This will allow students to spend less time waiting and more time designing. Ram Racing wants to represent Colorado State University well, and this is where it starts.

Name of project: Ram Racing EV

Requestee: David Elijah Umaru, Oscar Wenham, Cara Guydish, Saleh Al Mahmoud

Amount requested: $36,230 (without storage container)

Breakdown of cost:

Item	Part	Justification	Quantity	Cost	Link
Batteries Storage Cabinet	H-6314BL	Stores battery packs	1	$865	ULINE
Spot Welder	AWithZ P60F	Building battery modules	1	$459.95	DIY 500 AMP
Fume Extractor	-	Ensures safety during spot welding process	1	$469.99	Lowe's
Portable Thermal Imaging Camera	FLIR TG267	Testing & inspection of thermal runaway	1	$600.69	Grainger
Arc Flash PPE Kit	9150-5388E	General Safety equipment	1?	$442.11	JendcoSaftey
Insulated HV 1000V Gloves	S-25318R-M	General Safety equipment	4	$95	ULINE
Fire Blanket (Class D rated)	S-18904	Battery modules Safety equipment	2	$110	ULINE
5-gallon Squeegee Bucket	H-2847	Battery modules Safety equipment	2	$58	ULINE
Class-D Fire Extinguisher	-	Fire extinguisher capable of stopping lithium fire	1	$930	Home Depot
Work Table	-	Workbench for battery assembly	1	$145.99	Amazon
Proposal Budget				**$4176.73**	

Faculty:

Item	Part	Justification	Quantity	Cost	Link
Shipping Container Lab	-	Clean, and accessible lab space for all CSU students/Faculty	1	$10k Working through Quotes now, possible availability used, or locally	AliBaba
Space Heater	-	Maintain operational battery temperature, and usable workspace	1	$64.97	Home Depot
Spot Welder	AWithZ P60F	Building battery modules	1	$459.95	DIY 500 AMP
Portable Thermal Imaging Camera	FLIR TG267	Testing & inspection of thermal runaway	1	$600.69	Grainger
Arc Flash PPE Kit	9150-5388E	General Safety equipment	1?	$442.11	JendcoSaftey
Insulated HV 1000V Gloves	S-25318R-M	General Safety equipment	4	$95	ULINE
Fire Blanket (Class D rated)	S-18904	Battery modules Safety equipment	2	$110	ULINE
5-gallon Squeegee Bucket	H-2847	Battery modules Safety equipment	2	$58	ULINE
Class-D Fire Extinguisher	-	Fire extinguisher capable of stopping lithium fire	1	$930	Home Depot
Proposal Budget				**$12,760.72**	

Faculty:

Item	Part	Justification	Quantity	Cost	Link
Bambu Labs H2D	H2D AMS Combo	Printer for student use	1	$1749	Bambu
PC FR Filament	PC FR	Fire safe use for printing electronic components (Grey)	3	$43.99	Bambu
PC FR Filament	PC FR	Fire safe use for printing electronic components (White)	4	$43.99	Bambu
PC FR Filament	PC FR	Fire safe use for printing electronic components (Black)	3	43.99	Bambu
Total				$2188.9	

Faculty:

Item	Part	Justification	Quantity	Cost	Link
Lathe DRO Kit	FAGRPROKIT20ITL	Improved manufacturing equipment	1	$1740 + tax	Fagor
Mill DRO Kit	FAGRPROKIT30IM	Improved manufacturing equipment	1	$2146 + tax	Fagor

Total Cost: $3886 + tax

Item	Part	Justification	Quantity	Cost	Link
Metal Lathe	G0709	Improved manufacturing equipment	1	$7,671 + tax	Grizzly

Additional Options:

Item	Part	Justification	Quantity	Cost	Link
Metal Lathe	G4003G	Improved manufacturing equipment	1	$6,595 + tax	Grizzly
Metal Lathe	G4003	Improved manufacturing equipment	1	$6,349 + tax	Grizzly

Total Cost: $6,349 to $7,671 + tax

Itemized Equipment Request

Item	Part	Justification	Quantity	Cost	Link
Aspect 230 AC/DC Water-Cooled One-Pak	K4342-1	Improved manufacturing equipment	1	$9979.99 + tax	Lincoln

Additional Options:

Item	Part	Justification	Quantity	Cost	Link
Aspect® 230 AC/DC Air-Cooled One-Pak	K4341-1	Improved manufacturing equipment	1	$6,709.99 + tax	Lincoln
Precision TIG® 225 TIG Welder Ready-Pak	K2535-1	Improved manufacturing equipment	1	$5999.99 + tax	Lincoln

Total Cost: $9979.99 to $5999.99 + tax

Item	Part	Justification	Quantity	Cost	Link
Vehicle Control Unit (VCU)	ECM-1793-196-1503	Core Processing unit for control logic, safety interlocks, and CAN communication	1	$2,500	New Eagle
Microcontroller	DEV-16771	Used in firmware development, subsystem control and student testing	2	$80	Teensy
Low voltage battery	Optima	Power for the whole low voltage system	2	$800	Optima
PCB Design and Fabrication	Custom power/signal PCBs	Custom circuit boards for low-voltage power distribution and signal processing	1 set	$1200	JLCPCB
Connectors & Wiring Harness	-	Harness materials for robust and safe interconnection	-	$1000	New Eagle, New Eagle,
Enclosures & Mounting Hardware	MB-IOT-BOX	Weatherproof enclosures	-	$250	Macboost
Firmware / Software Licenses	-	Required for configuring, programming, and testing ECU and microcontrollers	-	$1000	New Eagle
Testing and Debugging Tools	-	Testing and validation tools for system bring-up	-	$800	Keysight, Digikey
Total				$8,330	

- Result

About their ask:

More in Packet. Ask Tillie if wanted

- Safety Equipment for Battery Manufacturing

- Portable lab space
- Battery Manufacturing Equipment
- New Machining Capability for Undergraduate Programs at the ERC
- Improving Current Machining Capabilities for Undergraduate Programs at
- the Engineering Research Center
- Expanding Fabrication Capabilities for University Programs and Senior
- Design Projects at the Engineering Research Center.
- Low Voltage System Components

Name of project: Rotorcraft Modeling and Control lab

Requestee: Dr. Ciarcia

Amount requested: $7,500

Breakdown of cost:

Crazyflie 2.1 quadrotors 8 $240 $1,920

Crazyradio PA dongles 8 $25 $200

Battery and charging kits 8 $40 $320

Propeller and guard kits 8 $20 $160

Loco Positioning System (12 anchors + tags) 1 $1,500 $1,500

Firmware/ROS workstation 1 $1,200 $1,200 Ancillary wiring, mounts, safety enclosures — — $200

Student hourly setup support (60 h × $25/h) $1,500

Contingency $500

About their ask: This proposal requests UCFT support to establish the Rotorcraft Modeling and Control Laboratory, which will serve the new senior elective MECH 415 – Rotorcraft Modeling and Control. This course is a core element of the forthcoming Robotics and Automation concentration within the Mechanical Engineering B.S. program, scheduled for launch in Fall 2026. The course provides students with advanced, hands-on experience in rotorcraft dynamics, control systems, and mechatronic integration. The proposed lab will enable students to experimentally validate control algorithms developed in MATLAB/Simulink using physical quadrotor systems, bridging simulation and real-world

implementation. This initiative aligns directly with the UCFT mission to ensure state-of-the-art instructional technology for students and supports CSU's strategic goals in robotics, automation, and autonomous systems education.

Name of project: Open Orbit Satellite Radio Antenna

Requestee: Jacob Auman

Amount requested: $5274

Breakdown of cost:

Ettus USRP B210 Kit #1 Software Defined Radio transceiver with enclosure, 70MHz-6GHz coverage (UHF Dedicated) 1 $2,338

Ettus USRP B210 Kit #2 Software Defined Radio transceiver with enclosure, 70MHz-6GHz coverage (S-Band Dedicated) 1 $2,338

UHF/S-Band Antennas UHF/S-Band antennas for NOAA and ISS signal reception 1 $500

About their ask:

The Open Orbit CubeSat team requests ESTC funding to support permanent satellite ground station infrastructure at Colorado State University. This general-purpose ground station system will provide hands-on educational experiences for engineering students across multiple departments while enabling research capabilities in satellite communications, atmospheric science, and RF signal processing. This ground station will allow hundreds of CSU engineering students across multiple disciplines to listen to satellite radio signals as they fly overhead. The 30+ undergraduate students on the Open Orbit CubeSat team will gain invaluable hands-on experience with professional satellite communications equipment. Students interested in Atmospheric Science and Space Systems will have free access to real-time weather satellite data for climate research and environmental monitoring. Electrical Engineering students will work with RF signal processing, antenna design, and software-defined radio systems. Computer Science students will develop satellite data processing algorithms and machine learning applications for image analysis across a variety of applications. Unlike equipment that serves a single course or lab, this ground station will function as permanent, multi-year infrastructure supporting CubeSat missions, research projects, senior design courses, and STEM outreach. This benefits the entire CSU student body through free access to satellite imagery and data.

Name of project: Concrete Canoe Team

Requestee: Eva Fathbruckner

Amount requested: $4,500

Breakdown of cost:

Stand Mixer- $4,291.46

Replacement Drums x2- $125.98

About their ask:

The Concrete Canoe Team at Colorado State University participates annually in the ASCE Student Symposium. Participating in the concrete canoe competition engages engineering students in a rigorous, multidisciplinary project that simulates a professional design-build process. The competition challenges teams to respond to a mock Request for Proposal (RFP) by researching, designing, and fabricating a functional concrete canoe. Complete with technical documentation that mirrors industry standards, the competition challenges students to think about every aspect of a project from start to completion and all the detail that goes into it. This hands-on experience exposes students to critical engineering practices including CAD modeling, CNC mold fabrication, and concrete mix design. With no previous experience needed, new recruits can gain deeper understandings of topics that they may not learn until future classes or depending on their major may have never learned at all. One of the most critical portions of the project includes the mix design. In creating a mix design students must use precise proportioning and thorough blending of aggregates and cementitious materials to achieve a lightweight yet structurally sound composite. When attempting to create a product that not only looks good but performs well in competition, there must be a certain level of consistency and quality control. Currently, our team lacks access to a dedicated concrete stand mixer, which significantly limits our ability to produce consistent, high-quality batches and complicates logistics on pour day. We are requesting funding to purchase a concrete stand mixer to improve the quality, efficiency, and safety of our fabrication process. The mixer will enable better control over material consistency, reduce physical strain on team members, and support iterative testing during mix development. Currently our team uses a process which includes a handheld drill with a mixer attachment, this severely hinders the pour process and the professional quality of the product our team presents. This investment will directly enhance the educational value of the project by allowing students to engage more deeply with materials engineering and construction practices in a controlled, professional setting. The stand mixer would benefit not only current members of the team but future teams and students as well as it would be used in many years to come. It is important to note; the Concrete Canoe Team is open to engineering students of all majors. This inclusive structure allows participants

to explore roles aligned with their interests whether in design, materials, documentation, or project management, gaining exposure to multiple engineering disciplines and building confidence through real-world collaboration. By exposing students to experiences that are invaluable to engineers they are able to build their problem-solving capabilities becoming better rounded and prepared for their futures.

Name of project: Preparing students for the AI Revolution with Low-Cost Robotics

Requestee: Jianguo Zhao

Amount requested: $8,000

Breakdown of cost:

20 × Robotis OMX Manipulator Kits, including 5-DOF manipulator, gripper, control board, and power supply ~$400 each, depending on configuration and shipping

About their ask:

This proposal requests funding to purchase 20 units of the Robotis OMX robotic arm, a low-cost, open-source manipulator designed for education and AI-based control. These robotic arms will provide engineering students with hands-on experience in robotics, control, and artificial intelligence—skills that are increasingly essential in today's technology-driven world. By enabling both low-level motor control and high-level ROS-based programming, the OMX platform allows students to bridge theoretical knowledge with practical implementation, deepening their understanding of kinematics, dynamics, and modern automation. The robots will serve as the primary hardware platform for the new course MECH 416: Robotic Manipulation and will also support a range of Mechanical and Electrical Engineering courses, including Mechatronics, Control Systems, and Robot Programming. Through interactive experiments, coding, and design projects, students will learn to connect mathematical models, sensing, and actuation in a tangible and engaging way—preparing them to lead in the era of intelligent and autonomous systems.

Name of project: Spray Drying – A sustainable process for food and pharmaceutical engineering

Requestee: German Parada

Amount requested: $ 20,000

Breakdown of cost:

The education price for this equipment is $42,800 + $1,500 for shipping (from the Manufacturer's quote). We request $20,000 from the ESTC, and plan to fund the rest (~24.5k) with the Chemical Engineering Type D lab funds.

About their ask:

Spray drying is a common manufacturing process in the pharmaceuticals, food, and beverage industries. Given Colorado's growing biotech and alternative protein sectors, experience with this technology will better prepare CSU engineers for internships and post-graduation positions. This proposal recommends acquiring a compact lab-scale Spray Dryer from Armfield (model FT30-MKIII). This unit supports a wide variety of feed solutions and uses small-medium volumes, which makes it ideal for classes, senior design, and other interdisciplinary projects. Bringing this equipment to CSU will strengthen experiential learning in our curriculum and provide students with practical skills aligned with industry needs.

Name of project: HAAS HA-5C Attachment

Requestee: Noah Wood

Amount requested: $15,790

Breakdown of cost:

HA-5C attachment - $12,595

4th-axis drive and wiring - $3,195

About their ask:

The HA-5C is a single-axis rotary attachment for the HAAS CNC Mills in the Engineering Manufacturing Education Center. This attachment would give our mills full 4th-axis machining capability. It is by far the most cost-effective way to improve our on-campus machining ability. It would be used by engineering clubs, students completing class projects, senior design students, and researchers. This attachment would open the door for more incredibly complex designs to be brought to life at no extra cost to the students. The only current way for students to make 4th and 5th axis machined components is through the Rapid

Prototyping Lab. This is not only incredibly cost-prohibitive to most students, it also moves the most advanced machining off-campus. Purchasing the HA-5C attachment will both increase the complexity of designs possible on campus and help the most technical projects get off the ground.

Name of project: Graduate Multimedia Production Room in the Department of Atmospheric Science
Requestee: Delián Colón-Burgos

Amount requested: $6,000

Breakdown of cost:

Camera:
- Nikon Z7 II Mirrorless Camera with 50mm f/1.4 Lens and Basic Bundle (includes battery and charger), $3000
- Aluminum Camera Tripod Stand, $30
- Nikon EN-EL15c Lithium-Ion Battery x1, $60
- 128GB SD memory card, $40
- ProGrade Digital card reader (for video transfer), $80
- Logitech Brio 4K Webcam, $140

Audio:
- Polsen MO-IDL1-MK2 Omnidirectional Lavalier Microphone for DSLR Cameras and Smartphones, $25
- DJI Mic 2 Compact Digital Wireless Microphone System/Recorder for Camera & Smartphone, $180
- Rode video shotgun microphone (camera mount), $240
- Rode Podcasting Microphones and Studio Headphones (pair), $350

Lighting:
- LED light for video conferencing, $15
- GVM 800D-RGB LED Light Panel (2-Light Kit), $270

Background/ space decor:
- Frames for atmospheric science related pictures, $100
- Picture printing, $100- CSU Bookstore wall decor, $190
- Acoustic Panels (18-pack) x4, $160
- Greenscreen backdrop with stand, $120
- Curved monitor, $200
- Furniture and setup, $500
- Miscellaneous- cables, extensions, decor mounting, $200

About their ask:

The CSU Seasonal Hurricane forecast, currently led by Dr. Phil Klotzbach, has been running for 42 years. Members of the Department of Atmospheric Science are seen as reliable sources of information on hurricane forecasting, research, and science, and regularly engage with media outlets worldwide. A large part of Colorado State University's media mentions and requests are associated with the Seasonal Hurricane Forecast. During April 1st - October 6th of this year, the CSU Seasonal Hurricane forecast has been featured in 13,900 stories, with a total reach of 55 billion people during this period, according to an earned media measurement report prepared by CSU Marcomm staff. Students in the CSU Seasonal forecast team participate in media inquiries, including TV, radio, and science podcast interviews, engaging global audiences in both English and Spanish. Media engagement in the Department also typically involves conversations on topics such as air quality, prominent satellite missions, and climate science. Digital media needs also parallel a greater demand for graduate students to participate in opportunities such as online academic conferences and produce digital content (e.g., research presentations, course videos, and outreach materials). We currently lack a dedicated space with the proper equipment to meet these multimedia needs. Through this proposal, we are requesting funding to equip a multimedia production room in the Department of Atmospheric Science, including a high-quality camera and accessories, microphones, lighting, acoustic treatment, and background and computer setup. The proposed multimedia room will provide all graduate students, faculty, and staff within the Department of Atmospheric Science with a dedicated, professional-quality space for conducting media interviews (including CSU–led communications like SOURCE and undergraduate journalism outlets like the Rocky Mountain Collegian), podcast or video recordings, high-profile virtual meetings, and other digital communications. The creation of this multimedia room will not only provide students and faculty with the tools to communicate effectively in today's digital landscape but also cultivate valuable professional skills in media literacy, production, and presentation. With a strong history of student-crafted multimedia produced in the department, students will be able to strengthen their ability to communicate their science beyond the classroom and empower them to confidently engage with journalists, policymakers, and the broader public. The Multimedia Production room will provide a high-quality space to showcase the world-class research being done at the Walter Scott, Jr. College of Engineering.