



Grant Application 2023-2024

This SEJF grant application is for all fund requests. Please fill out the application completely, utilizing additional space as appropriate. Supplementary documents may be added in the appendix at the end of the document. For questions about the application, reference the SEJF Grant Proposal Toolkit or ask a program representative.

Submit your completed application (including signatures) by emailing it to the SEJF Grant Program Coordinator, Zinta Lucans. Applications must be signed by your advisor, all members of the project team, and all stakeholders, in order for them to be reviewed. Email: lucansz@wwu.edu.

Application Level: Determine the amount of funding you will require and check or highlight the appropriate category.

	Small Grant: Up to \$5,000. Applications of this size will be reviewed by the Director of the Sustainability Engagement Institute. Small grant applications may be approved, declined, or sent to the SEJF Committee for consideration.
	Medium Grant: Between \$5,001 and \$35,000. Applications of this size will be reviewed by the Director of the Sustainability Engagement Institute for alignment and completeness and then provided to the SEJF Committee. The committee will review the grant application, receive your presentation, and approve or decline the funding request.
X	Large Grant: Over \$35,000. To request funding at this level, you must first complete an SEJF Committee feedback session – please ask an SEJF representative for more information regarding this process or refer to the SEJF Grant Proposal Toolkit. Applications of this size will be reviewed by the Director of the Sustainability Engagement Institute for alignment and completeness and then provided to the SEJF Committee. The committee will review the grant application, receive your presentation, and approve or decline the funding request.

SECTION 1: Project Concept.

a. Project Title: WWU MakerMobile

b. Statement of Purpose:

The MakerMobile initiative will extend access to “make-do-build” experiences to the WWU and surrounding community with the goals of fostering innovation, building community, deconstructing engineering stereotypes, and increasing equitable access to tools and equipment. This customized vehicle will house tools, materials, and technology for users to participate in purposefully designed experiences including workshops, demonstrations, and interactive sessions. The MakerMobile events will be supported primarily by students with assistance from faculty and staff. This will facilitate community building and belonging through peer-to-peer learning and mentorship.

c. Project Description

Makerspaces provide students with open access to resources that help them develop their problem-solving skills, provide opportunities for collaboration, increase self-efficacy, and benefit well-being (Wilczynski, 2015) (Andrews, Borrego, & Boklage, 2021). These types of risk-tolerant environments nurture creativity and innovation while building community through informal student engagement across disciplines and levels (Sheridan, et al., 2014). WWU currently has one small makerspace that is housed in the Engineering & Design building. This 1500 square foot facility, which opened in 2019, provides all WWU students access to 3D printers, laser cutters, vinyl cutters, sewing machines, and open space to collaborate. During the design phase of the makerspace, faculty and staff actively worked to create an environment where people from diverse backgrounds, abilities, and experiences feel welcome, respected, and empowered to participate fully in maker activities.

This past year, the makerspace has seen over 80% increase in use by WWU students. The growth is exciting and indicates a strong student interest in participating in making. However, despite a strong focus on creating a welcoming and inclusive environment, there are still many students who have never been to and/or do not know about the makerspace. This could be due to lack of awareness, perceived barriers, intimidation, lack of interest, or culture/social factors such as perceptions of who belongs in a maker environment. Clearly, there is a need to expand access to “make-do-build” experiences across campus. A mobile unit that can come to where the students are will increase equitable access to intentionally designed make-do-build experiences. The ENGD makerspace is staffed by student employees who work hard to publicize and draw people to the makerspace by hosting events and workshops. The MakerMobile will help extend the reach of the makerspace to students all over campus and will build a connected community of makers.

The MakerMobile will consist of two main components: 1. a specially designed vehicle and 2. interchangeable learning modules. The vehicle, a critical component of this project, serves as the foundational infrastructure unit. More specifically, the vehicle will be a Ford Transit EV (high roof, extended length) that is purposefully designed by students and then “upfitted” and equipped with tools, materials, and equipment to bring maker experiences directly to the WWU community. Figure 1 is an example of what we imagine this looking like (though our layout will be different than this). This vehicle will feature a reconfigurable floor plan that will house interchangeable learning modules. The vehicle floor plan will be designed by a group of faculty and students (see section 3: Project Participants) and will be intentionally designed to accommodate many different types of maker experiences. The ability to custom design the vehicle to meet the needs of the project is critical to success. The actual “upfitting” of the vehicle will be completed by a local company, Freedom Vans, who have agreed to work with the faculty and students involved in this project during both the design and construction phase. This will be a collaborative effort between WWU Engineering & Design students (with guidance from faculty) and Freedom Vans and the two

groups will be working together throughout the upfit phase. The students listed as team members on this proposal will be involved in the upfit process and we will invite other ENGD students to participate as well (however, we will limit the group to 4 students). While it is possible to upfit vans in-house, it would be time-consuming and resource intensive (requiring faculty time and departmental facilities that we do not have). In addition, the unique constraints involved in upfitting a van requires a very specific set of skills and tools. We recognize that a professional upfit will cost more money, however, it will take less time, fewer department resources, and the end result will be better quality. This is important because we want to get the MakerMobile operational as soon as possible, we want it to represent WWU well, and we want the van to last a long time! Also, working with the upfitter will be a good experience for students as it will require them to clearly specify design objectives, communicate ideas effectively, and work with professionals.



Figure 1: What our MakerMobile might look like

The interchangeable learning modules, which will be designed and fabricated by WWU students, will consist of tools, equipment and resources, each supporting a specific maker experience. Each learning module will have a unique focus that aligns with chosen learning outcomes and targets a specific audience (refer to Table 1: Interchangeable Learning Modules for details). Both the vehicle and learning modules will be designed sustainably with a focus on renewable energy (solar power, electric vehicle) and low/zero waste when possible. This “interchangeable” model allows for educational and technological adaptability which ensures that the MakerMobile will be relevant for years to come. We plan to continue to seek funding opportunities that will allow development of new learning modules. We have already investigated continued funding beyond the SEJF, including National Science Foundation grants and industry partners. Unfortunately, most federal funding agencies do not support funding of vehicles due to federal guidelines, which is why initial funding for the infrastructure (vehicle & upfit) are so critical to the success of the project.

Table 1: Interchangeable Learning Modules
<p>Learning Module 1: Social Equity & Engineering Solutions Tools: Traditional makerspace tools & equipment such as 3D printers, laser cutters, vinyl cutter, sewing machines (common to the ENGD makerspace) Focus: Provide students with “make-do-build” experiences designed to showcase STEM as diverse, socially meaningful, impactful, and engaging. Projects will vary (“makers making change,” button making & clothing repair, glass bead making/materials science).</p>
<p>Learning Module 2: Beach Cleanup & Plastics Recycling</p>

Tools: Hand-held plastics identification instruments, student-designed recycling equipment for cleaning, granulating, drying plastics, oven and press to manufacture new products

Focus: Introduce students to the problem of marine debris, ocean plastics, recycling, and promote reduction and reuse of materials; project introduces students to common engineering terminology and equipment through non-traditional applications.

The MakerMobile will provide access to hands-on maker education to WWU students outside of a classroom or laboratory setting. The learning modules will be designed to promote creativity and innovation while empowering students with practical hands-on skills. In addition, the MakerMobile will foster community engagement (both within WWU and with the regional community) through shared learning experiences and projects. Learning modules will be designed to appeal to diverse audiences with specific focus on incorporating elements that work to dispel traditional technocentric masculine stereotypes often associated with making and engineering. Together, these elements foster equitable access to maker education, prioritizing underserved communities and marginalized groups. The MakerMobile events will be supported primarily by students. We plan to have 1-2 paid student employees, called Maker Mobile Ambassadors, who will be responsible for organizing and coordinating MakerMobile events. These students will work with other WWU students to plan and host events. The idea behind the MakerMobile Ambassador position is to facilitate coordination of those who want to use the MakerMobile. It is important to the project team that events are led by students (rather than faculty or staff). Student supported events help to build peer relationships and facilitate community connections across campus.

The benefits of a mobile maker lab include increased accessibility, cost-effectiveness (lower infrastructure costs and investments), broader reach, community engagement, service-learning opportunities, and collaborative experiences. Furthermore, the exchangeable learning modules allows for increased flexibility in programming since additional modules can be developed to align with current trends, student interests, community needs, and research opportunities. Overall, the MakerMobile will offer a versatile and effective platform for delivering makerspace experiences to students (and other audiences), promoting accessibility, engagement, and innovation in STEM learning and outreach efforts. Additionally, we see the MakerMobile as a fantastic marketing tool for WWU.

We are requesting funds to purchase the van, complete the overall design and upfit, and design/build two learning modules. Students will be involved in all phases of the project. As mentioned, the upfit will be a collaborative project with Freedom Vans (guided by students) and will include flooring, walls, cabinetry, and other necessary infrastructure such as solar, electrical, and water (refer to the budget and appendix for a complete list). The design and fabrication of the two learning modules will occur at WWU by the MakerMobile Ambassadors and other student employees in the Engineering and Design department. Funds are needed to pay the MakerMobile Ambassadors (for the first year) and to purchase materials, consumables, and equipment for the learning modules.

References

- Andrews, M., Borrego, M., & Boklage, A. (2021). Self-Efficacy & Belonging: The Impact of Makerspaces. *International Journal of STEM Education*, 8(24).
- Sheridan, K., Halverson, E., Litts, B., Brahms, L., Jacobs-Priebe, L., & Owens, T. (2014). Learning in the making: A comparative case study of three makerspaces. *Harvard Educational Review*, 84(4505-531).
- Wilczynski, V. (2015). Academic Maker Spaces and Engineering Design. *ASEE Annual Conference and Exposition*.

a. Goals:

Project Goals:

1. *Provide equitable access to tools and equipment*
2. *Provide venue for students to explore sustainable solutions to practical problems*
3. *Build community for WWU students*
4. *Dispel common engineering stereotypes*
5. *Foster innovation and creativity*

Project Objectives:

1. *Increase student access to “make-do-build” experiences*
2. *Introduce students to engineering principles that benefit the environment*
3. *Collaborate with other units across campus (ex: Counseling & Wellness; ZeroWaste)*
4. *Create learning modules that encourage alternate images of making, engineering, and technology*
5. *Increase student well-being and sense of belonging*

b. Student Impact:

This project has the potential to positively impact WWU students in many ways. One great thing about the modular learning units is that we can design new units as needed to meet specific needs and outcomes which really makes this project customizable now and into the future.

The below list highlights some of the top student impacts:

- Increases inclusive access to tools & equipment for all WWU students (and staff and faculty too!)
- Brings “making” to students - engages WWU students who may not otherwise come to a makerspace.
- Provides opportunities for all students to collaborate across WWU units (ex: counseling & wellness, Zero Waste, Engineering & Design, etc.)
- Provides opportunities to connect multiple elements: ex: sustainability, well-being, and making.
- Builds WWU community & student engagement by offering hands-on experiences to students in unique ways.
- Provide community engagement & service-learning opportunities now and into the future
- Provides ENGD students with experience upfitting a van with mentoring and support from Freedom Vans (a small, local company) – a great collaborative project opportunity.
- Provides ENGD students with opportunities to design/build learning modules
- Provides evidence that making is important to students and benefits their WWU experience (academically & socially) through faculty research
- Potential to lead to expansion of maker-based facilities on campus
- Goes where the students need it to go!

c. Education and outreach plan:

How do you plan on promoting your project on campus? How will the Western community learn about your efforts? Is there an educational component to your project?

The MakerMobile, being an educational and outreach vehicle, will be largely self-promoting. The van will be easily identifiable and will be designed to attract an audience. For example, the exterior of the van will be outfitted with decals such as “WWU” and “MakerMobile” and “Come Learn with Us.” We plan to setup the MakerMobile in high-profile areas of campus to maximize visibility. We will attend existing WWU events (see below list), host our own events, and partner with others for collaborative events. Each year we will determine an “annual event plan” that outlines our goals for the year along with events we plan to attend. The MakerMobile Ambassadors will take the lead on annual event planning.

Some events will plan to attend:

- AS Fall Info Fair

- Fall Family Weekend
- Admitted Students Day
- Earth Day
- Lawnstock
- Beach Clean-ups
- Health & Wellness Promotion events (these will be collaborative)
- Paint Bellingham Blue

We will promote the van through various methods at the department, college, and university level including social media, email lists, department/college/university announcements, class visits, and flyers. Promotion will include an initial marketing push to introduce the van to students, faculty, and staff. We plan to create a social media account for the MakerMobile where we will share photos, stories, and videos of current and future MakerMobile events. We will also create an interactive dashboard called “Where is the MakerMobile” on the Engineering and Design website where people can track the location of the MakerMobile and view upcoming events.

In addition, we plan to partner with other campus organizations such as Zero Waste, Counseling & Wellness, WWU Alumni Association, Student Technology Center, WWU Surfrider Foundation, and more. Through these partnerships, we hope to reach a larger, broader audience of students and community members. One of the goals of the MakerMobile is to extend make-do-build experiences to students who would not otherwise be inclined to come to a makerspace so it will be important to focus outreach efforts on these partnerships.

The van will reside in the ENGD department and we, the faculty leads on this proposal, will take ownership responsibilities of the van now and into the future. We will oversee the use of the van and will take the lead on developing the annual usage plan, working closely with the MakerMobile Ambassadors. When at events, any student can engage in the activities. The students who take the van to events (MakerMobile Ambassadors) will need training on equipment use, STEM principles, and how to create an equitable and inclusive experience for the users. We will provide students with necessary training prior to the events and will support them during events. If outside groups are interested in using the MakerMobile for a specific purpose, they can work with faculty and the MakerMobile Ambassadors in the planning and facilitation of the event. We aim to have 1-2 collaborative events each quarter. When not at events, the van will be parked in the ENGD parking lot (behind the ET building).

We plan to seek additional external funding for the continuation of MakerMobile Ambassador position and to fund additional learning modules (beyond the first two, which are part of this proposal). We also hope to integrate the MakerMobile Ambassador into existing student employment positions in ENGD that are connected to the Makerspace (our Makerspace Technicians & Student Engagement Liaisons).

d. Metrics:

How will the impact of this project be measured? What are quantitative and/or qualitative metrics that can be tracked?

We will measure the impact of the project using the following metrics:

Design/Build/Implementation

- Number of students involved in the design of the van (upfit)
- Number of learning modules developed
- Number of students involved in design & implementation of the modules
- Number of students employed as MakerMobile Ambassadors
- Knowledge gained through design/build experience (gathered through student employee feedback)

Events:

- Number of events attended
- Number of different locations MakerMobile goes
- Number of participants/event
- Number of collaborative events (ex: Zero Waste)

Impact:

- Participant Feedback – surveys will be administered at select events to gauge participant satisfaction, interest in event, and suggestions for improvements.
- Employee Feedback – we will solicit feedback from the MakerMobile Ambassadors on a regular basis to gauge the impact of the project on their experience and development as a student.
- Impact on Maker Stereotype – this is a more long-term goal where we plan to conduct a research study on the impact of the MakerMobile on student impressions of making and makerspaces

e. Lasting Impact & Ownership:

What is the longevity of this project? How will it impact sustainability, in the long-term, on campus? Which individual, office, or department is taking ownership of this project? Identify the post-SEJF-funding plan.

We expect this project to have a large impact on students and a lasting impact on campus. Due to the nature of the exchangeable learning modules, the MakerMobile can be easily updated and modified to meet current student needs, industry trends, and/or interest areas. Phase 1-3 (for which current funding is being requested through the SEJF) will require a 1-year design & construction phase followed by a year implementation phase. Once designed and constructed, the MakerMobile can be used well into the future. We plan to continue to develop new learning modules over time as funding allows.

We intend to partner closely with the entities on campus that focus on sustainability to help educate students about implementing sustainable practices into their daily lives through our MakerMobile learning modules. Existing collaborations between Engineering & Design and groups like Zero Waste Western, Surfrider, and the AS Recycling Center will be expanded to include a much broader student audience through the mobility of the MakerMobile on campus.

The Engineering & Design Department will take ownership of the vehicle. Jill Davishahl and John Misasi will provide ongoing support for the MakerMobile and the MakerMobile Ambassadors. We have already identified a place to park the vehicle and the lab facilities we will use to design and construct the learning modules. We also identified funding for annual maintenance of the van. We are currently working on identifying external funding sources (industry partners, see Letters of Support in appendix) to support the development of additional learning modules and to support MakerMobile Ambassadors beyond year 1. If funded, the Engineering and Design Department has committed to helping the PIs determine proper funding sources for insurance.

SECTION 2: Sustainability Impact.

- a. How will your project positively support at least one of the four pillars of sustainability at Western?
1. Create economic vitality; 2. Promote well-being; 3. Protect the environment; 4. Uphold social justice.

The MakerMobile will positively impact all four pillars of sustainability at WWU as shown in Figure 2 below.



Figure 2: Impact of MakerMobile on Sustainability Pillars

b. How will your project positively align with Western’s Sustainability Action Plan (SAP)? Please determine how it advances one or more of the ten SAP chapters. For information on the SAP, please refer to the Sustainability Engagement Institute’s website (sustain@wwu.edu) or ask a program representative. The ten SAP chapters are:

1. Built Environment
2. **Campus & Community Engagement**
3. **Curriculum and Research**
4. Dining Services
5. Grounds
6. Investments
7. Procurement
8. **Student Life**
9. Transportation
10. Waste

Primary chapter of alignment: **Campus & Community Engagement**

Explanation: The MakerMobile will have a significant positive impact on campus and community engagement due to its flexible nature and the ability to provide access to hands-on maker education to WWU students outside of a classroom or laboratory setting. The learning modules will focus on connecting students, promoting creativity, and empowering students with practical hands-on skills. The mobile nature of MakerMobile will foster community engagement both within WWU and with the regional community by providing shared learning experiences and projects. The MakerMobile Ambassadors will provide mentorship

and peer-to-peer learning opportunities which build connections between students. And finally, collaborative events will help connect WWU units and break down silos. Together, these elements support goals 2.2 (expand courses and co-curricular programs for first year students that teach about local and regional sustainability issues through community engagement), 2.4 (Establish sustainability-related interactive experiences, cooperatively designed and supported by WWU and community partners, to help build relationships among members of Western, and with the broader community) and 3.2 (Increase use of vibrant, visible, and accessible venues across the Salish Sea Region for community sustainability events).

Additional chapter(s) of alignment and explanation, if applicable: **Curriculum & Research** and **Student Life**

Curriculum & Research: The MakerMobile will impact **curriculum** through the development of learning modules. Furthermore, we will engage in educational **research** that will investigate impact of the MakerMobile on 1. Participants and 2. Student perceptions of engineering/maker stereotypes. This supports goal 1.3 (Identify and promote opportunities for engaged learning in the area of sustainability).

Student Life: In addition, the MakerMobile has the potential to improve **student life** by providing fun, engaging, connecting, creative experiences for students. This connects to goals 1.1 (Increase participation in programs that connect students to sustainability in the local, regional, and global community), goal 2.1 (Enhance and increase co-curricular opportunities for student participation in campus-based sustainable practices), goal 2.2 (Increase student participation in service learning and civic engagement that connects to SEE sustainability), goal 2.3 (Improve sustainability literacy throughout co-curricular learning) and goal 2.5 (Increase and further develop co-curricular education and outreach programs targeting sustainable living practices).



SECTION 3: Project Participants.



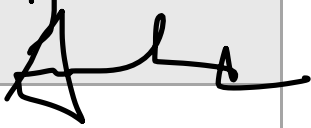
Project Advisor (Faculty or Staff) Student proposals must include a staff or faculty advisor. The role of the advisor is to assist the team during the development, implementation, and post-implementation stages of the proposal process.

Project Lead: There must be a team lead designated for the project. This individual is expected to serve as the communication liaison for the project.

Financial Agent: The project must have someone with budget authority to manage funds for all purchases. Should funds require transfer, this individual will have to provide a FAST Index and Activity Code to the SEJF Program Coordinator. Financial agents must be permanent staff and/or faculty members on campus, and cannot be student employees.

Program Coordinator: A member of the SEJF team will serve as the primary contact for the program and committee.

Role	Name	Department/School: <i>Students provide major/minor and expected graduation quarter/year</i>	Position: <i>Faculty/ staff/ student</i>	Western email address	Signature to verify agreement
<i>Team Advisors</i>	<i>John Misasi Jill Davishahl</i>	Engineering & Design	Faculty	davishj@wwu misasij@wwu	 <i>John Misasi</i>
<i>Team Leads</i>	<i>John Misasi Jill Davishahl</i>	Engineering & Design	Faculty	davishj@wwu misasij@wwu	 <i>John Misasi</i>

<i>Team Member</i>	Kylea Assayag-Nodine	Engineering & Design Industrial Design Major 6/26	Student	vinzank@wwu	
<i>Team Member</i>	Alexa Renshaw	Engineering & Design Polymer Materials 6/26	Student	renshaa@wwu	
<i>Financial Agent</i>	Amy Lazzell	Engineering & Design	Staff	lazzela@wwu	
<i>SEJF Project Coordinator</i>	Zinta Lucans				

SECTION 4: Project Timeline.

a. Describe how your project will progress, both before and after the approval of your proposal. Outline all tasks that are required to complete the project, including all the means in which you will promote the project on campus, in the table below. Insert additional rows, as necessary.





b. When is the planned project completion date?

This project is intended to continue into the foreseeable future. However, the MakerMobile team will work with SEJF on this project until June 12, 2026, when a final report will be provided to the SEJF committee. Interim meetings with the committee will occur quarterly to provide updates on the progress of the MakerMobile.

Phase #	Project Task	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	Jul 25	Aug 25	Sep 25	Oct 25	Nov 25	Dec 25	Jan 26	Feb 26	Mar 26	Apr 26	May 26	Jun 26	
0	Apply for SEJF Funding																										
1	Specify Van with Ford																										
	Purchase Van																										
	Van Design w/ Outfitter																										
2	Upfit Van @ Outfitter																										
3	Learning Module Design @ WWU																										
	Learning Module Build @ WWU																										
	Launch MakerMobile Activities																										
	Monthly WWU MakerMobile Event																										
	Begin MakerMobile Assessments																										
	Compile Data and Analyze																										
	Final Report to SEJF																										

SECTION 5: Project Stakeholders.

a. Does your project involve labor/participation or require permission from organizations, departments, or individuals on campus? Who will be impacted if this proposal is implemented? All stakeholders must provide a signature of approval for this project. *Note: Only stakeholders internal to WWU must be listed.*

Stakeholder Name	University Department and Position	Involvement in Project	Stakeholder signature of approval
Jill Davishahl	Engineering & Design, First Year Program Director, Associate Professor	Principle Investigator	
John Misasi	Engineering & Design, Polymer Materials Engineering Program Director, Associate Professor	Principle Investigator	
David Gill	Engineering & Design, Department Chair	Supervisory Support	
Amy Lazzell	Engineering & Design, Administrative Services Manage	Budget management & financial administration	

b. Does your project propose a temporary or permanent facility or property modification? *N/A*

SECTION 6: Project Budget.

Provide an itemized list of the budget items required for this project. Include equipment, construction costs, publicity, labor, and any other costs.

Itemized Budget.

Budget item	Cost per Item (\$)	Quantity	Total Cost	
PHASE 1: VEHICLE PURCHASE (FY 24)				
Ford eTransit Van	\$59,920.00	1	\$63,814.80	<i>includes tax</i>
PHASE 2: DESIGN, UPFIT, & PLANNING (FY 25)				
Van upfit with Freedom Vans	\$105,660.00	1	\$105,660.00	<i>includes tax, quote in A2</i>
Portable Battery Unit	\$2,000.00	1	\$2,000.00	
Work Gloves	\$10.00	4	\$40.00	
Rubber Gloves (x3)	\$10.00	2	\$20.00	
ShopVac	\$150.00	1	\$150.00	
Extension Cords	\$20.00	3	\$60.00	
Propane Torches	\$50.00	4	\$200.00	
Tweezers	\$10.00	4	\$40.00	
Exacto Knives	\$10.00	4	\$40.00	
Mallets	\$10.00	4	\$40.00	
Hand Drills	\$50.00	4	\$200.00	
PHASE 3: LEARNING MODULES & EVENTS (FY 25)				
80/20 Al T-Slot Framing & Fasteners	\$800.00	1	\$800.00	
Plywood	\$70.00	4	\$280.00	
Poly Pegboard	\$60.00	4	\$240.00	
Caster Wheels	\$35.00	8	\$280.00	
Storage containers	\$60.00	4	\$240.00	
Bottle Jacks	\$40.00	4	\$160.00	
Small Ovens	\$100.00	4	\$400.00	
Aluminum Plates	\$40.00	8	\$320.00	
Blender	\$250.00	1	\$250.00	
Metal Rings (x120)	\$20.00	1	\$20.00	
Recycled Paper (x500)	\$25.00	1	\$25.00	
Large Wash Basins	\$25.00	3	\$75.00	
Hand Shears	\$20.00	4	\$80.00	
Button Press	\$100.00	1	\$100.00	
Mending Kits	\$15.00	4	\$60.00	
Cordless Iron & Ironing Board	\$150.00	1	\$150.00	
Sewing machine	\$300.00	1	\$300.00	
misc consumables	\$500.00	1	\$500.00	
3D printer	\$1,500.00	1	\$1,500.00	
Glass bead stations	\$200.00	4	\$800.00	
MakerMobile Ambassadors	\$3,000.00	2	\$6,000.00	<i>not taxed</i>
			Subtotal	\$184,844.80
			tax	\$843.30 <i>on remaining items</i>
			10% contingency	
			Total	\$185,688.10

Budget Justification.

Phase 1 (FY 2024): Van Purchase - \$63,814.80

Funding of the entirety of the electric van for the MakerMobile is requested as it is the core of the project, and without it, this project cannot be completed. We have pursued other avenues of funding for the van such as grant funding from the National Science Foundation (NSF), WWU’s Foundation, and industry partners, however none of those funding sources were able-to or interested-in purchasing a vehicle for WWU. However, if the van is purchased through SEJF funds, NSF is much more likely to support research that utilizes the van in the future, which could help support the MakerMobile’s operational costs down the road. Similarly, our industry collaborators have stated they are keen to see the project succeed, and are willing to support it via donations and grants once the van is in-house.

Phase 2 (FY2025): Design, Upfit, Planning - \$108,450

The van upfit will include the design and fabrication of the MakerMobile interior at Freedom Vans, and the purchase of tools that will be housed in the van regardless of the event or module being utilized. We are requesting funds for the upfit to be completed in collaboration with a local van upfitting company, Freedom Vans (\$96,936 +tax). Freedom Vans has agreed to mentor our students through the design and upfit process which will be a great learning opportunity for our students. In addition, they have agreed to work directly with their vendors on getting discounts or donations once the design process begins. Freedom Vans expects that, with a September 2024 start date, the upfit would be completed by March 2024 or earlier, allowing us to begin MakerMobile events Summer 2025. Doing the upfit at WWU would be extremely time and resource intensive. We predict that an internal upfit at WWU would require at least 12-18 months, delaying the launch of the MakerMobile by at least a year. Further, although the Engineering Department is technically equipped to perform the upfit at WWU, it would require the shifting of a significant number of campus resources (faculty, laboratory staff, tools, consumables, etc.) from other student activities. Additional funds are requested for tools and supplies that will be housed in the van permanently, such as buckets, extensions cords, hand tools, and an auxiliary battery.

Phase 3 (FY2025): Learning Modules & Initial Events- \$12,580

Learning Module Development

Funding for two learning modules is requested to develop, design, and construct the physical modules, systems, and equipment that will be used for specific events with students. The funds will be used to purchase construction materials, equipment, and event consumables.

MakerMobile Ambassadors

Funding for 2 students to serve as Maker Mobile Ambassadors for 1 academic year. The MakerMobile ambassadors will take the lead on design and development of the learning modules and will support the MakerMobile events during the first year of operation. This will be a collaborative effort with faculty and other ENGD student employees (makerspace employees and student engagement liaisons). We estimate an average of 5 hours per week for 30 weeks at \$20/hour for a total of \$3000 per ambassador. After the first year of funding, we will use a combination of grant funding, donations, and department TA funds to support this position. We are confident we can secure the resources to continue supporting this position.



The SEJF program encourages the identification of additional funding sources to augment SEJF funds, though it is not required. List pending, approved, and denied applications for funding from other sources, along with amounts requested from those sources.

Additional funding source(s), if applicable	Status	Amount
Freedom Vans in kind support – mentoring students through design & construction phase; donation/discount facilitation w/ vendors	Funded	
ENGD Department Support – faculty time, facilities to store vehicle, lab technician support, admin services & management, resources to complete the design &	Agreement of Support	

construction of the learning modules; agree to support ongoing costs		
Industry partners (Syensqo, Toray) – in-kind support as well as funding commitment for next year (Toray)	Agreements of Support	
Total of all other funding sources		\$

Total funding amount requested from SEJF	\$185,688.10 (split over 2 fiscal years per budget)
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If the project is implemented, will there be any ongoing replacement, operational, maintenance or renewal costs? If yes, has a source of funds been identified to cover those costs? This must be communicated to the appropriate stakeholder.

Ongoing cost	Amount/year	Responsible Stakeholder	Signature
Annual van maintenance	\$1000	Engineering & Design (PME) John Misasi, Program Director	
MakerMobile Ambassador (1)	\$3000	Engineering & Design (FYP) Jill Davishahl, Program Director	

SECTION 7: Appendices.

Provide any additional documents, references, or information here.

A1: Ford eTransit Quote



Pricing Summary

Base MSRP ^{§1}	\$54,995
Options ^{§4}	+ \$3,030
Accessories ^{§8}	+ \$0
Destination Charges ^{§17}	+ \$1,895
Total MSRP ^{§16}	= \$59,920
<hr/>	
Estimated Net Price ^{§5}	= \$59,920
<hr/>	

Freedom Vans



freedomvans5150@gmail.com
www.freedomvans.co

Estimate

ADDRESS
WWU

SHIP TO
Jill Davishahl
Western Washington
University

ESTIMATE # 1215
DATE 04/23/2024

ACTIVITY	QTY	RATE	AMOUNT
Foundation			
Insulation 3 in 1 underlayment applied to inside of all exterior sheet metal. 2" rigid foam ceiling insulation. Rockwool filling every wall cavity and over the front headliner. All rockwool insulation covered with plastic vapor barrier. Ceiling foam covered with underlayment after light wiring and foam installation. All materials are moisture resistant and offer vapor protection, sound reduction, and thermal balance.	1	4,100.00	4,100.00T
Paneling 1/4" wood wall panels (choice of stain, paint, or fabric wrap); tongue and groove ceiling (choice of stain or paint); fabric wrapped rear and sliding door pillars	1	6,450.00	6,450.00T
Trim All trim pieces, caulking, electrical conduits, etc.	1	1,825.00	1,825.00T
Floor Laminate plank floor in living space; Coin grip or diamond plate rubber in garage; aluminum trim; subfloor; partially enclosed step with cubby	1	1,575.00	1,575.00T
Subfloor Exterior Grade plywood Moisture sealed subfloor	1	630.00	630.00T
Bed Space			
Dividing wall Dividing wall with door between front driver cabin and rear of van	1	2,075.00	2,075.00T
Seating			
Seating EST_TBD	1	2,525.00	2,525.00T
Kitchen			
Work Bench Work bench with storage	1	6,900.00	6,900.00T
Counter top Maple butcherblock countertop	1	1,550.00	1,550.00T
Stainless Steel Sink Undermount stainless steel sink	1	720.00	720.00T

ACTIVITY	QTY	RATE	AMOUNT
Faucet .Essie Stainless steel Pull-Down Sprayer Kitchen Faucet	1	410.00	410.00T
Outside Table Fold down table mounted to back of kitchen galley for outdoor use	1	930.00	930.00T
Cabinetry			
Overhead Cabinet Overhead cabinet above ***price per linear foot	10	415.00	4,150.00T
Shelves Storage shelves for bins against wall	1	4,800.00	4,800.00T
Headliner Shelf Headliner shelf over front driver and passenger seats	1	1,510.00	1,510.00T
Water System			
Fresh water system 15 gallon fresh water tank mounted in underneath van, plumbing to fixtures, water pump, water pump shut off, tank monitor	1	3,075.00	3,075.00T
Grey Water System 5 gallon bucket with twist off lid for sink drainage	1	310.00	310.00T
Y-valve Drain Y-valve at sink to drain outside	1	520.00	520.00T
Heated Tank Tank heater pads and water line heater pads	1	930.00	930.00T
Water enclosure Water system enclosure	1	2,300.00	2,300.00T
Outdoor Shower Outdoor shower with quick release attachment to water system	1	570.00	570.00T
Hose Kit Quick release hose attachment to water tank with high pressure pump	1	725.00	725.00T
Lights			
Interior Lights 8/10 interior ceiling puck lights with dimmable switches	10	260.00	2,600.00T
Storage Lights 4 lights in the garage storage area	4	260.00	1,040.00T
Undercabinet lights Undercabinet strip lights	2	365.00	730.00T
Sliding Door Light Exterior grade light mounted to interior of sliding door to illuminate outdoor area	1	780.00	780.00T
Rear Door Lights Exterior grade lights mounted to rear doors to illuminate outdoor area	1	990.00	990.00T
Side Lights Exterior LEDs mounted to passenger and driver sides of roof rack and switched at dash	2	625.00	1,250.00T
HVAC			
Fan Maxxair 10 speed rooftop fan with waterproof shroud, white trim	1	1,005.00	1,005.00T

ACTIVITY	QTY	RATE	AMOUNT
ring, exterior fan body color matched to van			
CRL T-vent Windows CRL t-vent awning OEM style full panel windows for sliding door and driver's side front panel; add security screen to sliding door window	2	1,215.00	2,430.00T
Power System			
Lithium battery bank 200 amp hour LiPO4 lithium battery bank with built in battery management system, connected to alternator with battery separator; master disconnect switch	1	4,800.00	4,800.00T
Additional battery Option to add additional lithium battery (100 Ah each)	1	1,365.00	1,365.00T
Inverter 3000 3000 watt pure sine AIMS inverter	1	1,020.00	1,020.00T
Circuit Panel AC distribution panel	1	775.00	775.00T
Fuse block DC distribution	2	470.00	940.00T
Shore Power 60 amp battery charger with 15 amp plug in	1	875.00	875.00T
AC outlet AC Outlets	3	225.00	675.00T
DC outlet DC Outlets	2	225.00	450.00T
Solar 60 cell solar panels (approx 370+ watts solar) , Victron solar charge controller, and Victron smart solar battery monitor	1	2,650.00	2,650.00T
Power System Enclosure Power system enclosure with shelf above	1	2,300.00	2,300.00T
LTE booster We Boost LTE booster (5G) Drive Reach Overlander	1	1,230.00	1,230.00T
Exterior			
Air compressor VIAIR Constant Duty Onboard Air System; mounted underneath van with interior metal control panel	1	1,810.00	1,810.00T
Awning Fiamma mechanical ****F80S awning mounted to roof rails (Sprinter)/ F45S awning mounted to side of van (Transit)***** (black case with gray awning)	1	2,090.00	2,090.00T
Ladder AL Aluminess rear door mount ladder	1	1,560.00	1,560.00T
Passenger Side Step Passenger side custom welded low clearance step	1	1,550.00	1,550.00T
Driver side Step Driver side custom welded low clearance step	1	940.00	940.00T
Rear step Van Compass Rear Step w/ D rings	1	570.00	570.00T
Roof Rack Custom roof rack	1	5,590.00	5,590.00T

ACTIVITY	QTY	RATE	AMOUNT
			Subtotal: 90,595.00
Project Management service charge for design, material acquisition, and project management	0.07	90,595.00	6,341.65T

SUBTOTAL	96,936.65
TAX	8,724.30
TOTAL	\$105,660.95



Dear SEJF Committee,

I am writing to express Syensqo's enthusiastic support for the WWU MakerMobile project and its alignment with our mission and values. We are committed to fostering innovation, creativity, and inclusivity in engineering, and we believe that the MakerMobile project embodies these principles.

The goals of the MakerMobile project resonate with us, particularly in its aim to bring "make-do-build" experiences to students and communities. This hands-on approach not only fosters a deeper understanding of science and engineering but also cultivates problem-solving skills and creativity in individuals of all backgrounds.

Furthermore, we are excited about the opportunity for students to explore solutions to practical problems through the project. By dispelling common engineering stereotypes and showcasing the collaborative nature of engineering, this initiative not only educates but also inspires the next generation of engineers.

Syensqo is especially supportive of the project's focus on increasing diversity in engineering through meaningful, small-scale projects in composites, sustainability/circularity, and aerospace. We believe that by providing practical, complex engineering projects for WWU students, the MakerMobile project will not only build awareness of local industry and engineering careers but also empower students from underrepresented backgrounds to pursue careers in STEM fields.

Syensqo is excited to stand behind the MakerMobile project and looks forward to continuing our partnership with WWU Engineering and Design to achieve its ambitious goals. Specifically we are happy to commit scientist hours for advisement.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Frazee", is written over a light blue horizontal line.

Andrew Frazee, Ph.D.



Toray Composite Materials America, Inc.
19002 50th Avenue East,
Tacoma, WA 98446

Dear SEJF Committee,

I am writing to express Toray Composite Material America, Inc. (CMA) support for the WWU MakerMobile project and its alignment with our mission and values. We are committed to fostering innovation, creativity, and inclusivity in engineering, and we believe that the MakerMobile project embodies these principles wholeheartedly.

The goals of the MakerMobile project resonate deeply with us, particularly in its aim to bring "make-do-build" experiences to students and communities. This hands-on approach not only fosters a deeper understanding of science and engineering but also cultivates problem-solving skills and creativity in individuals of all backgrounds.

Furthermore, we are excited about the opportunity for students to explore solutions to practical problems through the project. By dispelling common engineering stereotypes and showcasing the collaborative nature of engineering, this initiative not only educates but also inspires the next generation of engineers.

Toray CMA is especially supportive of the project's focus on increasing diversity in engineering through meaningful, small-scale projects in composites, sustainability/circularity, and aerospace. We believe that by providing practical, complex engineering projects for WWU students, the MakerMobile project will not only build awareness of local industry and engineering careers but also empower students from underrepresented backgrounds to pursue careers in STEM fields.

Toray CMA is excited to stand behind the MakerMobile project and looks forward to continuing our partnership with WWU Engineering and Design to achieve its ambitious goals. Specifically, we will provide our material and expertise "in-kind" to support project creation and execution, and will consider a cash contribution once the MakerMobile project has been formalized. We commend the SEJF Committee for supporting initiatives that promote sustainability, equity, and justice, and we are grateful for the opportunity to contribute to such a worthy cause.

Sincerely,

Damon Call
Senior Manager, Technical Service
April 26, 2024

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