



Mountie Makerspace Business Plan

Mission Statement

The mission of the Mt. SAC Makerspace (Mountie MakerSpace) is to drive member success and innovation by creating an environment where Mt. SAC students, faculty, staff and the community can collaborate on the creation of tangible items and entrepreneurial ideas. The Makerspace serves as a hub for project based learning across instructional areas by providing the tools and space to complete practical and artistic projects that emphasize the skills required for 21st century employment.

Core Goals

- Hub for project based learning in instructional programs
- Enable the development of employment skills
- Provide a place for collaboration in the creation of tangible things
- Support contract Ed and Non credit programs
- Raise profile of Mt. SAC in the community
- Support entrepreneurship

Vision

All Mt. SAC & Non credit students, staff, faculty, administrators and local community members have access to space, tools and mentors which enables them to implement their visions in concrete form.

Introduction

As Laura Fleming wrote: "Great MakerSpaces democratize learning. They make materials, supplies, and concepts available and accessible to all learners." We are building an environment that encourages tinkering, play, and open-ended exploration for everyone. The United States Department of Education's "Educational Technology Plan" outlines a path for all those involved in American education to "ensure equity of access to transformational learning experiences enabled by technology". Equity and access are at the heart of ensuring that all students have the opportunities available to them that our MakerSpaces presents.

Here are some resources that support the use of MakerSpaces to enhance equity.

- <https://www.edutopia.org/blog/makerspaces-equal-access-to-learning-laura-fleming-billy-krakower>
- <https://mitpress.mit.edu/books/confronting-challenges-participatory-culture>
- <https://worlds-of-learning.com/2017/03/07/agile-makerspaces/>

What is a MakerSpace?

A MakerSpace is a physical location where many different people, including veterans, first generation/basic skills, socio-economically disadvantaged and foster youth students, gather to share resources and knowledge, work on projects, share ideas, and build; like a community center with tools. MakerSpaces combine manufacturing equipment, community, and education so members can design, prototype and build items that they normally would not have the resources to create. Expert advisors are available, but often members get help from other users.

The concept emerged from the technology-driven “maker culture,” associated with Make magazine and the Maker Faire it promotes. This idea of a collaborative studio space for creative endeavors has caught hold in education, where the informal combination of lab, shop, and conference room form a compelling argument for learning through hands-on exploration. On campuses, the MakerSpace is being embraced by the arts as well as the sciences, and a new energy is building around multidisciplinary collaborative efforts. Finally, entrepreneurship is promoted through MakerSpaces by enabling production of prototypes and, often, “Shark Tank”-type presentations to investors.

The Mt. SAC Mountie MakerSpace:

The Mountie MakerSpace opened early in Fall 2017, in Building F7 on the eastern edge of the Mt. SAC campus, between the equine facilities and parking lot F, and just east of Building 40.

The MakerSpace might be the only space on campus in which learners are empowered to follow their own processes for making and creating, rather than following prescriptive processes dictated by someone else. This type of flexible, self-directed learning will empower as well as enhance all learners' unique learning abilities. A differentiated MakerSpace can allow students of all abilities to participate, experience success, and ultimately flourish.

All students may use the Mountie MakerSpace as a benefit of their normal Mt. SAC fees and tuition. Faculty and staff may also sign up for free. Community members must sign up through Community Education before becoming Mountie MakerSpace members. All members are required to follow policies and procedures and to sign a liability waiver. They are required to receive safety training before any use of tools. Access to tools is predicated upon MakerSpace Technicians' assessment of each members' knowledge and ability to use tools safely.

Some tools or equipment may be reserved for certain times, and some may be only available on a walk-in basis. There may be times when groups are in the Mountie MakerSpace, but the entire space will never be reserved exclusively during normal open hours. There also are open work surfaces which are not dedicated to any particular kind of making. Members are encouraged to use these areas for projects.

There are occasional workshops and training held in the Mountie MakerSpace, but in general members are expected to learn to use equipment through other sources (we can recommend them). Funding will help to support expert Technicians who will be available during extended open hours to assist with problems or questions for members, including veterans, first generation/basic skills, socio-economically disadvantaged and foster youth students.

With enough funding, training will be available to some students through our “Maker Skills Academy”, where students are trained off-campus at two partner MakerSpaces, to use equipment and tools. Then students will be assisted in finding an internship or job opportunities on-campus or off, which utilize these skills.

The ability to offer open access to materials, supplies, and easy-to-start activities will guarantee successful and independent learners while limiting frustration. Despite this low barrier of entry, it's also possible to ensure that students find challenges here with the opportunity to take their learning as far as they choose -- a student-driven learning environment.

There are open social meetings with shared food once a month in the Space, occasionally with experts speaking about certain techniques or experiences, and always as an opportunity to get to know other members in an informal setting. In addition there are large, open-to-everyone open house events once per semester, and an art show once per year, featuring art created with some MakerSpace connection. Clubs and groups such as the Society of Women Engineers are hosted, and support the activities of their members in making. Members are encouraged to provide mentoring and role modeling for other members, including deaf/hard-of-hearing, veterans, first generation/basic skills, socio-economically disadvantaged and foster youth students.

How are Mt. SAC Faculty involved?

Mt. SAC faculty are encouraged to incorporate the use of MakerSpace tools, resources and experts into their curricula. This can be done by assigning the creation of an item, or by encouraging students to use the MakerSpace for homework or projects on a one-time or ongoing basis. Faculty may bring their students into the Mountie MakerSpace to orient and introduce the students to the facility. We will provide guidelines for the students to understand before the orientation, and everyone will be required to sign a liability waiver and take a safety tour when they visit.

Mountie MakerSpace managers and technicians can meet with faculty individually or in groups (based on department or subject matter) to discuss potential projects, assignments or components of instruction to benefit veterans, first generation/basic skills, socio-economically disadvantaged and foster youth students.

What would Funding Support?

- Technicians to provide expert guidance
- Student workers/ Tutors to provide peer support, assistance and mentoring
- Project supplies to support: laser cutter, 3D printer, CNC router, button maker, vinyl cutter and more
- Equipment repairs to support safe and effective equipment use by members
- Administrative assistance to support membership, safety tracking and reporting
- Project Management to plan and publicize events, make connections in the business community, collect and produce data and reports, and to plan for future activities and expansion including applying for funding from other sources
- Maker Skills Academy: paid training for student members to master skills in laser cutting, 3D printing, vinyl cutting, CNC routing, wood and metal fabrication and welding
- Faculty release time to advocate for and coordinate the infrastructure required to obtain the resources that support members and to further integrate making into the curriculum
- Faculty professional development to enable faculty to help members use the Makerspace more effectively and to integrate project-based learning into more disciplines
- Through collaboration with Cal Poly Pomona's iLab, members will have the opportunity to participate in the CPP "Innovation Weekend". During this event, members will get to spend three days at CPP learning about entrepreneurship, doing market research, developing a product prototype at the Mountie MakerSpace and then presenting their ideas to a panel of Entrepreneurs / Investors. Equity support could provide materials for the entrepreneurs and facilitate attendance by covering any fees or charges required to participate. If this event no longer occurs, similar opportunities will be offered.

Financial

Funds received:

- CCC Maker Grant 2017-2019 **FUNDED total \$540,000**
 - 2016-2017 - \$40,000 Seed Grant to prepare for starting up the Space
 - 2017-2018 - \$250,000
 - 2018-2019 - \$250,000
- Associated Student Funding (to purchase supplies for use by members) **FUNDED total \$3439**
 - Spring 2018 - \$1,000
 - Fall 2018 - \$1,350
 - Spring 2019 - \$1,089

- Immediate Needs June 1st - 30th 2019, FUNDED total \$16,653
 - Faculty release time
 - 2 Part-time technicians 25 hrs/week
 - 1 Project Manager 25hrs/week
 - Student workers
 - Maintenance supplies
- Immediate Needs August - September 2019, FUNDED total \$ 27,732
 - Faculty release time
 - 2 Part-time technicians 25 hrs/week
 - 1 Project Manager 25hrs/week
 - Student workers
 - Maintenance supplies
- Donations
 - Donations held by Mt. SAC Foundation - \$1,590
 - Scrap wood from Theater after each show
 - The farm has donated and invested \$ 25,826.85 worth of supplies, equipment and land improvements to the Makerspace
 - The Architecture, Industrial Design Engineering, and Manufacturing Department donated \$28,280 worth of equipment
 - The Air Conditioning and Welding Department donated an arc welder and an english wheel worth \$ 1,550.
 - Jan 12th 2019 received Kiln (~ \$ 1,000) from John Egbert
 - Potters wheel spring 2019 Mala Arthur (~\$1200)
 - Sewing-work supplies from various members
 - Variety of tooling and supplies from Professor Betsy Lawlor
 - Extension cord, pens, notebooks, leatherworking tools, accessories making tools and supplies, and prizes for events from retired Mt. SAC event service technician and valued member, James Gonzales
- Volunteers
 - Volunteers from Cal Poly Pomona students from IEEE, WE and a senior project team of Jenny Zhen Yu for the Robotics Event "October Obliteration" hosted in October 2018
 - Volunteers at the *Combat Robot Events* Team during October Obliteration 2018 and SparkleCon SMASH 2019
 - Volunteers from the community and faculty for various outreach events including Open House activities, MFG Day, art show and other events

Funds Applied For:

- NSF AISL (Advancing Informal STEM Learning) DENIED
 - *"Promoting Educational Attainment in Underserved Populations through MakerSpace Participation"*
 - Application Date: November 2018
 - \$ 1,288,600 over three years
 - Supposed to hear from them by April 2019
 - Government shut-down slowed operations, notification Aug 26, 2019

- Strong Workforce 2018-2019 **PENDING**
 - Application Date: March 2019
 - \$10,000 to support student workers as part of the Mechanical Engineering Technology and General Engineering Technology proposals
 - **Funded pending state delivery of funds and issue between Engineering and Electronics Depts**
- Strong Workforce 2017-2018 **DENIED**
 - o Applied for \$ 81,212 for supplies, full time tech, faculty release time
 - o Proposal not approved due to staff position, committee decided they would not fund in 2017
- Campus equity funds 2017 - 18, 2018 - 19 **DENIED**
 - o Applied for 95,085 dollars for supplies, full time tech, student workers
 - o Informed that there was no way to evaluate effectiveness of existing programs and fund new programs

Institutionalization of the Makerspace

Long Term Funding Sources:

Apportionment: Community College funding to districts is allocated based on student enrollment. The Mountie MakerSpace staff have worked with Community Ed to develop a VOC FAB course that would allow credit and non-credit students to participate in an open entry/exit course that would collect apportionment for all of their eligible hours in the MakerSpace. Based on the type of activity in the MakerSpace, this is valued at ~\$6.62/ hour. However, since a Faculty Member of Record must be present during all open hours, cost to pay faculty could be as much as \$115,000/year at the non-instructional rate, according to Associate VP of Continuing Education Madelyn Arballo. She calculated, to break even we need an average of 15 students per hour. We are not there yet, but have plans to increase attendance. In addition, community members would not be charged to sign up, so the College would lose the \$46/semester, \$23/winter session and \$15/week fees that have been collected. The total for these fees for FY 18/19 is \$2492.

Equity funds: The Mountie MakerSpace is fundamentally an equity area. Mt. SAC has provided excellent facilities to support students whose out of class work involves textbooks and writing, but has not treated equitably students who have welding, construction or other making-type homework assignments. Most of our students are expected to complete a substantial number of hands-on out of class projects and the MakerSpace provides a facility for them to do so. The campus receives equity funds to support a student equity mission. A survey of programs on campus shows that the campus provides support of between \$4.20/hr and \$782/hr for student equity programs with the mean at \$5/hr. Mountie MakerSpace is usually open 39 hours/week for 44 weeks/year, so at the mean rate would receive \$195/week, totaling \$8,580/year.

Contract Education: The Mountie MakerSpace is eager to offer contract education programs for community partners. There are currently opportunities such as the Metropolitan Water District apprenticeship program and the solar installer training program which are not currently served by campus facilities and can bring in additional revenue to the college. Potential amounts have yet to be calculated.

Community Memberships The MakerSpace currently charges community members to use the space through the Community Ed non-credit class. See the Apportionment section above for details.

Foundation Fundraising donations The Mountie MakerSpace has consistently received individual donations of cash or useful items from private individuals to support the mission of the space.

Short Term Funding Sources:

Local Strong Workforce: The Engineering Technology program has submitted two proposals for local strong workforce funds. The Engineering Technology program sees the MakerSpace as a critical component of their program and as part of their proposal they funded two student assistants for the Mountie makerspace for the next three years in order to assist Engineering Technology students in using the space.

Regional Strong Workforce: The Mountie MakerSpace RFID/ digital badging system is considered to be a model for other colleges. A Regional Strong Workforce proposal to support makerspaces and digital badging in the LA / OC Region is currently under preparation. Mt. SAC would continue its leadership role in the MakerSpace movement and serve as a regional resource for MakerSpace development.

| <u>Proposed Financials for the Mountie MakerSpace</u> | | | |
|--|---------------------|-------------------|---------------------|
| Funding Source | Hours / Year | Value / Hr | Total / Year |
| <u>First Year</u> | | | |
| Apportionment | 14,871 | \$6.62 | \$98,446 |
| Equity Funds | 13,235 | \$5.00 | \$66,176 |
| Local Strong Workforce | | | \$10,000 |
| Regional Strong Workforce | | | \$150,000 |
| Contract Ed | 1,000 | \$6.62 | \$6,620 |
| Foundation Fundraising donations | | | \$2,000 |
| Community Ed Memberships | | | \$3,000 |
| | | | \$336,242 |
| <u>Ongoing, per Year</u> | | | |
| Apportionment | 20,000 | \$6.62 | \$132,400 |
| Equity Funds | 17,800 | \$5.00 | \$89,000 |
| Contract Ed | 10,000 | \$6.62 | \$66,200 |
| Foundation Fundraising donations | | | \$10,000 |
| Community Ed Memberships | | | \$3,000 |
| | | | \$300,600 |

Potential Funds:

We have investigated all of the following grant resources:

- NSF “EAGER”
 - Extension of our current teacher prep NSF Grant
 - Amount ~ \$100,000 (max \$300,000)
 - Term: 1 year (max 2 years)
- NSF ITEST
 - Application Deadline: August
- MacArthur Foundation
- Honda
- Pledge LA
- Venture Well
- Lemelson Foundation
- California Office of Economic Development

At this point our Grants Office has advised us that none of these are good avenues for the kind of foundational funding we need to keep the MakerSpace open.

SWOT Analysis

Strengths

- Faculty Involvement: Faculty members of **36 instructional** and **5 non-instructional** departments contributed to the success of the Mountie Makerspace
- Staff members of **21 instructional** and **14 administrative services departments** contributed to the success of the Mountie Makerspace
- High student-member-return-rate due to Faculty members incorporating hands on projects in their curriculum
 - Students get comfortable with the tools available at the mountie makerspace
- Offering a large variety of equipment and tooling to enable members to create almost anything (Digital fabrication, Woodworking, Metalworking)
 - Members are able to start on projects immediately after signing up
 - Techs, employees and mentors can consult on possible approaches to making a project
 - Some training on 3D Printers, Laser Cutter, Soldering, T-shirt making, Stickers, Buttons, Sewing
- Open Hours are targeted towards students (M-Th 4-10pm, F 3-10pm, Sat 11am-7pm)
- Strong Database system and analysis of member activities in the Space
- RFID System allows us to track hours of usage on each machine by each member
- Perceived as leaders/ trendsetters by other colleges and universities; consultations at Mountie MakerSpace with 6 different community colleges, 2 Cal State colleges and three private universities, plus presentations at make/SHIFT (April 2019) and MIRA (July 2019) to several hundred attendees

Weaknesses

- Not able to offer extensive training on high-level equipment (Woodworking, Metalworking)
 - Woodworking: Table saw, chop saw, miter saw, CNC router, sanders, corded tools
 - Metalworking: Plasma cutting, Milling, Lathes, Welding
- Solutions
 - Option 1: list appropriate Mt. SAC classes including **current** CRN codes
 - Option 2: refer members to partner makerspaces that offer training (Umakers, MAGLab)
 - Option 3: self-training through videos, members may ask experienced members in the MakerSpace to demonstrate usage of equipment
- Lack of Funding
 - No funding for staff support when classes, clubs or groups visit outside of operating hours
 - Reasons for staff support when classes visit:
 - Ensure safety of everyone involved
 - Provide a “safety-tour” to ensure that boundaries are made clear to visitors
 - Locate needed items and supplies easily and ensure items are put away
 - Issues
 - Professors struggle to bring in students during class time. Thus, often limited to referring their students to the MakerSpace on students’ personal time
 - Professors are unable to incorporate project based learning into their curriculum because time and resources are tight, hard to grade results
 - Professors or students do not show up at agreed time
 - Solutions
 - Techs come in early to work (their usual shift is 7 hours long)
 - Project Manager or Faculty Lead comes in
 - Not enough workers in the space during operating hours
 - Try to have 1 Tech, at least 2 student workers at all times to provide service to members
 - As attendance grows, we lose the capacity to complete maintenance and repairs on equipment and also support all members who visit the space
 - Issues:
 - Techs have responsibility to manage student workers, maintain the equipment in the makerspace, repair broken equipment, give tours to potential and new members, safety test members to higher “levels” (this refers to the usage of certain equipment) and assist members as needed in addition to record-keeping and general management of people and things
 - When equipment is broken, the space is less useful to members
 - Solutions
 - Increase tech hours per week, possibly by adding another p/t tech
 - Balance tech hours between open and closed time to complete necessary repairs and maintenance
 - Give qualified student workers increased responsibility for maintenance
 - Hire more student workers

Opportunities

- Growing demand for MakerSpace services; the number of users has increased every semester as well as the number of logged hours
- Increasing recognition of the leadership of the Mountie MakerSpace in the community college MakerSpace movement; invited to present at MIRA (Makerspaces for Innovation and Research in Academics) conference and NACCE (National Association for Community College Entrepreneurship) make/SHIFT conference. In addition, Mt. SAC serves as the regional organizer for community colleges in the CCCMaker alliance and is perceived as a leader by four-year institutions
- Increasing recognition of the leadership of the Mountie MakerSpace in the four-year college/university movement, resulting in consultations, emails and calls with idea exchanges
- Mountie MakerSpace maintains a 4.8/5.0 rating on google business with over 2000 active searches per month
- The Mountie MakerSpace implementation of an RFID / data collection system serves as a model for institutional implementation by others, including 4-year universities
 - Presentations at national conferences have logged over 28 inquires from universities, colleges and academic libraries about how this system could be implemented at their location
 - Invited workshop on RFID implementation planned for MIRA 2020.
 - Current preparation of a Regional Strong Workforce proposal to implement RFID/ digital badging at regional community colleges

Threats (Risks/Competition)

- Safety is always the highest priority
- Working with faculty to insure that the MakerSpace is not perceived as a threat to existing programs
- Keeping up with member demand for access to the space and equipment there
- Balancing needs of the campus with needs of the larger community
- Now that the MakerSpace has transitioned a previously under-utilized space into one that is highly functional to serve 1500+ students, this now useful space is attractive to areas that do not have sufficient space for their own programs.

Sustainability of the Space

Apportionment

Here are the amounts we could have received based on the student hours accrued from the time we opened until end of Winter 2019, assuming that the apportionment rate for the Makerspace would be \$6.62.

| Semester | Hours | Apportionment |
|-------------|-------|---------------|
| Winter 2019 | 1,959 | \$12,969 |
| Fall 2018 | 3,078 | \$20,376 |
| Spring 2018 | 3,444 | \$22,799 |
| Winter 2018 | 1,030 | \$6,819 |
| Fall 2017 | 1,584 | \$10,486 |

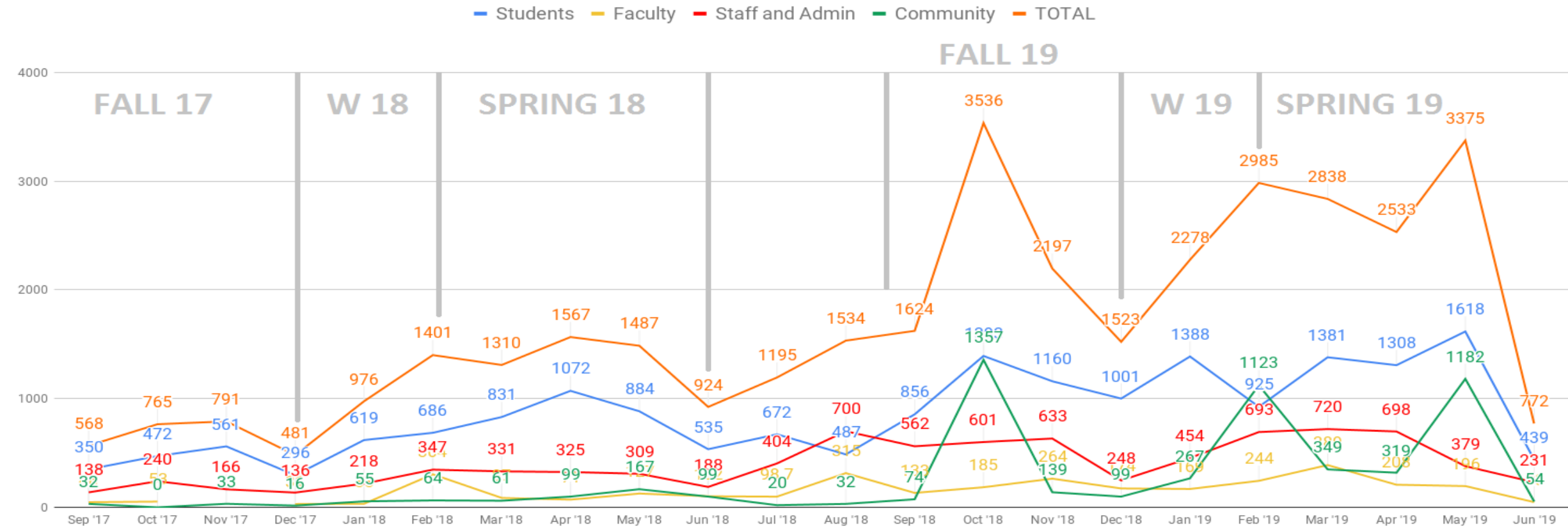
\$73,449

* Spring 2019 has not yet been calculated

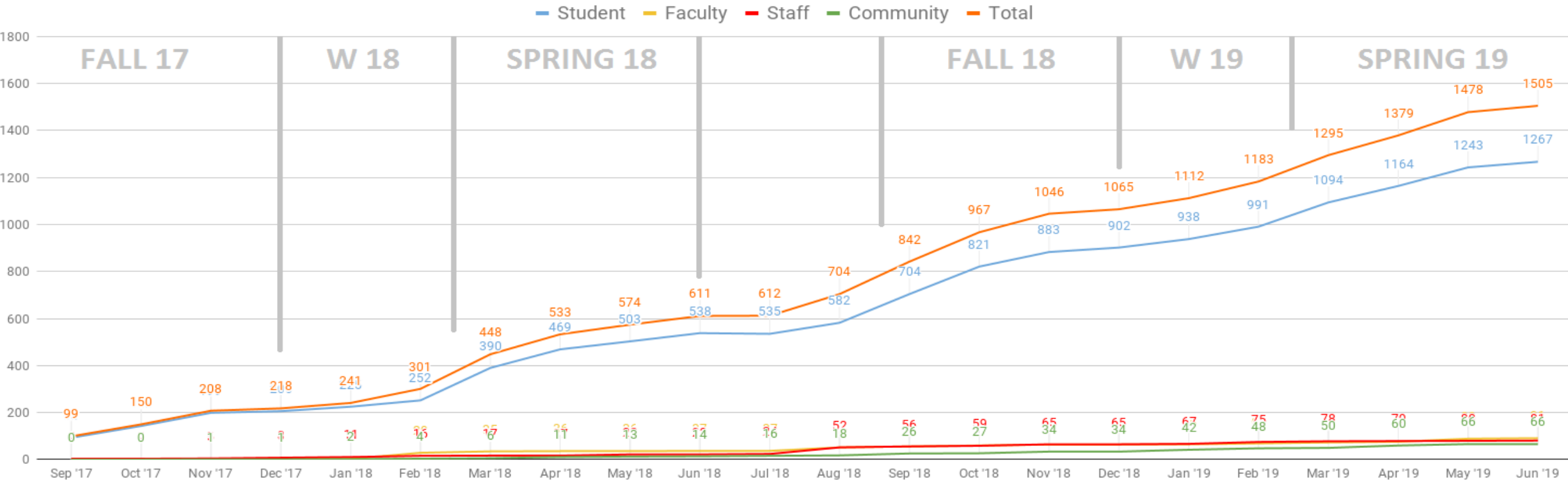
Community Ed Non-Credit Class Fees Received

| Community Ed | Fall 2018 | Winter 2019 | Spring 2019 |
|--------------|-----------|-------------|-------------|
| Full | 18 | 18 | 20 |
| Week | 6 | 2 | 14 |
| Total Amount | 24 | 20 | 34 |
| Total \$ | \$918.00 | \$444.00 | \$1,130.00 |

Member and Non-Member Hours
Between September 1, 2017 and June 30, 2019



Total Members at the End of each Month
Between September 1, 2017 and June 30, 2019



Overview of the Mountie Makerspace

Current Metrics

Number of Members

| Type | Total Members As of June 2019 |
|-----------------|----------------------------------|
| Students | 1,267 |
| Faculty | 91 |
| Staff and Admin | 81 |
| Community | 66 |
| TOTAL | 1,505 |

Member and Non-Member Hours

| Type | Hours Accrued Year 1 | Hours Accrued Year 2 | Total |
|-----------------|-------------------------|-------------------------|---------------|
| Students | 6,306 | 12,627 | 18,933 |
| Faculty | 940 | 2,425 | 3,365 |
| Staff and Admin | 2,398 | 6,323 | 8,721 |
| Community | 626 | 5,015 | 5,641 |
| TOTAL | 10,270 | 26,390 | 36,660 |

Member Visits

| Member Type | # Visits |
|---------------------------------------|--------------|
| Community | 565 |
| Faculty | 528 |
| Staff | 1,578 |
| Student | 5,572 |
| Total Visits to the MakerSpace | 8,318 |

Returning Members

| | # Students returning from previous semesters or intersessions |
|-----------|--|
| 17 Fall | |
| 18 Winter | 20 |
| 18 Spring | 55 |
| 18 Fall | 72 |
| 19 Winter | 57 |
| 19 Spring | 152 |

Class Visits

| Division | # Classes |
|-----------------------|-----------|
| Natural Sciences | 29 |
| Arts | 5 |
| Technology and Health | 19 |
| Continuing Education | 10 |
| Business | 2 |
| Total | 65 |

Students

Student Majors Overview

| Division | # students | # visits | Hours accumulated |
|--------------------------------|--------------|--------------|-------------------|
| Art | 105 | 358 | 895 |
| Business | 61 | 124 | 236 |
| Continuing Education | 53 | 104 | 162 |
| Humanities and Social Sciences | 112 | 275 | 686 |
| Kinesiology & Athletics | 3 | 8 | 20 |
| Natural Sciences | 559 | 3,291 | 11,121 |
| Technology & Health | 320 | 1,181 | 2,956 |
| Undecided | 46 | 244 | 738 |
| Total | 1,259 | 5,585 | 16,814 |

Student Majors by Department

| Division | Department | # students | # visits | Hours accumulated |
|--------------------------------|--|------------|------------|-------------------|
| Art | Commercial & Entertainment Arts | 62 | 218 | 502 |
| | Fine Arts | 4 | 9 | 30 |
| | Music | 15 | 24 | 62 |
| | Theater Arts | 6 | 49 | 138 |
| | Other Arts | 18 | 58 | 162 |
| | Total Arts | 105 | 358 | 895 |
| Business | Accounting and Management | 4 | 12 | 20 |
| | Business Administration | 12 | 20 | 44 |
| | Child Development | 6 | 9 | 19 |
| | Computer Information Systems | 8 | 20 | 48 |
| | Consumer Science and Design Technologies | 8 | 12 | 20 |
| | Other Business | 23 | 51 | 84 |
| | Total Business | 61 | 124 | 236 |
| Continuing Education | Adult Basic Education | 11 | 26 | 40 |
| | Community Education Fee Classes | 41 | 77 | 121 |
| | High School Programs | 1 | 1 | 1 |
| | Total Continuing Education | 53 | 104 | 162 |
| Humanities and Social Sciences | American Language | 5 | 6 | 12 |
| | Art History | | | |

| | | | | |
|-------------------------|---|------------|--------------|---------------|
| | Communications | 8 | 14 | 32 |
| | English, Literature, & Journalism | 10 | 69 | 176 |
| | Geography | | | |
| | History | 7 | 15 | 37 |
| | Philosophy | 2 | 8 | 14 |
| | Political Sciences | 11 | 19 | 45 |
| | Psychology | 31 | 60 | 160 |
| | Sign Language/Interpreting | 3 | 8 | 16 |
| | Sociology | 25 | 56 | 125 |
| | World Languages | 6 | 11 | 33 |
| | Other Humanities and Social Sciences | 4 | 9 | 35 |
| | Total Humanities and Social Sciences | 112 | 275 | 686 |
| Kinesiology & Athletics | Athletics/Team Sports | | | |
| | Dance | | | |
| | Fire Physical Ability Test | | | |
| | Other Kinesiology | 3 | 8 | 20 |
| | Total Kinesiology | 3 | 8 | 20 |
| Natural Sciences | Agricultural Sciences | 46 | 118 | 267 |
| | Biological Sciences | 31 | 70 | 148 |
| | Chemistry | 4 | 12 | 17 |
| | Earth Sciences & Astronomy | 9 | 27 | 62 |
| | Mathematics, Computer Science | 41 | 99 | 240 |
| | Physics, Engineering | 425 | 2,965 | 10,367 |
| | Other Natural Sciences | 3 | 7 | 21 |
| | Total Natural Sciences | 559 | 3,298 | 11,121 |
| Technology & Health | Aeronautics | 10 | 57 | 104 |
| | Air Conditioning and Welding | 24 | 122 | 291 |
| | Aircraft Maintenance Technology | 27 | 32 | 23 |
| | Architecture, IDE & Manufacturing Tech | 198 | 648 | 1,600 |
| | Electronics & Computer Technology | 17 | 73 | 269 |
| | Mental Health | | | |
| | Nursing | 18 | 29 | 52 |
| | Public Safety Programs | 13 | 191 | 573 |
| | Radiologic Technology | | | |
| | Respiratory Therapy | | | |
| | Other Technology & Health | 13 | 29 | 43 |
| | Total Technology and Health | 320 | 1,181 | 2,956 |
| Undecided | | 46 | 244 | 738 |

Clubs

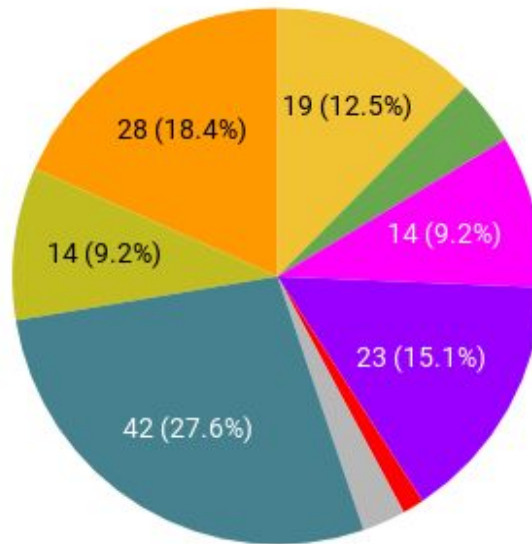
| Club | Activities |
|--|--|
| ACCESS Club (Formerly DSPS) | Created custom t-shirts, and buttons. |
| AFM Club "Accounting, Finance and Management Club" | Created custom t-shirts, and buttons. |
| Animation and Gaming | Students created their own game, including game pieces to exhibit in the Game Fest. Some of those students also DIY-ed their giveaways and trophies for Game Fest 2018 and 2019. |
| Architecture and Design Club | Created a structure to compete in the Design Village 2018 Competition in Cal Poly San Luis Obispo. |
| Bicycle Club | Upgraded their bikes to achieve different performances |
| Chemistry Club | Created custom t-shirts, and buttons. |
| Circle K International | Created custom t-shirts, and buttons. |
| CNSA "California Nursing Students Association" Club | Created custom t-shirts, and buttons. |
| DHH "Deaf or Hard of Hearing" Club | Created funny custom t-shirts, and buttons. |
| Dream Believe Achieve Club | Created custom t-shirts, and buttons. |
| EAGLE "Environmental Action Group for a Livable Earth" | Created custom t-shirts, and buttons. |
| Engineering Club - Rocket Team | Designed and built three rockets, two one-stage and one two-stage rocket with experimental fuel, to compete in both divisions of the FAR-1030 Competition. |
| Horticulture Club | Designed and built an outdoor structure and WON the Spring Garden Show Competition at South Coast Plaza in 2018. |
| Hospitality Club | Visit and brainstorm projects they can do in the space. |
| IDEAS "Improving Dreams Equality Access and Success" | Created custom t-shirts, and buttons. |
| Japanese Culture Club | Created custom t-shirts, and buttons. |
| Lambda Student Association | Created custom t-shirts, and buttons. |
| Math and Engineering Club | Created custom t-shirts, and buttons. Used the Laser cutter to engrave their Logo onto wood to display at the miracle mile. |
| MEChA "Movimiento Estudiantil Chicano de Aztlán" Club | Created custom t-shirts, and buttons. |
| Political Science Club | Created custom t-shirts, and buttons. |
| PTK "Phi Theta Kappa" Club | Created custom t-shirts, and buttons. |
| Robotics Team | Created custom 3D printed parts for their robots to compete region-wide as well as Worlds! |
| RVT "Registered Veterinary Technician" Club | Created custom signs, posters, buttons and prizes for the 2019 Farm Day Event! |
| SHPE "Society of Hispanic Professional Engineers" | Created custom t-shirts, and buttons. |
| SWE "Society of Women Engineers" | Hosted a hand-tooling workshop |
| TRIO/Upward Bound | Created custom t-shirts, and buttons. |

Faculty Involvement

Faculty Year 1 + Year 2

Between September 1, 2017 and June 30, 2019

- Arts
- Business
- Continuing Education
- Humanities and Social Sciences
- Kinesiology and Athletics
- Learning Resources
- Natural Sciences
- Student Services
- Technology and Health



Faculty Department List

| Division | Department |
|--------------------------------|--|
| Arts | Animation |
| | Commercial & Entertainment Arts Department - Film and TV |
| | Fine Arts |
| | Music |
| | Theater |
| Business | Business Administration |
| | Child Development |
| | Computer Information Systems |
| | Consumer Science & Design Technology |
| Continuing Education | Adult Basic Education |
| | Continuing Education |
| | Counselor, ST Vocational |
| | Health careers res ctr |
| | Matriculation - Noncredit |
| | Older Adult Education |
| Humanities and Social Sciences | American Language |
| | Communication |

| | |
|---------------------------|--------------------------------------|
| | English, Literature, Journalism |
| | Foreign Languages |
| | Political Science |
| | Psychology |
| | Sociology |
| | Sociology, Philosophy |
| Kinesiology and Athletics | Kinesiology - Football |
| | Kinesiology - W Soccer |
| Learning Resources | Library |
| Natural Sciences | Agricultural Sciences - Horticulture |
| | Anthropology |
| | Biological Sciences |
| | Chemistry |
| | Earth Sciences, Astronomy - Geology |
| | Mathematics and Computer Sciences |
| | Physics and Engineering |
| | RVT Program SWP |
| Student Services | Counseling and Guidance |
| | DSPS |
| | EOPS |
| | Veteran's Services |
| Technology and Health | Aeronautics |
| | Air Conditioning and Welding |
| | Aircraft Maintenance Technology |
| | Electronics, Computer Tech |
| | Emergency Medical Services |
| | Industrial Design Engineering |
| | Mental Health |
| | Nursing |
| | Public Safety Programs |

Grants and Other Funding

| Grant | Status | Start (approx) | End (approx) | Amount/ Year |
|--|---------|----------------|--------------|--------------|
| CCCMaker | awarded | 01/01/17 | 6/30/17 | 40,000 |
| CCCMaker | awarded | 7/17/17 | 5/31/19 | 250,000 |
| Mt. SAC | awarded | 7/1/17 | 8/15/17 | 3 LHE MMason |
| Strong Work Force 2018 | denied | 7/1/18 | 6/30/20 | 81,000 |
| Equity 2018 | denied | 10/1/18 | ? | |
| Associated Students | awarded | 3/1/18 | 6/15/18 | 1,000 |
| Associated Students | awarded | 9/1/18 | 6/15/19 | 1,350 |
| Associated Students | awarded | 3/15/19 | 6/15/19 | 1,089 |
| NSF AISL | pending | 10/1/19 | 9/30/21 | ~400,000 |
| Strong Work Force 2019, as part of Engineering proposals | pending | 7/1/19 | 6/30/21 | 50,000 |
| Immediate Needs Funds 1 | awarded | 6/1/19 | 6/30/19 | 16,653 |
| Immediate Needs Funds 2 | awarded | 8/1/19 | 9/30/19 | 27,732 |

Conferences

Below is a list of conferences we have hosted or attended to help others and ourselves to improve and expand our respective makerspaces.

| Conference | Date | Hosts | Type | Topic | Speaker(s) |
|-------------------------------------|------------|------------------------------|------------------|---|--|
| CCC Regional Meeting 2018 | 2018-01-11 | Mt. SAC - Mountie Makerspace | Presentation | Membership Policies | Martin Mason, Mala Arthur |
| | | | Presentation | Respect for space, each other, building community trust | Mala Arthur |
| | | | Cracker Barrel | Safety Policies, Shop Safety, Demonstration, Discussion | All |
| | | | Cracker Barrel | Access and Security Policies, Custom Software, Discussion | All |
| | | | Panel Discussion | Makerspace Events - Internal and External | Martin Mason, Mala Arthur, Rob Perhamus |
| | | | Cracker Barrel | Building a Makerspace: Recruiting and Training | All |
| | | | Panel Discussion | Equipment Choices, Discussion | Martin Mason, Trent Wilson |
| | | | Cracker Barrel | Institutionalization | All |
| Makerspace Alliance Conference 2019 | 2019-02-21 | Mt. SAC - Mountie Makerspace | Cracker Barrel | Equipping a Space | All |
| | | | Panel Discussion | Safety Practices | Trenton Wilson, Ben Roslof, Martin Mason, Rob Perhamus |

| | | | | | |
|---|------------|---|------------------|--|---|
| | | | Presentation | Membership Tracking at the Mountie Makerspace | Mala Arthur, Martin Mason |
| | | | Cracker Barrel | Staffing a Makerspace | All |
| | | | Cracker Barrel | Engaging Faculty and Curriculum | All |
| | | | Presentation | RFID Tracking and Digital Badges | Ben Roslof, Martin Mason |
| | | | Cracker Barrel | Events and Outreach | All |
| | | | Panel Discussion | Community Makerspace Collaboration | Trenton Wilson, Timon Trzepacz, Rob Perhamus, Brian Seo |
| | | | Cracker Barrel | Funding a Makerspace | All |
| MIRA - Makerspaces for Innovation and Research in Academics | 2019-07-10 | University of La Verne | Presentation | "Grow Your Makerspace"; Care and "feeding" of a healthy makerspace, including increasing curriculum involvement with faculty, increasing participation by underrepresented members of the Mt. SAC and outsidies communities, and supporting learning, growing and building confidence by making things. | Ben Roslof, Mala Arhur, Martin Mason |
| | | | Exhibit | Examples of RFID security/data system, examples of products | Ben Roslof, Mala Arthur, Martin Mason |
| make/SHIFT, the Makerspace Ecosystem Summit | 2019-04-24 | California Community Colleges CCC Maker, California Colleges Doing What Matters for Jobs and the Economy, and NACCE | Presentation | Making Decisions that Make a Difference From managing makerspace resources to assessing learning and program performance, real time data gathering and analysis can drive makerspace evolution and sustainability while aligning with state reporting metrics. The panel will introduce tracking software, data dashboards, and analytics that demonstrate the effectiveness and value of your makerspace and pose questions for future learning assessment and evaluation on a statewide scale. | Ben Roslof, Mala Arthur |
| | | | Exhibitors | Discussed Operations (Types of memberships, List of Equipment, Database and RFID Systems) | Ben Roslof, Mala Arthur |
| | | | | | |
| | | | | | |
| | | | | | |

Semester Analysis

Apportionment Hours Spring 2019

Hours include student and community member hours

| Days | Week | Hours accrued | Baseline Hours | % achieved | Missing Hours because of server shut down |
|-------------|---------|---------------|----------------|------------|---|
| 2/25 - 3/2 | Week 1 | 268 | 800 | 33.50% | |
| 3/4 - 3/9 | Week 2 | 363 | 800 | 45.38% | |
| 3/11 - 3/16 | Week 3 | 539 | 800 | 67.38% | |
| 3/18 - 3/23 | Week 4 | 498 | 800 | 62.25% | |
| 3/25 - 3/30 | Week 5 | 516 | 800 | 64.50% | |
| 4/2 - 4/6 | Week 6 | 499 | 800 | 62.38% | |
| 4/8 - 4/13 | Week 7 | 506 | 800 | 63.25% | |
| 4/15 - 4/20 | Week 8 | 417 | 800 | 52.13% | |
| 4/22 - 4/27 | Week 9 | 299 | 800 | 37.38% | |
| 4/29 - 5/4 | Week 10 | 106 | 800 | 13.25% | |
| 5/6 - 5/11 | Week 11 | 0 | 800 | 0.00% | |
| 5/13 - 5/18 | Week 12 | 66 | 800 | 8.25% | |
| 5/20 - 5/25 | Week 13 | 853 | 800 | 106.63% | |
| 5/28 - 6/1 | Week 14 | 458 | 800 | 57.25% | |
| 6/3 - 6/8 | Week 15 | 519 | 800 | 64.88% | |
| 6/10 - 6/15 | Week 16 | 363 | 800 | 45.38% | |
| Total | | 5,907 | 12,800.00 | 46.15% | |

This spring semester on May 14th, our server broke down and never went back online. This incident deleted a month's worth of Log data (between April 14th - May 18th).

Fortunately, we managed to recover student login data between April 14-30, however, all other data (community, faculty and staff) between April 14 - May 18th were not recoverable.

If we average the number of hours throughout the rest of the semester except the weeks with missing data (Week 8-13) we would get 412 apportionment hours per week. If we then insert that amount of time in for the weeks with missing data, we get

$$5,907 - (417+299+106+66+853) + (6 \times 412) = \underline{\underline{6,638}}$$

This would bring us up to 6,638 apportionment hours, a little over 50% of the baseline hours we need to achieve for apportionment to pay for itself.

If our student hour growth stays the same, we may be able to achieve the 800 hours per week in the next academic school year.

Social Media Results

Google Business

| Dates | # Who Viewed | # Asked for Directions | # Visited Website | # Called |
|-------------------|--------------|------------------------|-------------------|----------|
| 2019 (Jan-Jun) | 10,648 | 196 | 200 | 48 |
| 2018 (all) | 12,816 | 224 | 217 | 33 |
| 2017 (Sep-Dec) | 538 | 3 | 8 | 1 |

Facebook (sample weeks)

| Dates | post reach | post engagements | new page likes |
|------------------------------------|------------|------------------|----------------|
| 14 April - 11 May 2019 | 390 | 228 | 5 |
| 1-28 April 2019 | 139 | 135 | 5 |
| 26 March - 22 April 2019 | 148 | 134 | 1 |
| 21 March - 7 April 2019 | 157 | 132 | 1 |
| 9 March - 5 April 2019 | 320 | 164 | 7 |
| 3-30 March 2019 | 316 | 149 | 6 |
| 25 February - 4 March 2019 | 319 | 159 | 8 |
| 17 January - 13 February 2019 | 171 | 171 | 9 |
| 5 January - 1 February 2019 | 153 | 129 | 9 |
| 31 December 2018 - 27 January 2019 | 148 | 122 | 8 |
| 25 December 2018 21 January 2019 | 114 | 89 | 6 |

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