MakerSpace: a Place to Start Doing Citizen Science

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uc3m | MAKERSPACE

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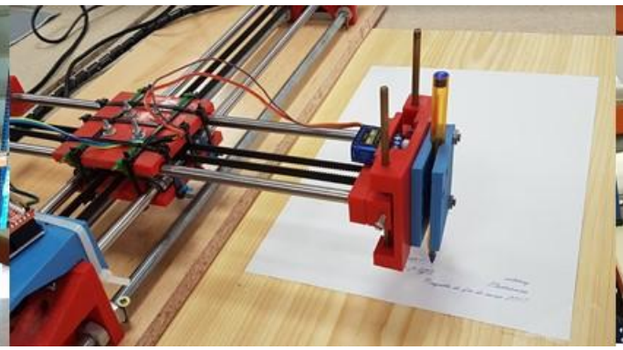
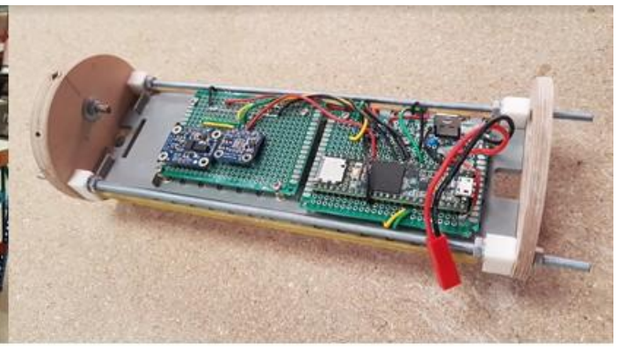




What is a MakerSpace?

- ✔ *A makerspace is a place where patrons have access to tools where they can create and innovate while simultaneously inspiring one another as a community*.

Hannah Pope, Emerging Technologies Librarian in Appalachian State University en *ACRLog: Blogging by and for academic and research libraries*
https://acrlog.org/2016/12/02/make-it-work-starting-a-makerspace-in-an-academic-library-phase-1/

What is a MakerSpace?

- ✔ *A makerspace is a physical space that is used to create and learn through practical, hands on experiences. Fostering community building; makerspaces encourage experimentation, exploration and the sharing of tools, materials, knowledge and expertise. The makerspace is a collaborative, cross-disciplinary space.*

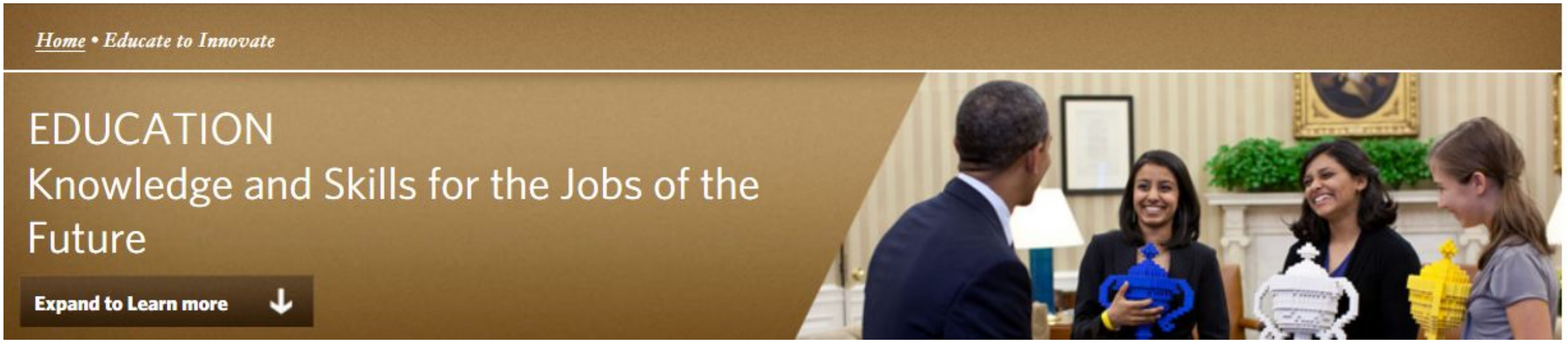
Curtin University. Library Facilities: Makerspace: https://library.curtin.edu.au/facilities/makerspace/

What is a MakerSpace?

- ✔ *Think about new and creative ways to engage young people in science and engineering [and]...encourage young people to create and build and invent—to be makers of things, not just consumers of things*

President Obama's Educate to Innovate initiative, 2009

https://obamawhitehouse.archives.gov/issues/education/k-12/educate-innovate



What is a MakerSpace?

- ✔ *Key concepts:*
  - *Physical space*
  - *Collaborative space*
  - *Tools and special materials*
  - *Exchange of ideas*
  - *Learning by doing*
  - *Creating community*
  - *Fostering innovation*

MakerSpace: Objectives

- ✔ *Fostering that creative and inventive people meet and collaborate*
- ✔ *Promoting and disseminating new technologies, innovation and industrial prototyping*
- ✔ *Encouraging the creation of multidisciplinary working groups that generate innovative solutions based on their previous individual experiences*

UC3M MakerSpace: Schedule

- ✔ Initiative from the EPS Politechnic School. First idea: creating a FabLab
- ✔ External Consulting. December, 2016
- ✔ Decision to create the MakerSpace in the Library. June, 2017
- ✔ Creation of the Working Group, coordinated by the Library. First meeting in September, 2017
- ✔ Project approved by UC3M Executive Board. October, 2017
- ✔ Opening. October 1, 2018

UC3M MakerSpace: Decision Group

- ✔ Vice-President for Scientific Policy
- ✔ Vice-President for Strategy and Digital Education
- ✔ Director of the School of Engineering
- ✔ Deputy Vice-presidents
- ✔ Head of Administration and Finance
- ✔ Head of Library Service
- ✔ Head of Technical Office

UC3M MakerSpace: Working Group

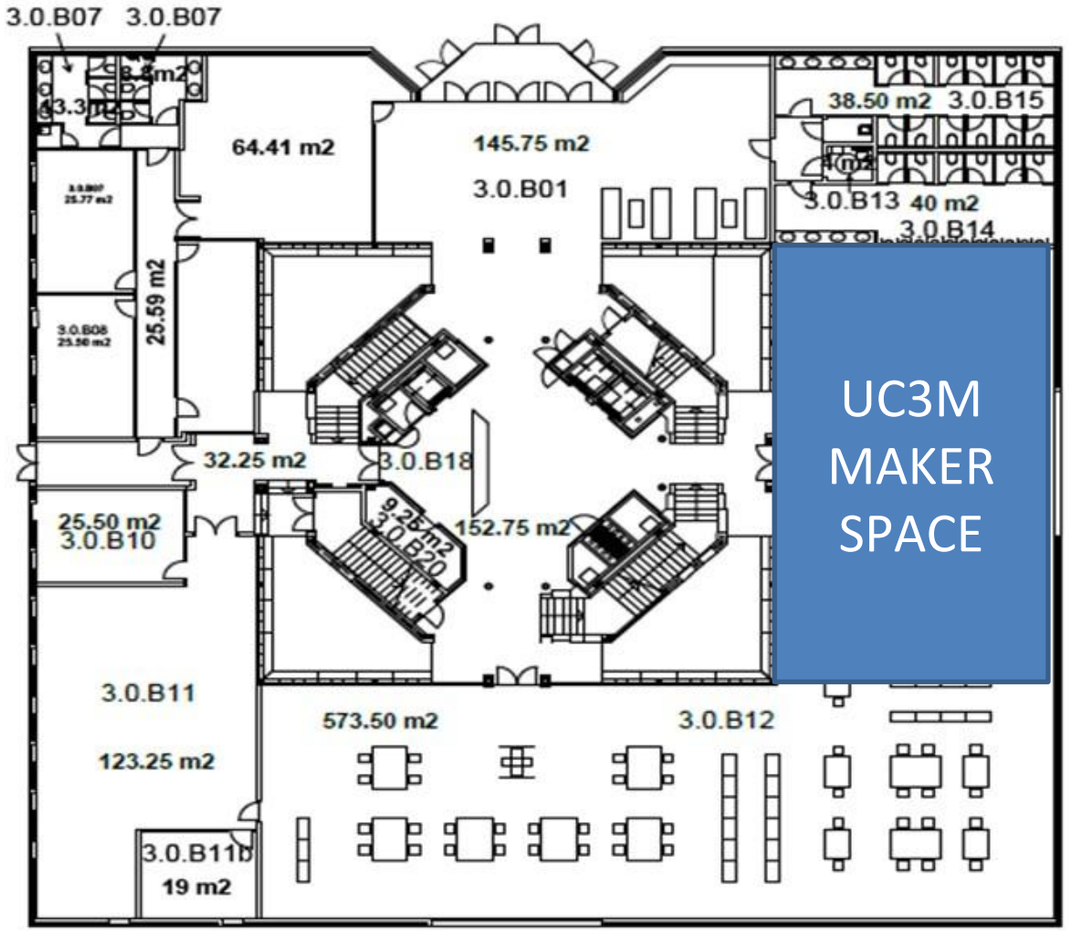
Coordination: Library Service

- ✔ Vice-President for Strategy and Digital Education
- ✔ Deputy Vice-President for Strategy and Digital Education
- ✔ Director of the School of Engineering
- ✔ Delegate of the School of Engineering Director for the Maker Space
- ✔ Head of Library Service
- ✔ Head of School of Engineering Library
- ✔ Head of Technical Office
- ✔ Technical Staff from Entrepreneurship and Innovation Service

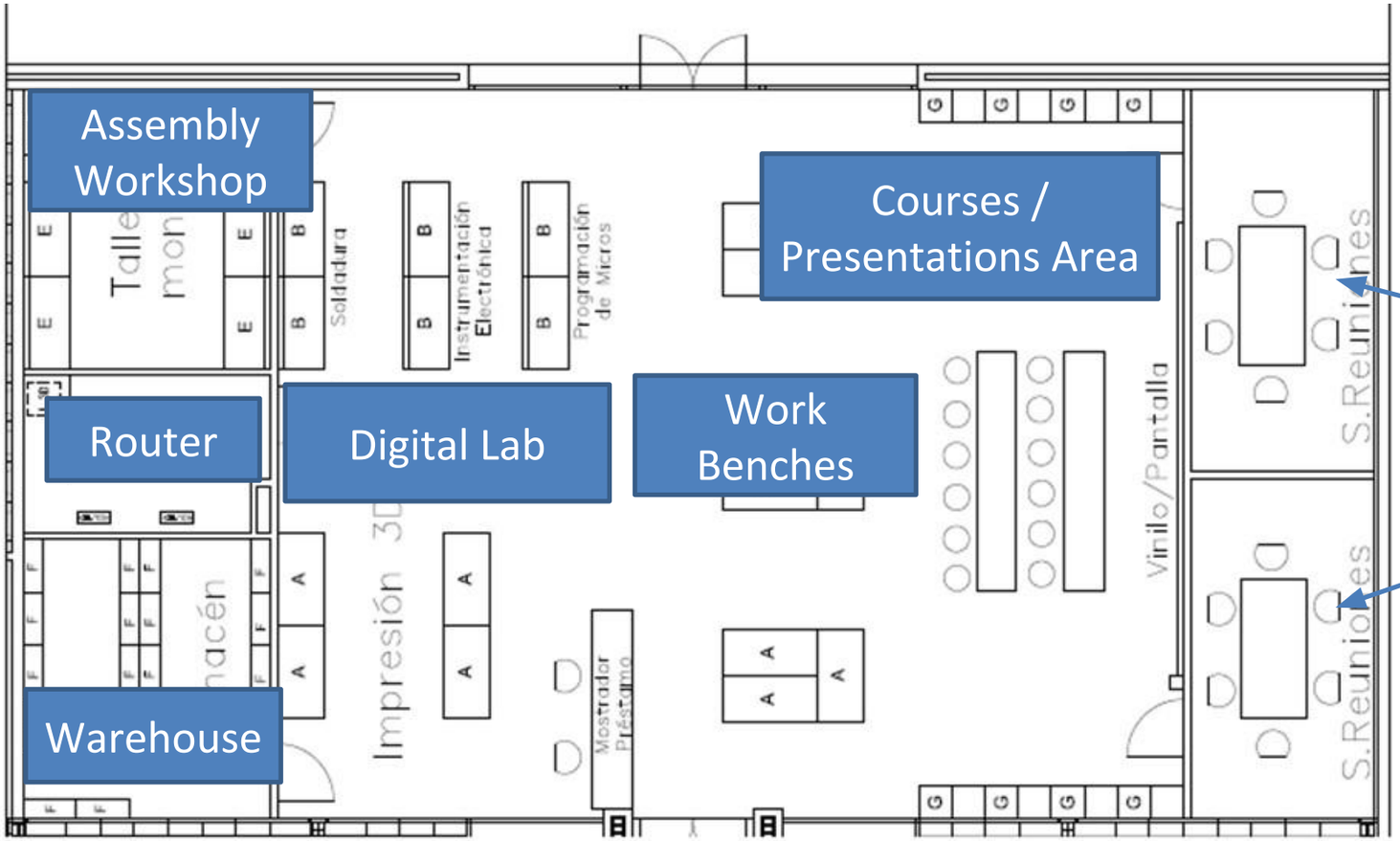
UC3M MakerSpace: Space Design

Where?

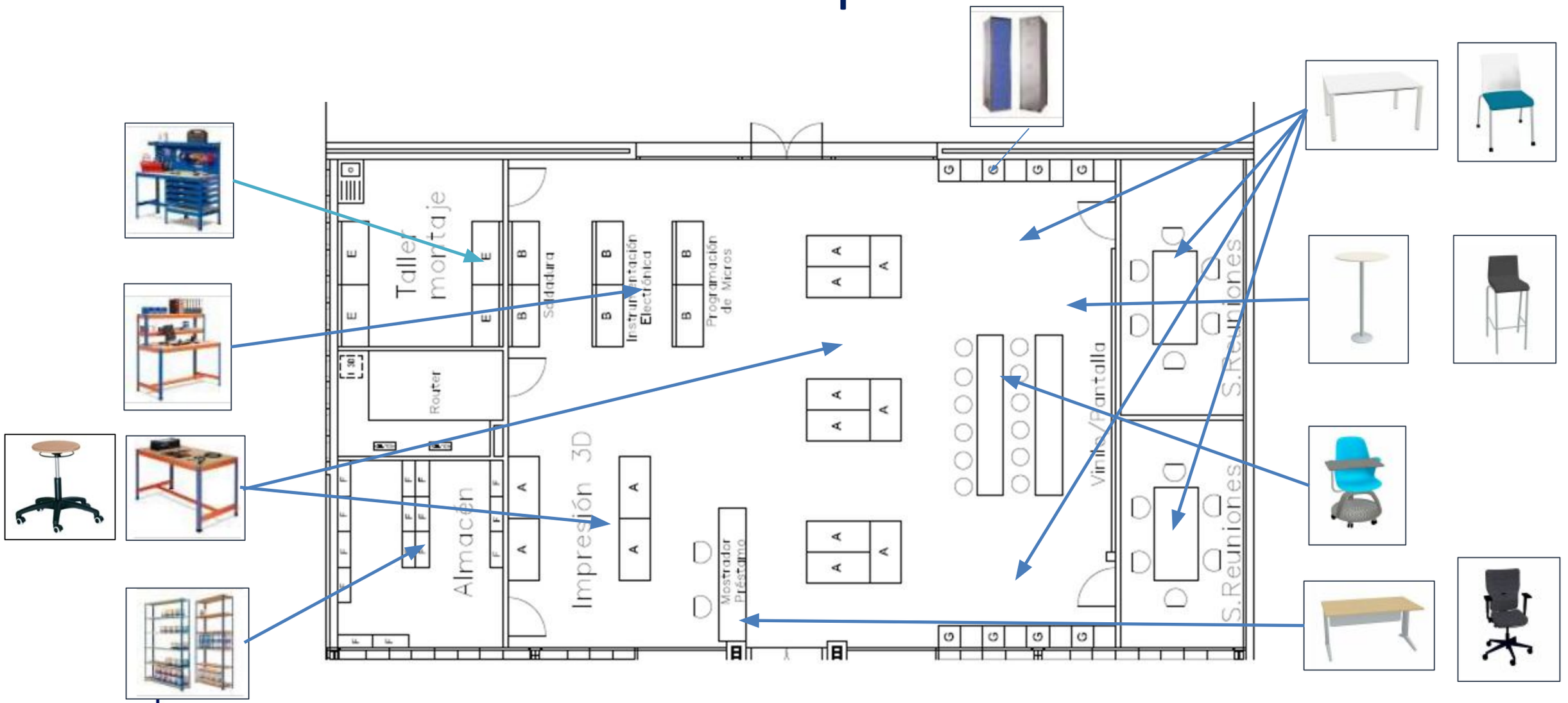
LIBRARY. FIRST FLOOR



UC3M MakerSpace: Space Design



UC3M MakerSpace: Furniture



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UC3M MakerSpace: Technical Equipment

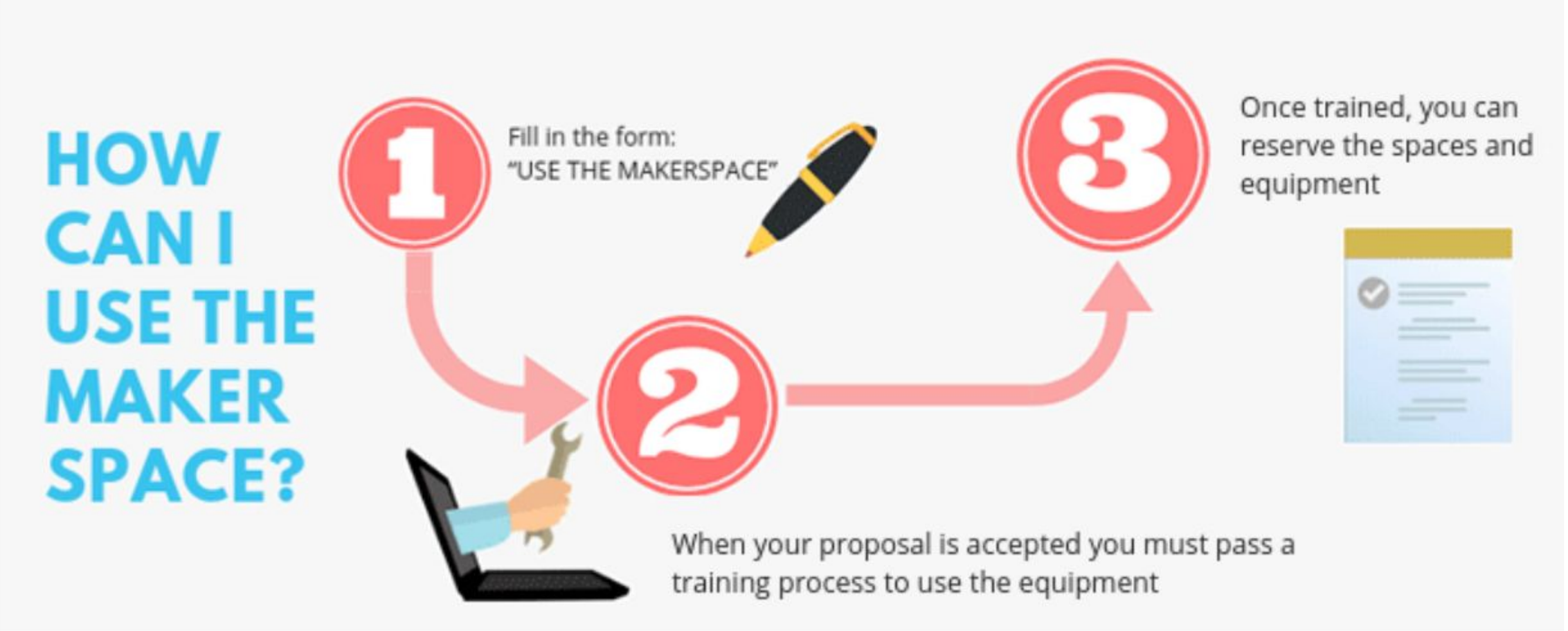
Servicio	Descripción	Puestos
Design	PC + software	8
3D Printing (FDM)	Prusa i3 MK3	3
	Professional Printer Markforged Two	1
Router	Milling Machine CNC Entry 840 + 500 W Engine	1
	Milling Machine PCBs	1
Measurement Tools	Caliber, Rules, Squads, etc.	2
Laser cut	Laser Head and Security Enclosure	1
Electronic assembly	Soldering and Desoldering Station	2
Electronic instrumentation	Source, Generator, Oscilloscope and Multimeter	2
Aspiration	Dry and Wet Vacuum Cleaner, Cyclone Vacuum Cleaner	2
Hand Tools	Bank lathes, Screwdrivers, Hammers, Wrenchs, etc.	2/1
Electric Tools	Miter, Grinder, Sander, Drills, etc.	2/1

UC3M MakerSpace: Service Orientation

There are three ways of using the MakerSpace, which allow students to explore their possibilities according to their needs:

- ✔ Individual Project Modality. Where students can propose a project that complements their learning within the university, either with innovative or entrepreneurial ideas, or with work arising from the university activity itself. Within this modality, projects related to Final Studies are included.
- ✔ Collective Modality. Where students can give free rein to their ideas and creativity through proposals for group work. This modality seeks to promote group work, multidisciplinarity and entrepreneurship by offering a meeting and teamwork space.
- ✔ Modality Associations. The student associations of the Carlos III University of Madrid can find in the MakerSpace a space where they can develop their projects and activities, both creative and for dissemination.

UC3M MakerSpace: How to Use It



UC3M MakerSpace: Student Associations

GUL UC3M

ASOCIACIÓN de ROBÓTICA
UC3M
UNIVERSIDAD CARLOS III de MADRID

BEST
MADRID CARLOS III

MOTO-MAQLAB-UC3M
BORN TO BE ENGINEER

UC3M MakerSpace: Professional Profiles

MEDIATOR (Library Staff)

Functions:

- ✔ Basic reception service, first information point for users
- ✔ Information and advice on the possibilities of the service in relation to the user needs
- ✔ Dissemination and marketing of the service
- ✔ Project development support

Profile:

- ✔ User service experience
- ✔ Good communicator
- ✔ Experience in service dissemination activities
- ✔ Proactive in designing promotional activities and disseminating the service

UC3M MakerSpace: Professional Profiles

TECHNICAL STAFF (Technical Office Staff)

Functions:

- ✔ Addressing the specific needs of the users
- ✔ Project development support
- ✔ Supervision of equipment and programs: commissioning and maintenance
- ✔ Materials and consumables request

Profile:

- ✔ Training in some engineering branch
- ✔ Technical equipment management

UC3M MakerSpace: Professional Profiles

TECHNICAL STAFF (Entrepreneurship and Innovation Service Staff)

Functions:

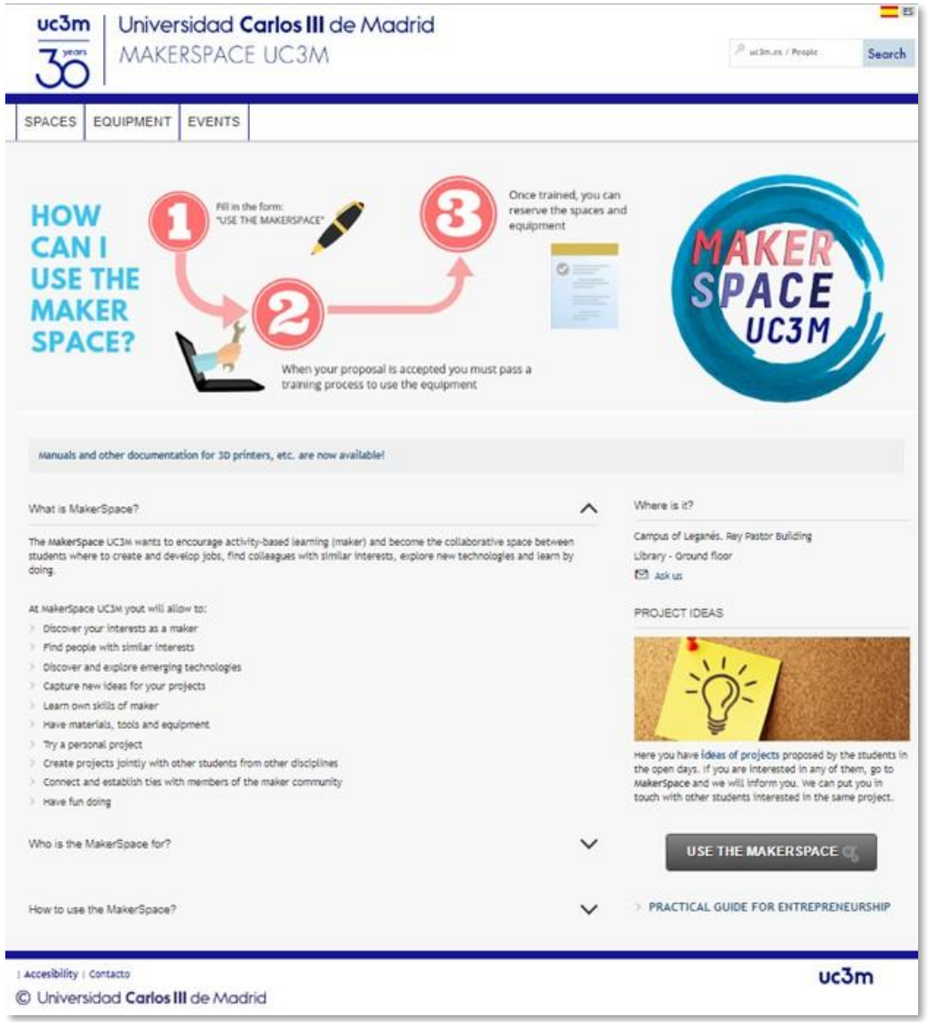
- ✔ Organization of events related to the MakerSpace
- ✔ Dissemination of the entrepreneurship culture and the MakerSpace projects
- ✔ Addressing the specific needs of the users
- ✔ Project development support

Profile:

- ✔ Training in entrepreneurship and innovation
- ✔ User service experience
- ✔ Good communicator

UC3M MakerSpace: Dissemination and Marketing

https://www.uc3m.es/makerspace/home



UC3M MakerSpace: First results: Students

UC3M MakerSpace: First results: Projects

Projects

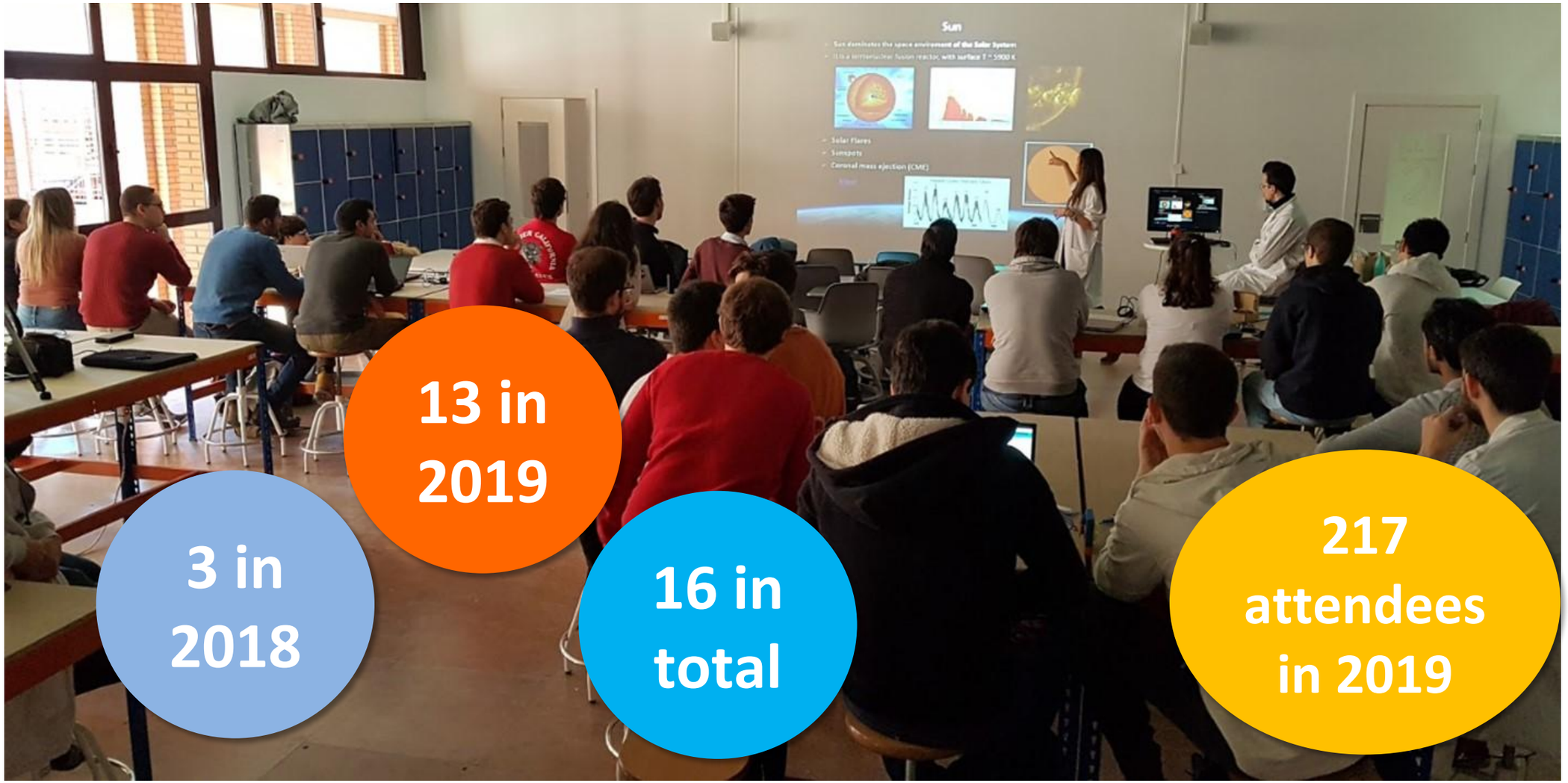
2018

MKS.18001 Equipo Cohetería
MKS.18002 Rótula panorámica para móviles
MKS.18003 Arte Urbano Led
MKS.18004 Mini coche controlado por Bluetooth
MKS.18005 Acelerador de tubérculos
MKS.18006 Funda móvil fotovoltaica
MKS.18007 Aerogenerador doméstico o Generador eólico.
MKS.18008 Placas de circuito impreso varias e impresiones 3D
MKS.18009 Mini home bot
MKS.18010 Creación de piezas mecánicas con fotografías en la universidad
MKS.18011 Aerógrafo plástico para modelismo
MKS.18012 Dron de alta duración
MKS.18013 Dron de bajo coste para la agricultura de precisión
MKS.18014 Modelado de una estructura cilíndrica, como estructura para un almacén de energía
MKS.18015 Construcción de circuitos eléctricos básicos guiada por la tecnologia de realidad aumentada
MKS.18016 Prácticas de Sistemas Electrónicos
MKS.18017 Juego para las capacidades psicomotrices
MKS.18018 TFG - Brazo Robótico de 3 GDL de bajo coste controlado por Arduino
MKS.18019 Fuselaje Piper cub
MKS.18020 Tweet Plant
MKS.18021 Deducir el Comportamiento de una Fuente de Alimentación Mediante Ingeniería Inversa
MKS.18022 EXPLORER SPACE - Proyecto Mag&Cos
MKS.18023 Controlador para un motor síncrono monofásico
MKS.18024 Estantes con baldas en diferentes ángulos
MKS.18.025 Vehículo teledirigido

2019

MKS.19001 CanSat
MKS.19002 Drone Selfies
MKS.19003 Maqueta estructura para cálculo dinámico
MKS.19004 Diseño de un sistema de bioimpresión para nuevas matrices poliméricas
MKS.19005 TFG - Montaje, sensorización y control de un cuello blando actuado con SMA
MKS.19006 TFG: Manufacturing process optimization of an airplane wing rib by using additive manufacturing
MKS.19007 TFG. Robótica Educativa
MKS.19008 TFG - Electroencefalograma
MKS.19009 TFG - Bases del semáforo para el TFG
MKS.19010 Control gestual
MKS.19011 Transferencia térmica desde un resistor a un líquido a través de metal y cerámica
MKS.19012 Figurita de una cara
MKS.19013 FocusBox
MKS.19014 Omnívoros 2018: Intervención artística de espacios del Auditorio Padre Soler
MKS.19015 TFG - Control de cruces de tráfico mediante sistemas empotrados
MKS.19016 Prótesis de una mano robótica
MKS.19017 Maqueta de barco con cámara subacuática integrada
MKS.19018 Barco de vapor
MKS.19019 Pocket Science
MKS.19020 TFG - Autonomous rail-cleaner robot
MKS.19021 Prototipo Pedal de Guitarra
MKS.19022 Sintetizador
MKS.19023 Instrumento para escritura para persona con movilidad muy reducida
MKS.19024 Prototipo para medición de aceleraciones en tren de pasajeros Rommel
MKS.19025 TFM-Diseño de cepillo que retenga aceites esenciales
MKS.19026 Tesla's Music
MKS.19027 TFM-Técnicas de emulación en tiempo real para el estudio de la estabilidad en la interconexión de convertidores de potencia usando PHIL
MKS.19028 Soporte de móviles para bicicletas de uso público
MKS.19029 Contenedor estanco de rollo de filamento con salida presurizada Bowden Drive modular
MKS.19030 Transmisión de audio mediante láser
MKS.19031 TFG cobertura protección de un sistema sensorial
MKS.19032 Carcasa personalizada para game hat raspberry
MKS.19033 Confección de un soldador de punto para materiales metálicos
MKS.19034 Fuente de alimentación de tensión variable
MKS.19035 Viabilidad de empuñaduras impresas en 3D con materiales compuestos
MKS.19036 Creación de molde para impresión de geles magnéticos (TFG)
MKS.19037 Medición de ángulos mediante sensores Inerciales
MKS.19038 Impresión 3D con polímeros magneto-activos TFG
MKS.19039 Generador (eléctrico) por gravedad
MKS.19040 Batería portátil solar
MKS.19041 Taller didáctico de reparación de electrónica y motores eléctricos
MKS.19042 Creación y configuración placa solar
MKS.19043 Letrero Neón
MKS.19044 Sintetizadores modulares
MKS.19045 Construcción de componentes para Arduino
MKS.19046 Ala fija RC asistida por chip controlador de vuelo
MKS.19047 Localización de un vehículo transmitido con radio
MKS.19048 Navaja EDC
MKS.19049 Kit de conversión a bicicleta eléctrica
MKS.19050 Sensor de ropa
MKS.19051 Multipresa de escalada

UC3M MakerSpace: First results: Events



UC3M MakerSpace: First results: Events

Workshops on entrepreneurship

- 21/02 The Decision to Undertake. Origin of Ideas
- 29/03 Creativity Techniques
- 05/04 We Moved: from Idea to Product
- 25/04 How to Present my Project

Students Associations

- 20/03 UC3M Robotics Association

Testimonials

- 11/03 #Ayuda tus sentidos
- 09/04 Gas&Co

- 25/09 Mobile Phone Worshops 1

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UC3M MakerSpace: First results: Reservations

Equipment	2018		2019		Total	
	Reserves	Hours	Reserves	Hours	Reserves	Hours
Design and Engineering / Microcontroller Programming	0	0:00	5	6:55	5	6:55
3D Printers	1	2:59	87	213:47	88	216:46
Electronic Instrumentation	0	0:00	6	9:54	6	9:54
Work Benches	16	24:44	318	535:52	334	560:36
Meeting Rooms	3	4:43	17	25:15	20	29:58
Welding / desoldering of printed circuits	0	0:00	3	5:57	3	5:57
Total	**20**	**32:26**	**436**	**797:40**	**456**	**830:06**

UC3M MakerSpace: Student Testimonials

Thank you!