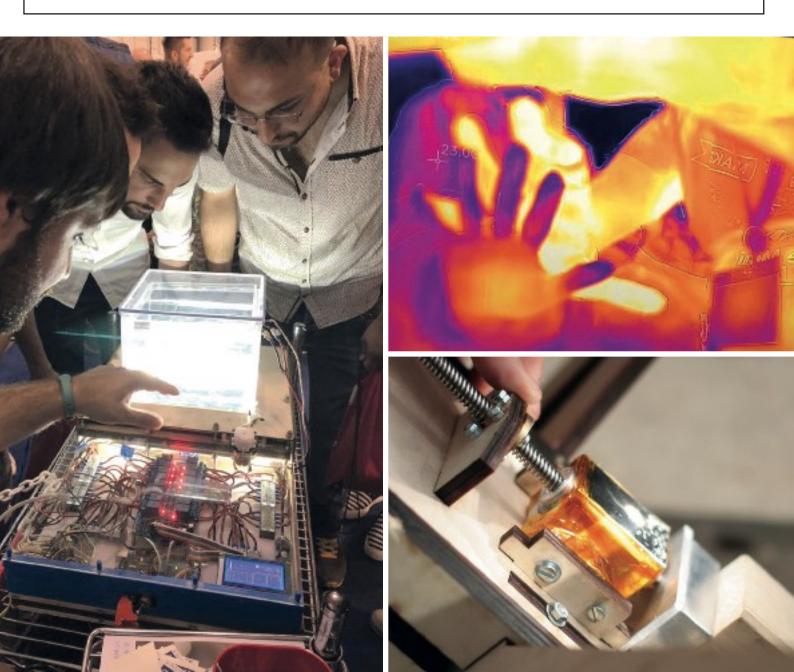
ICTP SCIENTIFIC FABRICATION LABORATORY SCIFABLAB 2014 - 2020

HIGHLIGHTS OF STEM PROJECTS & ACTIVITIES









DESCRIPTION

In 2014, the Science Dissemination Unit at the Abdus Salam International Centre for Theoretical Physics realised how **technology could draw people into science**. The **Scientific Fabrication Laboratory** (**SciFabLab**) was **founded** as **a modern**, **interactive way to spread science and access to science**. As part of a large world-wide community of maker spaces, SciFabLab exists to support Science, Tecnology, Engineering and Mathematics (STEM) education and help bring creative ideas to life, for the benefit of all.

The SciFabLab has multiple goals and tools to pursue by:

- doing science outreach: spreading the love of science and technology
- facilitating the creation of scientific fabrication laboratories and other maker spaces in **developing countries**
- · assisting with research projects and the development of affordable technologies
- embracing new technologies and their possibilites
- providing scientists, students, teachers, and public opportunities to learn new skills and tools to make
- promoting the organisation of Maker Expo events and show-and-tell inventor's exhibits in developing countries to motivate youngs into science and research
- organising Science & Society activities including workshops on Science Dissemination for the Disabled, Maker Faire events and NASA SpaceApp Challenge Hackathon

The SciFabLab is **open to all**, working to spread enthusiasm for science and technology, to promote the use of affordable and accessible digital tools, and to **provide opportunities** to make new devices and learn new things. The goal is to provide interactive, fun, hands-on exploration of "3D", tangible learning.

ABOUT ICTP



Founded in 1964 by the late Nobel Laureate Abdus Salam, ICTP seeks to accomplish its mandate by providing scientists from developing countries with the continuing education and skills that they need to enjoy long and productive careers. ICTP has been a major force in stemming the scientific brain drain from the developing world.

http://www.ictp.it

ICTP is governed by UNESCO, IAEA, and Italy, and is a UNESCO Category 1 Institute.





A DAY @ SciFabLab

There is always a lot going on at the SciFabLab, with many visitors and users working on a wide variety of projects, using a wide range of digital technologies. ICTP's SciFabLab is equipped with modern and versatile computer-controlled tools for rapid prototyping, such as 3D printers, 3D scanners, CNC (computer-controlled milling machines), and laser engraving and cutting machines. The SciFabLab facilitates projects in science, education and sustainable development, including works focusing on robotics, electronics, micro-controllers, scientific apps, and 3D printing.



Maker Expo	
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First Regional Maker Expo of Open Technologies and Inclusive Development Hittlemet St Market Stageneters

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NASA SPACE APP CHALLENG



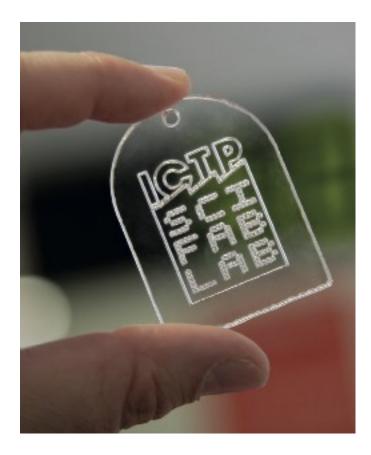








The SciFabLab reaches a total of 1,500 visitors every year on average. Foreign diplomats and distinguished scientists, teachers and students, journalists and citizens, kids and families: they are visiting the SciFabLab when touring the ICTP and they all love to meet its community, composed by makers, inventors, students, and researchers.







Users come from many places and backgrounds: students from the Universities of Trieste, Udine and Ljubljana have developed their Bachelor's Theses at the SciFabLab. A number of high school students, primary school students, and others have visited for short projects. Developers, scientists, and makers from all over the region and the world have attended workshops and worked on projects at the SciFabLab.



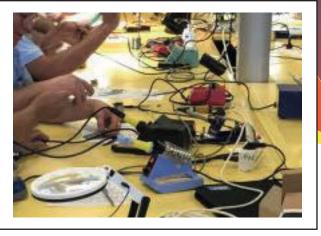


Anyone can become a user of the SciFabLab, setting up a project and collaboration with the core staff. Anyone can be a visitor when the SciFabLab is open. Thanks to funds from the Municipality of Trieste, technical assistants are available 3 whole evenings per week to welcome guests and visitors.

INTERNATIONAL WORKSHOPS & OPEN EDUCATIONAL ACTIVITIES

Soldering Course for Beginners (2016)

Hands-on training organized in collaboration with C.I.S.A.R. Trieste.





"m-Science" (2014)

This Workshop on "Mobile Science" comprised discussions on three main subjects of interest with a great impact on the society: sensing, computing and dissemination of scientific knowledge by the use of mobile devices.

"Science Dissemination for the Disabled" (2014 and 2017)

In this activity innovative technologies and projects were explored to support people with disabilities to allow them to study science.



"Fablabs and Makerspaces for

Science" (2015 and 2017)

The aim of these events has been to analyse new ways to establish and support the creation of Scientific-themed Fablabs (SciFabLabs) in remote areas in order to inspire curiosity and nurture young scholars and new generations of scientists without any exclusions.





Olivetti Programma P101 Repair (2015)

The world first desktop computer Olivetti Programma 101 was brought back to operation after 45 years by using an ad- hoc soft belt printed with the low-cost 3D printers of the ICTP Scientific FabLab under the presence and guidance of Gastone Garziera and Giovanni de Sandre, from the famous Pier Giorgio Perotto's Group at Olivetti, Ivrea, Italy.

3D Printer Assembling

The first open course about the construction of a 3D desktop printer Hephestos Prusa i3 was organized in early 2015. Furthermore, visiting scientists from Nigeria, Cameroon and Colombia have also assembled their institution's 3D printers while training at the SciFabLab. In the last year, the interest on the use and implementation of 3D printing technologies in STEM education has increased continuously.





Palestinian and Moroccan students training at SciFabLab

Four Palestinian students from Bethlehem University, who run a science outreach program in the West Bank called Science4People, together with two students from the University of Beni Mellal in Morocco participated to a special training at ICTP's SciFabLab to learn how to use and code for 3D printers and other affordable digital tools.

Public Seminars (on, and outside, Campus)

- 3D Printing, 3D Modelling and Open FabLab Technologies among other topics.
- High Schools Educational Workshops and Teachers' Seminars (2017).
- Training on Arduino micro-controllers and 3D Printing.



Activities Hosted at SciFabLab (2017-2019)

- Joint ICTP-IAEA Workshop on "Environmental Mapping: Mobilizing Trust in Measurements and Engaging Scientific Citizenry".
- ICTP-ICT4D Workshop on "Open Source Solutions for the Internet of Things (IoT)".
- *"TSFF Goes Virtual"*, training activity on Virtual Reality organized by Trieste Film Festival and Associazione Alpe Adria Cinema in collaboration with the ICTP SciFabLab.
- Inquiry-Based Science Education, an introduction (CESAME).
- Joint ICTP-IAEA School on LoRa Enabled Radiation and Environmental Monitoring Sensors.
- Advanced Workshop on Technology for Sustainable Development: Low-Cost Tools to support Scientific Education.
- Workshop on Rapid Prototyping of Internet of Things Solutions for Science.



NASA PARF NASA Space-Apps Challenge (2018)

International hackathon occurring over 48 continuous hours simultaneously in 200 cities around the world, including Trieste. The goal was to share ideas and engage with open data to address real-world problems, on Earth and in space. The Trieste event was organized by the SciFabLab of the ICTP with the Patronage of the Municipality of Trieste and the University of Trieste, and the sponsorship of the United States Consulate of Milan.





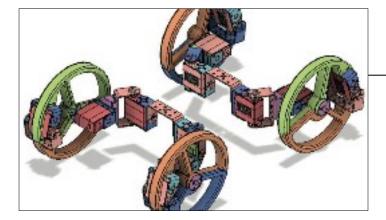
SPACE APPS

CHALLENGE

TRIESTE

THE FINALIST PROJECTS



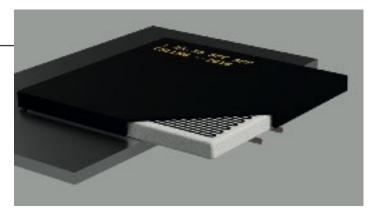


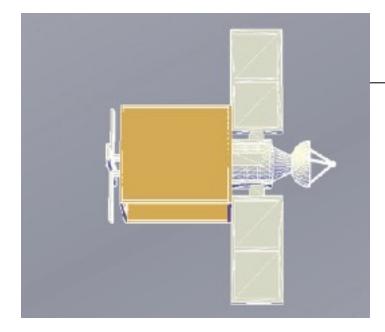
ALL TERRAIN ROVER | INVENT YOUR OWN CHALLENGE

The rover can move using either wheels or legs, is based on Arduino Due and uses a "Space Mouse" 3D controller. It is a peculiar four-legged crowler that can fold the legs transforming them in wheels. While in "wheel mode" it can efficiently save energy, in "crowler mode" it will overcome unstable terrain. The power and control of the distal motor is brought through slip rings, as a normal cable cannot be use while in wheel mode.

SYLAR | DESIGN BY NATURE

Inspired by the internal structure of the human skin we have tried to make the TPS' tiles proprioceptive. When an impact breaks the borosilicate cover, it breaks the resistance wire placed immediately under it, opening the circuit and triggering the alarm.





TEAMON | REMIX THE GOLDEN RECORD

If you could launch a time-capsule into space, what would you put in it? We thought of storing data in DNA to share information with aliens by appealing to emotions. We would show them our successes, as well as our mistakes in order to avoid repeating them.



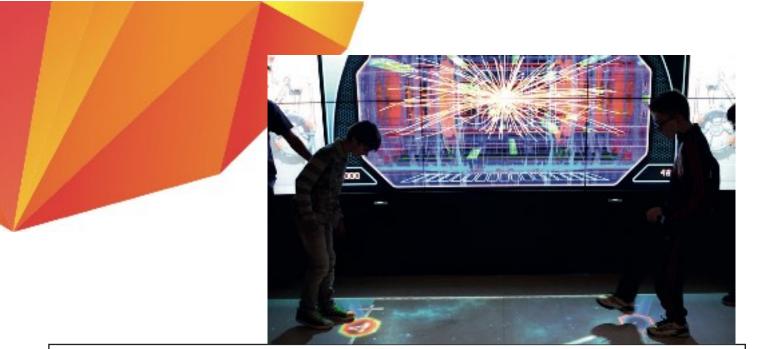
LARGE PUBLIC EVENTS

Open Days

SciFabLab Open Days are organized every year, together with the special event "Arduino Day" and other public activities within the "European Maker Week" with many demo activities.







Interactive LHC Tunnel by CERN (2016)

This exhibit produced by CERN is an interactive installation where people can play with elementary particles (the building blocks of the Universe) like the Higgs Boson, acting within a 3D virtual environment, while learning some knowledge of high energy physics. Guidance from local researchers working in the CERN ATLAS experiment was provided.

Trieste Science Picnic at ICTP Campus (2016, 2019)

This has been a free event open to all teachers and students of the Friuli Venezia Giulia region and beyond, aimed to promote science with an informal style, through demos and practical activities. Many interactive experiments, performances, educational and creative workshops and speeches from science communicators and scientists were organized. About 2,200 students participated in 2016, and from 2017 this event has been included within the Trieste Mini Maker Faire. In 2019 a whole day was organized for the second time as a free event for schools of all degrees.



Trieste Mini Maker Faire (2014, 2015, 2016, 2017, 2018, 2019)

Since May 2014, the ICTP SciFablab in collaboration with the Municipality of Trieste organizes every year this popular event under license of Maker Media. The Trieste Mini Maker Faire brings together makers, inventors, scientists, artists and other passionate creative enthusiasts coming from the Triveneto area of Italy as well as from Austria, Slovenia, Croatia and beyond. While showing their projects, participants share their passion for making, and inspire visitors to make things by themselves. Special attention is always given to ideas and projects of educational interest that can be shared and implemented in developing countries. Each year about 16,000 people visit the ICTP Miramare Campus to participate in these events.

See: http://trieste.makerfaire.com











ICTP's SDU in ESOF 2020 "Science in the City" Festival

Since May 2014, the ICTP SciFabLab organizes outreach activities in collaboration with the Municipality of Trieste. The SciFabLab --also present during the EuroScience Open Forum (ESOF) 2020 in Trieste under the "Science in the City Festival"-- embraces activities for the public engagement in science, technology, education and mathematics.



OUTREACH BEYOND CAMPUS

During 2014-2020, members of the ICTP SciFabLab have participated in numerous events and activities open to the public in many different places.

For example:





"TRIESTENEXT" (TRIESTE, ITALY)

with a big pavilion of the "Trieste Science Picnic"





PARTICIPATION IN SEVERAL RADIO & TELEVISION PROGRAMS

To spread and disseminate the activities of the ICTP Science Dissemination Unit and its SciFabLab at local and regional stations





REGIONAL "MAKER EXPO OF OPEN TECHNOLOGIES AND INCLUSIVE DEVELOPMENT"

In mid-August 2017 a gathering of local makers, scientists and creative people took place in Cartagena, Colombia. This activity was organized by the ICTP Science Dissemination Unit and the University of Cartagena. The town of Cartagena was selected since it has a considerable number of high educational institutions and a thriving industrial zone in sectors that require constant innovation. The second edition was organized at the University of San Carlos, Guatemala City, Guatemala in the second semester of 2018.

The young people in the region need new opportunities for showcasing their talents and need more dedicated spaces as the city grows. The first Maker Expo aimed at exploring all these needs. The event accepted the registration of projects in six categories: Internet of Things, Robotics and Home Automation, Software, Games and Start-ups, Applied Basic Sciences, Control and Automation. Attendance was free for exhibitors and the public, with a total of about 500 attendees.

See: http://indico.ictp.it/event/7655/ http://indico.ictp.it/event/8345/



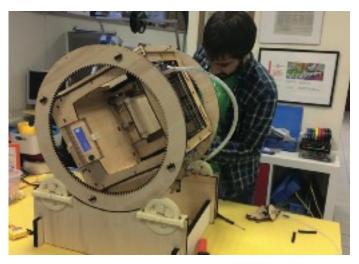
FEW EXAMPLES OF PROJECTS

Prototype for Inverted 3D Printing of Complex Objects

by Marco Baruzzo

The idea for this inverted 3D printing prototype is to be able to save plastics while 3D printing without using support material and improving the printing quality.





3D Print of Anatomical Replicas

by Carlo Campana, (a collaboration with 3dprintersurgery.com)

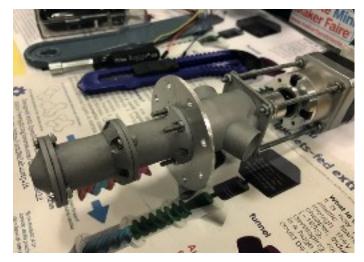
3D patient-specific anatomical replicas processed from Tac and Magnetic Resonance data for diagnostic purposes.

MANIpolare per Comunicare

by Elena Dall'Antonia

Educational prototype kit for deaf-blind children to assist in learning sign language, using 3D printing and Arduino. Winner of national awards.

See: http://www.youtube.com/watch?v=PE603qiwYg8





Pellextruder

by Carlo Fonda, Marco Baruzzo

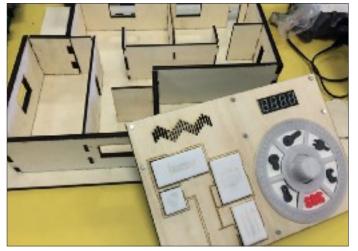
Study for the dynamics of multi-lobe Moineau's Progressive Cavity Pump as applied to the recycle of plastic and the production of filament for direct 3D printing. This is an open source prototype still under development.

Prototype of a Low-cost Meteorological Station

In collaboration with ICTP TC/ ICT4D group

Weather station entirely printed in 3D at SciFabLab.





Hand(s)Home

by Giorgia Sperandio

Simplified interface for home automation designed especially for users with disabilities or the elderly, realized using Arduino micro-controller, 3D printing and laser cutting.

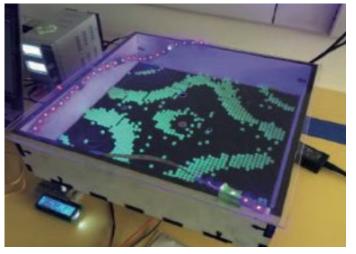
Chladni Figures

(project #PodobaZvoka)

by Taddea Druscovich

Interactive visualization and understanding of nodal patterns on vibrating plates (Chladni figures), with the peculiarity of replacing sand with larger spheres moving on a 3D printed net of different geometries and under frequencies adjusted via an Arduino micro-controller.

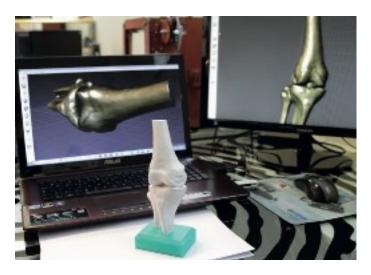




IMAGINARY Open Mathematics Exhibition

by Marco Rainone, Enrique Canessa

17 complex objects of the IMAGINARY Open Mathematics Exhibition of the Mathematisches Forschungsinstitut Oberwolfach in Germany were reproduced in the SciFabLab using 3D printing technologies. The target groups of the platform includes museums, universities and schools.



Eso-skeleton from CT Scan

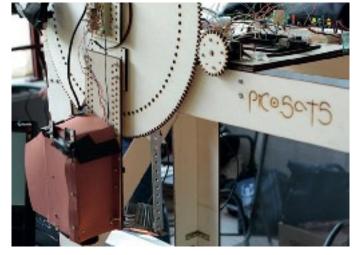
by Giancarlo Pellis

This is a light, 3D eso-skeleton (i.e., customized and personalized) from the elaboration of a CT scan data. By analysing the roto-translational movement of the knee, it can reproduce in a very reliable way the kinematics of the lower limb.

"Picosat" Photometer Model

by Michele Maris and Students

This is a light, small cube having solar cells, battery, GPS, compass, a small transceiver and a CPU that could be sent into space as ballast weight during the launch of bigger satellites.





Water Rockets Launch System

Built by Science Industries, Trieste

Launch of rockets made with plastic bottles and powered by pressurized air and water. The set up includes an Arduino- controlled command console and tracking station.

Augmented Reality SandBox

Scientific educational exhibit developed by UC Davis (USA) and made at $\mathsf{SciFabLab}$

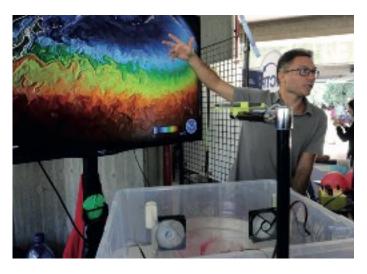
Hands-on exhibit combining a real sandbox, virtual topography and simulated water created using a MS Kinect 3D camera, powerful computer simulation and visualization software, and a video projector. It allows to create realistic geographical models by shaping real sand, which is then augmented in real time by an elevation colour map, topographic contour lines, and simulated water.

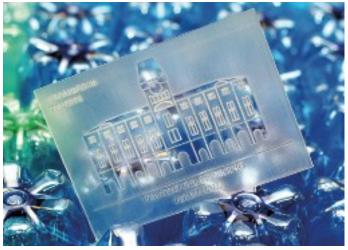


Weather in a Tank

Scientific educational exhibit developed by MIT (USA) and made at SciFabLab

Rotating water tank that allows to understand fluid dynamics experiments and atmospheric/oceanic phenomena.





Cromopolis

by Sara Sossi

Cromopolis is motivated by souvenirs which in reality reflect experiences and by the frottage technique of a coin or a texture. The idea is that a tourist puts a paper or a postcard on a 3D printed relief of a Tourist attraction and colors this page. With the pressure of the pencil, the icon is impressed on the paper. Cromopolis was the winner of the 2014 edition of the Map Pin competition.

Voice-Controlled Artificial Handspeak System

by Jonathan Gatti, Livio Tenze, Enrique Canessa

A man-machine interaction project aiming to establish an automated voice to sign language translator for communication with the deaf using integrated open technologies (OpenSCAD, Arduino) and Raspberry Pi mini-computer, and manufactured with a low-cost 3D printer which smoothly reproduced the alphabet of the sign language controlled by voice only.

See: http://www.youtube.com/watch?v=J5whsEsGr4s

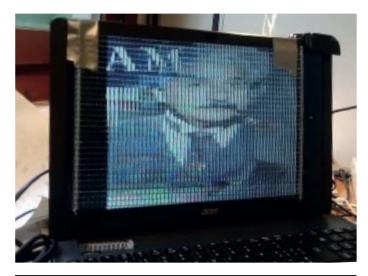


From Bottle Caps to 3D-Printing

by Javier Montoya

In-house production and use of recycled plastic as filament (raw material) for low-cost 3D-printing. This work was done in collaboration with condensed matter physicists from the Interdisciplinary Research Group GruMoc at the University of Cartagena, Colombia.

See: http://scifablab.ictp.it/author/jmontoya/

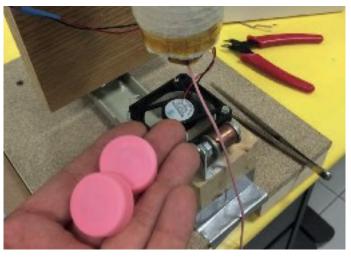


3D Printing Directly from PET Plastic Bottles

by Enrique Canessa, Carlo Fonda and ICTP SciFabLab Team

Using a simple and fast method to produce thin, spiral filament cut from PET plastic bottles at room temperature (without pellets) one can now 3D print such filaments using the conical auger screw at 260 °C designed by Mahor Muniz (from Spain). To control the flux, a simple dual-helix stator (easy to build and clean) is being studied and built via CNC Milling at the SciFabLab.

See: http://www.youtube.com/watch?v=eUtr9IWUHSU



DIY Lenticular Lens and Open3DStream

by Enrique Canessa

Demo of real-time lenticular video/image streaming using Open3DStream software together with the lenticular lens designed and fabricated at ICTP SciFabLab.

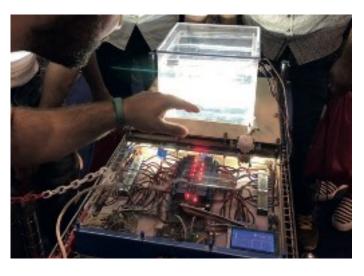
See: http://www.youtube.com/watch?v=ZKEK9I6TvHM



DIY Cloud Chamber

By Marco Baruzzo, Carlo Fonda

Do-It-Yourself (DIY) particle detector or "Wilson's Cloud Chamber" built by the ICTP Scientific FabLab with recycled and used parts, and 8 double-layer Peltier Cells (TEC).





3D Terrain Mapping

by Gaia Fior, Carlo Fonda

3D demo model of Biševo island, Croatia. 3D printed it in large scale (multiple tiles), for video-projecting augmented reality information on top of the model such as satellite map, roads, temperature and other info.

Plastic Injection Molding Machine with Solar Power

by Sara Sossi, Carlo Fonda

Prototype devices have been designed, built and tested with the goal of being able to melt and mold a small quantity of plastic granules (from waste plastic) using the power of the sun concentrated by a Fresnel lens and with an optimized metal extruder fabricated in-house.





Acoustic Levitator

by Paolo Lazzari, Arnau Mir

Acoustic levitator to explore possible applications of chemostat based on acoustic levitation rather than the classical tank experimental setup. The project could have impact as experimental tool for biogeochemistry.





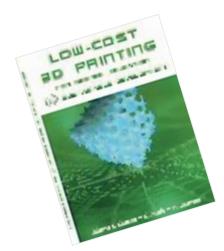
Thermoplastic Breast Immobilizer Prototype for SYRMA-3D project

by Lucía Mariel Arana Peña, Carlo Fonda

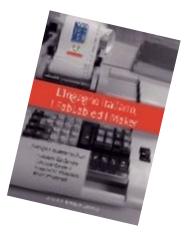
A 3D-printed model of a breast, generated parametrically with OpenSCAD using standard biometric data from published research papers, has been used to produce -by a very affordable and simple thermoforming procedure- a prototype of a customisable "supporting structure" for the breast, with the goal of improving the quality of medical imaging done at the Synchrotron facility in Trieste.



- **PUBLICATIONS**
- Morphing a Stereogram into Hologram, E. Canessa, L. Tenze, arXiv:1905.01727 [eess.IV] (2019)
- Trieste Mini Maker Faire Catalog (2017) ISBN 978-9295003-62-0 (2018)
- Study of Moineau-based Pumps for the Volumetric Extrusion of Pellets, E. Canessa, M. Baruzzo, C. Fonda; Additive Manufacturing **17** (2017) 143-150
- Making Ideas at Scientific Fabrication Laboratories, C. Fonda, E. Canessa; Phys. Edu. 51 (2016) 065016
- L'Ingegno Italiano, i FabLab ed i Maker, E. Canessa; Book: ISBN 978-9295003-57-6 (2015)
- FishEyA: Live Broadcasting Around 360 Degrees, E. Canessa, L. Tenze; Proc. 20th ACM Symposium on Virtual Reality Soft.&Tech. VRST 14 (2014) 227-228
- Trieste Mini Maker Faire Catalogs, E. Canessa, C. Fonda; ISBN 978-9295003-53-8 (2014), ISBN 978-92-9500358-3 (2015), 978-9295003-59-0 (2016), 978-92-95003-61-3 (2017)
- IMAGINARY Math Exhibition using Low-cost 3D Printers, M. Rainone, C. Fonda, E. Canessa; arXiv:1409.5595 (2014)
- Voice-Controlled Artificial Handspeak System, J. Gatti, C. Fonda, L. Tenze, E. Canessa; Int. J. of Artificial Intell. & Appl. (IJAIA) **5** (2014) 107-112
- EyApp & AndrEyA Free Apps for the Automated Recording of Lessons by Students, E. Canessa, C. Fonda, L. Tenze, and M. Zennaro; Int. J. Emerging Tech. in Learning (iJET) 9 (2014) 31-34
- Low-cost 3D Printing for Science, Education and Sustainable Development,
 E. Canessa, C. Fonda, M. Zennaro (Editors 2013); Book: ISBN 92-95003-48-9







The SciFabLab will continue to grow, with as many programs, technologies, and users as it can support. Future directions of expansion include:



PROVIDING SUPPORT FOR THE ESTABLISHMENT OF OTHER FABLABS AROUND THE WORLD, ESPECIALLY IN THE DEVELOPING WORLD

PROMOTING THE ORGANIZATION OF MAKER EXPOS IN THE DEVELOPING WORLD

INCREASING THE VARIETY OF WORKSHOPS AND TECHNOLOGIES

NEWS FROM NEWSPAPERS/ PRESS

SciFabLab, passato e futuro

L'assalto di bambini e curiosi al Centro di fisica per la sesta edizione della kermesse che quest'anno celebra Leonardo Dal robot pianista al telegrafo via whatsapp "Maker Faire", la fiera delle 300 invenzioni

NEW

LuigiPutignano

necento insentiori di sono radunati regli spa-zi del Centro di fisto per lasesta schrister di Trieste Mini Malter Faber, che la aperto i batterti inti in tarite mattinata nel segno di laccuardo, nel Stil manarriter-sario dalla matte del genio to-

suio dalla matte del genio to-tenzo e a un anto da lesef2020, per una due gioni all'asogno della creatività. Complica una giornata final-mente di sole, primaverite ven-gran, questriti di vicitzzori, un oni torri berritti i vicitzzori, un oni torri berritti i vicitzzori, un oni torri berritti i vicitzzori, un oti torri berritti i vicitzzori, un oti torri berritti i vicitzzori, un oti torri berritti i vicitzzori, un con torri berritti i vicitzzori, un con torri berritti i vicitzzori, un con torri berritti vicitzzori, un con torritti i vicitzzori, un con torritti i vicitzzori vicitzzori da i modellini farezzori chi ma-zenzano la perfectione del vice-neze liteirust della della con consenese liebrut Telefont. O, anto-ra, artikati dall'idea di pilotare

la exclusioni in volo di un dro-

In archiniari in volo di un dro-ne. Dei metento "molest" ben 95 anno di Tinaste. Tra chi pro-tene da fuori regime mattici la patroggia del Vennto, con 34 pronozza di diversi e con 34 pronozza di diversi e con 34 pronozza di diversi e con 34 siorre la finale dell'Europare Reporto Stateme dell'Europare Reporto Stateme del Roma-dio zalla Supienza di Roma-ti a alla Supienza di Roma-ti a stateme la parte ripestare di sostenere la parte ripestare di un transitiva didattica valta a sostenere le parte ripazione di gruppi ardastici all'adicioni internazionale. Quest'anno qui a Triana si aldenanzo tra gruppi hallani, rispettivamengrappi fisikari, itsperitivanen-te di Padova, belhano e Roma, ocinque provenienti da Messi-on, Austria, Urgharia, Spagna, el bartagalloc.

Anche quest'anno, come la sensa edizione, ad amendere al varco il visitatore accalifato e a sorprenderio d'é Boramat, il distributore di tettoli. E semi pre con il venio si gioca con Lavora La Bom", che consiste pel sofficie all'internodi un sp-



IL BILANCIO DEL TRIESTE MINI MAKER FAIRE

Tredicimila visitatori all'Ictp per la fiera dell'ingegno

LuigiPutignano

Un'edizione 2019 da record questa del Trierte Mini Ma-ker Paire, giuzta alla sesta edizione grane alla collaborazione tra letp e Comune di Trieste, con il parrocinio e il finanzizmento della Regio-ne, il patrocinio dell'ateneo triestino e con lisof 2000, Al-la fine gli stand aperti sono stati 98 - tre le defezioni all'ultimo minuto per varie cause -, che hanno messo in vetrina più di mille tra progetti, invenzioni e protocipi, presen-taticon passione e competensa da giovani e meno giovani Leonardo'

Ben 320 alla fine i makers presenti, che, come sottoli-nesto da Carlo Ponda, re-sponsabile dello SciPabLab dell'Ectp, «hanno rappresen-tato per Trieste una concentrazione senza precedenti di

ingegro, creatività sidees. A conferma di un'edizione scoppiettonie arriveno anche i dati relativi all'affluen-za di pubblico, estimato-come sottolineato da Ponda -aturavenso il nievamento totalmente aponimizsato de-gli ID unici dei devite wire-less, ovviamente do-2-your-selfe opensouroe- in olire 13 mia presenza spalmate su un totale di 16 pre. Tutin la manifestazione è



Bambici rapiti davanti a glochi ed esperimenti alla Mint Nakor Faire

stata trasmessa in greaming video live sa YouTube, con audio e video dal palco in broadcast su man-schermi discribuit sigh oltre 10mils metri quadri dei campus ICTP di Miramare Quasicen to i seminari dal palco, che

hanno spazisto su tutti campi della tecnologia, scienza, creatinti e arte, e 56 work-shop gratuiti per bambin e ragazzi. A concerna della cararuta internationale della maker faire triescha zant i premi assegnati quest'anno

posito foco per tercare la pro-pote capacità "gneunologi-cha" avanthane se ai riesce a enalize una stolico egitorilo rienigoreia la Bara sume dei inizioli defia ciria, "Hong, che ad marca dei 2011 archi allo nel marco del 2011 andò alla deriva. E infarti, in timo almetcanismo, "traneggia" un picco-lo rendello del mitica picto-ne. Sono tantiestatigli stand inne. Sono tantiestmigti stanti in-terese anti e lartia mentaraba-rouna diazione. Madiamposi-tole non mencionare l'hobroni-co, il robor planista ideato fa Marceo Stati, che suona il pla-noforta cor la nua 53 dita. O il costruttore di atologi da atte-damento vattaga dyle, il cris-stino Stancesto Resti, con la ma interestone che oggi cinstino Seancesco Beairi, con la cua inversainte che ogni chi-que minuti limuita il testo toca-cio eschito in puro dialesto. Ma a "Maker Beard" i possibili in-vitre un messeggio wheesapp aus artico miegenio del 11036. «Uno ottumento – spiego Desnido De Lorence – conver-te la necesa edella diabaco Mettell messaggio in alfabero Mot-

> La manifestazione triestino ha anthe ma fore wienza "educational": la bunchestorie OneCoean è poesente con uno etani, che illustra la Charm enne cha un codine cheo per condividere i principi e lescio-ne a runcia del mare, con uno dei suoi ambascinori, Mario Pelaschier, il quai, a bordo di un'anto distrifos a sero impac-to ambientale, "produs," il ri-apetto dei fondati marini.....

Marca

a investori d'oltre confine: il premio "Lady Makes 2019" offerte dal Socuptimia Club Trisete, è stato assegnato al-la croata Kristina skaler del-

Is Wechemical techical school Parat Venetic, In "Young Maker 2019" officito della Pondassione Pateo Pittim, è indete alla spagnola Angela Poco Materia, del pro-gioro Bazonalto and Echad-na Shield, Concerne allo asmennedi Cremente allemente no" è andalos nuche il primo premio "Prioste Mini Malur Dege 2019" affento dal Tasmu ICP Selfediale, vinto dello Sironno frels Nokali, dal pro-gerto Open Thermal Cam-petto Open Thermal Cam-to Concentra Chemita Camra. Oranon resta che aspetta-re che quel "mini" scompaia perl'edizione 2030, quella di Boof.

WITH DRIVER PARTY



Domani il "Tributo all'inventiva italiana"

liana: ieri, oggi e domani" è il titolo dell'appuntamento in programma domani all'Ictp e targato SciFabi ab. Dalle 10 alle 12 mostra del calcolatore elettronico "Olivetti Program-ma 101", aperta a tutti con ingresso gratuito al laboratorio nell'edificio "Enrico Fermi", nel comprensorio di Mirama-re. Nella medesima fascia ora-

ria, Giovanni de Sandre e Gastone Garziera, due dei comstonie Garziera, due dei com-ponenti del team che 50 anni or sono realizzò il primo per-sonal computer - appunto l'Olivetti Programma 101 -, vi-siteranno SciFabLab. Dopo la siteranno SciFabLab. Dopo la gaussa pranzo, la giornata pro-seguirà dalle 14 alla Adriatico Guestheurse di via Grienana 9. Guesthouse di via Grignano 9 con un incontro tra de Sandre, Garziera, Università e

Ictp SciFabLab (partecipazione a richiesta e a numero

A seguire, dalle 17.30 alle 19, incontro aperto al pubblicó con I grandi maker di ieri e có con I grandi maker di ieri e di oggi "Italia, avanguardia tecnologica: dalla Program-ma 101 Oliverri ad "Ardutino", menzo secolo di inventiva e ricerca", moderato dal diretto-re de ll Piccolo, Paolo Possa-

Nuove tecnologie L'Ictp apre il suo nuovo laboratorio di stampa in 3D per creare oggetti con plasuca ... NI

di Cristina Serra Ingranoga, di meanino e pro-isoi aminenti per una esterna. Malentali da laboraziate e taka per il materna fognario. Tutti-genoannere in planito, me glio se biodespresibile o addi-nitore mercheo, sono deserper la damente la plastica dal sia se biolograficiolite e addi-niture necidata, sono atemi dei produtti che esceno per on, selo in ferma el proceti postulai - del SO Lab prin-tira, il travvo laboratario per la manya la dal SO Lab prin-tira il travvo laboratario per la manya la dal SO Lab prin-lica dal SO Lab prin-tira dal SO Lab prin-tira dal SO Lab prin-lica dal SO Lab prin-terio dal SO Lab prin-dal SO Lab printerio dal SO Lab printerio dal SO Lab printerio dal SO Lab printerio dal sono d

wishipment is called tim weithle re-fer di plassion colorada au unap-pasite wapprotto, spostandori nende reconsol de indirection di dongras com puterscate. La excenderan tone è mova-reconsilizzationi score inte-reconsilizzationi score inte-querta intellazzo incorpar Cancel.

CONFERENZA

La scienza salverà il mondo

La matcanica qua stistica ha La maccanica quantitrica ha materia si l'unero i limiti dal alto grardi d'unero i limiti dal si organeti d'ordezioni rabie nel la rabera, lia paria dorazi alla faziare, lia paria Dandicine contenenti alto Dandicine contenenti dorami alla 14 20 Sangie del Nicher, gunhassare del Nicherenka "Sopienza" di Roma, la une conterenza pubblica ata Siana 41 Vriante Via Boscrean 2553. El parterio di Campi quantitatica, inoria della quantericica, ma versare della puntoricica, ma versare della puntoricica, ma versare della nazione di concencenza e del radio della cultura nella sostare indevidane. in Italiano.

34. del grupper Science dissi-nisation unit dell'inter-monité quelle di produre expertit più di mento internati o cristi il monto oblictime è u bite tecnologia a bana



al recreation provenienti dai porsilin via di soltappo, in noo do da stinolare more idee e socceste di utilizzo della pla-

Il file di plastica quasi sem-pre biotogradatie con cat a creaze si regreti costa le competiti conto de partie le competiti conto de partie portunità



L'Ictp festeggia il "compleanno" del Fablab Open day al Centro di fisica di Miramare. Serracchiani: «È il futuro della scienza applicata all'industria»

«E un 'initiative importante ne del fare impresa del laborito en del fare impresa del laborito en del fare impresa del molto en del fare impresa del molto en del societta estato en del societta estato en del societta estato en della tragente del formato desis della tragente del directo da posi-desis della tragente della tragente desis della tragente della tragente desis della tragente della directo da contro versa Abdas Salari desis della tragente della directo di tra-to della directo della societta desis della tragente della directo desis versas Abdas Salari della di directo di posi-to della directo della Societta della directo della Societta della tragente di tragente di adei di travest spaci. Immo pos-tato di versas della societta di ante di seltare dell'aconte si tra-to della della directo di tratto della di travesta posi-ttato di travesta posi-ttato di seconta di tratto della di travesta di tratto della di tratto della di tratto della di t



it wind to all bads. ari Fablah del C o di fisica teorica (f

il mondo, rendendo accessibituro. Stamportil Sd. macchine di par il capito laore e altre ap-parecchantare di avangoardia dajatati suco le protogentaro di questo epocia. El laogo di questo epocia divan-rate prenorio, oppoti con cui norragite: cinve la taccologia innolena rendenalo acossibili linnolena inmenenti di bittori-cazione digitale. La Scilla-bilab dell'algoride e inmenoriti una conta aportale e innovati que a disposizione dall'agorto dello actoro anno di incercazo-dello scoreo anno di incercazo-ni, inventori e artiglato del fo-



erracchient trait alerd aco Copolini de physical e il rettora P

cono per oltre sutinostilo cre dando spuedo e presidulità di crescita a ventinette disensi

può contre esplotata eles 19-min di quello che il meccano el proporte glà confriettentita, que Cancora i dura el lenti que Cancora i dura ricercontori respontabili della struttura. Nettorio gritta 36 porte di attività, la SciFabLob ha invecrascia a versation propeti Disboarosito si è estisppato sul modello di quarco avide-ne gli otmoceane, ragli Stati Uniti. Qui, gracia alla presensa di templogie ovoravissi-me, quali schede elvernei-de macchia Losertori, una decana di samparit ID esi-locate accastra a postatoral computazionne, la constituta à transattatamente frubble à transattatamente frubble di caso, secol baccha, o nati-bito stampato gnate alla fib-titi caso, secol baccha, o nati-rittimente anche prostetta il fin-mento, que pregetto paò es-are conducto con quètori

Quarte polo di excellenzo, dirappo, permerite agli sciene riati che si operazio non solo di accre una moderno di sciene ma surba di condividuenzione ma surba di condividuenzione perso a "harow haw" constituta-perso a "harow haw" constituta-ta intervazionale della reta intervazionale della rista intervazione della piblico in occasione della statuenzi madera l'inter-sione accesso della estatua diretta intervazione della sino saccesso della estatua statuenzi madera l'inter-sione della treva l'MO vi-statuenzi madera l'inter-

ALLE 17.30 I grandi maker di ieri e di oggi a confronto in via Grignano 9

Appuntamento, oggl, con "Un tribute all'inventiva italiana: jeri, oggi e domani", grazie a Ictp -Centro internazionale di fisica teorica Abdus Salam e a SciFabLab (Scientific Fabrication Laborstory), il laboratorio per ricercatori, creativi, inventori e arto distamps in dei tre ticerce tigiani ter uv trene mente, anch dell'lorp, Fett E ancho cene Non possion 'o pet aver portugiti aperto all'edificio "Enrico Fermi", nel comprensorio di Miramare. Il programma prevecie dalle 10 alle 12 la mostra del calcolatore elettronico 'Olivetti Programma 101", con ingresso gratuito per tutti in Sci-FabLab e visita di Giovanni de Sandre e Gastone Garziera, due dei componenti del team che realizzò il primo pc. Dopo il break, la giornata proseguirà dalle 14 alla Adriatico Guesthouse di via Grignano 9 con un incontro tra de Sandre, Garziera, Università e Icip SciPabLah, Dalle 17.30 alle 19 sempre in via Grignano 9. incontro aperto al pubblico con i grandi maker di ieri e di oggi Italia, avanguardia tecnologica: dalla Programma 101 Olivetti ad "Arduino", mezzo secolo di inventiva e ricerca", moderato dal direttore de Il Piccolo, Paolo Possamai, e che wedrà partecipare Alessandro Ranelhucci (diret-

) e proprio L La tevola a dal quotip in occaentro di fitegno di Almin del Fvg aolo.

rearris, que pengeta paral ela sure condivita con qualitari laboratorio in ugui porte del mondo. «Sismo aperti a turi, grantamento: hasta avano fiello hastar idano, tagdange Fonda. ends. Quarte polo di eccellerno,

ove cia

TORNANO GLI ANNI '60 3D: il futuro è or Tantissime le applicazioni possibili positive

sto laboratorio a farla da pa-

un processo di "produzione



MINDE

Vita Nuova

LDRONE EIROBOT ECCOIL VIVAIO DEGLISTARTUPPER

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Come

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MANI SA SCIENZA

Change fao a vessel is per induced a principal, guaran-reene als Ates Onio Paris. Term endowed a minor 'on-ene transition of 'minor' on-tant della edena d'angent del Cento et angent angent d'Orne a transmissione d'angent interagiante a campitale reine a transmissione del San e morte. Depi Abdes Salar, l'avento, especialment dell'arg instance a transmissione d'angent terme a transmissione del Cento mette especialment per les agas re l'enquert inert data l'argent done. I'manor' che el incrive-rane con l'apopri poppet av-to venerelli polosano especial del

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(dal design alla medici gnamento al turismo...), ma soprattutto perché è un vero e proprio di esempio di "democrazia scientifica". «Le stampanti 3D nascono in realtà già r 30ctiv

TREZZATURE

Maior Fairs nance come E più grande aperacale di Ventra e dimantra" establicationi

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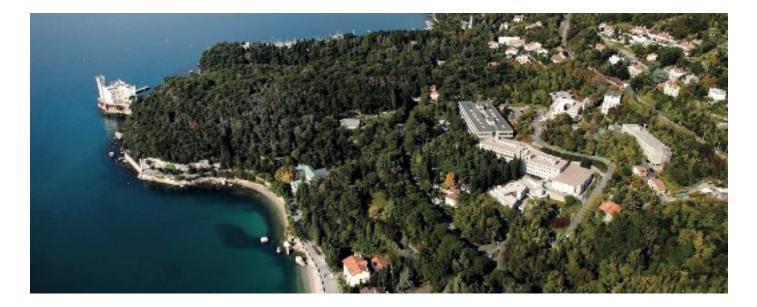
A Miramare c'è il primo raduno dei "makers" pante are nel C'è tempo fino a venerdi per iscriversi all'incontro organizzato per i cinquant'anni dell'Ictp gile. Un 'occasione reella quale gii inneccot constrance le lora oppere e constrbictione adu des banos harperiore. I maleres sona pensone che aquatane dugli es trattatti della termelogia si co-munitati della termelogia si co-munitati attigianati, chello della cagio estonenti a chi terrena qualerese te constitu. persoite di secapo di una Malere Paire è in-secapo di una Malere Paire è in-contenesse, informanzo, comuni-mi anditi. Speciale atomiciane and charac-ta a cleve e properti di atomicia datation classificazione atomicia valo valogare. Trangemos per il pobblico at-novatora por l'analori espaini avvicane por l'analori espaini province calesta una preventare registratore gottata. Inchi-ale propia secolore organizzo-tale barrennie e menotare le pre-espaini en un prepor le pre-espaini e un prepor le pre-espaini e un prepor pre-reggotti e registante gottate-renzo.

and part

manifi, La prima Maker Faire et è profin a San Maker in California enel 2015 ha calebrate la mater-ture editione annuale con situe

WE ARE HERE







"Scientific thought, and its creation, is the common and shared heritage of mankind" Prof. A Salam At 1979 Nobel Prize in physics' ceremony



Contact Info

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