

Pacific Library Partnership

Pacific Library Partnership
2015-16 Grant Program
Due Friday, October 30, 2015 by 5:00 p.m.

Please provide the following information in a Microsoft Word document. Please email the completed form to Wendy Cao at caow@plsinfo.org.

1. Title of Project: Regenerative, Self-Assembling Open-Source 3D Printing System
2. Category (A or B): A
3. Library applying for funding: Contra Costa County Library-El Sobrante Library
Name: Anh-Vu Doan
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Address: 4191 Appian Way
El Sobrante, CA 94803
4. Amount of funding requested: \$15,000

1. One paragraph project summary.

In order to ensure universal patron access to technology and to keep current with popular innovations, the Contra Costa County Library (CCCL) plans to have a 3D printer in every community library, available for patron use, library programming, and small-scale fabrication of replacement parts. The Library will construct a RepRap “Prusa Mendel i2” 3D printer using starter kits and self-fabricated, 3D printed components. The Library will self-replicate the printer until 26 units have been built. Library staff will assemble them with the help of volunteers and patrons who participate in a “Learn to Build a 3D Printer” program, organized at each of the 26 community libraries in the Contra Costa County Library.

2. Explain how this project fits with the library’s strategic directions.

The motto of the Contra Costa County Library as written in its 2014-2017 Strategic Plan is “To spark imagination, fuel potential, and connect people with ideas and each other.” The Library excels in innovation, programs, and customer service as demonstrated in signature programs such as the Discover & Go free museum pass program and the Library-A-Go-Go material vending machines located in BART transit centers.

The Library believes that the Maker movement, and its corollary trend of open-source hardware, dovetails with Strategic Plan Goal 3, Objective C: “Explore and implement technology to enhance the customer experience”. This project will substantially increase the Science, Technology, Engineering and Math (STEM) programming at all library locations. Additionally, the project will support science-based literacy and learning skills in support of the overarching Goal 2: “The Library champions personal and community engagement in literacy and reading to enrich lives.”

3. A description of the proposed project including the population served and the demographics of that population.

The “Regenerative, Self-Assembling Open-Source 3D Printing System” project will allow the Library to assemble and equip all 26 community libraries of the Contra Costa County Library with a RepRap Prusa Mendel i2 3D printer. One of these printers can produce an identical copy of itself using 3D printing files freely available online, if given the mechanical components available through starter kits.

The Library will partner with local school robotics clubs, volunteer groups, and electronics enthusiasts in the community to support this project. During the process of assembly, library staff will lead programs that teach the public how to build a 3D printer, during which participants will be able to follow along with assembly of the printers and fabrication of parts.

Interested staff members will be invited to sign up to learn to assemble the 3D printers in order to start a similar program at their own branches. Having done so, a kit will be sent to each branch that sets up a “Learn to build a 3D printer” program. At the conclusion of the program, each branch of the Library system will have acquired and built their own 3D printer.

Currently, the Library has access to four 3D printers as part of “kits” that can be circulated to any community library. However, when shared across 26 branches, the time that each kit can be at any one location is relatively small. An unintended consequence of this is that staff members do not always retain their training on or interest in 3D printing as they do not have long term access to the technology.

CCCL serves a diverse population of 1.049 million in Contra Costa County, excepting the City of Richmond which has its own municipal library. The median household income is \$78,756 annually, 28.5% higher than the average for California, and the poverty rate is 10.5% (U.S. Census Bureau 2013). However, within this relative prosperity are a number of notable outliers (see the following table).

	Median Income	Poverty Rate
Antioch	65,254	14.90%
Bay Point	43,441	29.10%
El Sobrante	60,849	10.20%
Pittsburg	58,866	16.80%
San Pablo	44,983	20.80%

Fig. 1: Low-income Communities served by or within the service area of a CCCL branch, U.S. Census Bureau, 2010.

CCCL serves a variety of customers, speaking an international range of languages including Hindi, Chinese, Vietnamese, Tagalog, Russian, and Spanish. Furthermore, fully 25% of CCCL’s customer base consists of Hispanic/Latino populations. According to the U.S. Census Bureau, foreign-born persons account for approximately 25% of Contra Costa County’s population (U.S. Census Bureau 2010).

Within this diverse population – both in terms of income and national origin – the library plays a significant role in introducing underserved or newly-arrived library users to the best of cutting-edge technology.

4. Goals and objectives of the project.

The Library’s main objective with this project is for each branch to have a 3D printer available for patron use with as much ease as a copy machine or reservable computer station. Having a 3D printer permanently located at every branch as regular library equipment will make 3D printing available for ordinary patron use and help facilitate creativity, design, and STEM/STEAM education as well as spur innovation through providing universal public access to emerging technology. Additionally, it will provide

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advanced opportunities for staff training with new technologies. Lastly, this program will offer valuable electronics and mechanical assembly experience and science-based literacy to volunteers and other participants that will enrich their lives and enhance their future job opportunities with hands-on experience through library programming.

5. Project timeline (activities).

Activity	2016											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Purchase 3D printer starter kits	X	X										
Fabricate structural components	X	X	X									
Recruit and train staff at each location			X	X	X							
Assembly at first location				X								
Testing, programming, debugging of process				X	X							
Assembly and programs at 26 public locations						X	X	X	X	X	X	X
Marketing of "Build a 3D printer program"				X	X	X	X	X	X	X	X	X

6. Evaluation of the project.

Assessment will be based on attendance statistics in "Build a 3D printer" program and patron feedback. A survey will be provided following public programs to assess future interest in programs based on STEAM components or 3D printing specifically. The survey will also ask patrons what their opinions are on the 3D printers, how much they may use the 3D printers, suggestions on future programming involving 3D printing, and to rank their satisfaction with using the 3D printers. Staff feedback will be collected via one on one in person assessments regarding the 3D printing training and programs at their library locations.

7. Project budget.

Starter Kits: \$12,450

Prusa Mendel i2 kit (Easyreap.com): \$389.00 USD / kit x 26 kits = \$9725 + tax + shipping

Power Supplies: \$1035

26 EVGA 100-W1-0430-KR 430W ATX12V / EPS12V 80 power supply units:
\$36.00 USD / unit x 26

Additional Materials: \$1515

Filament: \$880

5 Soldering kits: \$25 / kit x 5 = \$125

10 Screwdrivers: \$15 / screwdriver x 10 = \$150

10 Wrenches: \$22 / wrench x 10 = \$220

1 Power Drill: \$140

Total: \$15,000

References:

1. U.S. Department of Education. "Science, Technology, Engineering and Math: Education for Global Leadership". 2015. Web. Accessed 10/13/2015. <http://www.ed.gov/stem>.
2. U.S. Census Bureau; "American FactFinder"; generated by Anh-Vu Doan; using American FactFinder; <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>. (10/16/2015)
3. Contra Costa County Library. *Strategic Plan 2014-2017*. 2014. Web. Accessed 10/13/2015. <http://ccclib.org/aboutus/Strategic%20Plan%202014-2017.pdf>

