

Students learn 3D printing

Judy Hoyle

IVN Contributing Writer

Devon DeNoon first became intrigued with 3D printing in 2011 when he was still a student at I.V. High School. Now he's teaching an afterschool class in the futuristic technology as part of the federally funded 21st Century Learning Center program.

DeNoon sat at a computer in the industrial arts wing of the high school last week. He was using a 3D printer to build replacement parts for itself.

"You can print just about anything, from mechanical components to toys and trinkets," DeNoon said.

Last fall, DeNoon was an assistant in an afternoon arts and crafts class when he ran into his former teacher, Wayne McHugh, who told him one of the school's 3D printers wasn't working.

DeNoon had built a 3D printer before and offered to fix the machine. He was able to figure out that incorrect wiring had caused a heater element to overheat and break, a problem which had not been corrected when the heater was repaired. DeNoon got the printer working and began upgrading it, printing a new extruder for it and crafting a new build plate. McHugh offered him the opportunity to teach others the complex interplay between modeling

on a computer screen and producing a physical object or component.

"The current generation of low-cost 3D printing machines has its origins in the Netherlands in 2005, with the RepRap foundation," DeNoon said. "They wanted to build a machine capable of making parts for itself. The first models had overly complicated extruders and frames, but through trial and error, they refined them and came up with the electronics, software and design structure that most commercial 3D printers use today."

Once only available for expensive high-tech applications for large corporations, the technology has grown quickly over the past 10 years and now 3D printing is everywhere including small 3D print shops, startup companies and hobbyists with a printer in their home.

Almost anything can be printed, from an artificial leg for a dog to a working motorcycle, to name just two real world applications.

3D printing has transformed design, production and logistics processes, enabling easy production of prototypes, one-off components or custom tools and even small scale production manufacturing.

The process begins by making a virtual design of the object to be printed, using computer aided design

(CAD) software, or a 3D scanner to create a copy of an existing object.

The 3D file is converted into a mesh format, usually an STL, then a "slicer" program can be used to translate the model into a language the 3D printer understands.

A 3D printed object is created through extruding successive layers of material until the object is completed. Each layer of the 3D copy is a thinly sliced horizontal cross section of the object being copied.

There are several categories of 3D printer, each with a distinct method for creating physical objects, but all use the technique of laying down numerous layers of material to build up an object.

The most common is FDM (fused deposition modeling) and it uses molten plastic to create objects. "Many types of plastic can be used," DeNoon said. "They all have different physical properties. Some are easy to print. Others are incredibly strong, but very sensitive to heat, making them difficult to use. There are even flexible plastics."

Other 3D technologies include STL (stereo lithography) printers that solidify a photo curable resin, Powder Printers that bind or glue granules of powder together and SLS (Selective Laser Sintering) printers that use high power lasers to melt



(Photo by Judy Hoyle, Illinois Valley News)

Devon DeNoon (right) working with a student on 3D printing in his afterschool class, part of the 21st Century Learning Center program.

powders of metal together.

"I like the challenge of maintaining the machines," DeNoon said. "A lot can go wrong, but most problems have simple fixes. I can usually figure out what's wrong in five to 10 minutes and have it fixed by end of class."

He also expressed satisfaction that an absolute novice can master enough basic concepts within two hours to be able to design and create an object.

"It's cool that in this

class you can make any small plastic part any way you want, from chess pieces, to mechanical components," DeNoon said.

IVHS is currently looking for funding for a 3D scanner in order to help build the program next year.

DeNoon, a two-time Academic Masters finalist, also has other design projects in the works, including a model plane with a 3 foot wingspan. It's constructed from foam core and has a 3D printed battery holder. He's

now working on wiring the control for the aircraft.

Another project is research and development into a hopper feed Nerf ball gun using a five gallon drum and a 3D-printed adaptor.

"I'd like to be able to shoot hundreds of Nerf balls at a time rather than have to reload after just 12," he said. "Using 3D printing to create functional objects, even if they're for fun, helps inspire the kids and help them see more of the possibilities of 3D printing."

H&R Block Business Services

- Bookkeeping
- Payroll
- Tax Preparation
- Advice

H&R Block Business Services can help your business go further. Contact your local H&R Block office for more information.

H&R Block
210 W. Lister St.
Cave Junction
929-366-1100
Ted Crisler, LLC
Bob Lusk, LLC
Licensed Tax Consultants 0114914

H&R BLOCK | business services

STUMP GRINDING
Any Size

Contact Terry 541-660-9880

LICENSED and INSURED

ALLIED SEPTIC SERVICE

\$335 UP TO 1000 GALLONS *IV ONLY

We will beat "Anyone's" competitive price.

- Septic Pumping & Repair
- Location Service · Line Cleaning/Jetting
- Inspections & Installation
- Servicing, Scoping & More

541-660-8184
www.allied-septic.com
DEQ# 38518 · Licensed, Bonded and Insured

Courtesy of the Grants Pass Daily Courier.

240 N REDWOOD HWY #226
CAVE JUNCTION, OR 97523
541-592-4367

FOLLOW US ON FACEBOOK
WWW.FACEBOOK.COM/PAPAS DISPENSARY-WE'RE BACK

- GLASS
- CLOTHING
- ECLECTIC GIFTS

PAPA Ilc
Providing All Patients Access

Foris Winery

Visit our tasting room for selected wines at discounted prices

Open Daily for tasting from 11 am to 5 pm
654 Kendall Rd. Cave Junction, OR

Stay at our 100 year old farmhouse on the vineyard. Call the winery at 541-592-3752 for rates and availability, or check our online listing at <https://www.vrbo.com/315296> for pictures, calendar and to book.

fanelli's
Italian Cuisine

541-415-2100 • 155 S Redwood Hwy
Open Tuesday-Saturday 4-9 pm

Daily Specials, House made Entrees, Sauces, Soups, Breads, and Desserts
Featuring Illinois Valley Winemakers

MOSER PAVING, INC.

FREE ESTIMATES AND TECHNICAL ADVICE
SERVING SOUTHERN OREGON SINCE 1965

Jay Moser
541-479-2424

Black Top
Excavating
Cat & Backhoe
Utility Work
Road Construction
Demolition

Chip Seal
Seal Coating
Dust Control
Drainage Repair
Heating Oil
CCB#33187

FOR ALL YOUR AG BUILDINGS AND GROW SITES
650 Redwood Hwy Grants Pass OR 97527

cj@moserpaving.com
www.moserpaving.com