

LEGACIES

Central Oregon Community College Foundation Magazine Spring 2018



Science Matters COCC's STEM Programs

Steely Purpose

The Math Impact

Engineering for the Future

contents

features

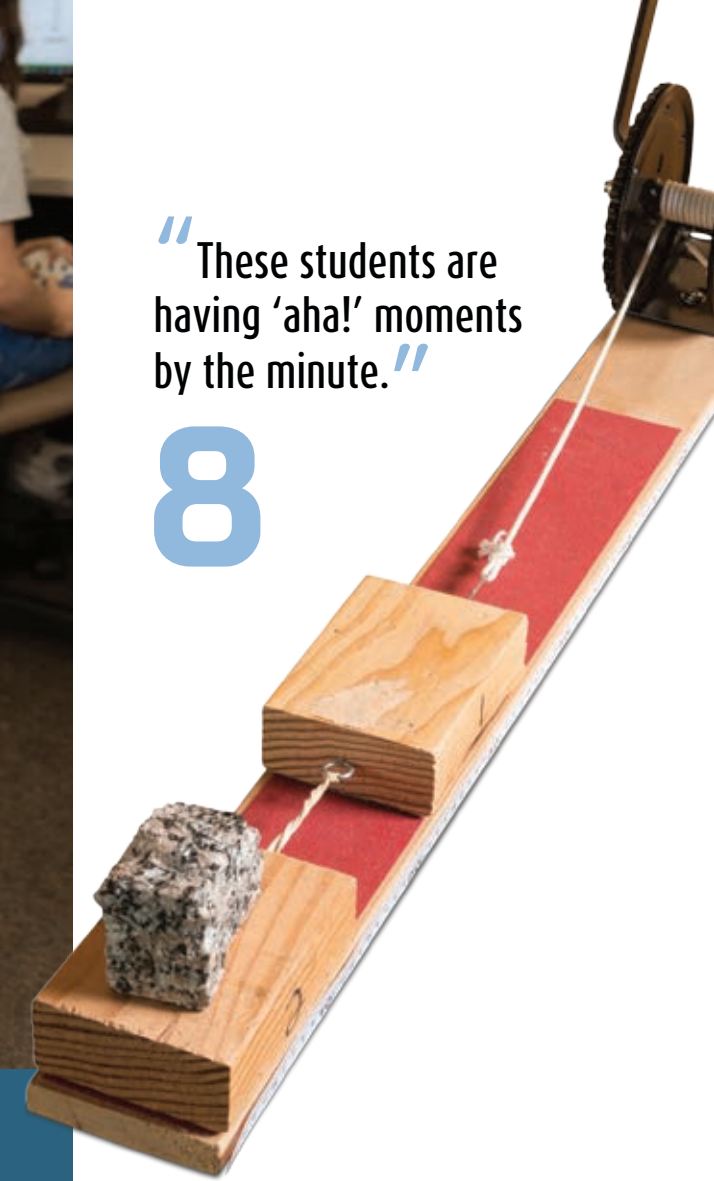
- 4 Steely Purpose**
The manufacturing program doubles down on its mission
By Mark Russell Johnson
- 8 Science Matters**
Shaping scientific literacy through hands-on labs
By Katy Bryce
- 14 The Math Impact**
COCC math students find a calling at the head of the class
By Mark Russell Johnson
- 18 Engineering for the Future**
Engaging methods are preparing tomorrow's problem-solvers
By Katy Bryce



"That's part of our collaborative spirit." **14**

"These students are having 'aha!' moments by the minute."

8



CENTRAL OREGON
community college
FOUNDATION



- COVER**
Timothy Park
- LEFT & ABOVE**
Timothy Park
- RIGHT**
EarthCruiser

"Steimer credits his experience at COCC for helping him land his dream job."



departments

- 2 Letter from the President**
- 3 STEM Strength at COCC**
Science, Technology, Engineering and Math
- 11 Scholarship Recipient Profile**
- 12 Igniting Minds**
Central Oregon Skilled Trades and Apprenticeship Fair
- 17 Fun with Numbers**
40th annual high school math contest
- 20 Embracing Science**
Recipients of the Thomas Endowed STEM Scholarship

LEGACIES

Spring 2018

Vol. 29 | No. 1

WRITERS

Zak Boone, Katy Bryce,
Mark Russell Johnson

PHOTOGRAPHERS

Karen Cammack, Eugen Helmbrecht,
Joe Kline/*The Bulletin*, Oregon State
University, Timothy Park

EDITORS

Zak Boone, Mark Russell Johnson,
Aimee Metcalf, Brittany Nichols,
Ron Paradis

DESIGN

Lora Szaraniec

COCC FOUNDATION BOARD OF TRUSTEES

Patti Carlson
Pat Fulton
Amy Howell
Terry Juhola
Daisy Layman
Erin MacDonald
Charlie Naffziger
Andrea Phelps
Vicki Russell
Judy Smith
Jeffrey Stuermer
Betsy Weedman

COCC BOARD OF DIRECTORS

Bruce Abernethy
Laura Craska Cooper
Joe Krenowicz
John Mundy
Vikki Ricks
Erica Skatvold
Alan Unger

*The Central Oregon Community
College Foundation Magazine is
published twice a year during Fall
and Spring terms. Contents may only
be reprinted with permission from
the Foundation. Central Oregon
Community College is an affirmative
action, equal opportunity employer.*

Letter From the President

Central Oregon Community College has a long history of serving this region, and the COCC Foundation has been our partner throughout. In February, we celebrated the 40th annual Meal of the Year—the premier annual event in our region.

As part of our celebration, we were able to recognize an individual and a company that have been among our strongest supporters for the past several decades. Trish Smith, who along with her husband, Bill, were our first-ever Meal of the Year Award recipients, provided a wonderful history of the Foundation and helped us honor all of those who have earned that prestigious award. Trish spent 25 years on the Foundation Board of Trustees, and she and Bill are tireless advocates for our scholarship program.

Trish then introduced this year's honoree, Kirby Nagelhout Construction Company (KNCC), which has a long history of commitment to our community, and in particular to COCC, the Foundation and student scholarships.

The Meal of the Year, along with Friday night's Taste of the Town, reminds all of us how special this community is. Hundreds of people come out to celebrate and support the students at COCC. We get the chance to celebrate the students, the great work of the Foundation, the continued leadership of the College in the community and—most importantly—the community itself and the wonderful people who continue to provide scholarships for deserving students.

This year, we raised \$313,000 for scholarships, bringing the total amount raised during the 40 years of this event to more than \$5 million! This is wonderfully gratifying and an accomplishment we can all be proud of.

COCC's culinary students again did a magnificent job of preparing and serving the meal. This year, we established a new partnership for the event and had culinary students from Mountain View High School create the salad course.

Thank you to everyone who continues to support COCC and the Foundation.

Dr. Shirley I. Metcalf
COCC President



(l to r) Trish Smith, Jeff Deswert (president of KNCC), Dr. Shirley I. Metcalf



— by Zak Boone —

Strength at COCC

There's an acronym flying around more and more in the world of education these days, particularly in higher education: STEM. STEM is the academic discipline of **science, technology, engineering and mathematics**, and the term is often used when addressing education policy and curriculum choices to improve competitiveness in science and technology development.

STEM arose in common use after an interagency science education meeting at the National Science Foundation (NSF)—a better acronym, it was reasoned, than the previously used 'METS.' One of the first NSF projects to use the acronym was STEMTEC, the Science, Technology, Engineering and Math Teacher Education Collaborative at the University of Massachusetts Amherst.

STEM is a growing movement worldwide. STEM-based learning programs are intended to increase interest in pursuing higher education and careers in those fields. Programs typically use a model of blended learning, combining traditional classroom teaching with online and hands-on activities. This approach is alive and well at COCC, and we've decided to dedicate most of this issue of *Legacies* to sharing the impact STEM is having in Central Oregon. But first, a primer (with help from LiveWire):

Science

Classes in the science category include biology, ecology, chemistry and physics. However, STEM-focused science classes have morphed in recent years and now incorporate technology, engineering and math.

Technology

Technology classes have definitely evolved and may include topics like digital modeling and prototyping, 3-D

familiar, such as algebra, geometry and calculus. However, STEM math has two main differences. First, students today are learning advanced mathematics at younger ages, with introductory algebra and geometry starting as early as third grade. Second, it bears little resemblance to the math lessons of the past. STEM math incorporates concepts and exercises that apply science, technology and engineering.

STEM IS THE ACADEMIC DISCIPLINE OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS

printing, mobile technology, computer programming, data analytics, Internet of Things (IoT), machine learning and game development.

Engineering

Much like technology, the field and scope of engineering has grown considerably in the last few decades. Engineering classes might include civil engineering, electronics, electrical engineering, mechanical engineering, and robotics, topics many parents today could not have imagined learning as early as elementary school.

Mathematics

Similar to science, mathematics is a category with classes that will sound

In some ways, STEM education is a long-overdue update to our entire education system—intended to bring students up to speed on the skills and knowledge most relevant in today's society. STEM initiatives also do more to reach and encourage women and underserved populations to pursue education and employment in these fields. In general, there is a true need for today's students to be more literate in the areas of science and technology than in previous generations. STEM education has earned its buzzword status—and is thriving in many ways at COCC. Enjoy learning more!

Zak Boone is the executive director of the COCC Foundation.



opened up, some two million won't be filled due to a lack of qualified hands. Time to get to work.

MANUFACTURING SOLUTIONS

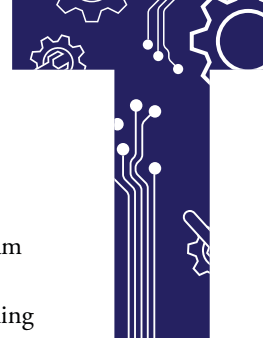
On a January afternoon at the Redmond campus, Baughman is overseeing students in the MATC welding lab. Goateed and in safety glasses, there's a trace of metallic

grime on his face. Over in a corner of the lab, students of the self-paced class are dipping hot projects into a water tank and then blasting off the residual moisture with an air compressor to prepare for a secondary weld. It's a step that marks the end of one phase and the readiness for another.

"We have designers, we have fabricators, people that just want to go to work, people who want to be machinists, some want to travel," Baughman says of his students in a nearby—quieter—library room. "The thing that's really unique about the manufacturing program," he adds, "is we've got basically three different

programs that you typically would not see together anywhere else."

The machine tool program (manual and computer numerical control), welding program and industrial maintenance program at COCC are all folded together into the same department. At most colleges, he says, these three specialties operate independently with their own systems and budgets. While the stacked-together nature of the MATC adds complexity, it also allows them to move as one.



STEELY PURPOSE

Forging new partnerships and retooling its curriculum, the manufacturing program doubles down on its mission

— by Mark Russell Johnson —

While the skilled trades shortage is an issue burdening the entire country, Chris Baughman seems to be making it his personal goal to turn the tide.

The former welder, and now director of COCC's manufacturing program since 2015, has set out to steer the college's Manufacturing and Applied Technology Center (MATC) through some major transformations. Together with instructor

Dan Holland, and building on the accomplishments of Bruce Emerson, who served as interim director, Baughman is expanding partnerships with high schools and connecting with business leaders. They've overhauled curriculum—about half of it. And they're laying the groundwork for career pipelines that will satisfy the industry while prepping students with top-notch training. It's heavy lifting, but the timing is more crucial than ever.

As the sizable boomer generation of skilled tradespeople is phasing into

retirement, and an information-based world is funneling jobs in a different direction, the U.S. economy is facing a conundrum: the work is there, but the talent isn't. A survey conducted this past December by the National Federation of Independent Businesses revealed that 54 percent of small businesses can't find the skilled labor they need. And a Manufacturing Institute report says that by 2025, while close to 3.5 million industry jobs will have



For instance, starting in 2016 Baughman and Holland revamped 31 courses to better align COCC with outside accreditation agencies and industry standards. Up until recently, the majority of the MATC programs were delivered by an outsourced e-Learning system and they weren't ideally aligned with industry criteria or outside accreditations. There was lab work, sure, but teaching was minimal. That's changed—and with added content, instruction and plenty of repetition, the caliber of skills is now on a new level. "We run it like a shop but with school standards," Baughman says.

With added content, instruction and plenty of repetition, the caliber of skills is now on a new level.

Since those skills often start to take shape in high school, connecting more with high school manufacturing programs was key. To open the doors, Baughman launched an annual high school welding competition, now in its third year, where



Chris Baughman

budding welders come from as far away as The Dalles. He's also visited high schools to promote COCC's programs, welded with the kids and shared his industry expertise.

This new rapport led to the convening of 10 high school welding instructors from around the region. The idea was to hash out a unified approach to instruction. "We brought them in for a four-day training over the summer, so we were all on the same page, so we knew what they expected from us and what their challenges were," he says. "That was tremendous."

While college credit has long been available to regional high school

manufacturing programs—students can tally up to seven credits before graduating—a new 13-credit, short-term certificate at Redmond High will go a step further. Though still being finalized, the articulated arrangement will fit the pattern of a pre-apprenticeship program, a trend that's growing in the industry.

Through this certificate, students will get a full term of college while

still in high school. They'll build skills and confidence while saving time and money on their schooling. Courses include math, writing, basic hand tools, beginning welding/fabrication and manufacturing. Ultimately, the plan gets students trained up and into the



trades quicker. Bend High has already expressed interest in doing something similar.

To help design this new articulation, Baughman consulted his advisory board. Comprised of local industry leaders—currently from Nosler Inc., Keith Walking Floors, ISCO Manufacturing Solutions, Advanced Northwest Welding, Mill Power and CR Fabrication—this board has long had a role in MATC programs. But the partnership had faded somewhat in recent years. Thanks to the MATC's new momentum, this working relationship has realigned. "We offer input from the industry side," says Nosler's Mike Lake, "...bridging the gap between education and the real world." The group, which meets several times a year, has a direct impact on shaping student outcomes. It benefits all involved.

ON THE JOB

Out at ISCO Manufacturing Solutions in Bend, Brandon Crosby runs a CNC waterjet that cuts parts. It's a detailed, sequenced process, and along with programming and inspections, there's a fair amount of finesse to the job for this recent MATC graduate. "There's

a lot of adjustment that I have to do to the machine to make it a good part," he says. But his training has prepared him. "COCC was most definitely helpful in me getting this position," he adds.

At a time when other disciplines are facing falloffs, the MATC is enrolling more students.

Andrew Hester, another recent grad, is now on his second year of employment with Titus Industrial Group. "We deal in wastewater solutions and build plastic manhole systems," he says of the Bend company. "We weld metal molds to create plastic parts that we fabricate into manhole baseliners." Hester's strong skillset has allowed him to excel. "I started out as a welder in the shop and am now a project manager and consultant," he says.

Connecting students with employers is the final figurative weld. In some cases, Baughman and Holland can make introductions or set up interviews. They also maintain a job board to post positions. Lately, a new partner is helping put students into the working world.

An internship coordinator at Economic Development for Central Oregon, partially funded by an MATC-generated grant, is linking high school, college and university students with Redmond-area employers. "My job is to go out into the business community and try to find opportunities," says Larry Holeman, Redmond internship coordinator. "This is a region-wide effort," he adds, referring to counterparts in Bend and Madras. In the first few weeks, Holeman's already helped two MATC students

land part-time intern positions with PCC Schlosser, a maker of precision parts.

MATC graduates have landed far and wide, from Louisiana (welding inspector) to China (bridge builder). In the U.S., grads are fabricating pharmaceutical equipment, making military gear and building fuel cells for racing cars. It's rewarding for the MATC staff to see their part in tightening the skills gap, but they're already focused on the next task.

ROOM TO GROW

When the Redmond campus's Technology Education Center opened in 2014, it included a designated space and equipment for studies in the rising field of non-destructive testing and inspection (NDTI). A degree program launched, but ceased two years later. "It wasn't self-sustainable as a standalone program," says Baughman.

Now, he sees a new way forward. The idea is to embed NDTI concepts into manufacturing, to bring that educational piece into welding and fabrication. Baughman's been taking coursework to augment his own NDTI knowledge and has already started the process of writing new curriculum.

All the heavy lifting and partnerships are paying off. At a time when other disciplines are facing falloffs, the MATC is enrolling more students. Classes which a year ago had 20 students now have double that.

High schools are queuing students up. Local companies are viewing the program with new eyes. A lot has improved in a short span of time. "We're growing and we're meeting a lot of industry needs," Baughman says, summing up the last two and a half years. Then he heads back into the welding lab. ■

Mark Russell Johnson is the staff writer in COCC's College Relations department.

Eugen Helmbrecht





Science Matters

Shaping scientific literacy through hands-on labs and open-air classes

— by Katy Bryce —



Timothy Park

The late Carl Sagan, one of America's most admired astrophysicists, once said, "Science is a way of thinking, much more than it is a body of knowledge." Science is, after all, how we make sense of our world. It is how we discover cures for diseases, how we grow the food we eat every day, and how we forecast weather. Science touches our lives every minute of every day. Yet any scientist will agree: we live in interesting times.

In the age of "armchair science," where politicians and celebrities espouse questionable information, education is critical in fostering a new generation of people working in scientific fields. Kevin Grove, chair of COCC's Science department and associate professor of physics, agrees that science education is more important than ever. "Learning about scientific inquiry, method and processes based on gathering data, experimenting and asking questions, is the basis for scientific literacy," he says. "It also piques our curiosity, that discovery element in science."

The Science Center at COCC's Bend campus is just the place to see this happen. Upon entering the building, you can feel the air buzzing with the energy of learning as classroom doors open and students spill into the hallways, discussing principles of physics and cell biology. Core science disciplines such as biology, chemistry, geology, physics, human anatomy, physiology and botany all happen within these walls, with a mix of classroom instruction and hands-on laboratories that give students a range of learning experiences. From fresh-out-of-high school pre-med students to non-traditional students seeking a career change, here everyone has the opportunity to dive headfirst into science.

Hands-On Learning

In the heart of the first floor of the Science Center, labs are stocked with beakers, Bunsen burners and, quite literally, body parts. Before the building opened in 2012, science faculty members had the opportunity to be involved in the design and use of the building so that it would fit their needs for instruction. As a result, COCC is now one of few community colleges that has the capability of having a human cadaver on site for its human anatomy and physiology classes.

Professor Amanda Layton teaches human anatomy and physiology (as well as microbiology) and is the cadaver coordinator for the college. She makes sure that students have access to learning about real human organs and tissues. "We have plastic models that students use to learn where organs are in the body, but nothing compares to actually touching and feeling the difference between what a nerve feels like and what a blood vessel feels like," she says. "Human tissues all have a different feel and it's amazing to see my students discover that."

Layton coordinates leasing the cadaver from Western University of Health Sciences and works with the school to have it customized and dissected depending on the curriculum for the year. "We get it tailor-prepped for how we'll use it," she says. Most of the students who use the cadaver are anatomy and physiology students who will transfer to a four-year university, or are on track to become nurses, emergency medical technicians or paramedics. But that doesn't limit who gets to see the cadaver. Once a term, Layton hosts kinesiology and massage therapy students at the cadaver lab for their own studies.

When human biology students aren't working with the cadaver, they have sheep brains or steer lungs to get an in-depth look at specific organs. "I have students inflate the lungs so they can see firsthand how lungs work," she says.

Real-World Relevance

College classes often include a diverse student population, with different ages, education and work experiences. A class might include a high school student on the fast track to a four-year degree sitting next to a retired teacher who wants to learn more about her geologic surroundings.

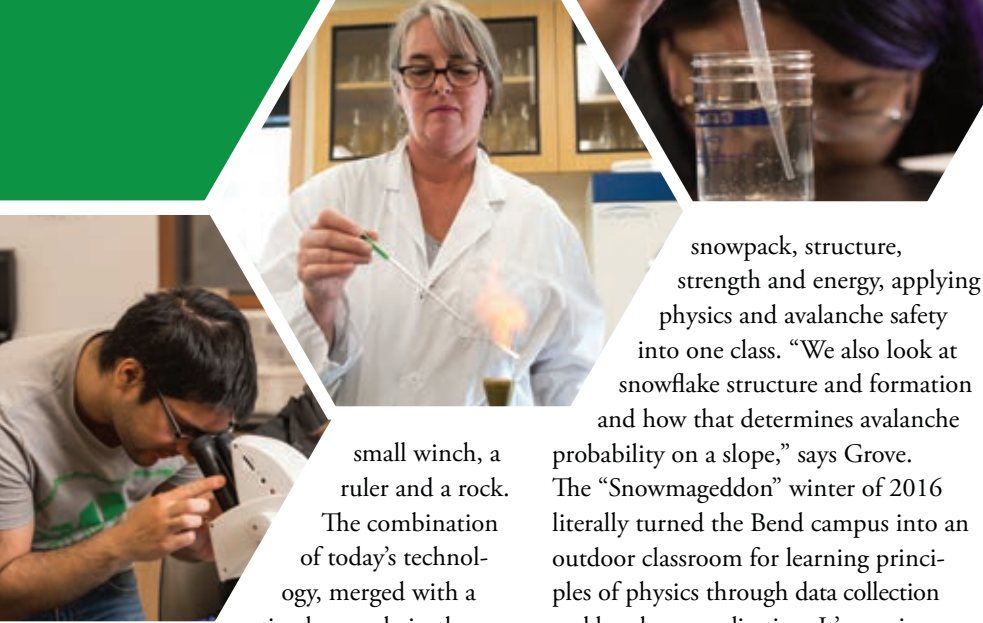
Geology professor Bob Reynolds has 24 years of instruction at COCC under his belt and tailors his classes to such diverse audiences by using a variety of teaching methods. "I get a mix of students, from those who are out of work and looking to be retrained for a new job, to those right out of high school," says Reynolds.

In Reynolds' Geology II lab, each student station includes laptops loaded with an online mapping program and a strange-looking apparatus made up of wooden blocks, sandpaper, a rubber band, a

"Nothing compares to actually touching and feeling the difference between what a nerve feels like and what a blood vessel feels like."



CENTRAL OREGON COMMUNITY COLLEGE FOUNDATION SCHOLARSHIP RECIPIENT PROFILE



snowpack, structure, strength and energy, applying physics and avalanche safety into one class. “We also look at snowflake structure and formation and how that determines avalanche

probability on a slope,” says Grove. The “Snowmageddon” winter of 2016 literally turned the Bend campus into an outdoor classroom for learning principles of physics through data collection and hands-on application. It’s a unique “physics in the field” opportunity.

High-Caliber Instruction

Bella Doorn is a 17-year-old student taking Layton’s microbiology class and lab. She is a dually enrolled high school senior with the Baker Early College program (online) and second year college student at COCC. She’ll graduate with her high school diploma and her associate’s degree all at the same time, giving her a two-year advantage when she enters a university next year.

“I’ll go into college next year as a junior,” she explains. “COCC has given me a huge advantage by shaving off half of my tuition for college because I have those classes under my belt.” She also attests to the value of her science classes and the high-quality lab instruction. “Being able to work with a cadaver and be in these great labs has just affirmed for me that I’m on the right track in pursuing medicine.” She also finds a comfortable place among her instructors and

older student peers. “Amanda takes me seriously, despite me being the youngest student in class,” says Doorn.

In the microbiology lab, students don white lab coats and learn how to create slides of different bacteria colonies that they cultured earlier that week. Some cultures are from swabs from their own gums, and when a student appears squeamish to look at the bacteria from the inside of her mouth, Layton assures her, “Don’t worry! It’s very normal to have things growing in your mouth.”

Student teams are, at times, quiet and intensely focused while creating slides and exuberant and inquisitive when using the microscopes. Much of the lab focuses on procedures and processes that ensure they are safely using tools and substances, like sterilizing the right things at the right time so they have clean samples and get good results. Perhaps just as important is the fact that these processes are similar to what happens in an actual working lab, providing students with a peek into what it is like in a real lab environment.

Science and the “science way of thinking” are taken seriously by students and faculty alike at COCC. Carl Sagan would be proud. ■

Katy Bryce is a freelance writer living in Bend.



small winch, a ruler and a rock. The combination of today’s technology, merged with a timeless made-in-the-shop science experiment, seems to be the ticket. Students crank the winch to see how the blocks move, then record their findings. It’s seismic activity at their fingertips.

“Wait, what just happened?” a student asks, wide-eyed, when her classmate cranks the winch enough that the set of blocks jumps. “That’s really cool!” She looks at Reynolds, who smiles back and nods, and moves on to the next table. These students are having “aha!” moments by the minute. Reynolds explains to the class that this is how we know how and where to construct buildings to withstand earthquakes. The Cascadia Subduction Zone in the Pacific Northwest is at the top of many minds, sparking a lively discussion about when the next “big one” might happen.

It’s also no secret that Central Oregon is a geologic wonderland, surrounded by volcanoes, lava flows and world-class ancient treasures such as the John Day Fossil Beds. When possible, Reynolds and his students embark on nearby field trips to see and touch the rocks and processes that make up our local geologic heritage.

The Cascade Mountains also provide the perfect teaching environment for Grove’s snow science course. He guides students to analyze and assess

Timothy Park



“I could not have come as far as I have without the support and community I found at COCC, including the community of donors who made my education possible.” -KATIE WILLIS

KATIE WILLIS, PA-C

Associate of Arts Oregon Transfer Degree

“When I think about my time at COCC, the word ‘community’ is central to my memory.

“Given my return to the classroom was a decade removed from high school, I was very nervous about the course load required to pursue an advanced degree in medicine. The small class sizes and excellent instruction helped me get up to speed, while the constant encouragement to pursue my goals kept me going when I questioned my plan.

“I came to know my teachers were not just experts in their fields of study but also educators whose goals were to provide students with knowledge and understanding.

“When I sit with a patient, I do so with a goal to be an educator, hopeful I am able to provide knowledge and understanding. I could not have come as far as I have without the support and community I found at COCC, including the community of donors who made my education possible.”

CURRENTLY
PHYSICIAN ASSISTANT,
ST. CHARLES HEALTH SYSTEM



“This isn’t a job about strength and brawn, this is a job about technical awareness and problem-solving. I can do that.”

Brewery display, a group of boys nibbles curiously on fresh hops while getting a run-down on the role of sanitary welding. Meanwhile, over at the Hooker Creek table, students throw on hardhats and safety vests, posing for pictures. Even these small interactions—articulating questions, engaging with a potential employer—are takeaway moments.

In Building 3, sparks are flying. The “tick-tick” buzz of a welding demo is underway. COCC’s Mike Perry is helping students gear up, handing out work jackets and protective eyewear. It’s proving popular and Perry smiles broadly. Students chalk a design on an iPhone-sized plate of steel and, with an instructor’s help, fuse their name or a pattern onto it. A basic task that just might trigger a career.

In a nearby classroom, a Bend company called Wright Werx is showing a presentation on composites to a focused audience, planting a seed for future engineers. And down the hall you can hear the thrum of a computer numerical control (CNC) mill machine as it generates aluminum widgets. Students filter through, pause at the device’s window, and learn about its many applications, from shaping prosthetic joints to aviation parts. Within these and other workshops, there’s the chance to take the pulse of a trade.

Back outside, parked next to the Technology Education Center, a hulking, sage-colored Kenworth semi draws students in like a magnet. Some peek into the cab. Others want to rap about the open road. “There’s a lot of technology in these trucks,” says Phil Taylor of Central Oregon Truck Co., there to inspire up-and-coming truck mechanics. Aden Modine, a freshman from Crook County High School, seems to have already



caught the big-rig bug from his trucker aunt—he stands close to the semi, as if feeding off its energy.

A cluster of students moves by, chatting and laughing. In their wake is Josh Davis, vice principal at Culver High School, who is chaperoning 10 of his students. He seems happy with the day’s impact, gaining a boost in his commitment to getting his students college- or career-ready. “We’re trying to make sure we can help every kid,” he says. “To show them what’s out there.”

Those connections are key to Whitney Swander, executive director of Central Oregon STEM Hub. She’s one of the driving forces behind the fair and has seen the moments of discovery firsthand. “Girls, especially,” she says, “...recognizing, ‘Oh, this isn’t a job about strength and brawn, this is a job about technical

awareness and problem-solving. I can do that.”

Soon, this newfound confidence will go on to gain traction in many different places—including at COCC. “We heard back from faculty that the reason some new students knew about college programs is because of last year’s Skilled Trades Fair,” adds Swander. A little can-do goes a long way.

Mark Russell Johnson is the staff writer in COCC’s College Relations department.

Karen Cammack

IGNITING MINDS

— by Mark Russell Johnson —

The excavator operator seems to have a serious case of the giggles.

Trinite Tail, a 16-year-old student from YouthBuild in Redmond, is helming the controls of the compact machine and she laughs nervously as it crawls forward jerkily, rocking, its bucket tipped at a strange angle. Dust seems to kick up in disgust.

But to her credit, Tail never takes her eyes off the task. With coaching from a Peterson Cat employee stationed just outside the cab, she manages to lower the boom in gentle increments, finally grabbing and raising a rather forsaken-looking car tire that’s been waiting patiently in the dirt. It’s a can-do moment—and that’s the theme of the day.

On a sunny, bone-biting November morning, more than 500 high school students from all over Deschutes, Crook and Jefferson counties (and some places beyond) have converged on COCC’s Redmond campus for the 2nd annual Central Oregon Skilled Trades & Apprenticeship Fair. The hands-on, immersive event, a collaborative project coordinated by Central Oregon STEM Hub, highlights the skilled trades sector by blending company face time, internship advice, real-world perspective and a big dose of give-it-a-go.

Together with the college, more than 40 businesses, internship programs and educational entities are set up to dispense knowledge about their select field or focus, with reps on hand from places like Brightwood Corp., Kendall Auto Group,

Keith Manufacturing, OSU-Cascades and Bend Research. Workshops, including “Thirty Minutes in the Life of a Veterinary Technician” and “Arduino Boards: Computer Science,” are underway.

The teenagers pinball between the displays and demos. Kenzie Hays, a sophomore at Marshall High School in Bend, seems excited for the day’s automotive sampling, which includes a workshop on the future of transportation. “When I see a car, I want to see everything in it,” she says eagerly.

Others seem wide-eyed to their options. At the UA Local 290 table, four girls from Bend High are beginning to fathom how a union plumbing job translates to a good salary and a chance to travel. In another part of campus at the Deschutes



High schoolers find hands-on inspiration and career goals at the Central Oregon Skilled Trades & Apprenticeship Fair



$(A); \frac{\partial}{\partial x}$
 $(A); \frac{\partial}{\partial y}$

THE MATH IMPACT

— by Mark Russell Johnson —

Monday mornings are no match for Sean Rule. In a festive shirt patterned in different dry fly designs and a pair of well-loved, neon-green Crocs, his hair mushrooming up above his visor, the math professor moves and talks in quick bursts, leveling the early hour with his enthusiasm. He somehow seems to get more oxygen than those around him.

Seated at computers in the Barber Library's computer lab, students of Rule's 8 a.m. "Math and Society" class are getting their minds in gear. Most are groggy; a few yawn. Their first task of the day is a linear modeling problem that requires a cost comparison of whether to "buy" an inefficient, but cheaper, used Ford Escape V-6 or plunk down for a pricier hybrid model of the same vintage. They dive in—some deeper than others.

"I'm a little lost," admits a male student rather quickly. "That's OK," Rule replies, sweeping in. But he doesn't hover or linger or dole out a quick fix. He engages the student with a question, reframing the problem and then bursts on, addressing the whole class. He scribbles up a few whiteboards—and a window—with the lesson's salient points, constantly soliciting input, and continues to move, his hands puncturing the air like a martial arts demo.

Timothy Park (left), Joe Kline/*The Bulletin* (above right), Oregon State University (right)

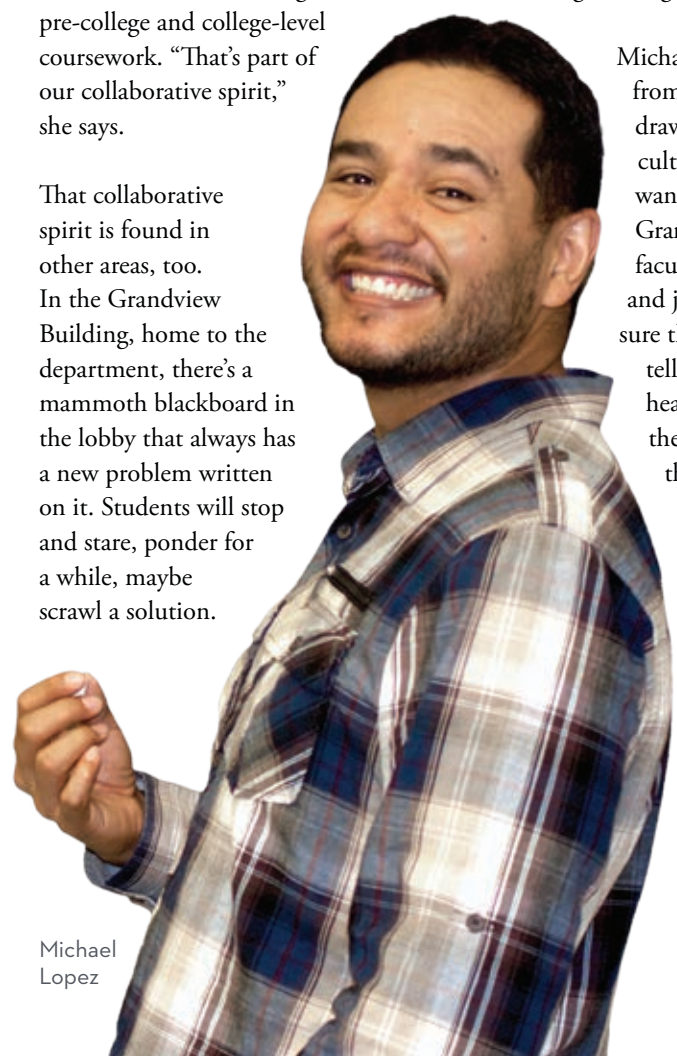
By now, more of the students are beginning to participate. The class ebbs more toward a dialogue than a lecture. With his positivity, his inclusive nature, Rule connects. He makes the discussion matter. It seems that even the most reticent students don't stand a chance in this learning environment.

COLLABORATIVE SPIRIT

With 12 full-time professors, and a total of 31 faculty and staff, COCC's Mathematics department is the largest at the college within a single discipline. Their curriculum—covering everything from pre-college math to vector calculus—has a hand in most educations at COCC. Whether you study aviation or massage therapy, there is a requisite math class to take.

But the size and scope of the department doesn't splinter their focus. Kathy Smith, math professor and department chair, says they emphasize their shared mission through things like routine teaching discussions and ensuring that full-time professors take turns teaching both pre-college and college-level coursework. "That's part of our collaborative spirit," she says.

That collaborative spirit is found in other areas, too. In the Grandview Building, home to the department, there's a mammoth blackboard in the lobby that always has a new problem written on it. Students will stop and stare, ponder for a while, maybe scrawl a solution.



Michael Lopez



Andrew Jensen

This can trigger some weeks-long, back-and-forth chalk chatter among students and faculty before the problem is solved.

Around the corner and down the hall, there's a collection of framed T-shirts on the walls from the department's annual high school Math Contest (see *Fun with Numbers*, page 17). It's a tribute to a longstanding collaboration.

Michael Lopez, who graduated from COCC in 2014, was drawn to this collaborative culture. "I remember just wandering the halls of Grandview, and the staff and faculty would invite me in and just talk with me to make sure things were going well, to tell me a story or joke, or to hear mine," he says. Soon, the department was turning this former U.S. Marine's favorite subject into a true passion.

"Jill Plattner was the very first person in the math world to take me under her wing," he recalls. Plattner encouraged him to be a class grader, and later a tutor and teacher. She found a way to involve him. With inspiration from other instructors, like Liz Coleman, Lopez went on to establish a math club at the college: Math Leaders of Central Oregon, or Math L.O.C.O. "Our main goal was to foster an appreciation of mathematics in the community," he says. The club held events and presentations to explore creative aspects of math—a new chapter in the collaborative spirit.

Lopez attended Oregon State University (OSU) to earn his bachelor's degree in mathematics in 2017 and is now working on his master's degree in math at OSU. He plans to attend a Ph.D. program and eventually inspire his own college students (though he's already making headway as a teaching assistant). "I really have no idea where I want to teach afterward, but I know that it would be amazing to be in a place that had a department such as COCC," he adds.

"I remember just wandering the halls of Grandview, and the staff and faculty would invite me in and just talk with me to make sure things were going well, to tell me a story or joke, or to hear mine."

Inspired by their studies, former COCC math students find a calling at the head of the class

Sean Rule

Patty Hammer decided that's exactly where she wanted to be. A COCC graduate of 2005—involving nine years of tenacious commitment to earn her associate's degree—she later earned her bachelor's degree from the University of Oregon and returned to COCC to teach, currently as an adjunct instructor.

"I have always had a love-hate relationship with math," Hammer admits. "My father was a math teacher and I used to help him grade papers, so you might say it's in my genes." But she bolted from math after that. Her dyslexia, she thinks, was the culprit.

Undiagnosed until she was 36, Hammer says the disorder overwhelmed her affinity for numbers and puzzles. She instead entered the printing profession, where working with press negatives always made sense to her back-to-front perspective. But a few factors, including the sense that she had "settled for what

was safe," eventually prodded her to begin taking classes at COCC.

Along the way, Hammer's instructors observed she was good at explaining math to her classmates. So they began to involve her in departmental things, like setting up the lab for online students and helping with the Math Contest. It encouraged her to overcome her obstacles. "All of them were involved in pushing me in a direction that I would not admit I was passionate about, but really loved to do," she says.

Today, Hammer, who teaches developmental courses, is passing that passion along. "There is nothing more exciting than to help others see what I can see in them," she says. "And to watch the sparkle come into a person's eyes when they, too, find their passion."

WHEN IT CLICKS

Andrew Jensen thinks the whole "math person" thing is a myth. And he should know. "Ironically enough, before going to COCC, I really struggled," shares the former student, who now teaches geometry and algebra at Madras High School. "Math never really 'clicked.'"

But at COCC, something undeniably did. First, while pursuing exercise science studies, and later, going after a biology degree, Jensen discovered in his required math classes that the subject took on new life.

It started with Pat Sunset's algebra class, he remembers, and continued with Sean Rule's statistics course—a game changer. "Sean helped me find my confidence as a mathematician and taught me how to be a critical thinker," he shares. It was more about the "why," he explains, and the thinking behind the mathematics than the memorizing of content.

After confronting his college nemesis—calculus—and earning perfect marks under professor Charlie Naffziger, Jensen realized that while he'd never imagined himself as a math person, the material was illuminated in a new way, made more relevant. He earned a bachelor's degree in biology at OSU in 2015, followed by a teaching degree, and took his keen interest in math to the head of the class. His students will soon explore "Geometry in Construction," a hands-on course that employs math to build a house—something that honors the "why" that first inspired him.

Like Jensen, Jeff Schiedler's entry into the field was somewhat unplanned, but ultimately irresistible. The Redmond High School math teacher, who earned his associate's degree in 2007, originally set out to be an engineer.

His time at COCC nudged him in another direction. He now guides students through calculus, geometry and physics.

"My years at COCC helped develop a passion for mathematics," says Schiedler. He attained his bachelor's degree at the University of Oregon and went on to earn a Master of Arts in Teaching from George Fox University. "Teachers like Doug Nelson and Charlie Naffziger stand out as individuals who I aspired to be like. They were incredibly personal, motivating and engaging."

THE BIGGER EQUATION

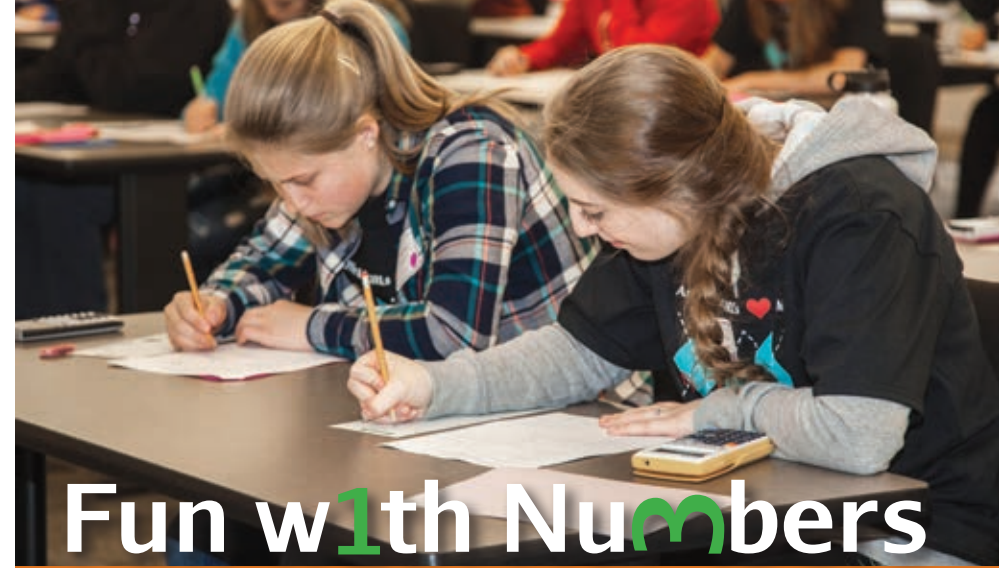
Making mathematics engaging and approachable is helping these and other students succeed. But the department's impact has larger consequences, too.

These days, math minds are more and more in demand. The U.S. Bureau of Labor Statistics reports that employment of math occupations is projected to skyrocket by 28 percent by 2026. But according to new Pew Research Center findings, there's a nagging perception about math: 52 percent of adults say the main reason young people don't pursue STEM degrees, like mathematics, is they consider these subjects too hard.

The perception of "math as tough" is one that needs to be dispelled—or at least lessened. Certainly, math is challenging and exacting. But it's also extremely rewarding and enjoyable. And with the right guidance, with elements of inspiration, math can prove to be a favorite subject that opens minds, opens doors, and, ultimately, empowers lives. ■

Mark Russell Johnson is the staff writer in COCC's College Relations department.

📷 Timothy Park and Eugen Helmbrecht



Fun with Numbers

High School Math Contest Hits 40th Milestone

Last summer, before moving to Washington, D.C., for a job with a healthcare nonprofit, Ashlee Horn of La Pine was going through some possessions and decided she was ready to part with her trusty high school calculator via Craigslist. The recent graduate of UC-Berkeley, with a bachelor's degree in bioengineering, was excited to be joining a team that generates evidence-based health data in support of the greater good.

When she met with the buyer—a COCC staffer named Kirsteen Wolf—outside Safeway on Bend's Westside, introductions led to a conversation about the college and how COCC's Math Contest had made an impression on her life's path.

"I was incredibly nervous the first time I attended the Math Contest," Horn recalls. "I remember having this attitude walking in that I should be cool, and try not to look like I'm a nerd." The contest, she quickly discovered, was a place for her love of learning to soar. "I realized how badly I wanted to continue

learning," she says. "I always knew I wanted to go to college, but the competition showed me that I didn't need to be ashamed of learning because there were people just like me who enjoyed learning and being a math nerd."

Now in its 40th year, this fun, game-style event, held each April, involves high school students from throughout the region—from Sisters and Bend to La Pine and Mitchell. They explore the Bend campus while participating in five math-focused tasks.

The contest, sponsored by Lonza, typically draws about 150 students and organizes around a helpful group of college and community volunteers. Events include things like a relay race, scavenger hunt and a *Jeopardy* game. "While there is a competitive nature to the contest, we place an emphasis on fun and participation," says Kathy Smith, Math department chair. Top students in several subject areas are invited to participate in the state's annual competition.

—M.R.J.



ENGINEERING FOR THE FUTURE

— by Katy Bryce —



Kevin Grove

board covered in Greek letters and math equations while she talks about omegas, epsilons, shear force and elasticity. My non-engineering mind spins as I try to understand these principles, but the students in the class follow right along, eagerly asking questions about stress-strain curves and the difference between ductile material and brittle material.

Sheldon, also born and raised in Bend, has an impressive resume that includes dual master's degrees in chemical and civil engineering as well as experience in water quality and storm water issues. As a part-time cycling tour guide, she has also traveled the world, but eventually wanted to be back home. Now in her fourth year teaching at COCC, her charge is to bring relevance to engineering and demonstrate how core engineering principles can translate into a multitude of career options.

Not too long ago, an aspiring engineer had four options: civil, mechanical,

ENGAGING EVERY STUDENT

The engineering program, as would be expected, is structured and methodical; each course builds upon knowledge from previous courses. The department is also directly tied to math and physics, and Sheldon credits the Physics department with helping students derive solutions on their own. "Sometimes it catches me off-guard how deeply my students are thinking about problems based on their experience in physics classes," she says. "I've thrown unsolvable problems at them, and they come up with some very viable solutions."

Engineering students tend to be a mix of recent high school graduates and older, non-traditional students. Sheldon has noticed that oftentimes, non-traditional students that are starting a second career set the bar very high. And unlike in a large university setting, the smaller class sizes at COCC allow for teachers to engage more with their students.

solve a lot of problems to produce an innovative, top-of-the-line product. This is quite evident at the EarthCruiser facility where Steimer leads his team to design and build these vehicles.

EarthCruisers are unique recreational vehicles designed for rough and remote overland travel—in places like the steppes of Mongolia or the wilds of the Yukon Territory. They look futuristic, with a combination of ultra-durable materials, solar energy systems and sleek interior designs. One can't help but think this could be a dream job for an engineer.

Steimer admits that although his primary work is as an engineer, he must take into consideration business issues, such as deadlines, costs, employee management and production efficiencies. He describes himself mostly as an industrial engineer since he's always working on improving production processes and creating the best parts. "My team designs four to five new parts a day, and we usually have to figure out how to make those parts in a very short timeframe," he says. With Steimer's leadership, the company is growing quickly. When he was hired two years ago, he was the eleventh employee. Today, EarthCruiser has more than 30 employees on staff.

Steimer credits his experience at COCC for helping him land his dream job, and he continues to assist others along the way. He helps the company give tours to current engineering students and attends college career fairs to pique the interest of budding engineers.

EarthCruiser also provides internships for high school, COCC and OSU-Cascades students, so they can dig in to real-world engineering work. His current intern is an OSU-Cascades student who started his engineering courses at COCC. "I know what it is like to start at the beginning," Steimer says. "Once you reach a place, I believe in helping out the people who are coming up behind you." ■

Katy Bryce is a freelance writer living in Bend.

"Engineering has become a huge discipline."

electrical or chemical engineering. Today, students have opportunities to be renewable-energy engineers, aeronautical engineers, even sustainability engineers. "Engineering has become a huge discipline," says Sheldon. "Most students take so many classes, and a lot of them are project-based and very rigorous. These students are expected to have a wide breadth of knowledge."

Her goal is to help students overcome their apprehensions by using real analysis tools to make design decisions. "I'll have students look at engineering problems in their everyday lives," she adds. "In my statics class, students will start to look at a hinge joint on a door—an everyday item seen everywhere—and analyze that structure by looking up data such as wind load or material strength."

"I'm amazed at my coworkers and how they challenge the students. I've also had several students who have transferred to large universities thank me and the College for providing an intimate, engaging environment in which to learn."

Aside from classroom instruction, Sheldon also supports students in finding relevant internships or working on projects outside of her classes. She recently helped connect a student with a local solar company, Zamp Solar, so he could get more experience in mechanical engineering.

WHERE THE RUBBER HITS THE OFF-ROAD

While Sheldon and Steimer are both quick to point out that the ultimate goal of the engineer is to solve problems, Steimer's daily job is to do just that—

BUILDING A STRONG BASE

When Austin Steimer, a Summit High School graduate, finished his service in the Marines, he had experienced a lot during his two deployments to Iraq and Afghanistan. After his military duty was over, he knew that he wanted to return to his hometown of Bend. He also wanted to go to college and pursue a degree in engineering, so COCC was a perfect fit.

"I literally took 11 math classes in a row, starting with the most basic course, to get the required math needed for the engineering program," he says. "I basically started from scratch, which, in retrospect, was really great because it created a strong base to build upon. I never felt that I was a step behind on anything."

After completing the full engineering transfer program at the College, he continued on to receive a bachelor's degree in energy systems engineering from OSU-Cascades. Shortly after graduating, he began his career as the engineering department manager for EarthCruiser Overland Vehicles, a rapidly growing Bend company. In fact, Steimer is just one of several past COCC engineering students who have gone on to work at well-known workplaces both near and far.

AN ABUNDANCE OF CAREER PATHS

Sitting in Katie Sheldon's "Strength of Material" class, I gaze up at a white-

Rigorous instruction and engaging methods are preparing tomorrow's problem-solvers

Ancient Roman aqueducts, the Great Wall of China, and even the Egyptian pyramids all have one thing in common—they are products of the world's earliest engineers. Built with what we now deem simple tools—wheels, pulleys and levers—these masterpieces are still with us today to remind us of the awesomeness of what engineering can do.

COCC brings that awesomeness to its engineering students through a rigorous, structured and exciting program that prepares them to design and create solutions for everyday living.

Embracing Science

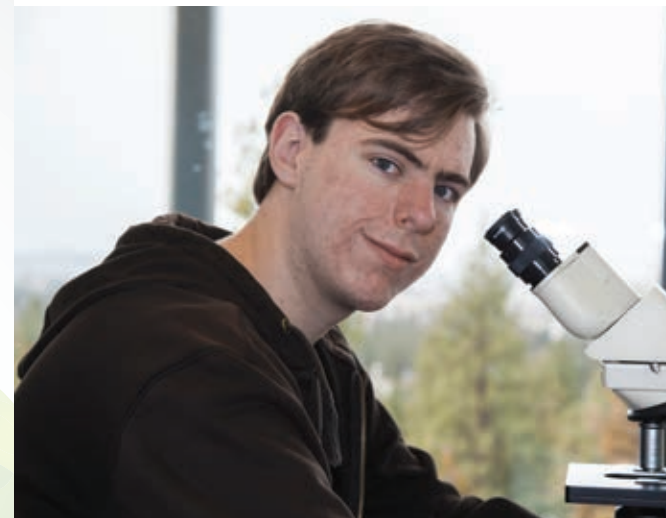
The Helen and Kenneth Thomas Endowed STEM Scholarship

by Mark Russell Johnson

The natural world has always spoken to Levi Mault. When he was younger, Mault would search out the scientific names of the plants in his yard in Culver, putting to memory what they could be used for. He'd study different cloud formations in the Central Oregon sky,

curious as to the weather they'd predict. Something about the interconnectedness of life around him, the relationships, made an impact. "It was always a struggle, but I found it very rewarding," he explains.

Those fascinations brought Mault to COCC, where he's currently working on his Associate of Arts Oregon Transfer (AAOT) degree with a biology focus. Upon completion, he plans to transfer to Oregon State University (OSU) and work toward a bachelor's degree in environmental sciences with a specialization in applied ecology; he also has his sights set on the school's Sustainability Double Degree. This emerging scientist then hopes to obtain a master's degree.



"I feel that COCC has helped me as a person more so than a student"

COCC has helped Mault grow, sharpened his motivation. "I feel that COCC has helped me as a person more so than a student," he shares. "COCC allowed me to connect with peers of all types and allowed me to connect with many different experts in their fields, to help me understand what it is I want for a lifetime career."

He credits his COCC Foundation scholarship with being the critical piece. "It is thanks to this scholarship that I am even here right now," he says. "Thank you so much for the learning opportunity that you provided me and so many others... the means of finding our place in this large world."

The Helen and Kenneth Thomas Endowed STEM Scholarship fund memorializes two members of our community who had the foresight to support scholarships in their estate plan. Thanks to their proactive philanthropy, an average of 10 full scholarships will be awarded annually to COCC students pursuing degrees in STEM-related programs.

Haley Talifson has battled to get where she is—but that determination is helping her to shape a bright future.

The Redmond resident, a single parent to two young children, has faced sorrow and challenges in her life. She lost her mother to cancer when she was just 17. She's suffered from addiction.

"In my first term at COCC," she shares, "I was diagnosed with early stage cervical cancer. Though stressful, I used my fear of this dreadful illness to motivate me instead of allowing it to impact me negatively." She rose up, met things head-on. And with the support of her boyfriend, Talifson is a full-time student, dedicated to advancing her education while

showing her kids what is possible. "I have remained focused on my goal, and today I have a 4.0 GPA."

With her lifelong love of animals and an interest in the environment, Talifson is studying biology at COCC. Her plan is to graduate in 2019 with an AAOT degree and continue her studies at OSU, pursuing a bachelor's degree in zoology. "I would like to work with endangered species, as well as study animal behavior and captive breeding programs," she says. "I believe that it is of the utmost importance to be ambassadors for the wellbeing of these creatures."

Receiving this COCC Foundation scholarship has been significant for the busy student and mother.

"It has immensely reduced the financial strain," she says. "I have always believed that it takes a village to raise a family... thank you for being a part of my village."

Mark Russell Johnson is the staff writer in COCC's College Relations department.

Eugen Helmbrecht



"I have always believed that it takes a village to raise a family...thank you for being a part of my village"



CENTRAL OREGON
community college
FOUNDATION

2600 NW College Way
Bend, Oregon 97703

ADDRESS SERVICE REQUESTED

Nonprofit Org
US Postage
PAID
Bend OR
Permit No. 87

The Nancy R. Chandler Visiting Scholar Program of the COCC Foundation Presents

HEALING THE BIPARTISAN DIVIDE

David Jolly

Former Congressman (R-FL),
MSNBC & CNN Contributor
and Attorney

Wed.
MAY 2
6:30 p.m.

Jolly will explore the current structural challenges that impede bipartisanship in Washington and will present the foundation of how both Republicans and Democrats, or perhaps a new party, can advance bipartisanship in November 2018 and beyond.



Both programs are in Wille Hall, Coats Campus Center, COCC Bend Campus.
For more information and tickets, visit cocc.edu/foundation/vsp

BECOMING LEONARDO

Mike Lankford

Author and COCC
Writing Instructor

Mon.
MAY 21
6 p.m.

Lankford will talk about how he took a fresh look at Da Vinci's life in his latest book, *Becoming Leonardo*, a Da Vinci biography that made the *Wall Street Journal's* Top 10 Nonfiction Book list of 2017.

