FLYING WITH SWALLOWS
Learn about MVC’s unique, emerging Citizen Science project in this month’s Staff Spotlight (Pages 3-6).

The MVC Honors Program is recruiting!
Honors courses offer exclusive advantages over traditional classes. Find out more on page 2.

SUMMER 2015 Activities | Events | Learn more on Page 8

BOOK YOUR COUNSELING APPOINTMENT ONLINE
Did you know that students can now make counseling appointments online with STEM Counselor Silvia Trejo?
To book an appointment, go to: https://esars.rcc.edu/moreno/STEM/eSARS.asp

CHECK US OUT: WE’RE ON THE WEB!
STEM WEBSITE: MVCSTEMSSC.COM | FACEBOOK: FACEBOOK.COM/STEM.MVC | SHAREPOINT SITE: MVCSP.COM/SI
"The [...] goal of the Riverside Community College District Honors Program is to provide an educational experience that allows students to stretch themselves intellectually and to work actively with fellow students and faculty to cultivate an awareness and understanding of the diverse points of view necessary for a rich and productive intellectual environment." - Excerpt from the Honors Program Mission Statement

The Honors Program at Moreno Valley College (MVC) is recruiting! The Honors Program is interested in students who are hard working, have a passion for learning, and the desire to expand their personal and academic horizons. The Honors Program requires enrolling students to have and maintain a 3.0 GPA.

Program benefits include transfer agreements that can include priority admission, honors to honors admission, and access to scholarships available only to honors transfer students. MVC Honors has agreements with UCLA, UC Irvine, UC Berkeley, UC Riverside, University of San Diego, and more.

Honors classes are smaller, usually around 20 students, which secures more individual support and one-on-one mentoring. Some Honors courses also include opportunities to gain university-level research experience.

Honors classes being offered during fall of 2015 are:
- Chemistry 1AH
- English 1AH
- Communications 1H
- Biology 1H
- Philosophy 10H
- History 6H

Interested? Learn more at mvc.edu/honors or contact the honors coordinator, Nick Sinigaglia at Nick.Sinigaglia@mvc.edu or call (951) 571-6173.
Joanna Werner-Fraczek, Ph.D., has been an instructor at Moreno Valley College (MVC) since the fall of 2006. Werner-Fraczek studied biology at Poland's University of Gdansk and completed her Ph.D. in genetics at the University of Wisconsin, Madison. She has researched at the Universities of California, Riverside (UCR) and Santa Barbara (UCSB), with her work being printed in more than 20 scientific publications and presented at a number of national conferences.

Her most recent work, published in June of 2015, is an article for the Barcode Bulletin, the quarterly newsletter of the International Barcode of Life project (iBOL), about the use of DNA barcoding as a teaching tool at community colleges.

Werner-Fraczek primarily teaches courses relating to biology at MVC, including General Biology, Human Biology, and Human Genetics (BIO-1, -17, and -34); degree-specific courses, like Introduction to Cell and Molecular Biology (BIO-11 and -11H) and Introduction to Population and Organismal Biology (BIO-12); as well as a few general education courses. Her teaching style consists of hands-on laboratories and a focus on critical thinking and real-world application of biological concepts.

RESEARCH OPPORTUNITIES AT MORENO VALLEY COLLEGE

Her work with her BIO-11 Honors classes is particularly notable. Werner-Fraczek states, "In the post-genomics era where DNA sequencing became an everyday activity, it is time to link specific genes to their functions in a living organism. Students [in BIO-11 Honors] study different genes in the model plant and describe their functions." Students complete this work in collaboration with the laboratories at UCR and two of its professors, Julia Bailey-Serres, Ph.D. and Patricia Springer, Ph.D., engaging in university-level research focusing on molecular genetics and environmental physiology. "The successful results," Werner-Fraczek adds, "are provided to UCR and entered into the appropriate world-wide database," meaning the research completed by BIO-11 Honors students at MVC has real-world impact.

This collaboration with UCR provides MVC scholars with a unique advantage, allowing them to receive valuable research experience often inaccessible at the community college level, both increasing their chance for transfer into competitive academic programs and better preparing them for education at four-year institutions. Werner-Fraczek cites data from the National Science Foundation (NSF) and other major education agencies, saying that "research experiences provides students with the means to practice critical thinking and
communication skills, and teaches them [responsibility] and consistency." She has noticed that her BIO-11 Honors pupils, in the course of completing their research, typically turn from "passive learners to very active and engaged students," taking the initiative to discuss their findings, compare results with not only their peers but the wider scientific community, and establish "a network of researchers."

Moreno Valley College is selected as one of 38 partner institutions (CCURI.org) nationwide for the NSF's Community College Undergraduate Research Initiative (CCURI). CCURI has sponsored eight MVC scholars to present their findings at national poster sessions, which were held in Washington, D.C. and North Carolina in fall of 2014 and Portland, Oregon in spring of 2015. Five of the students who presented research came from Werner-Fraczek's BIO-11 Honors and BIO-12 courses, two researched under the supervision of fellow biology instructor Felipe Galicia, and one under chemistry instructor Diane Marsh, Ph.D. These students have also presented research at the RCCD Honors Conferences held at Riverside City College and the University of California, Irvine.

Werner-Fraczek is extremely proud of the students who have presented at the CCURI and Honors Conferences, stating that they "did a great job conducting, analyzing, and presenting their research," which was "very well received and recognized as excellent by the organizers." She was kind enough to provide the names and topics of MVC students who presented at CCURI's National Student Poster Session held in Portland, Oregon in May of 2015:

- **Lauren Carter** – ArcGIS - Visual Data Taking Flight
- **Edward Galindo** – Assessing the Effectiveness of Detecting an Unknown of Pb+2 and Standardized Concentrations of 0.0010M-0.1M Pb+2 in Water Using Electrochemical Analysis
- **Stephanie Lara** – Gene Expression of NPH3 (Atg64330) Gene in Arabidopsis thaliana
- **Danilo Noguera** – Gene Expression in Arabidopsis thaliana
- **Daniel Pierce** – Cliff Swallows as a Bioindicator for Population Studies and Environmental Monitoring

**THE FLYING WITH SWALLOWS INITIATIVE**

Werner-Fraczek not only teaches biology and supervises her student's research, but she also designed and supervises the College's Flying With Swallows (FWS) initiative with the help of chemistry instructor Diane Marsh, Ph.D. FWS, aside from her classes, is her primary focus at MVC. FWS was first conceived during a CCURI conference in 2012, which focused on the best practices in teaching science. Werner-Fraczek reports feeling "enlightened and so enthusiastic" at the end of the conference, and when prompted to create a three-year action plan, she came up with the idea for the FWS initiative.

FWS comes as a result of MVC's unique status among its sister colleges as a nesting ground for the
American Cliff Swallow (Petrochelidon pyrrhonota) during the spring, the birds having migrated South America. "Birds," she says, "are an excellent research object for the observational science (for non-major courses) and for experiment-based science (for major courses)" and cliff swallows are readily available to MVC. FWS focuses on non-invasive methods of experimentation and analysis.

According the Werner-Fraczek, the FWS project is currently "designed to integrate research in biology and chemistry courses with a common research theme: the study of various aspects of swallow life in a suburban area with an emphasis on biomagnifications of pollutants throughout the swallow's food web. The hope is that the FWS project will enrich undergraduate science courses and STEM programs by introducing an innovative research-based curriculum, and would have a broad impact on raising the persistence, completion/transfer, and success rates of STEM community college students at MVC."

The FWS project uses ArcGIS online, a geographic information system, donated by Esri in Redlands, CA to collect and store data about swallow behavior over the course of a few years, after which it can be analyzed and incorporated into national studies. Werner-Fraczek, Marsh, and the FWS initiative have also established partnerships with UCR, the USDA Forest Department at Riverside, the California Department of Fish and Wildlife, and the University of Tulsa in Oklahoma.

Over 100 MVC students have made contributions to the ArcGIS database over the last two years, making it one of the most recognized projects at Moreno Valley College. Werner-Fraczek added that the success of the project was also due in part to the "two Press Enterprise articles written during the last academic year about research-based learning and the FWS project at MVC [which have prompted] other schools and organizations [to volunteer] their participation," with the end goal being the creation of a Citizen Science project.

Students participate in FWS not only through research in Werner-Fraczek's BIO-11H and BIO-12 classes and Marsh's chemistry courses, but through the Swallow Club and window adoption, the latter of which was developed by Marsh. Both students and faculty are able to "adopt" a window where swallows have nested to monitor the nesting practices of swallows over the course of a semester or longer by taking digital photographs with their camera or phone any time they are on campus.
photographs, and other gathered information, is then submitted to FWS’s ArcGIS database. All MVC students and faculty are encouraged to participate and adopt a window; no background in biology is required.

Allowing the swallows to thrive on campus has not always been a popular decision, but Werner-Fraczek encourages MVC students, faculty, and staff to appreciate the unique opportunities afforded to MVC because of the cliff swallow presence. She references the stance of Charles Brown, Ph.D., who has studied cliff swallows for over 30 years and is the leading authority on them worldwide: cliff swallows, unlike many non-migratory birds, present no human hazard. And although their presence might not be aesthetically pleasing to everyone, they offer extensive research opportunities that allow Moreno Valley College to stand out on both a local and national scale. In order to keep the FWS initiative alive, students have engineered devices that help protect MVC’s infrastructure. MVC has also pledged to support the construction of an alternative structure for nesting that, Werner-Fraczek says, "was 100% designed by our students." Marsh is overseeing the development of a budget for the alternative nesting structure.

Werner-Fraczek is excited for what the future holds both for MVC and the FWS initiative. She wants to integrate more courses and disciplines with the FWS project, as well as gather more community support. "I like to dream big," she admits. "I would love to study where the birds [come from]. I am sure there is a college on the other end on their migratory route that would love to become our sister college abroad."

The STEM Student Success Center (STEM SSC) at Moreno Valley College would like to thank Joanna Werner-Fraczek, Ph.D. for allowing us to highlight her and her work at MVC in the summer 2015 edition of the STEM SSC Newsletter. The STEM SSC would also like to thank Diane Marsh, Ph.D. for her collaboration with Werner-Fraczek with the FWS initiative and MVC student Daniel Pierce for the photographs used in this article.

For more information on the STEM SSC, previous STEM Newsletters, and more, visit the STEM SSC website at mvcstemssc.com.
Digital forensics is a branch of forensic science encompassing the recovery and investigation of material found in digital devices, often in relation to computer crime for use in a court of law. The goal of the process is to preserve any evidence in its most original form while performing a structured investigation by collecting, identifying and validating the digital information for the purpose of reconstructing past events. Digital forensics analysts are also often Certified Ethical Hackers (CEH) and/or Computer Hacking Forensic Investigators (CHFI).

**WHAT THEY DO:**

Job tasks may include: Recovering data from damaged or erased hard drives, tracing hacks, gathering and maintaining evidence, writing and reviewing investigative reports, working with computers and other electronic equipment, and working closely with other police officers and detectives.

Vast array of knowledge regarding computers, on both the hardware and software sides. They must have intricate knowledge of computer operating systems, including the BIOS, and should be very familiar with Linux, Mac OS and Windows.

Degrees related to criminal justice, computing, information technology or criminology, along with any relevant experience will also suffice.

Many students can now major in areas such as Computer Criminology.

In addition to computer skills and related education and certifications, forensic computer investigators and digital forensic experts must also possess strong analytical and investigative skills. They need to be able to read and interpret data and to formulate conclusions, and they must be able to present their findings and conclusions in a format that can be easily understood.

Recommended/Required Certifications:
- Certified Ethical Hacker (CEH)
- Certified Penetration Tester (CPT)
- Certified Computer Forensics Examiner (CCFE)
- Certified Reverse Engineering Analyst (CREA)

“Modern crime often leaves an electronic trail. Finding and preserving that evidence requires careful methods as well as technical skill.” - Simson L. Garfinkel.

**MEDIAN WAGE:**
$50,000 - $75,000/year starting salary

**JOB OUTLOOK:**
Out of the 3-5% job growth predicted for the forensics industry, digital computer forensics is expected to see the most growth and become one of the most dominant fields in forensic science.

**LEARN MORE:**
http://www.jdfsll.org/
Summer 2015
STEM MOBILE INNOVATION CENTER (SMIC)
Activities and Demonstrations

**July 7**
*Solutions, Solutions, & More Solutions*
Acid & Alkaline Solutions Laboratory Activity
(Chemistry)

**July 9**
No SMIC Activities or Demonstrations

**July 21**
“The Hour of Code” © and Robotics Demonstrations by the MVC SEC*
*(Software Engineering Club)*
(Engineering & Technology)

**July 23**
Identify Patient Zero of a Zombie Apocalypse With the Power of an ELISA™
(Immunology/Biology)

**July 28**
“It’s About Bacteria” and *Extracting Plasmid DNA from Fruit*
(Microbiology)

**July 30**
“The Cosmos on Campus” with the STEM Planetarium
(Physics/Astronomy)

For more information on the SMIC or activities, contact John Sousa, STEM SSC Coordinator, at (951) 571-6233 or e-mail John.Sousa@mvc.edu.

---

The Riverside Community College District complies with all federal and state rules and regulations and does not discriminate on the basis of ethnic group identification, national origin, religion, age, gender, gender identity, gender expression, race, color, ancestry, genetic information, sexual orientation, physical or mental disability, or any characteristic listed or defined in Section 11135 of the Government Code or any characteristic that is contained in the prohibition of hate crimes set forth in subdivision (1) of Section 422.6 of the California Penal Code, or any other status protected by law. This holds true for all students who are interested in participating in education programs and/or extracurricular school activities. Limited English speaking skills will not be a barrier to admission or participation in any programs. Harassment of any employee or student with regard to ethnic group identification, national origin, religion, age, gender, gender identity, gender expression, race, color, ancestry, genetic information, sexual orientation, physical or mental disability, or any characteristic listed or defined in Section 11135 of the Government Code or any characteristic that is contained in the prohibition of hate crimes set forth in subdivision (1) of Section 422.6 of the California Penal Code, or any other status protected by law is strictly prohibited. Inquiries regarding compliance, and/or grievance procedures may be directed to the District’s Title IX Officer/Section 504/ADA Coordinator, Ms. Georgina Villaseñor, 450 E. Alessandro Blvd., Riverside, CA 92508. (951) 222-8039. Alternate format: https://mvcstemssc.com