

MARC NEWS

Maximizing Access to Research Careers Summer/Fall 2016, Issue #2



SAN DIEGO STATE UNIVERSITY



Message from the Director

"A goal without a plan is just a wish."
Antoine de Saint-Exupery

Recently SDSU has been focusing on student success and helping students to stay on track to graduate. For MARC scholars there are a myriad of steps required to achieve academic and career success, and using goals effectively is key. You must be organized in setting goals, prioritizing your time and following through on each goal. The independent Development Plan (IDP) is a tool that was developed to help professionals develop their goals and to understand what skills, knowledge and experience they need to achieve those goals. Over the past ten years the IDP has been successfully used with doctoral students and post-doctoral students to facilitate career planning. A very useful online tool called MY IDP (<http://myidp.sciencecareers.org>) was developed and hosted by the Science Careers website of Science magazine. The use of this tool is now strongly encouraged for all NIH-funded pre and postdoctoral training programs. More recently this tool has been suggested for undergraduates. In fact, in our last MARC renewal, the reviewers suggested we make use of an IDP for our undergraduate scholars. An article on the SACNAS website (<http://sacnas.org/about/stories/sacnas-news/summer-2013/building-your-IDP>) provides an excellent resource to help undergraduates begin the IDP process. The article, by Dr. Gita Bosch, includes a sample goals worksheet, a sample skills assessment, a list of undergraduate core competencies, and a list of professional competencies. Go ahead and read this article and give her guides a try and see what you think!

Cathie Atkins, Program Director & PI



Charles Moreno Aztec Experience

There are many reasons for congratulating MARC graduating senior Charles Moreno. In May he successfully graduated from SDSU with a bachelors degree in psychology, and was selected as the Outstanding Graduate Senior in the Psychology Department graduating class as well as the College of Sciences Outstanding Graduating Senior. Besides the numerous research presentations awarded to him Charles also received the Board of Education Summer Fellowship from the University of Florida at Gainesville to do research work during the summer months before starting a Clinical Neuropsychology doctoral program in September at this same university. We congratulate Charles and express appreciation to his mentor, Dr. Paul Gilbert and his lab team for the support and guidance they provided Charles.

Find out about Charles' experience while at SDSU by reading the SDSU News Center article at: http://newscenter.sdsu.edu/sdsu_newscenter/news_story.aspx?sid=76089.

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Coming Attractions

SACNAS National Conference in Long Beach, CA	October 13-14, 2016
ABRCMS National Conference in Tampa, Florida	November 9-12, 2016
Current Ph.D. Panel Event, SDSU, San Diego, CA	December 2, 2016
Post Ph.D. Panel Event, SDSU, San Diego, CA	March, 2017
Undergraduate Research Symposium, SDSU, San Diego, CA.....	October 7, 2016

The SDSU Maximizing Access to Research Careers Undergraduate Student Training in Academic Research (MARC U*STAR) is a pre-doctoral research training program that seeks to prepare and assist underrepresented undergraduate who wish to pursue graduate studies leading to a Ph.D. or M.D./Ph.D. program in the biomedical or behavioral sciences. The program is funded by a 3-year continuation grant (5T34GM003803-27) by the National Institutes of Health, General Medical Sciences (NIH/NIGMS).

Achievements, Awards, & Fellowships

Alexis Romero, MARC graduating senior in Physics, received Honorable Mention for the 2016 NSF Graduate Fellowship. Alexis was one of 17,000 applicants and one of 1,077 women who applied for the fellowship from 488 baccalaureate institutions from all states, the District of Columbia and U.S. commonwealths and territories. This recognition is considered a very significant national academic achievement. Congratulations Alexis!

Charles Moreno received the Provost Award for Research and Scholarship at the 2016 SDSU Student Research Symposium (SRS) on March 4, 2016 for his research entitled "Recall and Recognition Discriminability in Healthy Aging". He also received the Board of Education Summer Fellowship from the University of Florida to be part of a team that will be working on (1) developing an intervention for Division One athletes with sports concussion, and (2) developing effective measures to diagnose Alzheimer's disease as early as possible. Charles will be doing "really awesome things" as he puts it.

Carlos Nowotny received the Outstanding Scientific Poster Presentation in Biochemistry for his research entitled "Heme Binding in Recombinant Murine Hemopexin" at the 2015 ABRCMS Conference in Albuquerque, New Mexico. Carlos conducted his research in the laboratory of his mentor, Professor Tom Huxford.

Meet the Graduates

Congratulations to our 2016 graduates! After a hectic two years with the MARC program, they made it through with their bachelor's degree and on their way to graduate school. The MARC program praises them for their dedication and hard work.

Mirae Dong (BS: Biology) worked with her mentor, Kelly Doran, on the Characterization of Bacterial Intracellular Survival in the Brain Endothelium. In fall 2016 Mirae will start the Biological Sciences doctoral program at the University of Chicago.

Babgen (Bobby) Manookian (BS: Chemistry) worked with his mentors, Andrew Cooksy and Thomas Cole on the synthesis and characterization of trifluoroborate salts. In fall 2016 Bobby will start the Chemical Sciences doctoral program at the University of Massachusetts, Amherst.

Charles Moreno (BA: Psychology) worked with his mentor Paul Gilbert on assessing cognitive differences based on sexuality. In fall 2016 Charles will start the Clinical Neuropsychology doctoral program at the University of Florida, Gainesville.

Carlos Nowotny (BS: Biochemistry) worked with his mentor Tom Huxford on the relationship between NF- κ B and its inhibitor I κ B-zeta studied via site specific chemoenzymatic bioconjugation of I κ B-zeta and GFP. In fall 2016 Carlos will start the Tetrad doctoral program at the University of California, San Francisco.

Alexis Romero (BS: Physics) worked with her mentor Fridolin Weber on the non-spherical models of compact stars. In fall 2016 Alexis will start the Physics doctoral program at the University of California, Irvine.

Program Publications

Zubairi, O., Spinella, W., **Romero, A.**, Millenger, R., Weber F., Orsaria, M., & Contrera, G. (April 2015). [Non-Spherical Models of Neutron Stars](#), arXiv:1504.03006v1 [astro-ph.SR].

Zubairi, O., **Romero, A.**, & Weber F. (May 2015). [Static Solutions to Einstein's Field Equation for Compact Stellar Projects](#), *J. Phys. Conf. Ser.*: 615, 012003.

Pre-MARC Highlights

The Pre-MARC program is an enrichment program for freshman and sophomore students majoring in STEM that provides them with experiences to enhance their engagement in science, and establishes a pipeline to the MARC program. It introduces students to research through the Learning Community (LC) seminars (a 1-unit MARC class), are given the opportunity to be paired in a mentoring relationship with Institutional Research and Academic Career Development Award (IRACDA) post-doctoral fellows from UCSD, as well as the opportunity to participate in a 6-week summer science enrichment program (SEP) that introduces them to courses in writing, mathematics, chemistry and research design as well as hands-on laboratory research experience.



Dylan Petersen, a Pre-MARC student majoring in Mechanical Engineering, got involved in research after completing the Engineering LC seminar in spring 2013. He was selected for an internship to conduct research with Dr. John Bellefriere from the Graduate School of Public Health on a project entitled "Project Fresh Air". Project Fresh Air is a randomized clinical trial testing whether

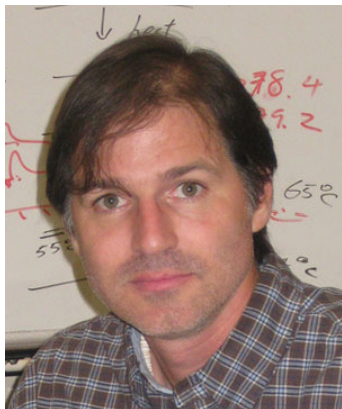
real-time feedback from air particle monitors and one-on-one coaching could protect household members from exposure to secondhand smoke.

His first introduction to a research conference was as a freshman for a Pre-MARC seminar assignment where students had to attend the SDSU Student Research Symposium and write about their experiences. Three years later he found himself at the other end. His poster entitled "An Algorithm to Identify Anomalous Data in Big Data Generated by Air Particle Monitors" was chosen from more than 500 undergraduate and graduate presentations to be presented at the 2016 SDSU Student Research Symposium.

The Pre-MARC LC seminar also shows students the different components needed in order to be a successful candidate for graduate school. As Dylan puts it: "the Pre-MARC program showed me the potential of receiving a graduate school degree in the STEM field". After he graduates, he will work for Northrop Grumman, but plans to pursue a master's in statistics or data science. The MARC programs wishes Dylan success in his studies and career.

MARC Mentor Highlight

Dr. Tom Huxford



Tom Huxford, Professor of Chemistry & Biochemistry and MARC faculty mentor, leads a group of graduate and undergraduate students working to understand the detailed mechanisms by which biological factors (usually proteins) carry out their cellular functions. “We use techniques, principally x-ray crystallography, to be able to determine structures of biomolecules so that we can understand their mechanisms and how they function

in the cell and keep us healthy” said Dr. Huxford in a recent Red Chair interview.

He has been working with his students to determine the structure of the IkappaB Kinase enzyme which is a key player in the cellular response to toxic stress. They recently discovered the manner in which this enzyme becomes active in response to stress signaling in cells. This is very exciting because better control over the IkappaB Kinase cell survivor response could lead to new treatments for inflammatory diseases (arthritis, asthma, multiple sclerosis, and colitis) as well as cancer. This type of research is important because “it tells us how life works and suggests how to fix it when it doesn’t”.

Making discoveries is very important to Dr. Huxford, “there is nothing like being the first person on the planet to get to see something and to have a complicated problem suddenly make sense”. He also cited mentoring as important because “mentoring students is an important part of the scientific endeavor. I received excellent mentorship as an undergraduate, as a graduate student, and as a beginning professor. I feel like I pay back my mentors when I do good work, and I definitely feel like my lab benefits from the successes of outstanding scientists like the one I have met through MARC”. Dr. Huxford has mentored four MARC scholars, three who have been accepted to Ph.D. programs (Linda Honaker - Harvard, Allen Washington - UCSD, Carlos Nowotny - UCSF and Eric Gonzalez who will graduate in 2017).

As his mentors inspired him, he has inspired the next generation of scientists. Quoting former MARC scholars, Carlos Nowotny, “I hope Hux’s level of enthusiasm for science and genuine concern for his students, are characteristics that are seen in me by my future students”.

Training Opportunities

Summer research at other universities around the country, provide our MARC scholars the opportunity to work with different mentors and research projects, and to experience life outside of SDSU. This summer, two of the three continuing scholars were accepted to summer programs to work on exciting research. We look forward to learning about their experiences when they return to campus. Here’s where our trainees visited this summer.



Alexandra Mallory, MARC scholar in Aerospace Engineering is spending this summer at Purdue University at the Advanced Computational Materials & Experimental Evaluation Lab with Dr. Michael Sangid. She is working on strain measurement bias correction of heat-resistant nickel-based alloys using a combination of scanning electron microscopy and digital image correlation (SEM-DIC).

Grant Varnau, MARC scholar in Physics is working this summer with Dr. Richard Haglund in the Applied Optical Physics group at Vanderbilt University. The goal of his summer project is to probe the structural change VO₂ thin films undergoes after an excitation from ultrafast second harmonic generated pulses from the VO₂. This will provide the first definite measurement of the nucleation time of VO₂, and has application in ultrafast optical switching, telecommunications and nanophotonics.

Eric Gonzalez, MARC scholar in Biochemistry decided this summer to continue his academic year research on campus with his mentor Christal Sohl, after spending the last two summers at UTSW and UCSF. This summer Eric will continue to work on characterizing tumor-associated mutations in isocitrate dehydrogenase (IDH1). Using enzyme kinetics, x-ray crystallography, and circular dichroisms, the lab seeks to understand the mechanisms by which these mutations change the reactivity of IDH.

Alumni Corner



Yessenia Ibarra, Ph.D. (2003-2005) got her first laboratory research experience at the Sanford-Burnham-Presbys Medical Discovery Institute in La Jolla, CA (then called the Burnham Institute) when she was accepted to the MARC program after attending San Diego City College. After graduating from SDSU Cum Laude and with distinction

in biology, she earned her Ph.D. in Neurobiology from Harvard University. She then worked for a while for a drug abuse NIH program in Baltimore, MD, but is now a Public Health Advisor with the CDC. In 2015, Yessenia deployed to West Africa as a laboratory subject matter expert for the CDC Ebola response efforts. While in West Africa, she was responsible for providing written and pictographic step-by-step procedures on how to use the new Ebola test kits that were going to be used, for the first time, by the local laboratory and clinical staff. She is now preparing to deploy to one of the Zika outbreak locations in the world (the exact location and her exact mission, not known at this time). We are very proud of Yessenia and wish her success in making her MARC on the future for a safer world.

Two of our MARC Scholars have reason to celebrate. They were among the 2,000 individuals (from 17,000 who applied) chosen to receive the NSF Graduate Fellowship for 2016. Congratulations to Ismael and Alterra on this impressive accomplishment!

Ismael Perez (2012-2014) can make it a double celebration. Not only was he awarded the prestigious NSF fellowship for 2016, but he was also accepted to a Ph.D. program in Biomedical Engineering. Ismael just completed his Master's of Science degree in Electrical Engineering from CSU Los Angeles, but this fall is headed to Duke University to embark on his dream of getting his doctorate.

Alterra Sanchez (2013-2015) was also awarded the NSF Graduate Fellowship for 2016. For the past year she has been working as a chemist at the USDA Agricultural Chemistry Labs, and this fall will start a Ph.D. program in Environmental Chemistry at the University of Maryland College Park.

Ellese Akre (2007-2009) will resume her studies in fall 2016 in the Health Services Ph.D. program at the University of Maryland School of Public Health. In 2010 she received her MA in Women's Health from Suffolk University in Boston. Ellese spent years working for education, policy and research organizations that promote and improve the health and well-being of vulnerable populations. We congratulate Ellese on her determination and perseverance.

Carl Bolano (2012-2014) co-authored a chapter in a book entitled "Moderators and Mediators of Treatment for Youth with Depression" in Marija Maric, Pier J. M. Prins, & Thomas H. Ollendick, *Moderators and Mediators of Youth Outcomes*, New York Oxford University Press.

Francisco Candido (2012-2014) co-authored the article entitled "Multistable Architected Materials for Trapping Elastic Strain Energy", *Advanced Materials Journal*, Doi: 10.1002/adma.201501708. The work in this article was accomplished while Francisco was a MARC trainee. He is currently a doctoral student in Mechanical and Aerospace Engineering at Cornell University.

Allan Washington, Jr. (2010-2012) co-authored the article entitled "Decreased Anti-Tumor Cytotoxic Immunity among Microsatellite-Stable Colon Cancers from African American", *PLOS One*, Doi: 10.1371/Journal.pone.0156660, June 2016. The work in this article was accomplished while Jr. was a MARC trainee. He is currently a doctoral student in Biomedical Sciences at UCSD.

Events

Post Ph.D. Panel

The 11th annual Post Ph.D. panel was held April 8, 2016 in the GMCS Building. There were two MARC alumni (Castillo and Olson) among the six panelists who shared the challenges and opportunities they faced during and after graduate school to the nearly 50 students in attendance. The first hour of the two-hour event, panelists addressed broad questions. On the second hour the panel separated into discipline-specific groups to allow students to address more specific subject that ranged from future career options with a Ph.D. to tips on how to balance family and graduate school. Here are this year's Post Ph.D. Panelists.



Patricia Castillo (2003-2004) earned her Ph.D. in Immunology from the University of California, Davis. She is currently a Post-doctoral Researchers at the University of California, Davis.

Karen Fortman earned her Ph.D. in Chemistry from the University of California, San Diego. She is currently a Senior Research Scientist at White Labs in San Diego, CA.

Justin James earned his Ph.D. in Electrical Engineering from Prairie View A&M University (Texas A&M University Systems). He is currently a Wireless Telecommunications Engineer for the Space and Naval Warfare (SPAWAR).

Brian Leon earned his Ph.D. in Chemistry from the University of California, Santa Cruz. He is currently an IRACDA Post-doctoral Researchers at the University of California, San Diego.

Lacy Olson (2007-2009) earned her Ph.D. in Clinical Psychology from Florida State University. She is currently a Post-doctoral Clinical Psychology Fellow at the VA San Diego Health Care Systems, University of California, San Diego.

Melvin Rouse earned his Ph.D. in Psychological & Brain Sciences from John Hopkins University. He is currently an IRACDA Post-doctoral Researcher at the University of California, San Diego, and in the fall will begin a position as an Assistant Professor of Psychology at the University of Puget Sound.

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