



UNIVERSITY

the annual publication of the Developing Scholars Program

Michael Zuñiga,





FROM THE DIRECTOR

Where to the DSP Difference. In August of 2000, the Developing Scholars Program welcomed its first twenty students from underrepresented backgrounds into what would become to many a life-changing journey. Sixteen years and approximately 250 graduates later, we have celebrated with our students as they have published papers and presented their research in national forums, practiced their Chinese at the Great Wall of China, participated in archeological digs in Peru, studied Organismic and Evolutionary Biology at Harvard, and provided algorithms to predict crime "hot spots" in Los Angeles. Scholars have gone on to practice law, medicine, dentistry, and optometry. Others are Teaching for America serving inner city children. They are engineers and food scientists, fashion marketers and entrepreneurs. We have celebrated Goldwater, Fulbright, and Gilman Scholars, and this spring we celebrated the first person of color to receive the University's Distinguished Young Alumni Award for alumni under the age of thirty-five; Clemente Jaquez has, at the age of thirty, designed hospitals from China to Chile, Canada to Texas.

Certainly all of these feats are admirable by any estimation; however, when one considers that many of our students are the first in their family to attend a university, some in their second language, it is all the more impressive the impact that their educational attainment represents: The DSP Difference is truly in the image of K-State 2025 where diverse people will work, question, create, and collaborate across disciplines and across the world. Who knows if it will be a Developing Scholar who does grow that potato farm on Mars or who finds a solution to the world's water quality, or creates a marketing campaign that revolutionizes how we view (and address) global sustainability, or maybe we have the next Gehry, Picasso or Paganini in our midst. I invite you to Dare to Dream: the DSP Difference!

Anita Coster

Anita Cortez, Director

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"that results in flourishing, sustainable, widely recognized research..."

STUDENTS EXCEL νετ MED

Arisa Yamashita, Melissa Riley, Mya Masterson, Tera Brandt, and Maira Cotton-Caballero are Developing Scholars enrolled in pre-veterinary studies at K-State. Though each student researches in a different department of the College they all have *excellence* in common. This excellence extends beyond their labs and classrooms out into their communities and even across the world.



Riley (left) and Brandt (Right) in front of Mosier Hall



Cotton-Caballero (left) and Yamashita (right) in front of K-State's College of Veterinary Medicine

ARISA YAMASHITA

Junior, ASI; Mentor: John Gonzalez, ASI

Yamashita has wanted to be a veterinarian since she was five years old. She decided to be a zoo veterinarian after she had an opportunity to meet the head veterinarian at Disney World. She was fascinated to find he traveled so much, which is something Yamashita wants to do. In fact, she spent fall semester in Nagasaki, Japan studying Japanese and getting better acquainted with her grandparents. Since returning, her DSP mentor has provided her a networking opportunity with meat science students from Japan.

MELISSA RILEY

Sophomore, ASI; Mentor: Bruce Schultz, Anatomy & Physiology

Riley interned at the Flint Hills Veterinary Hospital where she assisted with an emergency Cesarean-section of a Pomeranian, among other procedures. She reflects on her college experience saying that in addition to having the opportunity to attend a four-year university with a respected Veterinary Medicine program, DSP has opened yet another possible door, that of research. "DSP is more than networking; it is helping me develop who I am through the experience because of the added responsibilities."

MYA MASTERSON

Freshman, Biology; Mentor: Sally Davis, Diag. Medicine & Pathobiology

Masterson first shadowed at a veterinary clinic while still in high school where she witnessed a variety of procedures and surgeries. In 2014 she participated in Spay Day when the clinic spayed and neutered feral cats. This led to a job and ultimately, to K-State, her dream school for veterinary medicine. Having seen the inner workings of a veterinary clinic, she is now viewing the field from the angle of research as she completes her freshman year with the guidance of Dr. Sally Davis.

TERA BRANDT

Sophomore, ASI; Mentor: Thomas Schermerhorn, Clinical Sciences

Brandt grew up on a beef cattle farm, which gave her a deep appreciation for animals. Brandt reports that research has given her insight into the veterinary school that almost no freshman sees. What she enjoys most about research is how it engages her mind. Researching allows her to turn abstract ideas into understandable data: "I like taking seemingly unrelated data and turning it into an idea that could further the world of veterinary medicine." Brandt has been accepted into the Early Admissions program in the College of Veterinary Medicine at K-State.

MAIRA COTTON-CABALLERO

Senior, ASI; Mentor: Bonto Faburay, Diagnostic Medicine & Pathobiology

After graduation in May, Cotton-Caballero plans to travel to El Chaco, Paraguay, to work on environmental conservation. She will help tag and track the movements of jaguars for research purposes. Additionally, Cotton-Caballero will teach agriculture and research skills at the all-girls Flagship School. After her work in Paraguay concludes, Cotton-Caballero will begin the Pathobiology Graduate Program in the College of Veterinary Medicine at K-State. Last summer she went to an elephant refuge in Thailand.

IMPACTING COMMUNITES THROUGH DISCOVERY

Rafael Garcia (right), freshman in the School of Journalism and Mass Communications, is combining his passion for journalism with his desire to give back to the community. While in middle school, Garcia developed the first Emporia Middle School newspaper and discovered his passion for talking with people, acquiring information, and disseminating it to the larger community. His sights have been set on a career in journalism ever since.

Garcia has been working with his mentor, **Professor Gloria Freeland,** on conducting a case study of *La Voz Latina*, the Hispanic publication of Emporia. Together, the two have designed survey questions regarding the newspaper readership and literacy of the Hispanic population in Emporia.

"These guestions include frequency of newspaper consumption, preference of papers (i.e. The Emporia Gazette vs. La Voz Latina), opinion on what issues are important to the Hispanic community, the newspapers' coverage of the issues, and how effective that coverage is," Garcia said. The surveys will be distributed to various Emporia businesses and churches in late March. Garcia hopes to discover what the Hispanic community in Emporia believes to be important issues the newspapers should cover and how well the newspapers are currently covering those issues. "We will share our findings with the staff at the Gazette and La Voz to help them better inform and serve the Hispanic community of Emporia," he explained.

Before his research experience, Garcia had given little thought to Spanish journalism. He has since discovered he has the opportunity to help Hispanic communities through research by identifying key areas of the community that may be underserved or unnoticed in the reporting of news. This discovery, in turn, is shaping his future career aspirations.



MARKETING A LOST KANSAS COMMUNITY

Second-year Developing Scholar **Emmalee Laidacker**, Marketing major and History minor, has taken her research to a new level. When Laidacker is not busy researching how to market 3D printers to women with her DSP mentor, **Esther Swilley**, she is conducting research for her internship with the Chapman Center for Rural Studies. At her internship, she works on The Kansas Lost Town Project, established to bring life back to diminishing communities throughout Kansas. Recently, Laidacker took a trip to a community she has been researching: Volland (pictured), a Kansas community with a population of one. She said, "The town is very beautiful and it was exciting to finally visit a town I had been studying extensively for a long period of time. It was very rewarding."

Old general store built in 1913

"in a variety of disciplines and endeavors that benefit society as a whole."

www.ksu.edu/scholars



A DIFFERENT ANGLE ON RESEARCH

Zaira Ruiz, first-year Developing Scholar and junior in Humanities, is not conducting traditional STEM research. She is not mixing chemicals, injecting substances in mice, or developing new coding systems. Instead, she is taking a creative approach to research through photography. She is talking with people, capturing their moments in a still shot, telling their stories and letting their voices be heard.

Ruiz has been taking pictures since she was eight years old and has a knack for recording her family's history and events. Ruiz's Mexican heritage has always influenced her artwork, so when she met with DSP Director, **Anita Cortez**, it was quite clear what her research project should entail. With the supervision of her mentor, **Matthew Garcia**, Ruiz has been traveling to her hometown of Liberal, KS, to interview and photograph members of the community, primarily Mexican immigrants. She is giving them a voice and documenting their stories in an attempt to shed light on, "the Mexican immigrant rarely seen."

Ruiz said, "I hope by making these stories known, people get a sense of the immigrant experience, the

positive impact they have on the economy, Kansas, and the U.S. in general."

Conducting research through photographs and storytelling has directly impacted Ruiz in the classroom. "It has allowed me to see more connections in my history courses that reach deeper—with more profound implications—than my own personal views on immigration. It has also made me feel more a part of the process. Not only do I read information, but I also produce it," she said.

Through DSP, Ruiz says she has learned how to use her passion for photography beyond her business. She has learned how to give a voice to the people in the pictures. Through photography, Ruiz tells stories of the Mexican immigrants in her community who have been impacting lives for years. Ruiz also hopes current and future DSP students recognize their passions and the liberty DSP gives to pursue them. "Find something that you know, love, or care about and find a way to explore it. For me, it was my culture. There is always a way. The freedom to explore that DSP offers is incredible."

BEYOND LAB COATS AND MICROSCOPES: DESIGNING THE FUTURE

For most, the idea of research brings to mind images of lab coats and microscopes. For others, research looks very different. Our Scholars in architecture find research to be about innovation, creativity, and design. It is about heat flow through different materials; how comprehensive city plans have impacted the urban fabric of downtown Kansas City; monitoring the growth and patterns within the ecosystem of the University Meadow; and establishing a classification tool of architectural form types that young designers can use during the design process.

There are currently four Developing Scholars conducting research in the College of Architecture. Freshmen Jaasiel Duarte (mentor Nathan Howe) and Alexandra Mesias (mentor Michael Gibson) are researching in the general field of Architecture, while freshman Marcos Aleman (mentor Katie Kingery-Page) is focused in Landscape Architecture and sophomore Samantha Estabrook (mentor Jason Brody) is working within the Department of Regional & Community Planning.

Despite the variety of their research projects, these students have a shared experience of research helping them tremendously within the classroom. Mesias expressed the real-world impact of her research experience. "Further down the road my research experience with sustainability will help me understand important details in design like how to cut costs," she said. Estabrook echoed Mesias saying, "Research gives a real-life application to the theories we are learning in



the classroom." Additionally, Aleman's research in Landscape Architecture has allowed him to improve his sketching skills, which has translated to enhanced sketching ability in his Studio classes.

Going beyond lab coats and microscopes, these Scholars value the uniqueness and creativity of research in Architecture. "There are so many different questions you can study in architecture. You can go from very abstract research to analytical and concrete research all in the same field," said Estabrook. Duarte had similar insights saying, "One can still follow systematic methods used in other fields but also methods that are more flexible. Research in architecture is indeed unique, but worthwhile as it leads to the acquisition of knowledge and understanding of design."



Clemente Jaquez, DSP and K-State Alumnus (2008), was one of two recipients of the 2016 Distinguished Young Alumni Award. Jaquez is the design director for Hoefer Wysocki Architecture in Dallas, Texas. His work has ranged from hospitals in Texas to China to Chile.

OPPORT

First-year Scholars are setting the bar high and taking advantage of the diverse opportunities DSP offers. From the sciences to the arts, these Scholars have excelled during their first year of research in the DSP!



KATHLYN GOMENDOZA Biology/Pre-Medicine

Mentor: Dr. Lorena Passarelli, Biology

Research: Identifying substrates of a baculovirus sulfhydryl oxidase

Her role: bacmid DNA purification, Polymerase Chain Reaction, virus transfection and infection, titrations, coimmunoprecipitations, and western blotting

Other involvement: Pre-Health ambassador, Red Cross Club, ViaChristi Hospital volunteer

"DSP helped me realize just how important research is to progress. Effective medicine would not be possible without research. I hope to incorporate research into my medical practice one day."

MIA TAYLOR Kinesiology/Pre-Dentistry

Mentor: Dr. Emily Mailey, Kinesiology

Research: Barriers to healthy behaviors among military spouses: Discovering most frequent barriers limiting military spouses healthy behaviors

Her role: transcribed focus group recordings, coded surveys, survey coordinator

Other involvement: Edgerley-Franklin Urban Leader, Housing & Dining Ambassador, Pre-Dentistry Club, Kinesiology Student Association, Women's Club Soccer

"DSP has given me the opportunity to stand apart from my peers, become more connected in my major, and hold myself to a higher standard." "for undergraduate students to participate in high-impact experiential learning and research."

DURSITU HASSEN Biochemistry/Chemistry

Mentor: Dr. Stefan Bossmann, Chemistry

Research: Synthesis of Nanobiosensors for Point-of-Care Devices for Asthma Detection

Her role: collaborating to synthesize the required peptide sequences

Other involvement: KS-LSAMP, KSU American Chemical Society, Muslim Student Association, and American Ethnic Studies Student Association

"DSP helps challenge everyone to reach their highest potential, which motivates me every day."

RYAN DILLON Music Education

Mentor: Teri Holmberg, School of Music, Theatre, and Dance

Research: Improving Social Skills through Song

His role: survey and researchquestion coordinator, helped write the musical for Barrier Free Theatre performance

Other involvement: Resident Assistant at Jardine Apartments, Collegiate Chorale, University Choir, and Vocal Jazz Ensemble

"DSP has allowed me to apply skills learned in the classroom to real life situations. Through research, I have learned how to communicate more as the teacher and less as the student, which will help with future career aspirations!"

FAITH RAHMAN Biochemisty

Mentor: Dr. Stefan Bossmann, Chemistry

Research: Sensing and Measuring Biomarkers of Lung Inflammation Using Smartphone-Based Technology

Her role: synthesizing peptides that are then attached to nano-platforms and used in assays

Other involvement: Bridges to the Future

"DSP has given me the chance to develop connections with people who I probably would not have, if not for this program."



FACULTY SPOTLIGHT: PARTNERING WITH DSP

Dr. Tanya González, associate professor and graduate faculty in the Department of English: Dr. González instructs the first-year DSP seminar and has served as a DSP mentor. This Spring, González worked with first-year scholars to prepare their poster presentations.

Dr. Brenee King, Project Coordinator for the Kansas Louis Stokes Alliance for Minority Participation (KS-LSAMP): Dr. King served as the DSP seminar instructor during the Fall 2015 semester and coninues to support DSP students through the KS-LSAMP program.

Dr. Lawrence Davis, professor in the Department of Biochemistry and Molecular Biophysics: Dr. Davis and his wife Linda are the founders of the Davis Scholarship for Developing Scholars in Biochemistry and Molecular Biophysics in honor of his parents George H. and Olive E. Davis. To date, four scholars in Biochemistry & Molecular Biophysics, including **Samantha Gameros**, freshman in Biochemistry, who is working with **Dr. Erika Geisbrecht**, have been funded through the generous support of the Davis Scholarship.

Dr. Mark L. Weiss, professor in the Department of Anatomy and Physiology: Dr. Weiss is Associate Director of the Terry C. Johnson Center for Basic Cancer Research and founding fellow of the Midwest Institute for Comparative Stem Cell Biotechnology. Dr. Weiss has played an integral role as longest-serving Developing Scholar mentor. He has mentored DSP participants since 2000, our founding year. Dr. Weiss also originated the Eclipse Award given to a DSP scholar who has the potential to "eclipse" the work of the mentor. Currently, he is mentoring three DSP scholars.

"Dr. Weiss is an incredibly wise and caring person. He believes in all his undergraduate students, giving us all tough assignments and responsibilities to help us grow through new challenges. I couldn't imagine a better mentor and would ask nothing more from Dr. Weiss. He truly pours out his entire self to us. "

-Scholar Michael Zuñiga







Dr. King & LSAMP student, Kathlyn Gomendoza at DSP Induction



Dr. Larry Davis works with past Scholar, Mauri Zumalt



10 SCHOLARS' SCOPE 2016

"research is a K-State tradition." 🔅

Departments of Anatomy & Physiology and Chemistry, Kansas State University, Manhattan, Kansas Office of Undergraduate Research

Methodology

Abstract

Topie-negative breast cancer (TMEC) comprises any breast cancer one of characteristic by expression of the extrogen receptor (ER), progesterone receptor (PR) or Human Epidemial Growth Factor Receptor (ER), progesterone receptor (PR) or Human Epidemial Growth Factor Receptor (ER), progesterone receptor (PR) or Human Epidemial Growth Factor Receptor (ER), progesterone receptor (PR) or Human Epidemial Growth Factor Receptor (ER), progesterone receptor (PR) or Human Epidemial Growth Factor Receptor 2, the Zhang and the United States, this heterogeneous group of cancers accounts for up to 25% of all Breast cancer cases. When speaking of basialtype breast cancers, 50% to 75% are thigh-negative. Since no standard protocol exists to identify them yet, it is important to develop analytical methods to distinguish subgroups of TNBCs. Proteases, such as matrix metalloproteinase (MMFS), uPA, and cancer calls. By measuring the expression pattern of MMFs, uPA, and catecy is up to use of nanoparticles. By using an Fe/Fe, Q) nanoparticles as anapolatform specific to each MMF, uPA, and catepoin, the fluorescence resulting from the deleved consensis sequences of coanned dys and portyrins results in detection as sensitive as down to 1*10¹¹ mol 1⁻⁵. This fluorescence asis is noold tumors. The results obtained for TNBC are discussed here.



Conclusions

When exploring the different effects of the proteases on TNBL development of the protect of the

GOLDWATER FINALIST TURNS CHILDHOOD DREAM INTO REALITY

What do you want to be when you grow up? This question follows many students to college and causes stress and uncertainty. For a lucky few, however, the answer to this question surfaces at a young age and is strengthened and affirmed over time. The latter has been the experience of third-year Scholar, **Raquel Ortega**.

Ortega's parents came from Mexico to Goddard, KS, where Ortega faced the challenge of learning to speak and understand the English language. She worked hard to learn English while struggling through school. In fourth grade, her cousin began using biology as a middle ground to teach Ortega English. Through this process Ortega began to thrive in school as she discovered her love for science. Her answer to the question, "What do you want to be when you grow up," could easily be answered in one word: scientist.

Since coming to K-State, becoming a top-notch scientist is exactly what Ortega has done. Working on a research team with the supervision of her mentor, **Dr. Stefan Bossmann**, Ortega has been conducting cutting-edge cancer research since her freshman year. She has held significant roles in studies involving both early cancer detection and methods for drug delivery of cancer medication. She has given oral presentations on her research at the American Chemical Society Conference, and she copresented at Undergraduate Research Day at the Capitol last year. Ortega also has several publications in process.

Although Ortega determined her career path at a young age, her research experience through the Developing Scholars Program has been influential. Coming into college, Ortega was set on becoming a doctor. However, after her first year in DSP, she realized how much she valued the complexity and challenges of research. Ortega says that DSP "blew all of her plans for the better." She is now planning to pursue a combined MD/PhD program in order to practice medicine and continue conducting cutting-edge research. Ortega was recently selected to participate in the Pediatric Oncology Education Program at St. Jude Children's Research Hospital. She will spend her summer conducting research in Structural Biology under the mentorship of medical researchers at the hospital.

Ortega is also a finalist for the prestigious and highly competitive national Barry Goldwater Scholarship. She says that despite the difficult application process, it has solidified her future goals and forced her to articulate them more specifically. Ortega expressed that being considered as a national finalist for this scholarship makes her feel proud of her accomplishments. "All of the work I have put into research has paid off in ways I never imagined," she said.

SPREADING THE VALUE OF RESEARCH

This year, three Developing Scholars were selected to serve as undergraduate research ambassadors for the Office of Undergraduate Research & Creative Inquiry (OURCI). These students include **Navanté Peacock** (*left*), junior in Anthropology and Psychology, who is researching with **Dr. Don Saucier**; **Benjamin Archibeque** (*middle*), sophomore in Physics and Psychology, who is researching with **Dr. Eleanor Sayre**; and **Melissa Riley** (*right*), sophomore in Animal Science & Industry, researching with **Dr. Bruce Schultz**. As ambassadors, these Scholars help promote the value of research and creative inquiry to other undergraduates at K-State. Through presentations to classes and student organizations, setting up booths in the Student Union, and their involvement with K-State's first SPARK Week, these three did what Developing Scholars do best: paid it forward. Taking advantage of a volunteer opportunity, they were able to share their research journey with other undergraduates in order to help them experience all that undergraduate research and creative inquiry have to offer.

Are you an undergraduate interested in research? See our website, *www.k-state.edu/undergradresearch*, for more information on OURCI Research & Travel Grant Awards.



"Students Promoting the Advancement of Research at K-State" 🐌



PAY IT FORWARD AWARDS

Last year DSP Alumni - Jose Valles and Areli Monarrez-Valles, brothers Bobby and Phillip Gomez, Talia Gutierrez and her husband Jaime, Dr. Kristy Morales Garcia and her husband Jesus Garcia, and Jorge Mendoza - started the Pay It Forward Club. They gave funds to current DSP students to help with books and other expenses. If you would like to join the Pay It Forward Club, please contact cortez@ksu.edu.

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Your tax-deductable donations are greatly appreciated.

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