

# The PULSE

## *The Place for Undergraduate Learning and Scientific Exploration* The Department of Natural Sciences and Mathematics Newsletter

### RESEARCH COLLABORATIONS AT DOMINICAN

#### By Kamara Graham

With the new science center in the final stages of construction and the overwhelming success of the National Council for Undergraduate Research (NCUR) Conference, there has been a sudden interest in the many research collaborations currently in progress here at Dominican. The university's small size allows for sustainable research collaborations and partnerships with local and national organizations such as Search for the Cause (formerly known as Marin Cancer Project) and the National Park Service. The Department of Natural Sciences and Mathematics at Dominican University, headed by Dr. Sibdas Ghosh, is committed to providing students with the opportunity to do research, which would give Dominican students an edge in the competition for summer internships, graduate and medical schools.

Dr. Maggie Louie for instance, is currently partnering with Search for the Cause, a community organization that focuses on searching for the underlying rea-

sons why Marin County has such high cancer rates. She also works with teens like, Jessica Assaf in the Teens for Safe Cosmetics Campaign in order to educate the community about the potentially toxic chemicals found in our daily care products. Assaf and Louie are currently conducting research on understanding how some of these toxic chemicals can promote the development and progression breast cancer

Dr. Mohammed El Majdoubi has also been working in the field of bio-medical research. In Dr. El Majdoubi's lab, students are currently studying the potential for mouse embryonic stem cells to differentiate into several adult cell types including hormone-secreting neurons. They are planning on expanding their research to human embryonic stem cells in collaboration with Dr. Xianmin Zeng's lab at the Buck Institute. According to Dr. El Majdoubi, their ultimate goal is to "provide the basis for therapeutic research to treat neuro-endocrine-related development disorders such as dwarfism." He is

also using his research model to provide students with the opportunity to develop the technical skills necessary to grow, maintain and manipulate embryonic stem cells.

Approximately three years ago, Dominican started collaborating on a local level in order to more thoroughly understand parasites found in freshwater fish in California. Dominican faculty and students are working along side with members of the United States National Park Service, St. Norbert College in Wisconsin, and the Marin/Sonoma Mosquito and Vector Control Agency to study these parasites locally and all over the state. A presentation previously given at Dominican that focused on the benefits derived from research partnerships stated that, "To date, the study team has recorded a number of parasite species, native and introduced, from various locations around the San Francisco Bay Area." Many of these species were previously undocumented in earlier studies.

Dr. Ghosh, Arthur Scott, and numerous students at Dominican



From Left to Right: Students, Eric Hinderleider, Christopher Heiser, and Joyce Valencia presenting their research at "Posters on the hill". *Genus Apis* a non-native bee species found by DU researchers in California's State Parks, and a bison infected with brucellosis in the USA.

## National Conference on Undergraduate Research at DOMINICAN!

*Congratulations to the students, faculty, and staff who have attended the 21st National Conference on Undergraduate Research at Dominican University April 12-14, 2007*

### **Faculty & Staff**

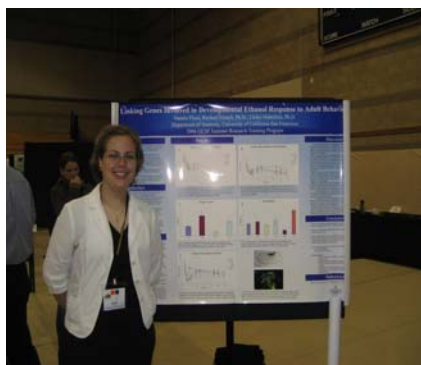
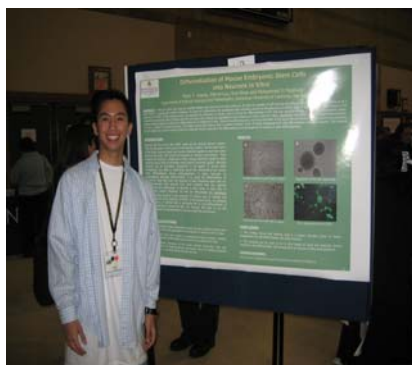
Vania Coelho  
James Cunningham  
Mohammed El Majdoubi  
Kenneth Frost  
Sibdas Ghosh  
Mietek Kolipinski  
Maggie Louie  
Mary Sevigny  
Diara Spain

### **Students:**

Monika Alas  
Gregory Cameron  
Jan Marie A. Cheng  
John Tracey

Christopher K. Heiser  
Ian McFadden  
Marielle Discipulo  
Bianca S. Gabriel  
Angela M. Giertych  
Tyler M. Sheppard  
Diana Paula Hallare  
Kamara Graham  
Raquel P. Luistro  
Thomas J. Ciaglo  
Sarah Al-Hussein  
Rosanna Hanson  
Bridget Gengler  
Natalie Plaza  
Alma Martinez  
Christopher R. O'Mara  
Lawrence Hepworth  
Adrian Savella  
Eric Hinderleider  
Joyce Valencia  
Peter Hoang  
Marvin Luu  
Eun Rhee

Ashley McClellan  
Lauren Kawabata  
Vanessa Miller  
Angelyne Tompkins  
Julie Nakao  
Jennifer Jensen  
Mark Orcholski  
Rachel Puckett  
David Ramirez  
Luz Romero  
Kia Sanford  
Dacheng Shen  
Tiffany Dure  
Jazzmon Sherman  
Maryah Trigg  
Megan Vossler  
Jennifer Williams  
Orgiltuya Batjargal  
Desaree Williams  
Angelo Wong  
Jessica Assaf



From Left to Right: Peter Hoang and Natalie Plaza presenting their research; Jacqueline Villareal and Angelo Wong volunteering at the ice cream desk

“It was amazing to see so many people here at Dominican during NCUR 21. It was great to see so many enjoying this beautiful campus that we are so fortunate to attend every day. Everyone who volunteered and worked during this prestigious conference did a wonderful job. It was amazing to see the community of Dominican working together to make NCUR run smoothly.”

*David Ramirez, Class of 2009*

## IMPRESSIONS

“This year Dominican saw some of the most unique and diverse presentations in NCUR history, including Psychology, Biochemistry, Religious Studies, Management, and Zoology.”

*Dr. Sibdas Ghosh, Department Chair of Natural Sciences and Mathematics*

“We have long known that Dominican is the perfect venue for academic research, learning, and dialogue. Now our colleagues throughout the United States know as well.”

*Joseph R. Fink, President, Dominican University of California*

# Senior Thesis Presenters

<b>Akolo Rebecca</b>	<i>Environmental Factors Affecting Egg Size and Clutch Size in Australian Birds</i>
<b>Baumgartner Khristina</b>	<i>Canine Epilepsy and the Canine Genome</i>
<b>Brooks Cynthia</b>	<i>The Role of Pharmaceuticals in Breast Cancer A Review of the Literature</i>
<b>David Sharlene</b>	<i>Gestational Diabetes: From Risk Factors to the Next Generation</i>
<b>De Giacomo Francesco</b>	<i>Stem Cells and the Future of Regenerative Medicine</i>
<b>Hassler Kevin</b>	<i>The Impact of the Mandibular Anterior Repositioning Apparatus(MARA) on Bone Growth in Patient's Jaws</i>
<b>Hurley Meghan</b>	<i>The connection between Autism and the cerebellum; Punkinje Cells, white matter, and the circulatory</i>
<b>John Penny</b>	<i>Interaction and Exploration of DAX-1 and Steroidal Hormone Nuclear Receptors</i>
<b>Kawabata Lauren</b>	<i>The Behavioral Effects of Gender and Age on California Sea Lions Infected with Domoic Acid.</i>
<b>Krisa Jennika</b>	<i>Detoxification and toxic mold syndrome: A review</i>
<b>Martinez David C.</b>	<i>Complimentary and Alternative Medicine as a Means of Prevention and a Source of Therapy for Arthritis in the Elderly</i>
<b>McAnulty Kyla</b>	<i>Development of a bioassay to determine the relative toxicity of cadmium and mercury samples at various concentrations using transgenic <i>Caenorhabditis elegans</i></i>
<b>McClellan Ashley</b>	<i>Understanding Tamoxifen Resistance in Breast Cancer Cells under Hormone Deprived Conditions</i>
<b>Parr Sheri</b>	<i>Tamoxifen Resistance in Breast Cancer Cells</i>
<b>Puckett Rachel</b>	<i>Nickel Promotes Breast Cancer Cell Proliferation</i>
<b>Rhee EunKyoung</b>	<i>Stem Cell Research</i>
<b>Romero Luz</b>	<i>Discrete Trial Training as a Teaching Approach for Autistic Children:Assessment Through a Personal Experience</i>
<b>Seltenrich Lauren</b>	<i>The behavioral effects of age and gender on California Sea Lions with Domoic Acid</i>
<b>Sherman Jazzmon</b>	<i>Nutritional Genomics, Nutrition and Health, CBPR</i>
<b>Sidhu Gurleen</b>	<i>Recovery of Neurons and Dentate Gyrus Volume in Alzheimer's APP Transgenic Mice by Mutation of Asp664</i>
<b>Thorng Seiha</b>	<i>Transcriptomic Changes in Skeletal Muscle in Response to Disuse: Characterization of Microgravity and Suspension Models of Muscle Atrophy</i>
<b>Turcios Mirna</b>	<i>My senior thesis title is: Steroids: Past, Present, and Future</i>
<b>Valadez Veronica</b>	<i>Comparison of Weed Invasions in Three California Ecosystems: Marine Coastal (Point Reyes National Seashore), Desert (Mojave National Preserve), and Sierra (Yosemite National Park)</i>
<b>Van DenBerg Jessica</b>	<i>Hymenoptera Diversity in California</i>
<b>Wells Ashley</b>	<i>Pharmaco Genetics</i>
<b>Williams Desaree</b>	<i>Photosynthetic Pigments of <i>Halimeda tuna</i> and <i>Dictyota sp</i> in Relation to Depth in Little Cayman, Cayman Islands</i>

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have worked to develop the Global Bison Exhibit with the local offices of the National Park Service, and internationally with National Park Service Agencies in Poland. These students and scientists are investigating Bison diseases, health, genetics, immunology, parasites and the reestablishment of the Bison population. Currently, Dominican is raising \$800,000 for the Global Bison Exhibit. The researchers expect to also gain support from Canadian National Park Systems and from

the United States Fish and Wildlife Service.

Overall, Dominican University's commitment to giving students endless research opportunities has opened numerous doors for students wanting to gain research experience. This experience gives our students the upper hand when applying to summer internships, graduate schools and medical schools. Due to Dominican's small size and dedication to collaboration, our Dominican students have been given many opportunities not available at larger schools.



## A Lifetime of Research

By Joyce Valencia

When looking back at fond memories, Dr. James Cunningham recalls family trips in which his parents would take him to parks, showing him the intriguing aspects of Mother Nature. “I remember on one trip we went to southern Oregon, and we went to an area where we spent a considerable amount of time hunting fossils,” recalled Dr. Cunningham. His parents, both scientists, influenced him to grow up more observant to his surroundings.

However, there was one thing in nature he particularly enjoyed at an early age: birds. “A book of birds my grandmother gave to me actually taught me how to read rather than the ‘See-Spot-Run’ books targeted for children,” he said.

After achieving his B.S. in zoology at San Diego State University, Dr. Cunningham went to Arizona to work on his master’s degree. An ornithologist at Northern Arizona University offered him the opportunity to study secondary-cavity nesting birds around Flagstaff, Arizona. Dr. Cunningham helped the forest service determine the impact dead trees had as nesting sites for birds with a U.S. Force Services grant.



“I couldn’t believe that someone was going to pay me to do something that I just loved doing,” he exclaimed.

Dr. Cunningham obtained his M.S. in biology in Arizona, and then studied for his Ph.D in zoology at the University of Canterbury in Christchurch, New Zealand. For six years, he studied the vocal behavior of the New Zealand Brown Creeper, analyzing their songs and communication pattern.

Dr. Cunningham now works as an Associate Professor at Dominican University of California bringing his research influence to undergraduate students in a variety of projects that train them to be more observant and analytical.

One project that Dr. Cunningham started was the analysis of *Ramalina menziesii* – a species of lichen that exhibits two growth patterns: a perforated external appearance and an appearance with no perforations. Undergraduate students are trying to determine why specific cells receive a signal for death that causes these perforations. Through methods such as protein analysis, students are able to find



leads to what exactly is causing the lichen to grow in such a peculiar manner.

“There is still a lot of work to accomplish in terms of analyzing protein, but in the future we’d like to delve further into the genetic origin of the perforations,” says biology major Jennifer Williams. Samples are collected throughout Marin County, but especially in Point Reyes National Seashore where they grow in abundance.

“I like doing this research. Dr. Cunningham trusts us enough, so he doesn’t constantly monitor our work; he’ll be around if we need assistance, but it gives us the independence needed to take the initiative, be responsible and learn what it takes to be a researcher,” says junior biology major, Orgiltuya Batjargal, “That’s what makes research actually fun.”

As most refer to him on campus as “The Bird Man” the contemporary version of Darwin plans on leaving for sabbatical in the fall to do further research on the New Zealand Brown Creeper that he studied before. He plans to bring back new material for students to study as a new research project concerning the vocal behavior in ornithology.



From Left to Right: Adult Chestnut-backed Chickadee, nestling chickadees, Dr. Cunningham and students inspecting nestbox.