Peter J. Shields Endowed Chair in Dairy Food Science
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ENDOWMENT PURPOSE
The Peter J. Shields Chair in Dairy Food Science was established in 1983 by the California Milk Advisory Board and the California Manufacturing Milk Advisory Board to attract and sustain outstanding dairy food science scholars in the Department of Food Science and Technology. The Chair was named to recognize the historic relationship of the “founder of the Davis campus” to the dairy food industry, and should provide the occupant with opportunities to conduct exemplary research and teaching, as well as to offer continuous interaction with the dairy food industry.

RESEARCH
With support from the Peter J Shields Endowed Chair I have advanced a research agenda focused on understanding the beneficial impact of milk components on the gastrointestinal tract. In order to gain medical community acceptance of the unique benefits of the bioactive components within milk, it is critical to perform detailed mechanistic studies demonstrating how specific milk components improve health as well as beneficially modulate the gut microbiota. To accomplish this Peter J. Shields Chair funds have paid, in part, for senior scientific staff, postdoctoral scholars, graduate students and undergraduates doing research in my laboratory or the UC Davis Milk Processing Lab. In the last year we accomplished several significant goals. We published a series of papers showing how to modify bovine milk streams to garner oligosaccharides, a valuable prebiotic, from bovine milk glycoproteins. In addition, we completed very high profile study demonstrating that supplementation of bovine milk oligosaccharides dramatically improves lean body mass growth in an animal model for human malnutrition. These advances will continue to drive research, translation and commercial interest in bioactive molecules derived from milk.
TEACHING
In the last year I developed two new courses, one undergraduate course "The Microbiology of Fermented Foods" and a second graduate level course "Interactions of Food and the Gut Microbiota". These courses were offered for the first time in spring of 2016. The undergraduate class covers the background technology and microbiology of most dairy fermentations (yogurt, sour cream, cheese, fermented milks) and puts that into a framework of other types of food fermentations to discuss common themes. The course was restricted to Food Science students in the first year but will now open up to microbiology and biotechnology students in the future. I expect this to drive significant enrollment and, as a consequence, exposure of hundreds of students to dairy microbiology and technology subject matter. The graduate course seeks to prepare graduate students with the tools necessary to design, interpret and evaluate feeding trial studies employing foods to beneficially modulate the gut microbiota—a common target for all functional foods today. A major component of this class is the influence of milk on the gut microbiota of infants. In the last year some Shields Funds to pay for graduate student Guy Shani to assist me in the development and teaching of these courses.

STUDENTS
Shields Chair activities have advanced numerous student activities. In general, Shields Chair funding is used to cover gaps in personnel funding. In 2015-2016, the endowment paid, in part, for a Staff Research Associate (Dr. Karen Kalanetra), Project Scientist (Dr. Ishita Shah) and a Junior Specialist (Chad Masaweh). Together, Drs. Kalanetra, Shah and Mr. Masaweh coordinate the microbiological and metagenomic work in my lab which supports all the ongoing milk-related research on milk glycans, intestinal health and environmental microbiology of dairy facilities. The Shields Chair helped fund a number of undergraduate workers including Priyanka Bapat, Leela Dixit, Alexis Faria, Kevin Fukumoto, Jenna Huynh, Henderson Lu, Pavithra Ravishankar, Melanie Shojinaga, Jothika Tamizharasu, Claudia Tang, John Davis, Ryan Viveros. All of these undergraduate students work closely with my graduate students and postdoctoral researchers to examine various aspects of bioactive components in milk.

OUTREACH
In the last year I presented our milk-focused research at various meetings including: 2015 FASEB Meeting on The Origins and Benefits of Biologically Active Components in Human Milk, 23rd International Symposium on Glycoconjugates, UC Davis Center for Mind & Brain Summit Series, 2nd Annual Microbiome Symposium, University of Pennsylvania, 11th Latin American Symposium on Food Science, Oxygen Club of California 2016 World Congress, 2016 FASEB Meeting on Microbial Glycobiology, American Society for Microbiology Annual Meeting (Divisional Lecture) and the International Scientific Conference on Probiotics and Prebiotics.

Research emanating from the Shields Chair and our UC Davis Milk Bioactives program received much press in the past year. First and foremost, as part of his new book on the microbiome, science writer Ed Yong discussed our research repeatedly during various interviews including NPR’s Fresh Air and Science Friday programs (among other venues) and the New Yorker Magazine excerpted a chapter from his book that profiled our work. In addition our publication on the use of bifidobacterial endoglycosidases to release oligosaccharides from bovine milk was profiled in Scientific American and various other news outlets. Perhaps the work that received the most attention was our collaborative work with Dr. Jeff Gordon which resulted in a publication in Cell and was profiled by a large number of news outlets.
Links to publications, press releases, and media coverage are available on the Mills Laboratory website, mills.ucdavis.edu.

THANKS

It is a great honor to be the Shields Endowed Chair in Dairy Food Science. Funding from this endowment is supporting exciting new studies in the Department of Food Science and Technology. This research is defining the health benefit of milk but also identifying novel bioactive molecules and microbes that can be employed to improve intestinal health. We are also using novel techniques to map microbial transfer throughout dairy production facilities, thus providing insight into dairy spoilage and contamination processes. In short, we are training the next generation of dairy scientists focused on using milk processing and milk components. It is an amazing time to study milk—the only food that evolved to make the consumer healthy.