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The Jackrabbit Dairy Review

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INTRODUCING FOOD SCIENCE

The department is pleased to introduce food science as a new major at the undergraduate level with offerings of M.S. and Ph.D. degrees as well, effective with the 2015-2016 academic year. Food science, which previously resided in the College of Education and Human Sciences as an undergraduate emphasis, was formally transferred to the College of Agriculture and Biological Sciences and, specifically, to the dairy science department. The four-year curriculum is designed per the guidelines of the Institute of Food Technologists, the professional organization of the food industry and leads to a B.S. degree. In 2016, we will begin the IFT approval process for the new program. The major already has some 15 students enrolled, many of whom transferred from their previous program at SDSU and we are now actively promoting the food science major.

The field offers numerous opportunities in the food industry around the country. Along with the transfer of the program, the department also welcomed Drs. Joan Hegerfeld-Baker, Padmanaban Krishnan and C. Y. Wang as food science faculty. In addition, through the Strategic Reinvestment Program at SDSU, a new food science faculty position was also created. We are currently recruiting to fill this position. Also in the plans is the renovation of labs that will be used for teaching and research activities in the new program. While the new program resides in the dairy science department, faculty expertise in other departments, such as in animal science, ag biosystems engineering and plant science also complements the food science program.

MESSAGE FROM THE DEPARTMENT HEAD

2015 was a very interesting year for the dairy science department; we started the year with extensive discussions on curriculum in dairy production and dairy manufacturing, resulting from input from students during exit interviews, faculty expertise, current professional needs of graduates, and striking a fine balance between teaching and research for faculty. The outcome was a curriculum that will better prepare our students for the future. This was followed by another extensive discussion on the incorporation of a new food science major at both the undergraduate and graduate levels. This is a defining new development, enabling the department to expand its reach from the dairy farm, to dairy processing and now to food processing. Given the tight connection between these areas, we are now positioned to offer students in all areas opportunities that will have a lasting impact on their future and that of food production. This makes SDSU the only university in the country that offers extensive academic and research programs in dairy and food science within one department and with synergies between the three. We were also faced with faculty vacancies that had occurred in the previous year. While the process for filling these vacancies ensued, teaching and research continued. Thanks to our existing faculty members that took on additional responsibilities to help ensure seamless progression for students. The additional duties did not deter excellence; scholarship awards were at an all-time high of approximately $114,000, the products judging team won their national contest for the eighth year in a row and faculty productivity in terms of research and publications was impressive; in fiscal year 2015 dairy science faculty members had secured over $1.4 million in external grants through 30 projects to cover research projects and support graduate students and researchers. This reflected a 12 percent increase in external funding over the previous year. The Office of Technology Transfer reported that nearly one-fourth of the total disclosures at the university for technology transfer came from the dairy science department. This is a clear testimony of the top quality faculty and students in the department and the immense value of the newly renovated facilities. Student accomplishments, as reported in this newsletter, were equally impressive. We are particularly eager about 2016 as we prepare to welcome three new faculty members: Dr. Sergio Martinez-Monteagudo, assistant professor in dairy manufacturing; Dr. Johan Osorio, assistant professor in dairy production; and a new faculty member in food science. The teaching and research expertise of these individuals will help us strengthen all three program areas. Help us spread the word about exciting careers in dairy production, dairy manufacturing and food science along with the outstanding scholarship program and the opportunity to engage with world-class faculty and facilities. We are well poised to continue to serve the dairy and food industry through our teaching, research and service programs.

Vikram Mistry
NEW FACULTY AND VISITORS

NEW FACULTY AND STAFF

Joan Hegerfeld-Baker joined the dairy science department as part of the new food science program. She is assistant professor/Extension food specialist. Dr. Hegerfeld-Baker has a B.S. in public health sciences; M.S. in education, curriculum and instruction; and Ph.D. in nutritional sciences, all from SDSU. She was first affiliated with Food Safety Extension at SDSU in 1994 and became Food Safety Extension Specialist in 2002. Prior to joining the dairy science department she was affiliated with the College of Education and Human Sciences. She works extensively with specialty crop producers in the state for food safety matters. She also played a key role in South Dakota raw milk regulations. She teaches the food safety management and food product development classes in her new role.

Padmanaban Krishnan has been a faculty member at SDSU since 1988 when he joined the Department of Nutrition, Food Science and Hospitality as an instructor. He holds a B.S. degree in botany from the University of Madras, India, M.S. in food and nutrition from NDSU, and Ph.D. in cereal science from NDSU. He moved to the dairy science department from the College of Education and Human Sciences as part of the new food science program. Dr. Krishnan has a very active program in cereal science and is very actively engaged in research in value-added utilization research in wheat, corn, oats and soybeans. In his new role, he is responsible for teaching several classes in food science, including food chemistry, food analysis and food processing.

Peter Linke is currently the longest-serving employee at the Dairy Research and Training Facility and has served in several capacities. In March 2015 he was appointed as manager of the DRTF. He joined the DRTF as ag foreperson in 2004 after he completed his B.S. in dairy production at SDSU. Over the 11-year period he developed extensive experience at the DRTF and now as manager he oversees all operations, including supervision of employees, coordination of research and teaching activities and is a liaison with the College of ABS Farm Department. Peter is also in the process of completing a master’s degree in dairy production.

Laura McMartin joined the DRTF in summer 2015 as ag foreperson. She serves as the lead person to feed cows and replacement heifers, maintain overall appearance of the farm including grounds maintenance and performs routine maintenance and general repairs on equipment. Laura is in the process of completing a bachelor’s degree in dairy production.

Kristi Prunty joined the dairy science department as secretary in January 2015. Kristi provides secretarial support to the dairy science department as well as the State Dairy Lab and Dairy Extension Specialist. She plays the important roles of managing student payroll, assisting with purchase procedures and managing the department switch board. She holds a B.S. in political science from SDSU.

C.Y. Wang joined the dairy science department in a partial appointment in 2015 as part of the new food science program. He joined SDSU in 1993 as assistant professor in the Department of Nutrition and Food Science. Dr. Wang’s B.S. degree is in agronomy from Shenyang Agricultural University, China, and M.S. and Ph.D. degrees are from Iowa State University in food science and technology. His research interests are in genomics, proteomics, metabolomics in human nutrition research; chemistry, analysis and health benefits of phytochemicals; processing and chemistry of cereal and oilseed components; proteins, carbohydrates, and lipids; processing and utilization of corn and soybeans; instrumental analysis of food components. In his new role he teaches food safety management and food product development.

VISITORS

Randi Gross, former president of Holstein Association, USA, and retired assistant branch manager of Northwest Farm Credit Services of Washington State, served as visiting instructor in dairy production classes. Gross’s wealth of experience was most valuable to our students.

Leyby S. Guijarro, an undergraduate student from Honduras, spent the summer under the mentorship of Dr. Maristela Rovai learning about South Dakota’s dairy industry. Through this program she assisted Rovai with her research and also worked at Golden Dakota Farms in Flandreau and MoDak Dairy in Goodwin.

Dr. Jorge Gutiérrez, a Spanish veterinarian specializing in small ruminants who works for Spain’s MSD Animal Health (Merck) in ruminant Scientific Field Affairs (SFA) spent 15 days at SDSU with Dr. Maristela Rovai. Along with Rovai, Gutiérrez visited commercial dairies and participated in the Dairy Tool Box Talks — An Educational Pilot program of dairy farm employee’s training sponsored by the High Plains Intermountain Center for Agricultural Health & Safety from Colorado State University.

Walt Wojie, alumnus and retired CEO of Michigan Milk Producers served as guest lecturer in several of our classes and conducted individualized practice interviews for our students. Wojie was also the recipient of a distinguished alumnus award of the SDSU Alumni Association in 2011.

2015 GRADUATES

Ph.D.
Ananya Biswas, Manufacturing
Haridas Meletharyal, Manufacturing
Jon Pretz, Production
William Weich, Production

M.S.
Subash Acharya, Production
Bhilendra Bhanduriya, Manufacturing
Somil Gupta, Manufacturing
Kyla Hulquist, Production
Rhea Lawrence, Production
Suresh Sutariya, Manufacturing

B.S. Manufacturing
Rachel Achen
Samantha Berg
Rachel Johnson
Andrew Kaskie
Kevin Kral
Natasha Laska
Weina Liu
Geena Mott
Della Stage

B.S. Production & Manufacturing
Jennifer Casperson
Ben Choudek
Kyle Fischer

B.S. Food Science
Emily Martin
Riley Pitman
Andrea Paffenbacher
Meg Viland
Bobbi Jo Wild

FOOD SCIENCE CLUB

Club members attended the Institute of Food Technologists Annual Meeting in Chicago in June. In September the club kicked off the 2015-2016 academic year with a pizza party to welcome new and returning club members. Additional activities this year included volunteering with SDSU concessions and participating in National Ag Day, Sanford All About Science Festival, and Farm Fest (Redwood Falls, Minnesota). Students have also been working on a project to develop Jackrabbit cookies. 2015 officers are Ashley Adamski, president; Poonam Velazco Fasce, secretary; Maggie Becher and Emily Resch, historians. Dr. Padmanaban Krishnan is the adviser.
JUDGING ACTIVITIES

DAIRY CATTLE EVALUATION

The SDSU Dairy Judging Team coached by Jon Pretz competed in several contests throughout 2015. The team members consisted of Audrey Souza, Jacob Johnson, Bernice Vander Wal and David Tacka. At the Southwestern Exposition and Livestock Contest in Fort Worth, Texas, the team placed 12th overall. The team placed fifth in Jerseys, ninth in Brown Swiss, 13th in Holsteins and eighth in oral reasons. Audrey Souza was fourth high individual in Brown Swiss, Jacob Johnson was ninth high individual for reasons, Bernice Vander Wal was ninth high individual for Jersey and David Tacka was 21st high individual for Jersey. On their way to Texas the SDSU team practiced at dairies in Kansas, Oklahoma and Texas. The team also competed in the 22nd Annual Accelerated Genetics Intercollegiate Dairy Cattle Judging Contest in Viroqua, Wis. The team placed fifth High Team overall and fifth High Team in reasons. David Tacka finished first High Individual in the Guernsey Breed and 15th High Individual overall. A total of 12 teams participated in this year’s contest. They judged Guernsey, Holstein, Jersey and Milking Shorthorn with each participant placing 10 classes and giving five sets of oral reasons. Another competition included the 95th Annual National Collegiate Dairy Cattle Judging Contest in Madison, Wis., at the World Dairy Expo. The team placed 16th High Team overall and 10th High Team in Reasons. The team placed 12th in Ayrshire, 16th in Brown Swiss, 11th in Guernsey, 12th in Holstein and 13th in Jersey. Jacob Johnson finished 10th High Individual in the Holstein Breed. A total of 18 teams participated in this year’s contest representing 69 contestants from 15 U.S. states and two countries. They judged Ayrshire, Brown Swiss, Guernsey, Holstein, Jersey, Milking Shorthorn and Red and White.

DAIRY CHALLENGE

The Dairy Challenge Team earned a second place award at the 13th Annual North American Intercollegiate Dairy Challenge® that was held in Ft. Wayne, Indiana. In total, 264 students from 37 colleges across the U.S. and Canada attended this educational event co-hosted by Purdue University, Michigan State University and The Ohio State University. The team, composed of David Berning, Matt Holdvogt, Chelsea Johnson and Holly Schmitt, ranked second from a field of eight teams, which evaluated the same operating dairy in the tri-state area. The team was coached by Kenneth Kalscheur, David Casper and Melissa Schmitt. In addition, a number of industry professionals assisted with practices to help prepare the team. For the contest, participants visited six dairy farms in Indiana, Michigan and Ohio, as part of their training to help farmers evaluate and adapt management to optimize success and animal care. Also, industry professionals presented cutting-edge research, new programs and career opportunities to students. Academy participants from SDSU included Jennifer Casperson, Sam Fuchs, Emily Martin, Riley Pitman and Sara Sontag.

DAIRY CLUB

Club members attended ADSA-SAD regional conference at the Wisconsin Dells in February. In June, club members hosted youth at the 12th annual Jackrabbit Dairy Camp and co-hosted the second annual Cow to Cap 5K. Other club activities throughout the past year included the South Dakota State Fair, Ag & Bio Ice Cream Social, National Ag Day, Relay for Life, World Dairy Expo and cheese boxes for which students cut, packaged and shipped almost 8,000 pounds of cheese around the country under the leadership of co-chairs Chelsea Schossow, Cole Hoyer and Eric Ode. 2015 Officers were Megan Schaefer, president; Maggie Stiles, vice president; Chelsea Schossow, secretary; Bernice Vander Wal, treasurer; Katelyn Johnson and Kiley Van Eck, historians; Sarah Post and Sam Fuchs, activities coordinators; and Megan Schaefer, Dairy Digest editor. Advisors were Dr. Jill Anderson, Dr. Lloyd Metzger, John Haberkorn and graduate students Jon Pretz and Billy Weich.

DAIRY PRODUCTS

The Dairy Products Judging Team placed first in All Products at the 2015 Collegiate Dairy Products Evaluation Contest that was held at the International Dairy Show in Chicago, Illinois. This was the eighth consecutive year that SDSU has won the National Championship. SDSU has a long history at the contest and has won the national championship 23 times in the 94-year history of the contest. The team placed first in butter, cheddar cheese, cottage cheese and ice cream and placed second in milk and yogurt. A total of 44 undergraduate and graduate contestants from 12 universities in the U.S. and Canada participated in the contest. SDSU team members were Nicole Jax, Waltham, Minnesota; Michaela VanderWal, Milbank; Kaylee Wegner, Faribault, Minnesota; and Dikshi Bawa, Karnal, India. The team is coached by Lloyd Metzger, SDSU professor of dairy science and Alfred Chair in Dairy Education, Natasha Laska, SDSU graduate student and Lee Alexander, SDSU graduate student. Jax placed first overall, second in yogurt, milk, butter and cottage cheese and fourth in ice cream. As the top overall judge Jax received the Robert Rosenbaum Award. VanderWal placed fourth overall, fourth in cheddar cheese, fifth in cottage cheese and sixth in milk. Wegner was sixth overall, first in cheddar cheese and second in ice cream. In the graduate student contest, Bawa placed first overall and was first in ice cream, second in butter, and third in yogurt and cottage cheese. As the top overall graduate student judge Bawa received the Genevieve Christen Award. For placing first overall, the SDSU team won the Shirley Sea Memorial Scholarship. This scholarship is in memory of Shirley Sears, who coached the SDSU team for 21 years. Metzger also received the Aurelia and George Weigold Coach of the Year Award. The contest was hosted by the International Dairy Show and the International Dairy Foods Association and was sponsored by the U.S. Department of Agriculture and more than 30 dairy associations, companies and suppliers.
PROFESSIONAL ACTIVITIES OF FACULTY AND STAFF

Faculty and students together presented numerous papers including refereed publications in scientific journals, abstracts, presentations, book chapters, extension publications, theses or dissertation, and Extension presentations. All publications are listed on our website at www.sdsu.edu/x.

Dr. Sanjeev Anand has been on the dairy science faculty since 2006 and teaches and conducts research in dairy microbiology and food safety. He routinely mentors undergraduate researchers as well as graduate students working towards M.S. and Ph.D. degrees. Anand’s research is in the areas of biofilm development and control, control of spores in dairy processing, nonthermal methods for improving product quality, dairy products with enhanced health benefits, and general food safety education. He serves as the department representative to the Functional Genomics Core Facility (2007–present), dairy science representative for the Van D. and Barbara B. Fisher Honors College (2013–present) and department library representative (2014–present).

Dr. Jill Anderson joined the Department of Dairy Science as assistant professor in 2012 and teaches several classes and has established a research program in calf and heifer nutrition. She served on the College of ABS curriculum taskforce. Anderson has served as adviser to four graduate students and four undergraduate researchers. She also serves as chair of the Midwest ADSA Extension Symposium.

Howard Bonnemann has been on the dairy science faculty since 1997. He teaches a wide range of classes in dairy science as well as the introductory food science class. He serves as academic adviser to all undergraduate students in the department. He is the assessment coordinator for the department and the College of Agriculture and Biological Sciences representative on the University Assessment Committee. He is also the department curriculum coordinator and has conducted many FDA dairy products judging clinics across the state.

He serves as the executive secretary for the South Dakota Dairy Association.

Dr. David Casper began his research and teaching position as assistant professor of dairy science in 2011 and serves in various capacities on boards of the American Dairy Science Association and the American Society of Animal Science. He served as co-coach of the Intercollegiate Dairy Challenge team. Among several other classes, he co-taught an ag-bio class in spring for a study abroad trip to New Zealand. During summer 2015 he traveled to China on an industry trip surveying the dairy industry. He serves on the SDSU Faculty Senate and on the Institutional Animal Care and Use Committee.

John Haberkorn is the manager of the Davis Dairy Plant. In addition to managing the plant he also provided tours of the plant to numerous groups, initiated several new programs for the plant, including student edition cheeses, GMP program, development and production of a large range of flavored cheeses, and a positive release program. All initiatives involve student participation.

Dr. Joan Hegerfeld-Baker is the Extension food safety specialist and serves as treasurer of the South Affiliate of the National Extension Family Consumer Sciences. She is a committee member of the SDSU Institute of STEM Education Enhancement coordinator of the South Dakota FFA Food Science and Technology Career Event. She served on the South Dakota Raw Milk Working Group that was led by South Dakota Secretary of Agriculture Lucas Lentsch.

Dr. Padmanaban Krishnan conducts research in food science and teaches food science classes. He is president-elect of the Great Plains subsection of the Institute of Food Technologists and past chair of the Vitamins Methods Committee of the American Association of Cereal Chemists. Dr. Krishnan works collaboratively with scientists in the plant science department and industry on oats and wheat and their processing.

Peter Linke is manager of the Dairy Research and Training Facility. While overseeing all aspects of farm operations, he also helps coordinate all research and teaching activities at the farm.

Dr. Lloyd Metzger served as director of the Midwest Dairy Foods Research Center and the executive secretary of the North Central Cheese Industries Association. Member, ADSA Dairy Foods Milk Protein and Enzyme Committee and member of the editorial board of the Journal of Dairy Science. Metzger has served as coach of the dairy products judging team and led the SDSU team to a record eighth national championship.

Dr. Vikram Mistry served as the U.S. editor of the French Journal of Dairy Science and Technology and associate director of the Midwest Dairy Foods Research Association. He served on the boards of the American Dairy Association of South Dakota, South Dakota Dairy Producers and American Dairy Science Association Foundation. He also served as an advisor to the North Central Cheese Association and the South Dakota Dairy Producers.

Dr. C.Y. Wang has been on the dairy science faculty since 2006 and teaches several classes and is adviser to all undergraduate students in the department.

YEARS OF SERVICE

Howard Bonnemann was recognized for 20 years of service to SDSU. Bonnemann is presently lecturer in dairy science and teaches a wide range of classes and is adviser to all undergraduate students in the department.

STUDENT ACCOMPLISHMENTS

Cole Hoyer and Sara Sontag attended the Cornerstone Dairy Academy in Madison, Wisconsin, as part of dairy’s professional development organization.

Dairy Club elected new officers for 2016: Bernice Vander Wal, president; Chelsea Schossow, vice president; Olivia Klinzmann, secretary; Brandon Hawkins, treasurer; Brianna Lee and Megan Schaefner, historians; Cole Hoyer and Audrey Souza, activities coordinators. Megan Schaefner is the Dairy Digest editor. Dr. Jill Anderson, Dr. David Casper and John Haberkorn are faculty advisers.

Food science students participated in the Sanford Health Science Fair. Our students presented the exciting world of food science and processing to attendees.

Ph.D. and M.S. students in dairy production, dairy manufacturing and food science presented their research at the annual meetings of the American Dairy Science Association in Orlando and Institute of Food Technologists in Chicago.

Chelsey Johnson received the National Dairy Shrine Student Recognition Award. Johnson completed her B.S. in dairy production, and agriculture education, communication and leadership with an education specialization in 2014 and is currently employed as a digital communications coordinator at Accelerated Genetics in Baraboo, Wis.

Nine students received National Dairy Promotion and Research Board scholarships. Recipients include: Morgan Goche, Jacob Johnson, Kirby Krogstad, Andrea Pfaffenbach, Sarah Post, Kristen Mohr, Megan Schaefner, Audrey Souza and Kaylee Wegner. On behalf of dairy farmers, the National Dairy Promotion and Research Board each year awards nationwide up to 19 $1,500 scholarships. Our students have an excellent record in this program. Since 2003, 94 SDSU dairy science student have been recipients.

Jon Pretz, graduate student working toward his Ph.D. in dairy production and coach of the dairy cattle judging team received a National Milk Producers Federation scholarship.

Audrey Souza, Maggie Stiles and Kaylee Wegner were selected as Ag Bio Ambassadors by the College of Agriculture and Biological Sciences. They help promote college programs to high school students around the region.

Maggie Stiles, dairy production major, was selected as Miss Brookings 2015 and was a finalist for Miss South Dakota. As Miss Brookings, she promoted chocolate milk and dairy to numerous groups.

Bobbi Jo Wild, working under the mentorship of Dr. Jill Anderson, received first place in the 2015 Alltech Young Scientist Undergraduate competition for her research paper “Ruminal degradability and intestinal digestibility of sorghum distillers dried grains compared to corn co-products and soybean meal.”
ONGOING FUNDS FOR SUPPORTING RESEARCH

Completed projects are listed on our website: www.sdstate.edu/ds.


Patel, H. A. Scale-up and implementation of strategies to improve quality and process efficiency during manufacture of dairy ingredients. 9/1/2014 to 8/31/2016. Dairy Research Institute. $107,343.


Rovai, M. R. HICAHS/Dairy Tool Box Talks: An educational pilot project. 5/15/2015 to 9/14/2015. CDC/NIOSH FPF Colorado State University. $10,000.

DAIRY FACILITIES

The Davis Dairy Plant attracts a wide range of visitors, including school groups, alumni, prospective students, professionals and those curious about the manufacture of dairy products. (Take a virtual tour at www.sdstate.edu/ds/plant/video.) The plant processes approximately 1 million pounds of milk annually, converting it to 25,000 pounds of cheese, 20,000 gallons of fluid milk, 40,000 gallons of ice cream and 1,600 pounds of butter. One day a week is set aside for maintenance and repair, inventory and environmental cleaning.

Through the very comprehensive programs developed by plant manager John Haberkorn, students receive excellent hands-on training for product manufacture, quality assurance, product development and general plant management.

In 2014, SDSU dairy science students began manufacturing their own cheese flavors under the Student Edition Cheese program. In this program, cheese flavors are developed by a dairy science student and undergoes quality testing at the Davis Dairy Plant. Once the cheese completes a positive release it is cut, wrapped and labeled. The label features the type of cheese and the name of the originating student.

In spring 2015 our students traveled to the Wisconsin Cheese Industry Conference in Madison to participate in the conference and industry evaluation of their cheeses.

A similar program is being initiated with ice cream. The first flavor developed and now in great demand is “Barry Berry” named for Dean Barry Dunn, who has promoted experiential learning for students.

In 2015, invitations were extended to Jackrabbit Dairy Council members and donors for the dairy plant project to come to campus to conduct interviews for summer internships and permanent positions. Fifteen donor companies visited and conducted over 200 interviews and follow-up onsite interviews. Job offers for permanent positions and summer internships are being finalized.

Our Dairy Research and Training Facility has approximately 150 certified and registered milking cows and a total of 300 animals including approximately 50 Brown Swiss. The herd is used for research projects primarily in nutrition and also for teaching. In addition, K-12 students also benefit from it through the Dairy Camp and cattle judging contests that are hosted at the farm. Peter Linke with assistant manager Melissa Schmitt and student managers Brennan Albrecht, Nicole Knip and Tucker Roeker, manage the farm. Laura McMartin serves the farm as ag foreman and has the duty of feeding and maintenance. We are now embarking on a project for renovating and remodeling the facility to help meet future teaching and research goals. Over the next year, dairy producers and other industry groups will be invited to provide input into planning the new facility.
SCHOLARSHIPS

Our students were once again the beneficiaries of the generosity of many alumni, friends, and industry. At the spring 2015 banquet approximately $114,820 in scholarships were awarded for the 2015-2016 academic year. Agropur Inc. Dairy Manufacturing, $1,000 Agropur Inc. Dairy Production, $1,000 Alfred Herman Rishoi Memorial, (2/$575) $1,150 Associated Milk Producers Inc., $1,000 Bel Brands USA, $3,000 Clyde Helper Memorial, $1,000 Dairy Club, (2/$500) $1,000 Dairy Connection, $1,000 Dairy Farmers of America, $400 Dairy Fest, (2/$500) $1,000 Dairy Manufacturing, $2,375 Dave Clark/North Central Cheese Ind. Assoc., $1,000 David H. Henry Memorial in Ag & Bio Sciences, $200 David J. Schingoethe, $1,000 Dairy Club, (2/$500) $1,000 Clyde Helsper Memorial, $1,000 Alfred Herman Rishoi Memorial, (2/$575) $1,150 Agropur Inc. Dairy Production, $1,000 Ed and Jennifer Bick–Food Science, $700 Dean Foods–Sioux Falls, $1,250 Davisco Foods/Jay Headley Memorial, $1,500 David J. Schingoethe, $1,000 Dairy Club, (2/$500) $1,000 Clyde Helsper Memorial, $1,000 Alfred Herman Rishoi Memorial, (2/$575) $1,150 Agropur Inc. Dairy Production, $1,000 Waleed Alrayes, Kuwait Ashley Adamski, Vadnais Height, Minn.* Venkateswarlu Sunkesula, India* Neha, India* Dipakkumar Mehta, India Dalia Khan, Saudi Arabia* Natasha Laska, Canton* Dipakumar Mehta, India Neha, India* Venkateswarlu Sunkesula, India* Hiral Vora, India Food Science Ashley Adamski, Vadnais Height, Minn.* Waled Alayes, Kuwait

DAIRY AND FOOD SCIENCE STUDENTS

GRADUATE STUDENTS

Dairy Production
Lee Alexander, Twin Brooks Tagheer Alamkhi, Saudi Arabia* Nancie Appel, India* Dikshla Bawa, India Steven Beckham, Lincoln, Neb. Ashok Kumar Bharathidasan, India Harsh Dahya, India Nuria Garcia-Fernandez, Spain Dustin Grosbiler, Minneapolis, Minn. Megan Huegli, Hartford, Wis.* Shrihari Jindal, India Dalia Khan, Saudi Arabia* Natasha Laska, Canton* Dipakumar Mehta, India Neha, India* Venkateswarlu Sunkesula, India* Hiral Vora, India Food Science Ashley Adamski, Vadnais Height, Minn.* Waled Alayes, Kuwait

UNDERGRADUATE STUDENTS

Manufacturing

Production

INCOMING DAIRY STUDENTS

Clyde G. Helper Dairy Fieldmen’s Association, $1,000 Dairy Science Faculty, $700 Dr. S. K. Dash, $1,000 Howard Voelker Freshman Dairy Production, (1/$1,000, 1/$500) $1,500 Midwest Dairy Association, (3/$1,000) $3,000 Richard and Kathy Hardberger, $500 S.D. Dairy Fieldmen’s Association, (5/$1,000) $5,000 S.D. State Dairy Association, (1/$250, 2/$1,000) $2,250 Todd and Erica Stahl, $500 Valley Queen Cheese Factory Freshmen, $1,000 William and Marge Kallemeyn & Sons, $1,150

GRADUATE STUDENT SCHOLARSHIPS

Leaders for Tomorrow, $1,000 Yellow and Blue, (1/$1,500, 6/$1,000) $7,500

Wade Eisenbeiss Graduate Dairy Production, $1,000

INCOMING STUDENT SCHOLARSHIPS

WOW Logistics/Donald E. Utschig, $1,000 Walt and Yvonne Wosje, $1,000 Todd and Erica Stahl, $1,000 T. M. Olson, $700 Shirley Seas Memorial, $450 South Dakota State Dairy Association, (1/$1,250, 3/$1,000) $4,250 Shirley Seas Memorial, $450 Susan Hawkins, $2,000 T. M. Olson, $700 Todd and Erica Stahl, $1,000 Valley Queen Cheese Factory, $6,000 Walt and Yvonne Wojce, $1,000 WOW Logistics/Donald E. Utschig, $1,000
OUTREACH

Area Dairy Expos
Area Expos alumni, students, staff and faculty of the department participated in Central Plains Dairy Expo in Sioux Falls and the World Dairy Expo in Madison, Wis. Faculty and students also participated in the Washington Pavilion Ag Day events in Sioux Falls, demonstrating various dairy activities to participants.

North Central Cheese Industries Association
Dr. Lloyd Metzger serves as executive secretary and Dr. Vikram Mistry as adviser to the NCCIA. The annual meeting was held in Rochester, Minn., in October and attracted over 130 cheese makers and suppliers.

Jackrabbit Dairy Drive
Roger Scheibe, industry relations director of the Midwest Dairy Association, and alumnaus, collaborated with SDSU athletics for the third Jackrabbit Dairy Drive at a home women’s basketball game. The purpose of the event was to honor dairy producers, promote the dairy industry and raise funds for the dairy research and training facility renovations. In the fall another dairy drive was organized by industry at an SDSU home football game.

Faculty Hosts Nutrition Bloggers
Faculty members Howard Bonnemann, Jill Anderson, John Haberkorn and Vikram Mistry hosted a group of eight nutrition bloggers from Bel Brands USA for a dairy education workshop. During the workshop extensive information on milk production and processing was provided.

Virtual Labs
Faculty members Joan Hegerfeld-Baker and Sanjeev Anand collaborated with New Mexico State University over the past five years to create eight virtual labs in collaboration with the Food Safety Scientist curriculum created by SDSU. This program has received national recognition with well over 1 million high school and college students experiencing the food safety virtual labs. Students are better prepared for the science laboratory classroom through an increase in knowledge, laboratory techniques and confidence. Experience the virtual labs at myfoodsciencelab.org/.

K-12 STUDENTS

Dairy Camp
The Dairy Club hosted the 12th annual Dairy Camp in June for youth ages 8-18. Activities included a visit to a local commercial dairy, training on care of heifers, judging, visit to the SDSU dairy plant, making ice cream, clipping and showing cattle, and entertainment. Participants showcased what they learned at a showmanship contest on the final day of the camp. Parents were invited to attend the show.

High School Visits
Recruiting students for dairy science programs is a year-round activity and a priority. Dairy Science Ag-Bio Ambassadors visited several high schools throughout the year in South Dakota, Iowa and Minnesota. In addition, the department visited schools and career fairs in Minnesota and South Dakota.

EXTENSION

Dairy Tool Box Talks: An Educational Pilot Program
This program, led by Maristela Rovai, sponsored by the High Plains Intermountain Center for Agricultural Health and Safety from Colorado State University, offered an innovative training course for the dairy workforce in a context that follows the same structure used by the engineering and construction industries. This new training gave farm workers a basic understanding of the modern practices of a dairy, including basic animal care and handling, cow comfort and personal safety. The educational topics also focused on preventing zoonosis, animal well-being awareness, the risks posed by animal rights organizations and important cultural differences.

I-29 Dairy Consortium
The I-29 Dairy Consortium which includes Extension from SDSU, NDSU, ISU, UMN, UNL and dairy producer organizations in the five states, along with Minnesota Dairy Initiative representatives, was very active during 2015 with a wide range of programs including Boots on the Farm heifer tour, a winter workshop series and a dairy beef short course. Their theme for 2015 winter workshops was “Raising your Best Calf Ever.” The group also started an e-newsletter, “I-29 Moo University e-Newsletter,” as a joint effort of Extension articles and latest happenings. They are presently reaching people across the globe with their newsletter. The programs have been very well attended and are detailed on their Facebook page; www.facebook.com/129DairyOutreachConsortium as well as at www.4row.org

Second Annual Dairy Fest
The second annual Dairy Fest was held June 5-6, 2015, at the Swiftel Center in Brookings. This two-day event was hosted by the Dairy Festival Steering Committee made up of dairy industry representatives and dairy producers. The mission of the steering committee was “to help educate consumers about the dairy industry and the future of dairy youth education.” Proceeds from the event were used in the form of two scholarships in the SDSU Department of Dairy Science at $500 each to support the future of youth in the dairy industry. The festival began with a “Got Milk?” Gala on June 5, hosting 180 participants and featured various dairy products in food entries, while educating the attendees about the region’s dairy industry. Also on Friday, June 5, youth from area after-school/summer programs participated in the interactive dairy carnival. This carnival was then open to the public on Saturday morning through early afternoon. There were an estimated 400 people who went through the carnival. Saturday, June 6, began with the Cow to Cup 5K run followed by a Dairy Youth Carnival and a public forum on dairy matters. Volunteers included SDSU Dairy Club, SDSU dairy science faculty, dairy producers and dairy industry people to coordinate the event’s hands-on activities, teaching youth and their parents about dairying, where the milk goes, how it is turned into dairy products, and the nutritional value of dairy products. The carnival also included tours to a local dairy farm and the Davis Dairy Plant.

Training 4-H Program Advisers and Leaders
Training 4-H program advisers and leaders Joan Hegerfeld-Baker and Extension field specialists Lavonne Meyer and Christine Wood conducted food science 4-H fast and furious workshops in Sioux Falls and Rapid City for 4-H program advisers and volunteer leaders. The workshops and other similar activities conducted by faculty and staff are essential for promoting the numerous opportunities in food and dairy science to youth.

Dairy Science at World Dairy Expo
The dairy science department and the South Dakota Department of Agriculture jointly displayed a booth at the World Dairy Expo in Madison, Wis. in October. The booth highlighted the dairy development efforts and dairy education and research activities and opportunities in South Dakota. Many interested people and students stopped by to learn about the South Dakota dairy industry and education.

South Dakota Local Foods Conference
The conference, which was held in Deadwood, connected with over 100 local food producers and processors from across the state, Joan Hegerfeld-Baker and Rhoda Burrows (horticulture) conducted an introductory “Good Agricultural Practices Food Safety training.” Hegerfeld-Baker also presented “Promoting to Grow Your Market.”
RESEARCH HIGHLIGHTS

Faculty research activities are supported by the Agricultural Experiment Station and external grants. The broad areas of research are as follows:

Metabolic Relationships in Supply of Nutrients for Lactating Cows (NC-1009) Dr. David Casper The objective is to quantify supply, availability and interaction of nutrients and bioactive compounds utilized for efficient milk production while reducing environmental impact. To identify and quantify molecular, cellular, and organismal signals that regulate partitioning and efficient conversion of nutrients to milk. To use this knowledge of feed properties and metabolic and molecular quantitative relationships to challenge and refine nutrient requirement models leading to more precise feeding systems for dairy cattle.

Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (NC-2042) Dr. Jill Anderson The objective is to optimize calf and heifer performance through increased understanding of feeding strategies, management systems, well-being, productivity and environmental impact for productivity and profitability. Improve dairy cow management decisions through nutrient utilization, well-being and profitability. Analyze whole farm system components and integrate information into decision-support tools to improve efficiency, enhance profitability and environmental sustainability.

Evaluation of Different Dietary Energy Sources of Growth Performance and Metabolism of Replacement Dairy Heifers Dr. Jill Anderson Determine how different dietary energy sources impact calf and heifer growth, nutrient digestion, metabolism and reproductive development. Determine if energy and protein from distillers grains can replace energy and protein from forage sources in growing dairy heifer rations in precision feeding scenarios. Determine how particle size of the ration forage with slowly degradable concentrate sources influences total tract digestion of feedstuffs in precision-fed rations for dairy heifers. Determine how much supplemental fat can be fed in replacement of starch from corn in moderate forage heifer diets. Long term goal. Determine if manipulation of the energy sources in diets of dairy heifers can decrease age at puberty and breeding and therefore shorten the time it takes to initiate lactation without negatively impacting milk production of primiparous cows.

Manufacture of Dairy-Based Ingredients Dr. Lloyd Metzger This project will focus on the manufacture of modified milk protein concentrates and their utilization as ingredients and will include several related research projects. The objectives are: 1) to determine the impact of carbon dioxide injection on membrane performance, mineral content and functionality of milk protein concentrate; and 2) to evaluate the effectiveness of transglutaminase to modify the functionality of native casein concentrate and milk protein concentrate when they are used as ingredients in process cheese products and to evaluate the commercial feasibility of a novel process for producing a unique dairy-based ingredient that is targeted for process cheese product applications.

Structure-Function Relationship of Milk Proteins and Design of Dairy Ingredients with Tailored Functionality, Improved Nutrition and Health Benefits Drs. Hasmukh Patel, Lloyd Metzger and Bonny Specker The objectives are: 1) to improve our knowledge of structure-function relationship of milk proteins; 2) to provide link between food structure and bioavailability/nutrient delivery; 3) to improve understanding and provide insights for designing new dairy ingredients with improved nutrition and functionality.

Improving Feed Efficiency Through High Forage Rations as a Feeding Strategy to Increase the Profitability and Sustainability of Dairy Production Dr. David Casper This research is intended to identify and evaluate methods to improve the feed efficiency of dairy cows through traditional forage quality and new forage hybrids that may come available for use in dairy cattle diets. Most evaluations will be as feeds for lactating cows, although some evaluations (e.g. specific nutrient profiles) may be with growing heifers or dry cows. Specific objectives include evaluating the nutritional composition and feeding value of highly digestible forages and new forage hybrids for maximum inclusion rate for feeding high forage diets to lactating dairy cows. Techniques will include ruminal fermentation with continuous culture fermenter system, measurement of gas production from ruminal fermentation and rational feeding methods of lactating dairy cows. The second objective is to evaluate the maximum forage inclusion rates for mid-to late-lactation dairy cows. Highly digestible forages could result in very high forage diets that will reduce the feed costs of these cows. Lastly to evaluate the nutrient composition, dry matter digestibility, fiber digestibility, starch digestibility to accurately predict the feeding value of forages and new forage hybrids for dairy cattle.

Safety and Quality Improvement of Milk and Cheese Dr. Sanjeev Anand The objectives are to study the role of thermotolerant bacteria in influencing shelf life of milk products such as cheese, and to reduce the cross contamination in dairy processing environments by controlling bacterial biofilms.

Investigations of Compositional and Functional Traits of Cereal Grains and Oils Seed Crops to Enhance their Economic and Health Benefits Dr. Padmini Krishnan The objectives are: 1) to investigate the rheological traits and food functionality applications for South Dakota wheat varieties in new applications (asian noodle, tortilla, pizza dough, flat breads); 2) to investigate the development of high-value selenium wheat fractions (vital gluten, high-selenium bran, high selenium and whole white wheat) from South Dakota wheat varieties; 3) to provide collaborative assistance in the discipline of cereal chemistry to the wheat breeding program at SDSU; 4) to provide technological and scientific support for the development of healthy food products that aid in disease risk reduction.

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