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Jackrabbit Dairy and Food Review

Vikram V. Mistry

*South Dakota State University, vikram.mistry@sdstate.edu*

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Greetings from the Department of Dairy and Food Science at South Dakota State University. This newsletter is a compilation of the department’s 2018 activities. I am particularly pleased to note undergraduate enrollment is at a record high with 125 majors. This is the result of excellent scholarship support from generous donors, continuing 100 percent placement, outstanding faculty members and resources. Graduate student enrollment has also remained high at nearly 40 between our three majors. Graduate and undergraduate students come from approximately 13 states and 15 countries. Generous donors provided scholarship support of approximately $153,000 for the academic year.

Faculty productivity was impressive in 2018 as the department secured over $1.5 million in external grants through 24 projects to support research, graduate students and researchers. This reflects an approximately 29 percent increase over the previous year. Student accomplishments were equally impressive. Examples include nationally competitive scholarships from National Dairy Promotion and Research Board, National Dairy Shrine, Institute of Food Technologists, Minnesota Milk, John Brandt Memorial and others. The Products Judging Team, coached by Dr. Lloyd Metzger, placed first nationally, holding a record of nine first place finishes out of 10 consecutive years. The Dairy Challenge Team, coached by Melissa Schmitt, also were very competitive.

As reported last year, we have been engaged in developing plans for further strengthening our already robust dairy production program. As a step towards this, we redefined one of our faculty positions to place emphasis on herd management to complement the existing strength in nutrition. A new faculty member for this position, Isaac Salfer, will begin his appointment in spring 2019.

In the next phase of this plan to enhance the dairy production program, we have launched discussions that will lead to comprehensive renovations/rebuilding of the Dairy Research and Training Facility with the goal of providing state-of-the-art education and research opportunities that will prepare students for the future. This project is in the very early phases of development and will entail detailed planning followed by fundraising in the coming months. Another major need that is also in the early phases is the renovation of food science laboratories within Berg Agricultural Hall. The department received a major boost from alumnus David A. Thompson who has provided a very generous contribution for endowing the position of department head. Through this endowment, Thompson has made a lasting impact not just on the department but also on the students and industry. As we continue to strengthen our programs and facilities and progress towards fulfillment of our vision of being a national and international leader in dairy and food education, research and extension, I invite you to join us in spreading the word about the outstanding opportunities in our department and visit us at www.sdstate.edu/ds or better yet, in person.

Vikram V. Mistry
David A. Thompson Endowed Department Head and Professor

DAVID A. THOMPSON ENDOWMENT

David A. Thompson, a 1964 dairy manufacturing graduate of SDSU, has made a very generous contribution to the department to endow the position of Department Head. Thompson has had a very illustrious career in the dairy industry for which he was named distinguished alumnus in 2017. His generous endowment will help the department and its programs excel in all areas. Dr. Vikram Mistry, department head, will be the first holder of this endowed position. Further details of this generous gift are at https://www.sdstate.edu/news/2018/09/ david-thompson-endowed-chair-dairy-and-food-science-announced.

MARK YOUR CALENDAR

Central Plains Dairy Expo, March 26-27, 2019, Convention Center, Sioux Falls
Dairy & Food Science Scholarship Banquet, Wednesday, April 10, 2019, 6:00 p.m., Club 71, Dana J. Dykhouse Stadium
NEW FACULTY AND VISITORS

NEW FACULTY AND STAFF

Shouyun Cheng joined the department as a postdoctoral research associate. Cheng holds a Ph.D. in agricultural biosystems, and mechanical engineering from SDSU, an M.S. in chemical engineering from Taiyuan University of Technology, China, and a B.S. in chemical engineering from Shandong University of Science and Technology, China. At SDSU, his work will be in the areas of lactose and dairy additives.

Poonam Singha joined the department as a postdoctoral research associate. Singha holds a Ph.D. in agricultural biosystems and mechanical engineering from SDSU, an M.Tech. in food technology and biochemical engineering from Jadavpur University, India, and a B.Tech, in food technology from Techno India University, India. In her role at SDSU she will work on improving food quality of North American grown oats.

Krupa Saagar Vijayaragavan joined the department as a postdoctoral research associate. Vijayaragavan holds a Ph.D. in chemical engineering from Michigan Technological University, India; an M.S. in chemical engineering from Wayne State University and a B.S. in chemical engineering from R.V. College of Engineering, India. In his role at SDSU he will work on filtration-based research for dairy ingredient development.

VISITORS

Dr. Gerardo Caja, professor and an animal scientist from the Department of Animal and Food Sciences, Veterinary Faculty at the Autonomous University of Barcelona (UAB), Spain, visited the department in summer 2018. Caja chairs the Group of Research in Ruminants (G2R) at the university. Maristela Royai, assistant professor, hosted Caja.

Sergio David Lasso Ramirez, Jessica Halfen, Chavez Baarcellos Garaiotin and Dely Chavez Garay visited the department for various periods as interns under Johan Osorio Esteves and Sergio Martinez Monteagudo.

Randy Gross, former president of the 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’ wealth of experience was most valuable to our students.

Dr. Wenhao Li, associate professor, College of Food Science and Engineering, Northwest A&F University, Yangling, Shannxi, China, is spending a year with Srinivas Janaswamy on research work in the area of carbohydrates.

Walt Wosje, distinguished alumnus and retired CEO of the Michigan Milk Producers and retired manager of the CWT program of the National Milk Producers Federation, served as guest lecturer in several classes and conducted individualized practice interviews for students.

Dr. Alen Dzidic of the University of Zagreb served as guest speaker for Physiology of Lactation.

Daniel Mbogo, research associate at the International Potato Center in Nairobi, Kenya, visited the department for a joint project on sweet potato-based bread working towards improving bioavailability of beta-carotene and researched with Srinivas Janaswamy.

Mikayla Johnson, Tuskegee University, and Jene Martin, University of California-San Diego, were undergraduate researchers in the Department of Dairy and Food Science during the summer. Their mentors were Jill Anderson and Sanjeet Anand under a USDA grant.
and farm management data. After an in-person inspection, students interviewed the owners. Each team developed a farm analysis and recommendations for nutrition, reproduction, milking procedures, animal health, housing and financial management. Team members presented their recommendations and then fielded questions from judges. Presentations were evaluated for accuracy of analysis and recommendations, with awards presented at a final banquet. Abigail Hopp and Alexandra Preszler also participated in the Dairy Challenge Academy. Student-participants analyzed and developed recommendations for an operating dairy; however, the academy was organized in mixed-university teams with two advisers to help coach these younger students.

**DAIRY CLUB**

**2018 Officers:** Abigail Hopp, president; Sanne de Bruijn, vice president; Ashley Maus, secretary; Jenna Van Wyk, treasurer; Katelyn Groetsch and Lauren Libbesmeier, historians; Angelica Kasper and Denver Stage, activities coordinators; and Abigail Hopp, Dairy Digest editor. Advisers were Jill Anderson, John Haberkorn, Sergio Martinez-Monteagudo, Peter Linke and Melissa Schmitt. In January, club members attended the ADSA-SAD regional conference hosted by the University of Minnesota. Approximately 400 other students and advisers from universities across the Midwest attended. Over spring break, a group of members travelled to California. Along the way, they toured various dairy farms and a Lely manufacturing plant in addition to completing lots of sightseeing. In June, club members hosted youth at the 15th annual Jackrabbit Dairy Camp. Fifty-two participants, ranging in age from eight to eighteen, from three states attended. Other club activities included the South Dakota State Fair, CAEFS ice cream social, National Ag Day, World Dairy Expo, and ditch cleaning. The club was also busy with cheese boxes for which students cut, packaged and shipped almost 8,000 pounds of cheese around the country under the leadership of co-chairs Jenna Van Wyk, Carla Bromenschenkel, Laura Frye and Ashley Maus.

**FOOD SCIENCE CLUB**

**2018 Officers:** Maggie Becher, president; Emily Resch, vice president; Elise Emmick, secretary; Callie Koehl, treasurer; Elizabeth Steever, fundraising chair; Dana Edelman, activities chair; Jessica Christoffer, publicist; Allison Kolbe, publicist co-chair. Padmanaban Krishnan and Srinivas Janaswamy served as advisers. In August, the club kicked off the 2018-2019 academic year with a pizza party to welcome new and returning members. This year, the club has seen an increase in membership and held elections in October. In September, the club picked apples for the caramel apple bar at the September meeting. In October, the club picked pumpkins and had a pumpkin carving and painting event. In November, they conducted a fundraising activity, which involved selling Jackrabbit sugar cookies to employees and students in the College of Agriculture, Food and Environmental Sciences at SDSU.

**STUDENT ACCOMPLISHMENTS**

Our students participate and compete in numerous activities throughout the year. Below are a few examples.

**Maggie Becher** received a competitive Joseph F. Nelson Award of SDSU for undergraduate research.

**Dairy Club** received first place for Chapter Year Book at the national ADSA annual meeting in Knoxville, Tenn.

**Sanne de Bruijn, Andrew Wilwerding and Rebekka Paszewitz** were recipients of National Dairy Promotion and Research Board Scholarships in a nationwide competition.

**Sanne de Bruijn, Dennissen Nelson, Katelyn Groetsch, Jenna Van Wyk and Angelica Kasper** were selected as S.D. Dairy Ambassadors in the first year of this program sponsored by Midwest Dairy. They promoted the dairy industry throughout the year through various events and media activities.

**Mohamed Elfaruk and Most Farzana** received Honorable Mention in the “It’s all about Science” event in Sioux Falls. Both are graduate students under Srinivas Janaswamy.

Maryam Enteshari, doctoral student, was elected to Phi Tau Sigma, the Honor Society of Food Science and Technology.

Laura Frye, senior dairy manufacturing major, received the Youth Achievement Award of the National Brown Swiss Association.

Dillon Gratz, Jessica Kerfeld and Margaret Socha, received DHIA scholarships in a nationwide competition.

Rebecca Hoffman was a member of the South Dakota 4-H Dairy Judging Team at the World Dairy Expo in Madison, Wis.

Kirby Krogstad, Abigail Hopp and Rebecca Roberson received National Dairy Shrine Scholarships.

Rhea Lawrence and Maryam Enteshari, doctoral students, received John Brandt Memorial Scholarships from the Land O’Lakes Foundation.

Sowmya Marka, completed her master’s degree under Sanjeev Anand and her paper in the Journal of Dairy Science received recognition as editor’s choice.

Ashley Maus and Calissa Lubben were selected as Princess Kay finalists for the state of Minnesota from among 84 contestants and Rebekka Paszewitz was crowned the 65th Princess Kay of the Milky Way.

Uday Mishra and Alexandra Preszler, food science and dairy production students, respectively, received college undergraduate engagement award for undergraduate research.

Neha Neha, doctoral student in dairy manufacturing received the 2018 Joseph F. Nelson Graduate Scholarship.

Johannah Nielsen was a participant in the National 4-H Dairy Conference, Madison, Wis.

Karla Rodriguez-Fernandez and Neha Neha, both doctoral students, each received third place for ADSA presentations at the national annual meeting in Knoxville, Tenn.

Fernanda Rosa, doctoral student under Johan Osorio Estees received a Kemin 2018 ADSA Travel Grant.

Fernanda Rosa, Rhea Lawrence and Aliza Sigdel, graduate students in the department, competed in the Sigma Xi research presentation and poster contest.

Margaret Socha, Denver Stage, Johannah Nielsen, Ethan Johnson and Elizabeth Krienke received Minnesota Milk scholarships.

Aliza Sigdel, received a second-place award in the poster presentation at the fourth NDSU Annual Conference on Food for Health in Fargo, N.D. She also received a graduate research award (second place) from the Sigma Xi-SDSU chapter, the Institute of Food Technology (IFT)-Minn, chapter travel award to attend the 2018 IFT Annual Meeting and Food Expo in Chicago, and a student scholarship award from the IFT-Minn. chapter.

Mohamed Elfaruk, received a third-place award in the poster presentation at the fourth NDSU Annual Conference on Food for Health, Fargo, N.D.
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 SDSU Extension presentations. All publications are listed on our website at www.sdstate.edu/ds.

Dr. Sanjeev Anand has been a faculty member since September 2006. He teaches and conducts research in the areas of dairy microbiology and food safety. He mentors undergraduate researchers as well as graduate students working towards master’s and doctorate 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, encapsulated dairy products with enhanced health benefits, Listeria control in ice cream, and general food safety education. He serves as the department representative to the Functional Genomics Core Facility (2007-present), the Van D. and Barbara B. Fishback Honors College (2013-present), Brigg’s Library (2014-present), and member of CAFES P &T Committee (2016-19). He also serves on the editorial board for the Journal of Dairy Science (2017-2020), and is a member of the Dairy Foods Division and American Dairy Science Association (2017-19). He received the 2018 International Dairy Foods Association Teaching Award in Dairy Manufacturing at the annual meeting of the American Dairy Science Association and was an invited speaker at the U.S. Dairy Spore Seminar. Anand was the September 2018 featured faculty member: https://www.youtube.com/watch?v=7C64gq0hmCI.

Dr. Jill Anderson joined the department as an assistant professor in 2012. In 2018, she received tenure and promotion to associate professor. She teaches several classes and has established a research program in ruminant nutrition, with an emphasis on calves and heifers. Anderson has served as adviser to 11 graduate students and nine undergraduate researchers. She is currently serving as president of the Midwest ADSA. She is the coach of the dairy cattle judging team and a co-adviser to the Dairy Club.

Howard Bonnemann has been a faculty member since October 1997 and teaches a wide range of classes. He serves as academic adviser to all undergraduate students in the department. He is the assessment coordinator for the department and the College of Food, Agriculture and Environmental Sciences representative on the University Assessment Committee. He is also the department curriculum coordinator. Bonnemann has conducted many FFA dairy products judging clinics across the state. He serves as the executive secretary for the S.D. Dairy Association. In 2018, he received an NACADA advising award in recognition of his excellence in academic advising.

Tracey Erickson is an SDSU Extension dairy field specialist based in the Watertown Regional Center. Erickson received promotion to SDSU Extension field specialist III. She is the past chair of the I-29 Moo University Consortium, which is a collaborative outreach program for dairy education in the five states of South Dakota, North Dakota, Minnesota, Iowa and Nebraska. She serves as the secretary of the S.D. Dairy Fieldmen’s Association. Presently, she is serving on the Central Plains Dairy Foundation Board of Directors, and helping to build the newly formed 501(C)3 Foundation with a mission of investing in positive, proactive programming to support the dairy industry in the I-29 corridor. Erickson serves on the Dairy Fest Committee, coordinating the youth education events. She is the coordinator for the S.D. Dairy Ambassador program sponsored by Midwest Dairy. She serves on the Professional Advisory Council representing SDSU/NFE Extension employees.

John Haberkorn is the manager of the Davie Dairy Plant. In this role, he developed and led 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 extensive student training. He also provided tours of the plant to numerous groups. Haberkorn is co-adviser to the Dairy Club.

Dr. Srinivas Janaswamy joined the department as an assistant professor in 2016. He teaches several food science classes and leads a research program on functional biopolymers with an emphasis on the design and development of novel carriers of bioactive compounds. The program also focuses on agricultural residues toward package materials and water purification. He has published 60 international peer-reviewed journal articles, edited one book and one special issue, and is currently serving as an editorial board member of “Carbohydrate Polymers.” During 2018, he received funding from the Norman Borlaug Agriculture and Technology through USDA-FAS. He also received a Science Communications Fellowship from the S.D. Discovery Center in Pierre, S.D. Janaswamy advises six graduate students, two undergraduate students and one visiting scholar from Kenya.

Dr. Padmanaban Krishnan conducts research in food science and teaches several food science classes. He is past-president of the Great Plains subsection of the Institute of Food Technologists and co-chair of the Vitamins, Lipids and Minerals Technical Committee of the American Association of Cereal Chemists International. Krishnan works collaboratively with university and food industry scientists in the areas of wheat, corn and oats research and value-added processing. He directs the activities of the Crop Quality Laboratory on the SDSU Innovation Campus. He served on grant-review panels for NIFA. He has a patent pending for Vacuum Dough Expansion System for predicting bread dough rheological behavior. He serves as adviser to the Food Science Club.

Peter Linke is the 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. He planned and oversaw numerous upgrades to the farm facilities. The farm hosted hundreds of k-12 for activities such as Little I, FFA judging and Dairy Camp. Linke was co-adviser to the Dairy Club.

Dr. Vikram Mistry served as 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, American Dairy Science Association Foundation and adviser to the North Central Cheese Association and the South Dakota Dairy Producers. In 2018 he was named the David A. Thompson Endowed Department Head and Professor of the department.

Dr. Johan Osorio joined the department in fall 2016 with expertise in genomics. He was an invited speaker at several events, including in Florida, China and Brazil. He served as adviser to three graduate students and hosted several interns. He also co-taught the Dairy Farm Operations class.

Dr. Maristela Rovai started as an SDSU Extension dairy specialist in 2014 and has developed comprehensive programs including Dairy Tool Box Talks, an educational pilot program. She teaches Dairy Spanish to both undergraduate and graduate students and Physiology of Lactation. The aim of the Dairy Spanish course, that covers basic grammar, cultural differences and dairy issues, is to increase Spanish fluency of our students and state dairy industry workforce. She conducted numerous workshops throughout the year related to training farm employees.

Dr. C. Y. Wang co-advised a graduate student and taught the Food Product Development class. He retired in fall 2018 and moved to Western Carolina University in North Carolina as associate dean/professor. He was with SDSU for 25 years.

YEARS OF SERVICE

Dr. Padmanaban Krishnan received recognition for 30 years of service to SDSU. Krishnan is currently a professor with expertise in food Science.

Dr. Lloyd Metzger received recognition for 15 years of service. Metzger is a professor and Alfred Chair with expertise in dairy manufacturing.
DAIRY FACILITIES

The Davis Dairy Plant has three objectives: education, research and development, and manufacturing dairy products. A virtual tour of the plant is available at www.sdstate.edu/ds/. The Davis Dairy Plant processes approximately 1 million pounds of milk annually, converting it to 25,000 pounds of cheese, 40,000 gallons of ice cream, 1,600 pounds of butter and dried skim milk powder for the ice cream. One day a week is set aside for maintenance and repair, inventory and environmental cleaning. Through the very comprehensive programs developed by John Haberkorn, plant manager, students receive excellent hands-on training for product manufacture, quality assurance, product development and general plant management. The plant employs and trains approximately 40 part-time students. The Student Edition Cheese program gives students firsthand experience in the development and marketing of a new product. Students develop the idea for a cheese flavor, and then manufacture the new cheese at the Davis Dairy Plant and ensure that it meets standards. Once the cheese completes a positive release, it is packaged and labeled. The label features the type of cheese and the name of the originating student.

Throughout the year, the plant hosted numerous processing companies for research projects. In 2018, the department once again extended invitations to all our Jackrabbit Dairy Council members and donors for the dairy plant project to come to campus to conduct interviews for summer internships and permanent positions. In all, 13 companies visited the department and conducted 145 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 130 certified and registered milking cows. Of the 300 animals in total, roughly 50 are Brown Swiss. The herd is used for research projects primarily in nutrition and for teaching. In addition, k-12 students also benefit from it through Dairy Camp and cattle judging contests that are hosted at the farm. Aaron Beaner, Mallory Glisczinski and Emily Rogers serve as student managers. This year, Peter Linke, manager, and Melissa Schmitt, assistant manager, undertook extensive facilities upgrades to address cow comfort. Dani Tews serves the DRTF as ag foreman and parlor manager, DRTF staff and students showed our Holstein and Brown Swiss at the State Fair, earning high placings. Faculty members and graduate students routinely use the facility to conduct research projects that involve calves, heifers and lactating cows.

2018 GRADUATES

B.S. Food Science
Jill Folsland
Logan Johnson
Lily Schimke
Jinhao Zhao

B.S. Manufacturing
Rebecca Cantwell
Cord Cnossen
Kristin Erf
Anna Hemenway
Gregory Reeter
Shelby Riddle
Alexandra Snyder

B.S. Production
Caleb Blaisdell
Olivia Bartel
Katelyn Groetsch
Cole Hoyer
Joseph Kalina
Kirby Krogstad
Dennisen Nelson
Jacob Post

Cody Schroeder
Audrey Souza
Megan Struss
Jackson Sudbeck
Walker Sundstrom
Jacob Weg
Angela Wick

B.S. Production and Manufacturing
Bennet Baker

M.S. Food Science
Theodore Mohr, Food Science
Devendra Paudel, Food Science

M.S. Production
Sonia Rodriguez-Jimenez, Production
Lauren Shearer, Production

Ph.D. Manufacturing
Nancy Awasti, Manufacturing
Dipak Mehta, Manufacturing

Ph.D. Production
Karla Rodriguez-Hernandez, Production
Nirosh Senevirathne, Production

DISTINGUISHED ALUMNUS

Larry Tidemann was recognized as one of six South Dakota State University 2018 Distinguished Alumni. He received his bachelor’s and master’s degrees in dairy science after which he served SDSU Extension for 32 years. Tidemann started as a county agent and rose to director until his retirement in 2004. Following retirement, he served in the South Dakota Legislature, first as representative and then as senator from 2011 to 2018. Throughout his distinguished career, he has been a strong advocate of SDSU and the department.

WHERE ARE THEY NOW?

Troy Goscoigne, B.S.’92, Dairy Manufacturing. Vice President Operations, Prairie Farms, Rochester, Minn.
Katie Halgerson, B.S.’10, Dairy Manufacturing. Supervisor, Mini Baby Bel Development Account Manager, Bel Brands USA, Brookings
Lyle Kruse, B.S.’78, Dairy Production. Vice President U.S. Market Development, Select Sires, Plain City, Ohio
Chadwick Larsen, B.S.’96, Dairy Manufacturing. Director of FM Sales – Central Region. Barry Callebaut, Chicago, Ill.
Brent Van Middendorp, B.S.’15, Dairy Production and Dairy Manufacturing. Territory Sales Representative, Altech, Brookings
Mike Wolkow, B.S.’96, Dairy Manufacturing. Senior Vice President of Operations, AMPI, New Ulm, Minn.
Jonathan Ydstie, M.S.’97, Dairy Production. Dairy Technical Services Manager, Quality Liquid Feeds, Milbank

A Davis Dairy Plant tour.

Cattle from the DRTF received high placings at the South Dakota State Fair. From left to right: Emily Rogers, Chelsea Smith, Laura Frye and Peter Linke.
SCHOLARSHIPS

Our students were once again the beneficiaries of the generosity of alumni, friends and industry, receiving approximately $135,000 in scholarships 2017-2018.

UPPER CLASS SCHOLARSHIPS
Agropur, Inc. Dairy Manufacturing, $2,000
Agropur, Inc. Dairy Production, $2,000
Agropur/Jay Headley Memorial, $1,500
Alfred Herman Rishoi Memorial (2 @ $600), $1,200
Associated Milk Producers, Inc., $1,000
Bel Brands USA, $3,000
Clyde G. Helsper Memorial, $1,000
Dairy Club (5 @ $500), $2,500
Dairy Farmers of America, $400
Dairy Manufacturing, $2,860
Dairy Science, $500
David A. Thompson—Manufacturing/Food, $5,000
David A. Thompson—Manufacturing, $5,000
Dairy Science Scholarships (10 @ $1000), $10,000
Dairy Judging Manufacturing, $150
Dairy Judging Production, $150
Dairy Management, $2,000
Dairy Science, $500
Dairy Science F aculty, $1,300
Holstein Association (3 @ $2000, 1 @ $2000, 2 @ $1500), $8,600
North Central Cheese Industries Association (2 @ $1000, 2 @ $2000), $6,000
Oe Family, $500
Pete Behrends Memorial, $3,000
Ralph Rogers Memorial, $400
Robert Chamberlin—Food Science, $1,800
Rogers Dairy, $1,000
Ross Baker, $500
Royal D. Doner and Helen B. Doner Dairy Production, $400
Ryan Graber Memorial, $1,000
Scudder Cheese, $2,000
Schuch Family, $750
SD State Dairy Association (2 @ $1500), $3,000
Shirley Sea Memorial, $450
Susan Hawkins, $2,000
T. M. Olson, $700
Valley Cheese Factory $7,500
Walt and Yvonne Wosje, $1,000

AWARDS
Alfred and Hilde Tobkin Memorial (4 @ $135), $540
Arnold Hipher Dairy Challenge (4 @ $200), $800

DAIRY AND FOOD SCIENCE STUDENTS

GRADUATE STUDENTS
Production, Master of Science
Nathaly Carpinielli, Brazil
Michaela Della, Hartville, Ohio
Levy Guitarrro Rodriguez, Honduras
Lydia Ogumenji, Nigeria
Chelsea Schosow, Hewitt, Minn.
Lauren Shearer, Brookings
Production, Ph.D.
Carl Kass, Bruce
Rhea Lawrence, Aurora
Roshin Mohan, India
Nirosh Senevirathne, Sri Lanka
Fernanda Trindade Rosa, Brazil
Manufacturing, Master of Science
Lee Alexander, Twin Brooks
Khalid Alsaeelem, Saudi Arabia
Pratibha Chaudhuri, India
Ahmed Hamam, Australia
Megan Huegi, Hartford, WI
Collette Nyusdyke, Cameroon
Nataasha Scherber, Canton
Jae Young Sim, South Korea
Manufacturing, Ph.D.
Nancy Awasthi, India
Steven Beckman, Lincoln, Neb.
Maryam Enteshari, Iran
Shayanti Minj, India
Achyut Mishra, Nepal
Neha, India
Venkatwarlu Sunukesa, India
Kaavya Rathnakumar, India
Pratibha Verma, India
Hiral Vora, India
Food Science, Master of Science
Patra Akaya, Nigeria
Muath Alessa, Saudi Arabia
Brady Bury, Webster
Tanvee Deshpande, India
Most Farzana Yesmin, Bangladesh
Kara Konst, Chandler, Ariz.
Beatrice Manu, Ghana
 Bipin Rajpurohit, India
Aliza Sigdel, Nepal
Cecilia Wanjiru, Kenya*
Food Science, Ph.D.
Mohamed Elfaruk, Libya

UNDERGRADUATE STUDENTS
Manufacturing
Hannah Berg, Pipestone, Minn.
Jared Bowers, Hayti
Emma Brennan, Pewaukee, Wis.
John Butz, Cedar Rapids, Iowa*
Ryan Christie, Sioux Falls
Jennifer Domianska, Grand Rapids, Mich.
Daniel Domenichini, Tampa, Fla.
Joseph Donnay, Kimball, Minn.
Erika Franken-Ackerman, Fredericksburg, Iowa
Parker Greime, Valley Springs
Cole Halvorson, New Ulm, Minn.
Jacob Jeffet, Glencoe, Minn.
Ethan Johnson, Heron Lake, Minn.
Alysha Madsen, Corona
Lydia Meredith, Cokato, Minn.
Sophia Linne mann, Beatrice, Neb.
Brennen O’Reilly, Wayne, Neb.
John Oakley, Dakota Dunne
Sydney Peters, Winner*
Thijs Reuvekamp, Elkton
Rebecca Roberson, Akron, Iowa
Sarah Robbuck, Hamsick, Minn.
Daniel Sharp, Bath
Han Si, Tanggu, China
Zachary Sousa, Milbank
Kyle Swanson, Pukawana*
Whitney Ten Nagel, Irovet, Iowa*

Mitchell Timp, Le Mars, Iowa
Sijin Wang, Binhai xingu Tianjin, China
Jordan Zemlicka, Watertown

Production
Kyla Biel, Harmony, Minn.*
Colten Carlson, Willmar, Minn.
Theodore Czech, Watertown
Isabel Davidson, Eagan, Minn.*
Brooke Engstrom, Renville, Minn.
Carson Espinoza, Kasson, Minn.*
Ryan Franz, Bingham Lake, Minn.
Taylor Gilmore, Dillsburg, Pa.
Kate Hendrickson, Estelline
Rachel Henschen, Correctionville, Iowa*
Megan Heitenga, Orange City, Iowa*
Chase Hinsch, Goodhue, Minn.*
Rebecka Hoffman, Dolton*
Abigail Hopt, Chatfield, Minn.
Taylor Jerde, Northfield, Minn.
Morgan Kohl, Watertown*
Elizabeth Krienke, Lester Prairie, Minn.
Chloe Lien, Spicer, Minn.*
Calissa Lubben, Edgerton, Minn.
Johanna Nielsen, Russell, Minn.*
Bo Noble, Faribault, Minn.*
Madison Okerstrom, Shadel, Minn.
Lukas Pierson, Butterfield, Minn.*
Kaleigh Powell, Liberal, Ill.
Alexandra Preszler, Roscoe
Julius Sachs, E Dot, Minn.*
Courtney Schams, Dakota, Minn.*
Cheyenne Smith, Brookings
Margaret Socha, Rogers, Minn.
Kate Spadgenske, Menahga, Minn.*
Kyle Tew, Hutchinson.
Jennifer Thrill, Lake Forest, Minn.
Tiffany Van Buren, Wauuspin, Wis.*
Jenna Van Wyk, Remsen, Iowa
Taelyn Virus, Hebrom, Neb.
Maisei Walter, Montrose, Minn.

Sarah Westeyn, Linden, Calif.*
Andrew Woltering, Freeport, Minn.
Andrew Wolter, Perry, Iowa
Production and Manufacturing
Christina Boogerd, Hull, Iowa*
Carla Bromhenschelen, Brownston, Minn.
Sanne de Brujin, Pollock
Anna Donnay, Kimball, Minn.
Laura Frey, Logansport, Ind.
Theodore Jacobs, Ballwin, Mo.
Danielle Jax, Waltham, Minn.
Shelby Kuechle, Eden Valley, Minn.*
Ashley Maus, Freeport, Minn.
Claire Plapp, Malla, Ill.*
Kyla Post, Chandler, Minn.
Elizabeth Schwartzhoff, Lansing, Iowa
Denver Stage, Vesta, Minn.

Food Science
Maggie Becher, Somerset, Wis.
Max Cramerer, Sergeant Bluff, Iowa*
Jessica Christoffer, Round Lake, Minn.*
Tanner Davis, Fresno, Calif.
Dana Edelman, Cambridge, Iowa*
Elise Emmick, Carlisle, Iowa*
Rachel Heffner, New Hope, Minn.*
Callie Koehl, Morris, Minn.*
Allison Kolbe, Sac City, Iowa*
Uday Mishra, Dwarka New Delhi, India
Claire Olson, Austin, Minn.*
Somsudhawat Oneykwe, Chamberlain*
Emily Relsch, Spirit Lake, Iowa
Elizabeth Steever, Lennox*
Karl Vallin, Eagan, Minn.
Marina Velazco Fasce, Barquisimeto, Venezuela

Manufacturing and Food Science
Mohit Manoj Kotkar, Nimla Convant, India

*New students in 2018-2019

INCOMING DAIRY STUDENTS
Clyde G. Helsper, Dairy Fieldmen's Assoc., $1,000
Dairy Science Faculty, $1,300
Dairy Science Scholarships (10 @ $1000), $10,000
Howard Voelker Freshman Dairy Production, $1,000
Dairy Science Association (3 @ $1000), $3,000
S.D. Dairy Fieldmen’s Association (5 @ $1000), $5,000
S.D. State Dairy Association (1 @ $1500, 1 @ $1250, 2 @ $2000), $4,750

Valley Cheese Factory Freshman, $1,000
William and Marge Kalleymen and Sons, $1,200

INCOMING STUDENT SCHOLARSHIPS
Campanile- Valedictorian (2 @ $2000), $4,000
Jrackett Achievement (3 @ $2000, 1 @ $1000), $16,000
Jackett Now (5 @ $500), $5,000
Yellow and Blue (8 @ $1000, 3 @ $2000, 4 @ $3000), $26,000

GRADUATE STUDENT SCHOLARSHIPS
Dairy Recognition and Education Foundation (1 @ $2000, 2 @ $1800, 2 @ $1500), $8,600
Delbert and Robert Breazeale Memorial, $2,000
Dr. Vikram Mistry Endowment, $2,000
EXTENSION

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OUTREACH

Area Dairy Expos

Alumni, students, staff and faculty of the department participated in the Central Plains Dairy Expo in Sioux Falls, World Ag Expo in Tulare, Calif., 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 and food activities to participants as well as at the Minnesota Corn Growers Association Farm Fest. At the World Dairy Expo in 2018 the department hosted a reception for alumni.

North Central Cheese Industries Association

Lloyd Metzger serves as executive secretary and Vikram Mistry as adviser to the NCCIA. The annual meeting was held in Sioux Falls in October. Over 130 cheese makers and suppliers from the upper Midwest attended. Alumnus Kirk Baldwin completed his term as president. A large number of alumni in the dairy industry typically attend the NCCIA.

Jackrabbit Dairy Drive

Tom Peterson, industry relations director of the Midwest Dairy Association and alumnus, collaborated with SDSU athletics and industry for the fourth Jackrabbit Dairy Drive at a football game on campus. The purpose of the event was to honor dairy producers and promote the dairy industry.

EXTENSION

Dairy Fest

The fifth Annual Dairy Fest was held in June. Featured topics included: Increasing public awareness about careers in the dairy industry; the sustainability of the dairy industry; the economic impact of the dairy industry and dairy nutritional product information. Attendance was estimated at: Got Milk Gala—200 + attendees; Dairy Leadership Training—25 participants; Picowsa Dairy Art Painting Contest—19 participants, 3 volunteers; Fork to Farm—95 youth and 12 volunteers; Dairy Fest Carnival—more than 1,500 people and more than 60 volunteers. This included 25 youth and 10 adults of Latino heritage who were a part of the Semillas program and originated from dairies in the I-29 Corridor. SDSU Davis Dairy Plant Tours—more than 225 people with 6 volunteers. Old Tree Dairy Farm Tour—over 800 people with 25 volunteers. Sue McCloskey was the featured speaker at the Got Milk Gala and Leadership Training event.

I-29 Moo University

In its 13th year, the I-29 Moo University collaboration has established a widespread learning community. This is a cooperative effort of South Dakota, Minnesota, Iowa, North Dakota, and Nebraska University Extension person-nel along with producer associations in the five states. The objective of the various educational venues offered is to bring highly relevant and impactful research-based information to the dairy industry. Offerings included farm tours, a Dairy Beef Short Course, a Winter Workshop Series and a monthly e-Newsletter for producers and the industry.

Spanish Workshop

For the third consecutive year, a Spanish workshop targeting the I-29 dairy workforce was offered at Central Plains Dairy Expo.

This year “Udder Dissection: Are we performing the milking procedures correctly? Let’s see what the gland says” provided 80 participants the opportunity to dissect two lactating udders and one beef cow udder for comparison. In addition, several on-site trainings including a milking school, maternity care and cattle handling to dairy producers in South Dakota, Iowa and Minnesota were also provided. The Dairy Extension team continues to provide assistance in interpretation during farm meetings and written farm protocols to the dairy workforce.

Meat and Dairy Goat Workshop

South Dakota's first Meat and Dairy Goat Workshop was held July 14, 2018, at SDSU in Alfred Dairy Science Hall. Eighty-three beginner and experienced goat producers from South Dakota, North Dakota, Minnesota, Nebraska and Iowa attended. The event featured industry expert presentations and hands-on training. This event was a joint collaboration effort between Value Added Agriculture Development Center (VAADCC), South Dakota Specialty Producers Association (SDSPA) and South Dakota State University (SDSU) Dairy Extension.

K-12 STUDENTS

Dairy Camp

The Dairy Club hosted the 15th annual Dairy Camp in June for youth ages 8-18. Activities included training on care of heifers, judging, exploring the reproductive tract and digestive system, visit to the SDSU Davis Dairy Plant, making ice cream, clipping and showing cattle and entertainment. Participants displayed what they learned at a showmanship contest on the final day of the camp. Parents were invited to attend the show.

It’s All About Science

Srinivas Janaswamy demonstrated preparation of biobeads using polysaccharides to over 60 elementary, middle and high school students and general public. In addition, he presented at the S.D. Discovery Center to a similar set of students along with his graduate students Aliza Sigdel and Mohamed Elfaruk.

For more information visit www.sdstate.edu/ds
RESEARCH HIGHLIGHTS

The Agricultural Experiment Station and external grants support faculty research activities. The broad areas of research are as follows. Department faculty have approximately $1 million in research expenditures annually.

**Manufacture of Dairy-Based Ingredients** Dr. Lloyd Metzger. The overall goal of the project is to develop and improve manufacturing processes to produce dairy-based ingredients that have an extended shelf life and for utilization in domestic and international markets. Objective 1: Model the drying characteristics of dairy-based ingredients to maximize the efficiency of the drying process and accelerate the development of new dairy-based ingredients. Objective 2: Develop a lab-scale crystallization system and analysis protocols for evaluation of modified manufacturing processes that improve the efficiency of lactose and permeate manufacture. Objective 3: Develop and evaluate membrane-based manufacturing processes for isolating or concentrating components in various dairy products including milk, whey, permeate and delactosed permeate.

**Carbohydrate Based Carriers of Bioactive Compounds** Dr. Srinivas Janaswamy. (1) Preserve the structural form of a BC until the time of delivery, and (2) effectively deliver the preserved form to the physiological target. The following two objectives will provide a comprehensive evaluation of the proposed research strategy. 1. Explore the effectiveness of various carbohydrate-based carriers in encapsulating BCs. 2. Assess the stability and bioavailability of encapsulated BCs.


**Utilization of Advanced Molecular Biology and Sensor Systems Techniques to Improve Health and Performance in Dairy Cattle** Drs. Johan Osorio and Jill Anderson. Improve the health and consequently the postpartum performance of transition dairy cows through either nutrigenomic approaches or sensor systems. Validate the activation of peroxisome proliferator-activated receptor (PPAR) via specific fatty acids and determine new transcription factors (TF) that have greater direct activation by fatty acids through advanced molecular techniques such as gene reporter technology (GRT). Determine novel transcription factors (TF) that respond directly to other dietary nutrients or compounds such as amino acids, trace minerals, vitamins, etc. Validate and confirm the in vitro novel transcription factors (TF) uncovered in Objectives 1 and 2 at a complete animal level through in vivo experiments in lactating dairy cows. Improve automated sensor systems for early detection of postpartum diseases or disorders at the subclinical stage by combining sensor data with biomarkers of health status.

**Engineering Technologies for Novel Applications in Dairy Manufacturing** Drs. Sergio Martinez-Monteagudo and Sanjeev Anand. The overall objective of this research program is to generate scientific understanding of the behavior of dairy systems and their individual components during manufacturing. Specific objectives: To characterize engineering parameters of high-pressure homogenization. To investigate the efficacy of combined pressure-temperature on safety and selected quality parameters of dairy beverages. To evaluate the role of pressure on emulsion stability within a wide range of processing conditions. Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-1119) Dr. Jill Anderson. Optimize calf and heifer growth and development by improving feeding strategies, management systems, well-being, new technologies and environmental impacts for productivity and profitability. Optimize dairy cow performance and well-being by improving nutrition, forage utilization, technology and management. Evaluate whole farm system components and integrate information and technology to improve efficiency, profitability, environmental sustainability and social responsibility.

**Evaluation of Alternative Feed Ingredients and Developing Supplements on Growth Performance, Nutrient Utilization and Metabolism of Replacement Dairy Calves and Heifers** Dr. Jill Anderson. Determine how alternative feed ingredients and novel feed additives impact calf and heifer growth, nutrient digestion, metabolism and development. Objective 1: Determine the effects of novel fat supplements in diets for calves and heifers. Objective 2: Determine how alternative protein sources that are by-products or co-products of the biofuel industry or food industry work in diets for calves and heifers. Objective 3: Determine how complex carbohydrates and simple carbohydrates that are by-products of the food industry perform as feed supplements for calves and heifers.

**Value Enhancement of Health, Nutrition and Economic Traits of Cereal Grains** Dr. Padmanaban Krishnan. Objectives: The goals of this project are to enhance the health, food functional, nutritional and economic value of cereal grain crops grown in the state and region. Improved and enhanced food production and increased monetary and health value cash crops such as wheat, oats and corn will result from the effort.

**Carbohydrate Based Carriers of Bioactive Compounds** Dr. Srinivas Janaswamy. The overall objective of this project is the design and development of novel carbohydrate-based delivery systems for bioactive compounds (BCs) in food, pharmaceutical and medicinal applications. This project will evaluate the optimal conditions for entrainment and release of BCs in carbohydrate networks (oriented fibers, starches and porous starch granules) and establish the stability and bioavailability of entrapped BCs. Objective 1: Explore the effectiveness of various carbohydrate-based carriers in encapsulating BCs, and Objective 2: Assess the stability and bioavailability of encapsulated BCs.