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The Jackrabbit Dairy Review

Dairy Science

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Winter 2011

## The Jackrabbit Dairy Review

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# THE JACKRABBIT DAIRY REVIEW

Winter 2010-2011

Dairy Science Department, SDM 136, South Dakota State University, Brookings, SD 57007

## Dairy Science Department

### Faculty

Sanjeev Anand, Associate Professor  
Jacob Anderson, Dairy Plant Manager  
Robert Baer, Professor  
Howard Bonnemann, Instructor  
Stephen Crego, Manager, Dairy Research & Training Facility  
Alvaro Garcia, Associate Professor/Extension Dairy Specialist  
Ashraf Hassan, Associate Professor  
David Henning, Associate Professor Emeritus  
Arnold Hippen, Professor  
Kenneth Kalscheur, Associate Professor  
Lloyd Metzger, Associate Professor, Alfred Chair in Dairy Education  
Vikram Mistry, Professor and Head  
Rajinder Nauth, Adjunct Professor  
John Parsons, Professor and Head Emeritus  
David Schingoethe, Distinguished Professor

### Staff

Jayendra Amamcharla, Postdoctoral Research Associate  
Jill Anderson, Research Assistant  
Ananya Biswas, Microbiologist  
Jongwoo Choi, Post Doctoral Research Associate  
Valerie Denison, Secretary  
Akimoto Ichinomiya, Assistant Dairy Plant Manager  
Pete Linke, Ag Foreman/Fresh and Sick Cows/Calf Care  
Chenchaiiah Marella, Manager, Institute of Dairy Ingredients Processing  
Jayne Raabe, Senior Secretary  
Dawn Standish, Secretary  
Carol Van Meveren, Sales Clerk

### Graduate Students

#### Dairy Production

\*Ishwary Acharya  
\*Jacob Albrecht  
Jill Anderson  
Heidi Bruns  
\*Fernando Diaz-Royon  
Kevin Herrick  
Peter Linke  
Kamal Mjoun  
Sanjeeva Ranathunga  
Javier Sabbia

\*New students in 2010

#### Dairy Manufacturing

Mallika Avadhanula  
Ananya Biswas  
Gagan Deep  
Akimoto Ichinomiya  
Oliver Janevski  
\*Som Khanal  
Anil Kommineni  
Maneesha Mohan  
Prafulla Salunke  
Kartik Shah  
\*Diwakar Singh

## MESSAGE FROM THE DEPARTMENT HEAD

After spending a year and a half in cubicles around campus amid packed boxes, the Dairy Science offices finally returned to the Dairy-Micro Building on 20th December 2010. We now occupy the first and third floors of this spectacularly renovated building that features new offices, a new teaching lab, new graduate offices, and new research labs with supporting facilities such as equipment and conference rooms. Another major development in 2010 was the long awaited ground breaking of the new dairy plant. This event that took place on 7th May brought to campus many of the generous donors for the project as well as alumni and friends. Construction is progressing well and the project is expected to be completed in summer 2011. These two major projects will help strengthen our programs significantly and we are looking forward to continuing to serve the dairy industry for many years to come. The projects have also given us a unique perspective in many ways on the engineering aspects of construction, the visionary nature of industry leaders, generosity of industry, alums, and friends, persistence and leadership of those involved in making such projects succeed amidst many challenges, and the dedication of faculty, staff and students in the face of numerous hurdles. The demand for Dairy Science graduates remains high. Placement has remained at 100% for the past many years. In 2010 fifteen companies from around the US visited the department and conducted 143 interviews that resulted in numerous offers for internships and permanent positions. During fiscal year 2010 our faculty and staff spent almost \$850,000 of grant funds on research projects. These external funds were awarded to faculty through competitive grants and helped support research and salaries of at least 22 scientists and graduate students. Faculty excellence was demonstrated through their teaching and service to the industry in various capacities. Faculty members were invited to speak at professional events. They were recipients of national awards and participated in professional service activities that assisted the dairy industry. Details of all activities are listed in this newsletter. These are particularly difficult times for the dairy industry and for individuals as well but support in the form of scholarships and other projects continued at admirable levels. We recognize this and continue to develop extension and research programs that will benefit the industry in the long term. Most importantly this support has helped develop the future leaders of the industry.



Vikram Mistry

## 2010 GRADUATES

### B.S. Manufacturing

Jordan Dorneman  
Kara Gutormson

### B.S. Production

Holly Bruns  
Sara Lopez  
Ashley Schroeder  
Brian Speltz  
Casey Utke  
Michelle Vander Linden  
Bradley Vansanten  
Abigail Wirt

### B.S. Manufacturing and Production

Samantha Erickson  
Alex Ode

### M.S.

Jenna Buyck

### Ph.D.

Kamal Mjoun

NEW FACULTY AND STAFF



**Jacob Anderson** will join the Dairy Science Department as Manager of the new dairy plant in January 2011. Jacob holds a B.S. degree in Dairy Science from SDSU and was employed at

Davisco Foods International in Lake Norden, SD as Production Supervisor.

**Howard Bonnemann** who is instructor and dairy plant manager will assume the role of instructor and research coordinator after the arrival of Jacob Anderson. Howard has been with the department since 1997 and holds B.S. and M.S. degrees in Dairy Science from SDSU.

**Stephen Crego**, formerly Assistant Manager accepted a position as Manager, Dairy Research and Training Facility, Lecturer. He holds a BS degree in Farm Business Management/Animal Science/Plant Science from Cornell University, Ithaca, NY. Steve will manage all aspects of the farm and will coach the cattle judging team and teach the dairy cattle evaluation class.

**Chenchaiah Marella** moved from position of Post Doctoral Research Associate in Dairy Science to Manager of the Institute of Dairy

Ingredients Processing. His BS is in Dairy Technology from Acharya N. G. Ranga Agricultural University, India, MS in Dairy Engineering from Gujarat Agricultural University, India and PhD in Agricultural Biosystems Engineering, SDSU. Dr. Marella will work under Dr. Lloyd Metzger to manage research on ingredients in the new dairy plant.

**Dawn Standish** joined the department in summer as a temporary Secretary for the Dairy Plant and Store. She then assumed permanent employment in December 2010. She holds an Associate's Degree in Sales, Marketing and Management from Ridgewater College.

**Carol Van Meveren** joined the Dairy Science Department as Sales Clerk for the new downtown dairy store. She holds a B.S. degree in Horticulture from SDSU. She is responsible for managing the downtown dairy store.

UNDERGRADUATE STUDENTS

\*Ann Albaugh, Castlewood, SD: Prod, Man  
 Lee Alexander, Twin Brooks, SD: Man  
 Kyle Anderson, De Smet, SD: Man  
 Austin Asche, Stewart, MN: Man  
 \*Adam Bates, Green Isle, MN: Man  
 Jessica Becker, Eden Valley, MN: Prod, Man  
 \*Kevin Berg, Baltic, SD: Prod, Man  
 Roxane Chapman, Winfred, SD: Prod, Man  
 Bethany Chapman, Winfred, SD: Prod  
 Katelyn Crocker, Grand Rapids, MN: Prod  
 Michael Dunn, Vale, SD: Pro, Man  
 Carrie Ellefson, Princeton, MN: Prod  
 \*Jordan Evans, Pipestone, MN: Man  
 \*Eric Flynn, N. Sioux City, SD: Man  
 Megan Forst, Gibbon, MN: Prod, Man  
 Nathan Gollnick, Flandreau, SD: Man  
 \*Jennifer Gunnink, Lake Benton, MN: Prod  
 Tom Hammink, Bruce, SD: Prod  
 Rebecca Hanson, Brandon, SD: Man  
 Renae Hinkeldey, Alta, IA: Prod  
 Andrea Hoffman, Cleveland, MN: Prod  
 \*Matthew Holdvogt, Eden Valley, MN: Prod  
 Kayla Holscher, Twin Brooks, SD: Man

\*Cassandra Hulstein, Edgerton, MN: Prod  
 April Johnson, Heron Lake, MN: Prod  
 Heather Jons, Bonesteel, SD: Prod  
 Emily Jungemann, Wolsey, SD: Prod  
 \*Andrew Kern, Owatonna, MN: Prod  
 Angela Klaers, Wabasso, MN: Man  
 \*Caleb Kottke, Owatonna, MN: Prod  
 Taylor Lais, Brandon, SD: Man  
 Melissa Lax, Sleepy Eye, MN: Prod  
 Grace Liebenstein, Dundas, MN: Prod  
 Mitchell Maher, Nunda, SD: Prod  
 \*Laura McMartin, Gerber, CA: Prod  
 Eric McNeel, Blackfoot, ID: Man  
 Valerie Mohr, New Ulm, MN: Prod  
 Brittany Moore, Minneota, MN: Prod  
 Katie Nelson, Rice, MN: Prod  
 Larissa Neugebauer, Dimock, SD: Prod  
 Stephanie Nussbaum, Garretson, SD: Prod  
 \*Joshua Oakley, Dakota Dunes, SD: Man  
 Justin Ochsner, New London, MN: Man  
 Molly Paterson, Marshall, MN: Man  
 Rachel Patrick, Eatonton, GA: Prod  
 \*Timothy Pennings, Saint Petersburg, FL: Man

Morgan Petersen, Cokato, MN: Man  
 Ethan Pidge, Sanborn, MN: Prod  
 Luke Rensink, Freeman, SD: Man  
 Megan Rice, Firth, NE: Prod, Man  
 Cody Schlecht, Canby, MN: Prod  
 \*Holly Schmitt, Thorp, WI: Prod, Man  
 \*George Schoessler, ID: Prod  
 Johnna Schuur, Sauk Center, MN: Prod, Man  
 Ana Schweer, Watertown, SD: Prod  
 Angela Sellner, Sleepy Eye, MN: Prod  
 \*Noah Sellner, Sleepy Eye, MN: Prod  
 Nicole Stevens, Pipestone, MN: Man  
 Danielle Tews, Hutchinson, MN: Prod  
 Kaitlin Van Eck, Ruthton, MN: Prod  
 Cody Van Eck, Ruthton, MN: Prod  
 \*Alisha Vander Wal, Pipestone, MN: Prod  
 Jennifer Vander Wal, Pipestone, MN: Prod  
 Todd Wight, Pocattello, ID: Man  
 \*Merideth Williams-Ponto, Gilman, WI: Prod  
 Cory Zelfel, Kennard, NE: Man

\*New students in 2010



The 2010 Heifers for State was held in conjunction with the annual South Dakota Central Plains Fall Sale on 30th October 2010 at the Animal Science Arena on the SDSU campus. Dairy Club members worked all week to set up the arena, prepare cattle, feed and milk them. On the day of the sale they showed the cattle to buyers. Over 60 animals were sold at the sale. Three generous producers also donated animals for the fourth Heifers for State program. Donors included New Alta Dairy, Pipestone, MN; K. C. Dairy -- Edward Kavanaugh, Elkton, SD and Marv and Joy Post, Volga, SD. \$5,000 were raised from the donated animals. This contribution will be used for supporting dairy education, research programs

and providing scholarships to Dairy Science students at SDSU. The Heifers for State program started in 2006.

HEIFERS FOR STATE DONORS

- New Alta Dairy, Pipestone, MN,
- K. C. Dairy Edward Kavanaugh, Elkton, SD
- Marv and Joy Post, Volga, SD

## JUDGING ACTIVITIES

### Dairy Cattle & Production

SDSU Dairy Science students competed in the 89th Intercollegiate Dairy Cattle judging contest that was held in conjunction with the World Dairy Expo in Madison, WI. Twenty universities from across the USA participated in the contest. During the contest, students placed twelve classes representing seven dairy cattle breeds and presented six sets of oral reasons. The SDSU team consisting of Katie Nelson, Rice, MN; Megan Rice, Firth, NE; and Heather Jons, Bonesteel, SD placed 16th overall in the contest. On an individual basis Katie placed 26th. The team placed 4th overall in the Red and White Holstein class. The SDSU team was coached by Matthew Laubach and Stephen Crego, Interim Manager of the SDSU Dairy



Research and Teaching facility. Earlier in the year our students also participated in the Midwest Regional Dairy Challenge Contests in Wooster, OH and the North American Intercollegiate Dairy Challenge Contest in Visalia, CA. At the Midwest contest Cassey Utke,

Holly Bruns, Cory Zelfel, Michael Dunn (pictured) participated and competed against students from 15 other universities. Holly Bruns was a member of a Platinum awarded team. At the National Contest 28 teams from the United States and two teams from Canada competed. The SDSU team included Holly Bruns, Samantha Erickson, Abigail Wirt and Alex Ode and received Platinum placing, the highest at this contest. Both Challenge teams were coached by Dr. Arnold Hippen and Matt Laubach.

### Dairy Products

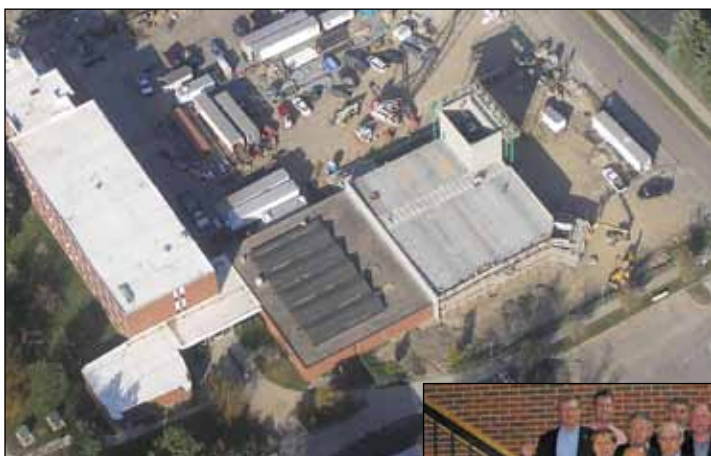
The Dairy Products Judging Team consisting of Samantha Erickson, Rebecca Hanson, Eric McNeel, and Gagan Deep competed in regional and national contests in 2010. At the regional contest that was held at Kraft Foods, Glenview, IL, Rebecca Hanson placed first, Eric McNeel placed second, and Samantha Erickson placed third overall in the contest. Gagan Deep placed first in the graduate student contest. Eight teams from seven states with 30 contestants participated in the contest. The SDSU team placed first in milk,

yogurt, ice cream, and cottage cheese. At the national contest that was held at Archer Daniels Midlands Company, Decatur, IL, our team placed first in all products. This was the third year in a row for the Dairy Products Judging Team to win the National Championship. The team placed first in milk, butter, ice cream, and Cheddar cheese. A total of 38 undergraduate and graduate contestants from 10 universities in the U.S. and Canada participated in the contest. Erickson placed first overall, including first in milk, butter, and Cheddar cheese. As top judge in the nation, Erickson received the Robert Rosenbaum Award and lifetime membership in the National Dairy Shrine. She has also been invited to participate in



the spring 2011 Quality Chekd Dairies, Inc. annual conference in St. Louis, MO. Hanson placed fourth overall, first in ice cream and second in milk and butter. She was awarded lifetime membership in the National Dairy Shrine. McNeel was 12th overall and placed fifth in Cheddar cheese. In the graduate student contest, Deep placed first overall and was first in milk, butter, ice cream, cottage cheese, and yogurt. As top judge in the graduate contest, Deep received the Genevieve Christen Award. For placing first overall, the SDSU team won the Shirley Seas Memorial Scholarship. This scholarship is in memory of Shirley Seas, who coached the SDSU team for 21 years. Baer also received the Aurelia and George Weigold Coach of the Year Award. The contest was sponsored by the U.S. Department of Agriculture, the Food Processing Suppliers Association, Chr. Hansen, Inc., and the American Dairy Science Association. The team for both contests was coached by Drs. Bob Baer and Lloyd Metzger. Czmowski (Assistant Chief Judge), Virgil Metzger, and Mark Johnson.

## DAIRY FACILITIES RENOVATION



Bird's eye view of the Dairy Science construction site

2010 was a landmark year for the Dairy Science Department; renovation of the Dairy-Micro Building was completed in December and construction of the new dairy plant began. The Dairy-Micro Building project involved complete gutting and

redesign of the interior of the building. During this phased project that began in May 2009, offices moved to other locations on campus. Research labs remained in sections of the building. Offices returned to the Dairy-Micro Building in December of 2010. The



The Jackrabbit Dairy Council contributors to the dairy plant project

ground breaking for the new dairy plant took place on 7th May 2010. Approximately 150 people that included alumni, friends,

donors, university personnel and students participated. The Clark Drew Construction company has been making remarkable progress on the project with engineering assistance from Davisco Foods. Progress on the project can be viewed on our website.



On Hobo Day we opened doors to a new dairy store, The Campanile Connection, down town on Main Avenue. The store is open on week days until 5:30 P.M., 8:00 P.M. on Thursdays and is open on weekends as well.

## 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, thesis or dissertations, and extension presentations. All publications will be listed on our new website at <http://www.sdstate.edu/ds>.

### ACTIVITIES

**Dr. Sanjeev Anand** was granted tenure effective July 2010. Dr. Anand has been a faculty member since September 2006. He teaches Dairy Microbiology, Advance Dairy Microbiology, and Food Microbiology classes and conducts research in the area of biofilms on membranes, CLA in cheese and other areas involving food safety. He is a Member of the American Dairy Science Association, SDSU-Functional Genomics Core Facility, ADSA/ASAS Food Safety Committee, Member of the FAO expert group (JECFA) for food additives, contaminants and natural toxicants for 2007 to 2011, Chair of the Food Safety Committee for the 2010 Joint ADSA-ASAS-CSAS symposium that was held in Denver, CO, SD State resource person in food safety and added in the 'Food Safety Contacts Directory' of USDA, CSREES, July 2007-present.

**Dr. Robert Baer** was recipient of the Aurelia and George Weigold Coach of the Year

Award for dairy products judging.

**Howard Bonnemann** served as secretary/treasurer of the South Dakota Dairy Association. He conducted several dairy product judging clinics for South Dakota high schools.

**Dr. Alvaro Garcia** was a co-organizer of the I-29 Dairy Conference along with colleagues from Iowa, Minnesota, Nebraska and North Dakota.

**Dr. Ashraf Hassan** is a member of the International Animal Agriculture Committee of the American Dairy Science Association and of the expert panel on low fat cheese research of the Dairy Management, Inc., and member of the editorial board of the Journal of Dairy Science. Dr. Hassan traveled to Egypt with two Dairy Science students for a short exchange visit. He began a year-long sabbatical visit to Egypt in August.

**Dr. Arnold Hippen** was an active participant in multi-state regional projects, NC 1040, Metabolic relationships of nutrients. He was a member of the Graduate Student Poster Competition Committee for the ADSA. He served as chair of Institutional Animal Care and Use Committee of SDSU.

**Dr. Kenneth Kalscheur** was an active participant on a NC multi-state research project; NC 1042, Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises. He awarded

the ADSA Foundation Scholar Award for Dairy Production at the national meeting. He is currently serving as Vice-president of the Midwest ADSA/ASAS Board of Directors.

**Stephen Crego** served as Assistant dairy farm manager until September, at which time he was appointed as interim Manager and then as Manager effective 22nd December 2010. He also coached of the dairy cattle judging team.

**Dr. Lloyd Metzger** serves as the 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, President of the ADSA Dairy Foods division and member of the editorial board of the Journal of Dairy Science.

**Dr. Vikram Mistry** served as the US editor of the French Journal of Dairy Science and Technology, Le Lait and Associate Director of the Midwest Dairy Foods Research Association. He also serves on the Board of the American Dairy Association of South Dakota and advisor to the North Central Cheese Association and the South Dakota Dairy Producers.

**Dr. Dave Schingoethe** is a Member of the Contemporary and Emerging Issues committee for the '09-'11 meetings of ADSA. He was elected as a Fellow of the American Society of Animal Science at the national meeting.

## NEW AND ONGOING FUNDS FOR SUPPORTING RESEARCH AND OTHER PROGRAMS

Anand, S. K., Hegerfeld, J., Krishnan, P., Muthukumarappan, K., Wang, X. Recruitment and retention of a diverse population of food safety students using novel approaches to market enhanced programs. 09/01/2008 to 08/31/2012. USDA/CSREES EPT North Dakota State University. \$88,866.

Anand, S. K. Bacterial biofilm formation on dairy filtration membranes. 09/01/2008 to 06/30/2010. Midwest Dairy Association. \$68,276.

Anand, S. K., Hassan, A. Evaluation of different cleaning agents for the removal of membrane biofilms. 01/01/2010 to 6/30/2011. Midwest Dairy Association. \$42,400.

Baer, R. J. Improving the texture of ice cream. 01/02/2008 to 06/30/2011. Industry Support. \$15,000.

Garcia, A. D. Producer surveys and outreach/extension programs for livestock producers. 05/01/2007 to 04/30/2012. USDA/Agricultural Research Service. \$36,000.

Garcia, A. D., Kalscheur, K. F., Hippen, A. R. Fermentation characteristics and aerobic stability of ensiled corn silage with and without the addition of Bio-N-Liven Answer and Carbon Answer. 09/24/2009 to 01/31/2011. Environmental Care and Share, Inc (EC&S). \$8,000.

Hassan, A. Application of salt whey from Egyptian cheese varieties and Cheddar in process cheese making. 08/14/2008 to 09/30/2010. US-Egypt Joint Science and Technology Board through USDA/FAS. \$30,000.

Hassan, A. Development of novel functional ingredients from whey containing exopolysaccharides. 10/01/2008 to 12/31/2010. Dairy Management Inc. \$78,225.

Hassan, A. Production of 50% reduced fat

Cheddar cheese with improved characteristics. 11/26/2007 to 03/31/2010. Dairy Management Inc. \$57,044.

Hassan, A., Anand, S. K. Role of bacterial cell-dairy separation membrane interactions on biofilm formation. 01/01/2010 to 12/31/2010. Midwest Dairy Association. \$42,400.

Hippen, A. R. Direct enumeration of metabolically active yeast from the rumen of ruminally-fistulated cattle. 10/19/2009 to 06/01/2010. Alltech Inc. \$4,777.

Hippen, A. R. Feed additives and immunological responses of dairy cows. 01/26/2009 to 02/28/2010. Rural Technologies Inc. \$11,907.

Hippen, A. R. Prebiotic digestibility and production experiment. 06/05/2009 to 06/05/2010. Temple-Inland Inc. \$19,961.

Hippen, A. R., Hassan, A., Abd El-Salam, M. H. Production of novel probiotic dairy products rich in conjugated linoleic acid. 03/01/2006 to 11/30/2010. US Egypt Joint Board. \$27,000.

Hippen, A. R., Kalscheur, K. F., Schingoethe, D. J. New uses of distillers grains products in dairy cattle feeding. 05/01/2007 to 04/30/2012. USDA/Agricultural Research Service. \$160,000.

Hippen, A. R., Kalscheur, K. F., Schingoethe, D. J. Protocol for Steam-Flaked Soybeans in Dairy Cow Diets. 12/17/2009 to 12/17/2011. Midwest EnRG Flakes, LLC. \$52,000.

Hippen, A. R., Schingoethe, D. J., Kalscheur, K. F. Examination of Butyrate as a feed supplement for dairy cattle. 07/01/2010 to 06/30/2012. Nutriad, Inc. \$35,358.

Kalscheur, K. F. Alltech Fellowship in

Dairy Science. 08/15/2009 to 08/31/2010. Alltech. \$27,600.

Kalscheur, K. F., Rosentrater, K.A. Evaluation of commercial-scale pelleted DDGS in dairy cattle diets. 08/01/2010 to 07/31/2012. USDA/Agricultural Research Service. \$25,000.

Kalscheur, K. F. Use of alternative crops in dairy cow diets. 09/01/2010 to 08/31/2012. USDA-Alternative Crops Consortium. \$34,000.

Kalscheur, K. F., Garcia, A. D. Feeding escape microbial protein (EMP) to dairy cows. 04/06/2010 to 09/30/2010. Alltech. \$19,980.

Metzger, L. E. Low fat/fat free process cheese for slice-on-slice applications. 01/01/2007 to 06/30/2010. Dairy Management Inc. \$91,877.

Metzger, L. E. Manufacture of reduced/low sodium SOS process cheese. 11/01/2007 to 12/31/2010. Dairy Management Inc. \$100,796.

Metzger, L. E. Prediction of process cheese instrumental texture and melting characteristics using dielectric spectroscopy and chemometrics. 07/01/2009 to 06/30/2010. Dairy Management, Inc. \$52,500.

Metzger, L. E. Development of a new rapid method for the determination of lactose in low pH products such as whey and cheese using a commercially available blood glucose biosensor. 01/01/2010 to 12/31/2010. Midwest Dairy Association. \$21,200.

Metzger, L. E., Hassan, A. Evaluation of NFD and MPC in yogurt formulations. 10/01/2008 to 12/31/2010. Dairy Management Inc. \$70,791.

Metzger, L. E., Mistry, V. V., Hassan, A., Muthukumarappan, K. Institute for Dairy In-

gradient Processing, 09/01/2007 to 08/31/2010. Dairy Management Inc. \$866,904.

Schingoethe, D. J. Evaluation of the Silo-King in fermented feeds throughout the ensiling period. 09/15/2008 to 05/01/2010. Agril-King, Inc.. \$9,550.

Schingoethe, D. J., Hippen, A. R., Kalscheur, K. F. Evaluation of high protein distillers grains versus regular DDGS, soybean meal, and canola meal for lactating dairy

cows. 12/01/2007 to 06/30/2010. POET/Dakota Gold Research Association. \$46,000.

Schingoethe, D. J., Hippen, A. R., Kalscheur, K. F. Maximize the use of Canola meal in dairy feeds: amino acid nutrition and metabolism. 07/01/2010 to 03/31/2013. Canola Council. \$299,000.

The Dairy Science Department has been a member of the Midwest Dairy Foods Research Center since 1988. Through this Center

the department has participated in numerous research activities funded by the Midwest Dairy Association and the Dairy Management Inc. The annual conference was held in at the University of Minnesota, St. Paul and included a contingent of faculty, students and researchers from the Department. Dr. Lloyd Metzger serves as the Director of the Center.

## STUDENT ACCOMPLISHMENTS

**Jill Anderson** was the recipient of the John Brandt Fellowship for her Ph.D. program. Dr. Kenneth Kalscheur serves as her advisor.



**Jordan Dorneman** as the top Cheddar cheese judge in 2009 was invited to the 2010 US Champion Cheese Contest in Green Bay. At this contest Dorneman participated as associate judge to evaluate over 2,300 cheeses from around the world.

**Jordan Dorneman, Nicki Stevens and Cassey Utke** dairy products judging team members in 2009 were invited to participate along with coach Dr. Bob Baer to participate in the 2010 Quality Check Dairy Leadership Conference in Dallas, Texas.

**Emily Jungemann**, Dairy Production major was selected as the South Dakota Dairy Princess for 2010–2011. As a dairy ambassador she will promote the dairy industry around the country. 2010 on an exchange program.

**Kamal Mjoun** was a recipient of the Young Dairy Scholars Award at the 2010 Midwest ADSA/ASAS Meeting held in Des Moines, IA during 15-17 March, 2010. Kamal earned a B.S. and M.S. degrees in Animal Science from the National School of Agriculture in Morocco. He also received a M.S. degree in Animal Science with an emphasis on dairy cattle nutrition from South Dakota State University working on phosphorus utilization in dairy cows. He completed his Ph.D. research in Dairy Science at SDSU.

**Rebecca Niewohner** was awarded an undergraduate research award of \$6,500 under the 'Funds to enhance scholarly excellence 2010' of the Vice President of Academic Affairs, and completed a research project entitled 'Effect of a natural biopreservative 'Nisin' in different foods', during spring 2010. Dr. Sanjeev

Anand served as her research advisor.

**Morgan Petersen** has been awarded the undergraduate research award under Griffith and Bentley undergraduate research program 2010–11. Dr. Sanjeev Anand serves as her research advisor.

**Luke Rensink**, Dairy Manufacturing major received the top prize for his business plan at a competition at the SDSU Innovation Center.

**Ana Schweer**, Dairy Production and Manufacturing major served as Ag-Bio Ambassador.

Numerous Students participated in internships around the country during summer 2010. Organizations and locations included Leprino Foods, CA; Kemps, LLC, MN; Broken Bow Dairy, NE; Schwan's Foods, MN; Glanbia Foods USA, ID; Davisco Foods, ID and SD; Kraft Foods, IL, MO; University of Minnesota Extension, MN; Hiland Dairy, KS; Braums Dairy, OK; First District Association, MN; Hematech, IA and several others, including home farms.

## YEARS OF SERVICE

**Howard Bonnemann** was recognized for 15 years of service.

## RETIREMENT

**Gary Kirkham**, Ag Foreman at the Dairy Research and Training Facility (DRTF) retired after 26 ½ years of service to the Dairy Science Department. Gary joined the Dairy Science Department in May 1984 as a farm worker for the SDSU Dairy Farm.

Since that time he served in many capacities and eventually became the lead feeder at the facility. The DRTF, home of SDSU Holstein and Brown Swiss cows, provides a venue for dairy nutrition research, and teaching. In his capacity as feeder Gary was responsible for the feeding operations at the farm and he interacted



with faculty members that used the facility for research and teaching activities. He also interacted with student workers at the farm. A retirement reception was held in Gary's honor on 16th December.

## VISITORS

**Santiago Nigro**, Exchange student from Argentina for the fall semester.

**Dr. Latha Sabikhi** who is Research Scientist at the National Dairy Research Institute, Karnal, India was sponsored by her government for a 2-month assignment in the Dairy Science Department to work with Dr. Sanjeev Anand. While at SDSU she worked in the area of probiotic bacteria with specific emphasis on the anti-tumor activity of conjugated

linoleic acid (CLA) produced by a starter culture isolate.

**Fernando Diaz-Royon** of Spain worked as a Ph.D. scholar with Drs. Kalscheur and Garcia on dairy cattle nutrition.

**Doaa Essam**, Animal Production major, and **Orchid Elbadry**, Dairy Manufacturing major of Alexandria University, Egypt in the Faculty of Agriculture visited the SDSU Dairy Science Department during summer on an exchange arrangement.

## DAIRY CLUB

2010 Officers: Katelyn Crocker, President; Mitchell Maher, Vice President; Megan Rice, Secretary; Melissa Lax, Treasurer; Megan Forst and April Johnson, Historians; Cassie Hulstein and Carrie Ellefson, Activities Coordinators; and Nicole Stevens, Dairy Digest editor. Advisors were Howard Bonnemann, Dr. Arnold Hippen, Dr. Kenneth Kalscheur, Matt Laubach and Dr. Lloyd Metzger. The Dairy Club hosted the Midwest ADSA-SAD conference in

Brookings. Approximately 350 dairy students and advisors from universities in the Midwest travelled to Brookings to attend this conference. After a year of planning, this conference went off very well. In June, Club members hosted 30 youth at the Superhero Dairy Camp. Other club activities throughout the past year included the Fall Central Plains Dairy Sale, Hobo Days festivities, trip to the Canadian Royal in November and cheese boxes.



## SCHOLARSHIPS

Our students were once again the beneficiaries of the generosity of many alumni and industry. At the spring 2010 banquet, 175 attendees witnessed the award of over 80 scholarships and awards totaling \$75,400. The scholarships were as follows:

John Anderson Memorial	\$1000
Associated Milk Producers, Inc.	\$1000
Ross Baker Memorial	\$550
Emery Bartle Memorial	\$5000
Dairy Club (2 @ \$500 each)	\$1000
Dairy Farmers of America	\$400
Dairy Science Department (4 @ \$variable)	\$1750
Danisco (2 @ \$1,000 each)	\$2000
Davisco Foods Int'l, Inc.	\$750
Dean Foods - Land O'Lakes	\$1000
Derdall	\$500
Gilbert T. & Olga Gilbertson Memorial	\$500
John C. Gross	\$1000
Heifers for State (2 @ \$500)	\$1000
Clyde Helsper Memorial	\$500
I-29 Dairy Extension	\$500
Kemps LLC (2 @ \$1,500 each)	\$3000
Land O'Lakes-Region 65	\$300
Midwest Dairy Association (2 @ \$1,500 each)	\$3000
David H. Henry Memorial	\$250
James Marvel Memorial	\$400
Kirk Mears Memorial	\$1150
Nordica Licensing, Inc.	\$750
North Central Cheese Industries Association (2 @ \$1800, 1 @ \$1400)	\$5000
H. C. Olson	\$550
T. M. Olson	\$750
Alfred Hermann Rishoi (2 @ \$650 each)	\$1300
Ralph Rogers Memorial	\$600
Ryan Graber Memorial	\$1000
Saputo Cheese	\$1000
Schreiber Foods	\$1500
Schuch Family	\$1000
Shirley Seas Memorial	\$500
SD State Dairy Association (5 @ \$1000 each)	\$5000
Todd and Erica Stahl	\$1000
Valley Queen Cheese Factory	\$4000

Joseph Van Treeck	\$1000
Walt and Yvonne Wosje (2 @ \$1,000 each)	\$2000
WOW Logistics' Donald E. Utschig	\$2000
J.J. Yee	\$500

### Awards

D. F. Breazeale Memorial	\$500
Dairy Challenge (4 @ \$150)	\$600
Dairy Judging Manufacturing	\$150
Dairy Judging Production	\$150
Forbes Leadership	\$300
Graber-Ford	\$100
Students Employee Excellence (2 @ \$250)	\$500
Alfred Tobkin Memorial (4 @ \$110 each)	\$440
Virginia Dare	\$250
Howard Voelker Memorial (4 @ \$135 each)	\$540

### Incoming Students Scholarships

Dairy Science	\$500
Dairy Science Faculty (2 @ \$800 each)	\$1600
William & Marge Kallemeyn & Sons (2 @ \$650 each)	\$1300
Midwest Dairy Assn/SD Division (2 @ \$1000)	\$2000
NCCIA Recruiting Scholarship	\$750
SD Dairy Fieldmen's Association (5 @ \$1000)	\$5000
Clyde G. Helsper Dairy Fieldmen's	\$1000
Royal and Helen Donor in Dairy Production	\$400
SD Dairy Association (2 @ \$500, 1 @ \$650)	\$1650
Valley Queen Cheese Factory	\$1000
SD Dairy Association (2 @ \$600 & 1 @ \$500)	\$1700
Valley Queen Cheese Factory	\$1000

Dairy Science students won 8 of the 20 scholarships awarded by the National Dairy Promotion and Research Board in nation-wide competition. Students were Austin Asche, Samantha Erickson, April Johnson, Emily Jungemann, Melissa Lax, Ana Schweer, Nicole Stevens and Todd Wight. Nicole Stevens was the recipient of the James H. Loper award.

## SDSU DAIRY SCIENCE IN EGYPT



Dr. Ashraf Hassan and two Dairy Science students, Kathryn Norling and Eric McNeel, spent three weeks at Alexandria University in May 2010. This launched the student research exchange portion of the agreement between SDSU and Alexandria University. The goal of this visit was to provide

students an opportunity to expand their technical knowledge of the global dairy foods industry in a multi-cultural environment.

Alexandria University provided faculty advisors, assisted our students in establishing networks with Egyptian students of similar interest, and provided housing arrangements. Students worked in an internationally recognized dairy microbiology laboratory. They learned how to make Egyptian cheeses, and modern techniques in isolation and identification of lactic acid bacteria from dairy products produced in Egypt. Students visited two dairy plants in Egypt. Students also enjoyed sightseeing and experienced the Egyptian culture including a visit to the pyramids and Egyptian museum in Cairo. In summer of 2010 two undergraduate Dairy Science students visited the SDSU Dairy Science department for experience in the Dairy Production and Manufacturing programs.

## SCENES FROM THE PAST





## DAIRY RESEARCH AND TRAINING FACILITY UPDATE

Our dairy farm has approximately 140 certified and registered milking cows and a total of 300 animals. This includes approximately 50 Brown Swiss. The rolling herd average attained a record of just over 26,400 pounds per year. The herd is used for research projects primarily in the cattle nutrition area 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. Mitch Maher and Heather Jons serve as student managers. Some of our cattle were shown at the South Dakota State Fair. A major change this year included the retirement of Gary Kirkham after 26 ½ years of service to the farm. Matt Laubach, Manager resigned for a new position with Pioneer Hi-Bred. Steve Crego, Assistant Manager, was appointed as Manager.



## OUTREACH

### I-29 Dairy Conference

The Department in conjunction with the University of Minnesota, Iowa State University, and the University of Nebraska organized the 5th annual dairy conference. Invited speakers discussed various issues pertaining to dairying in the Midwest. The theme of the conference was "Sustaining Our Dairy Families, Farms, and Rural Communities".

### Area Dairy Expos

Alumni, students, staff, and faculty of the Dairy Science Department were involved in various activities of the 2010 Central Plains Dairy Expo. Dairy Club and staff assisted with registration and other duties. Faculty provided presentations on various topics and conducted a cheese tasting contest. Faculty also participated in the World Dairy Expo in Madison, WI and at the World Ag Expo in Tulare, CA.

### Cheese Grading Workshop

The Dairy Science Department hosted a cheese grading workshop under the auspices of the North Central Cheese Industries Association. The workshop drew 15 personnel from several cheese manufacturing organizations from the upper Midwest. Presenters included Drs. Bob Baer, Sanjeev Anand and Lloyd Metzger.

### Food Safety Lab Workshop

The second *Applied Food Safety Education Lab Course II - 2010* was jointly conducted by College of Agriculture and Biological Sciences, and College of Education and Human Sciences, South Dakota State University from June 21st to 24th, in continuation of *Applied introductory food safety lab workshop* held in August, 2009. These workshops are a part of the USDA Higher Education Challenge grant (2009–12) handled collectively by North Dakota State University, South Dakota State University, and New Mexico State University. The instructors were Dr. Sanjeev Anand, Joan Hegerfeld-Baker, Maneesha Mohan, and Robert Jjuuko from Dairy Science, and Nutrition and Food Science Departments of SDSU. The aim of the workshop was to familiarize students with food safety risks at all levels of the food production and delivery systems, and how the risks are monitored and reduced, prevented or eliminated. The target groups of the workshop were high school science teachers, family consumer science teachers, extension personnel and foodservice, processing and production industry personnel. Twelve participants attended.

### North Central Cheese Industries Association

Dr. Lloyd Metzger serves as Executive Secretary and Dr. Vikram Mistry as Advisor to the NCCIA. The annual meeting was held in Brookings in October and attracted over 130 cheese makers and suppliers from the upper Midwest.

## K-12 STUDENTS

### Dairy Camp

The Dairy Club hosted the 8th annual Dairy Camp in June for k-12 youth. This year there were 30 participants. Activities included a visit to a commercial dairy, training on care of heifers, reading a pedigree, judging, visit to the SDSU dairy plant, making ice cream, clipping and showing cattle, and entertainment.

### High School Visits

Recruiting students for our 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 in Iowa, Minnesota, and South Dakota.

## EXTENSION



### Meetings and Workshops:

Aside from local extension workshops, Extension also participated in regional and international activities including Peru and Ecuador. In Ecuador, Dr. Garcia discussed efficient ways of raising heifers.

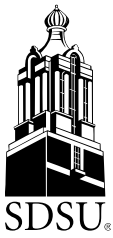
**Milk Quality Workshop:** Dr. Alvaro Garcia led a milk quality workshop at a large local dairy as well as several milk quality clinics for dairy employees.

**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, WI in October. The booth highlighted the dairy development efforts and dairy education and research activities and opportunities in South Dakota. Many interested people and alums stopped by to learn about the South Dakota dairy industry and education and to say hello.

**Alums and Students:** Visit the Careers Section of our website (<http://www.sdstate.edu/ds>) for a listing of job opportunities in Dairy Science. Please give us a call for details on positions that interest you.

**Mark your calendar:** The 2011 Dairy Science scholarship banquet is on 4th April at 6 pm at the SDSU Student Union.





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*Dairy Science Department*

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## 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**

Drs. Arnold Hippen, David Schingoethe and Kenneth Kalscheur. The long-term goal is to improve the efficiency of milk production, cow health and longevity, and thus promote environmental and economic sustainability in the US dairy industry. The approach to achieve this goal is to systematically identify those biological and nutritional management processes that will provide the greatest improvements in milk production and sustainability of dairy systems.

### **Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises**

Drs. Kenneth Kalscheur and Arnold Hippen. The purpose of this project is to develop decision support systems that address nutrition, management, environmental impacts, and economics of 1) calves and heifers and 2) lactating and dry cows.

### **Enhancement of Quality, Safety and Health Attributes of Milk and Dairy Products**

Dr. Sanjeev Anand. The purpose of the present investigation is to study the persistence of spoilage and pathogenic microflora under dairy farming environments and develop HACCP based system approach to control the pathogens. The study also aims at establishing cross contamination between dairy farms and dairy processing plants due to the presence of certain infectivity cycles. Another purpose

of the study is to enhance the health attributes of dairy products by enriching them with functional components like bioactive peptides, conjugated linoleic acid, and riboflavin to enhance health attributes.

### **Manufacture, Functionality, and Application of Protein Based Dairy Ingredients**

Drs. Lloyd Metzger, Vikram Mistry, Ashraf Hassan and Kasiviswanath Muthukumarappan. This project will develop manufacturing processes for protein based dairy ingredients that can serve domestic and export markets.

### **Strategies to Increase the Utilization of Coproduct and Traditional Feeds by Lactating Cows**

Drs. David Schingoethe, Arnold Hippen, Kenneth Kalscheur and Alvaro Garcia. This research will evaluate the use of new ethanol coproducts, and other byproduct feeds in diets of lactating cows.

### **Use of Biofuel Coproducts to Improve Nutrient Utilization in Dairy Cattle**

Drs. Kenneth Kalscheur, Arnold Hippen, David Schingoethe and Alvaro Garcia. This project examines nutrient utilization of dairy cattle fed diets using biofuel coproducts to improve milk production and reduce nutrient losses to the environment.

### **Flavor, Texture, and Nutritional Enhancement of Milk and Dairy Products**

Dr. Robert Baer. A method that inhibits and reverses light-induced oxidized off-flavor in milk will be developed. A method to reduce pink discoloration, a defect in Cheddar and colby cheeses, will be evaluated. Frozen desserts will be produced with improved nutrition and texture.

### **Metabolic Conditioning of Early Lactation Dairy Cows**

Drs. Arnold Hippen, Kenneth Kalscheur and David Schingoethe. The approach of these investigations focuses on regulatory mechanisms of blood glucose concentrations and aids for more rapid attainment of normal carbohydrate status through dietary intervention.

### **Role of Exopolysaccharides-producing Cultures in Biofilm Formation and as a Texturizing Agent**

Drs. Ashraf Hassan and Vikram Mistry. The objective of this work is to optimize manufacturing conditions for the production of 50% reduced fat and low fat Cheddar cheeses with characteristics similar to those in the full fat types using exopolysaccharide-producing cultures, to develop novel functional ingredients from whey containing exopolysaccharides and to study the formation of biofilms on whey reverse osmosis membranes as a cause of membrane fouling.