© Food Engineering Club at Washington State University

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“As engineers, we were going to be in a position to change the world – not just study it.”
- Henry Petroski

Award of Excellence (2017-18)
For “Registered Student Organization”
by the Graduate and Professional Students Association, Washington State University
From the CAHNRS Dean

Student organizations are a cornerstone of the CAHNRS student experience. In fact, they’re indispensable to achieving the college’s mission: each and every one of our close to 3,000 undergraduate and graduate students leaves equipped with the knowledge base, experience, and interpersonal communication skills to be job ready, day one. The Food Engineering Club has proven itself to be a model organization in this regard.

For eight years, and counting, the FEC has provided opportunities to engage with the food industry, to improve leadership and communication skills, and to incite interest in this very important aspect of our food system. The Global Food Product Development contest is a perfect example of the collaborative, innovative, and hands-on experiences that define CAHNRS as a college and the Cougs we produce. CAHNRS Cougs lead by example—in the classroom, in communities, and across the globe.

I’m proud to see the Food Engineering Club model these tenets, and I look forward to continued investment and impact for the future of food.

From the FEC Advisor

WSU Food Engineering Graduate Student Club is first of its kind in the nation. Since its inception in 2010, the club has served the professional needs of students and provided them with a platform to engage in social, cultural, and outreach activities. The club continues to make a significant impact on the professional growth of its members through industrial visits and professional development seminars. It is gratifying to watch members acquiring prestigious industrial internships, serving as student representatives in many professional societies, and winning national/international awards and paper competitions, all of which have sharply raised the visibility of our department as well as Washington State University. The club has also served as a role model and motivated the formation of three other graduate student clubs in the department. Enjoy reading more about club activities and accomplishments in this e-Newsletter.
From the President

It has been my pleasure to lead the Food Engineering Club into its 8th year of action, and my 2nd year as officer. As a graduate RSO, we stand out, for being a professionally structured and a well functioning unit, with 4 committees—professional development; social and community outreach; public relations and CAHNRS student senate. Each of these divisions function as committees, with committee chairs and members, working with and for each other. These divisions help a graduate student member in overall development, as an individual. FEC also provides the opportunity for students to interact with each other, taking time off their schedules. Graduate students are prepared for life outside and beyond the laboratory, and also use this opportunity to utilize the available resources. As an officer, looking back at the 2 years I have spent playing active roles in FEC, I have definitely learnt a lot of aspects of team work, co-ordination, organization and execution. I am happy to share our joy, success and experiences with the readers of this newsletter. I also thank our predecessors for laying the foundation stone for FEC, upon which we all have grown up, to come along way. Go FEC, Go Cougs!

Overview of events

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Professional development

Industry visits

This year, we visited three food processing and one packaging manufacturing company in Portland, OR and Yakima, WA as a part of our industrial exposure. 11 members from FEC club, visiting scholars from China and Brazil, 4 students from Food Science department and Dr. Gustavo Barbosa-Cánovas participated in the activity. On the first day of visit, we went to Ajinomoto Windsor Inc. and Pacific Foods of Oregon in Portland, OR. We started with Ajinomoto Windsor Inc. who manufactures frozen Japanese and Asian cuisines such as dumplings, noodles and rice. The tour began with brief presentation from factory General Manager about company history, business structure and product portfolio. This facility has the most diversity among employees representing people from 31 nationalities.

Plant supervisors took us on a factory tour, demonstrating and explaining all unit operations involved in their production lines such as cooking of broth, soups and rice; mixing; freezing; packaging, and some quality control steps. Finally, we had an opportunity to taste some of their popular fried rice and pot sticker products, and ended a discussion with the General Manager about product development based on customer needs. We learned that sometimes merely changing a packaging design can boosts product sales for the same product.

Our next stop was at Pacific Foods of Oregon which was recently bought by Campbell Soup Company. They specialize in manufacturing sterilized soups, non-dairy beverages, broths and meals packed in multilayer cartons. They use a retort (manufactured by JBT) as well as steam injection type heat exchangers (Tetra Pak aseptic processing line) for sterilization of products. The tour included a visit to the manufacturing process, product development lab, and waste recycling facility. The plant manager explained their entire process in detail involving production of chicken broth, extraction of soy milk, cooking of meals, aseptic filling of product into cartons, final packaging and retorting. We had an opportunity to chat with their multidisciplinary product development team, including the Director of Product Development. We learned about how they develop new product ideas, optimize their processes, conduct
shelf life studies, sensory testing and quality checks before marketing of products. We were excited to see their sustainability initiatives involving maximum utilization and environmental conservation of their wastes, containment of waste solids from rainwater and accidental spills from entering marshlands, and utilization of solar energy.

The second day of visit was to Tree Top Inc. and Shields Bag and Printing Company in Yakima, WA. In the morning we visited Tree Top Inc. at their Selah facility which produces juice and apple sauce. We met some of the WSU alumni working there and visitor group from WSU, Tri-Cities campus. The tour began with a brief presentation about the company, manufacturing facilities, and products. We had an opportunity to see apple sorting facility for various applications; product development lab and pilot plant; demonstration of some pilot scale machines; and manufacturing facility for juice, apple sauce and dried products. We were asked to do consumer sensory testing for an apple juice produced with some changes in the filtration step. Finally, small question and answer session was organized where Tree Top team comprising of Project Manager, Product Development Scientist, Process Engineer, HR Manager, and Distribution Chain Manager participated and provided an insight into the working culture and experience at Tree Top, as well as their academic and professional background and expectations from future employee.

On the last leg of our tour, we visited Shields Bag and Printing company, who manufactures various kinds of packaging for food and non-food applications. We met their Plant Manager and Sales Manager who took us for the factory and laboratory tour. We saw entire manufacturing process from receiving raw material, i.e. polymeric resins, in train wagons until final pouch making step including blown film extrusion process, color printing process, and quality control. We had a look at their quality control and development laboratory which consisted of sophisticated instruments for measuring and controlling quality parameters. Their lab manager briefly explained their quality control and film development process. From this visit we had an overview of how various thermal processing technologies such as sterilization using retort and aseptic processing, pasteurization, drying, evaporation and freezing are being employed on the commercial scale for manufacturing shelf stable as well as frozen products; and how different types of packaging needs are fulfilled to cater product requirements. Thanks to GPSA and CAHNRS student senate for the financial assistance!
Professional seminars

Dr. Tom Yang, US Army Natick Soldier Center, Natick, MA presented about the history and development of the US military rations with focus on quality and novel processing technologies. Dr. Yanyun Zhao, Department of Food Science and Technology, Oregon State University, Corvallis, OR spoke about the use of fruit pomace as antioxidant dietary fiber for enhancing nutritional value of food and bulk packaging materials. Also, Dr. Juming Tang shared his experiences on working with the Johnson Space Laboratory, NASA, and with 915 laboratories for technology transfer; we were joined by members of the Agriculture Automation and Engineering Club from Prosser for this seminar. The experiences were definitely invaluable for the students.

Internship experiences

Three FEC members, Shuxiang Liu, Ren Yang and Prashant Pokhrel did their summer internship at McMormick and Company, Baltimore and Pepsico, New York respectively, and shared their experiences with members. We look forward to having more internship recruitments and subsequent presentations in the years to come.

Social and community outreach

Coffee hour: members shared a variety of snacks, along with some warm coffee. During this event, the graduating students were gifted Cougar themed coffee mugs by Dr. Tang, from FEC. This was conducted along with the student presentations on internship experiences, so it was a fun learning session!

Secret Santa and annual dinner: We became each others’ Secret Santa, got together for the annual dinner and gift exchange at Birch and Barley, Pullman, WA, with friends and family. Dr. Barbosa joined us and it was fun to watch people trying to guess their Santa.

Annual potluck: In FEC, we have students from different parts of the world. For this activity, all the members brought an authentic native dish to share with everyone else. From such activities, people get to know more about food and culture of their fellow club members.

Bowling night: This activity was organized before the dead week to help club members cope with the stress of finals. Some club members also brought their friends and family to relax and have fun together.

-Juhi Patel
Food engineering club (FEC) is one of the participating clubs in CAHNRS student senate. The senate is the primary place of interaction between clubs in the college and this year, it has organized several activities to make this interaction even stronger. At the beginning of the semester, the senate undertook activities like group pictures and sessions with ambassadors to familiarize each club representative with senate activities.

The senate also organized small events which helped student representatives from different clubs to learn about the activities lined up by each club for the year ahead. It organized different events such as the career and internship networking night and career expo to provide internship and job opportunities to undergraduate and graduate students of the college.

Social events such as the fall festival were also organized which helped to increase public awareness regarding the research activities undertaken by CAHNRS students. Events such as the beef and brew were arranged on Dad’s weekend to gather funds for student activities in CAHNRS. FEC students volunteered for these events and helped by providing their physical and technical expertise in fulfilment of these events. For example, some of the FEC members were responsible for setting up and assisting the visitors during the networking night and beef and brew while other members helped the senate in filing the paperwork related to food safety requirements.

These events allowed the FEC members to socialize with other student clubs and know more about their activities. During the fall festival, the FEC members enlightened visitors about their research related to microwaves, packaging and shelf life. This provided other clubs the opportunity to know firsthand about the exciting research that was being conducted by FEC club members.

FEC members also participated in CAHNRS food drive and donated food and other articles. FEC members also participated in arranging lab visits for high school students during the month of May 2017 which was organized by CAHNRS. This was a wonderful experience for the FEC members to interact with young minds and explain their research.
My five-month experience in McCormick was very different than a normal internship.

I started my internship in January 2017 and continued through the spring semester. During the first day, my boss told me I had no specific project, which meant I had to create my own. My mission was to utilize the knowledge and technology that I learned from Dr. Tang’s lab to help the company solve their issues. The initial days were difficult, but everything got on track after I learned how to get help from others and get access to the resources provided by McCormick. I decided to build up relative humidity chambers and started water activity studies on spices.

The first visiting tour was two months later. About ten new interns toured the whole building for the Technical Innovation Center. During the tour, we got to see how different research groups functioned by themselves and collaborated with each other. I shot a glance at some advanced technology and devices in different research areas like food packaging and flavoring. I didn’t have the chance to learn deeper about these areas, but it was exciting to see how the food industry transfers scientific studies for the use of business.

The whole experience in McCormick was very pleasant. As a second year Ph.D. student, I was treated like a real engineer and they provided all the help that I needed to succeed. My boss, Stephen Lombardo, the director of Material and Process Technology, was very nice and supportive. He invited me to every meeting, including one with the CEO of McCormick. I did a final presentation to the whole Technical Innovation Center before my last day and many people from different groups in
McCormick showed up and asked about some details of my project. The presentation was successful and so was my internship experience.

Many employees in McCormick TIC have been working there for more than twenty years and I could tell that they do love their job. If you are looking for an internship, I would encourage you to give a shot.

The following students underwent internship training programs at the respective companies mentioned. We wish to thank the companies for hosting our students, and for the valuable experience.

**McCormick and Company:** Jie (Chris) Xu and Shuxiang (Susan) Liu

**PepsiCo:** Prashant Raj Pokhrel

### Student presentations

**Oral presentation:**


**Poster presentation:**


Student awards and honors

2017 Alaska Airlines Travel Award
Category: Itron Food, Energy, Water
Jungang Wang
Pavitra Krishna Kumar
Prashant Raj Pokhrel

2017 American Society of Agriculture and Biological Engineers (ASABE) Travel Award
Jie (Chris) Xu

2017 Biological Systems Engineering Outstanding Graduate Student Award
Food engineering - Arnie & Marta Kegel Endowed Fellowship
Pavitra Krishna Kumar

2017 Institute of Food Technologists (IFT) Awards
Division Leadership Travel Grant:
Jie (Chris) Xu
Pavitra Krishna Kumar
Feeding Tomorrow Scholarship:
Shuxiang (Susan) Liu
Feeding Tomorrow Intern+:PepsiCo Scholarship and Internship:
Prashant Raj Pokhrel
Puget Sound Outstanding Student Scholarship:
Jie (Chris) Xu

2017 King Saud University Scientific Excellence Prize
Saleh Al-Ghamdi

Institute For Thermal Processing Specialists Charles R. Stumbo Student Paper Competition
First place:
Jie (Chris) Xu

Student volunteers

ASABE Annual International Meeting 2017
Jie (Chris) Xu
Juhi Patel
Pavitra Krishna Kumar
Yoon-Ki Hong
Yuqiao (Judy) Jin
Zhi Qu

Subscribe to our YouTube Channel “Food Engineering Club”

Have you ever wondered if the use of microwave ovens in your kitchen or at work will cause cancer? Have you also wondered how these ovens work? Please head out to our YouTube Channel, Food Engineering Club, to watch 2 videos made by our members! These videos are intended for public awareness, and made by our members, so yes, these are from a trusted and scientific resource!
Faculty highlights

The Cochran Fellowship Program

Student member Zhi Qu and FEC advisor Dr. Shyam S. Sablani participated in the Cochran Fellowship Program organized by the WSU Office of International Programs in collaboration with the Department of Biological Systems Engineering. Sponsored by USDA-FAS, the Cochran Program promotes international trade of U.S. agricultural products. The recent program focused on natural food products and retail management for a team of retailers from China looking for high-quality U.S. products to differentiate their stores. Here is a picture by the side, of the team!

WSU Faculty Award 2017-2018

Dr. Juming Tang receives the “Innovation and Entrepreneurship Award 2018” from the WSU Showcase Annual Celebrating Excellence Banquet. In this annual event, Washington State University holds a weeklong Showcase celebration to honor the achievements of its faculty, staff and students. We congratulate Dr. Tang, and are proud of this achievement!

CAHNRS Excellence in Advising Award 2018

Dr. Shyam S. Sablani receives the Excellence in Advising Award 2018 by CAHNRS, as part of the CAHNRS Faculty and Staff Awards. We congratulate Dr. Sablani, and join him in the celebration!

NC-1023 Annual Meeting 2017

NC-1023, a Multi-State Research Project, which started more than 40 years ago, focuses on engineering aspects of food safety and quality. It is supported by a USDA-NIFA grant, where WSU has been an active member of this project since its inception. The 2017 Annual Meeting took place at WSU on December 4-5, 2017 where more than 30 delegates from a number of universities from around the country were in attendance. Three FEC members (Chandrashekhar, Juhi, and Prashant) actively participated in this meeting as volunteers to support a number of activities including the planning and organization, and later on, were at the meeting, at all times, assisting in setting up and hosting all technical and social events. Dr. Gustavo V. Barbosa-Cánovas was the chair of this national meeting in representation of the Biological Systems Engineering Department.
Student thesis focus

Ashutos Parhi: Polymer packaging for microwave-assisted thermal sterilization and pasteurization
Atisheel Kak: Rapid evaluation of oxygen barrier properties of wall materials in microcapsules
Chandrashekhar Sonar: Development of multilayer polymeric films and shelf life assessment for pasteurized food products
Jaza Al-Shammari: Pathogen control in high sugar food and studies the role of water activities of different sugar on efficiency of thermal inactivation
Jie (Chris) Xu: Studies on thermal resistance of Salmonella enteritidis PT30 and its surrogate enterococcus NRRL B-2354 and its relationship with water activity, food component and history of bacteria in low-moisture foods
Juhi Patel: Effect of polymer packaging on Microwave Assisted Thermally Sterilized processed foods

Li-Huei (Emily) Chen: Properties of food emulsions
Marco Perez Reyes: Influence of the composition of egg powders in the inactivation of Salmonella with Radio-Frequency
Pavitra Krishna Kumar: Ice recrystallization due to temperature fluctuation and its effect on select properties of frozen food
Ren Yang: Thermal death kinetic of Salmonella spp. in peanut oil and peanut butter
Saleh Al-Ghamdi: Effect of thermal and nonthermal process on multilayer plastic films containing high barrier polymers for sterilization and pasteurization applications
Yoon-Ki Hong: Simulation of Microwave Assisted Pasteurization Systems
Yuqiao (Judy) Jin: Thermal inactivation of Salmonella spp. in low-moisture foods

Congratulations—new graduates and new hires!

Class of 2017-18
- Shuxiang Liu
- Prashant Raj Pokhrel
- Deepali Jain
- Ravi Kiran Tadapaneni
- Nydia Munoz
- Jungang Wang
- Armando Quintanilla

You may also find some of us at:

Dr. Kanishka Bhunia: Post doctoral associate, Cornell University, NY
Dr. Hongchao Zhang: Post doctoral researcher, University of Maryland, MD
Dr. Poonam Bajaj: Food Scientist Intern, Perfect Day, CA
Dr. Reza Ovisipour: Assistant Professor and Director of Seafood Research Center, North Carolina State University, NC
Dr. Ravi Kiran Tadapaneni: Food Scientist, R&D/ Food Safety, Taylor Farms, CA
Dr. Jungang Wang: Senior R&D Engineer, Campbell Soup Company, NJ
Dr. Prashant Raj Pokhrel: R&D Senior Engineer, PepsiCo, NY
2017-2018 officers

Executive board

President
Pavitra Krishna Kumar

Vice President
Atisheel Kak

Secretary
Jiewen (Grace) Guan

Treasurer
Yuqiao (Judy) Jin

Office bearers

Chair, Professional development
Chandrashekhar Sonar

Chair, Social and community outreach
Juhi Patel

Chair, Public relations
Yoon-Ki Hong

Representative, CAHNRS student senate
Ashutos Parhi

Student affiliations

Institute of Food Technologists (IFT)
Jie (Chris) Xu - Student representative, Food Engineering Division
Pavitra Krishna Kumar - Student representative, Food Engineering Division
Chandrashekhar Sonar - Student representative, Food Packaging Division
Juhi Patel - Student representative, Food Packaging Division

International Society of Food Engineering (ISFE)
Pavitra Krishna Kumar - Secretary co-leader
Jiewen (Grace) Guan - Secretary co-leader
Yoon-Ki Hong - ISFE website manager
Saleh Al-Ghamdi - Upcoming event manager
Atisheel Kak - Professional society outreach
Chandrashekhar Sonar, Juhi Patel, Ga Young Shin - Student representatives

American Society of Agricultural and Biological Engineering (ASABE)
Sumeyye Inanoglu - Vice President, Student Engineering Branch, BSE
Together we can make a difference

We are looking to raise funds for our club and your financial aid to the FEC would be highly appreciated. It would be used to support more of FEC student activities, developing the professional skills of the future food engineers giving back to the society. Thank you!

Contact us

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Pavitra Krishna Kumar
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phone: 509-339-4910

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Food Engineering Club (Attn: Dr. Shyam Sablani)
213 L.J. Smith Hall, Biological Systems Engineering, Washington State University Pullman, WA, 99164-6120

OrgSync page
http://studentinvolvement.orgsync.com/org/fec/

YouTube Channel
https://www.youtube.com/channel/UCZ8_8PKpIXJEQ1_J_Ba_7-Q

Facebook group
https://www.facebook.com/groups/149073285169928/

Twitter account
https://twitter.com/fec_wsu

Compiled and edited by Public Relations Committee, Food Engineering Club, Washington State University
For comments, suggestions and feedback, please write to Yoon-Ki Hong, Chair, Public Relations Committee: yoonki.hong@wsu.edu