FED NEWSLETTER

..to promote the development of new processing technology, to improve the present technology, thus contributing to improved efficiency of food production and the quality and safety of food products...

May 2010 - N.15

In This Issue

- Chair corner
- Student Rep's Corner
- Paper Competition
- Elected New Officers
- Events at the IFT-2010
- IFT- 2010 FED Symposia & Sessions
- FED Members Honored
- Food Engr Programs
- Announcements
- Up-coming Events
- Editor's Comments

Engineering Opportunities in the New AFRI (FY2010)

Much anticipated Request for Applications (RFAs) of the Agriculture and Food Research Initiative (AFRI) have finally been released in late March.

There are six of them and one more yet to come. The significant changes in program structures, priorities and requirements have surprised many. Numerous questions were raised in academia and research institutes, professional societies and the industries.

- Where does my research fit in this new AFRI structure?
- How do I approach to write a winning grant under the new scheme?
- Do I have a future within the AFRI offerings?
- What are the rationales for the new programs?

This brief article is intended to explain the principles behind the major change, and to suggest opportunities where engineers can use your expertise to make significant contributions.

As you are already aware by now, the current USDA leadership has identified five major societal challenge areas around which to structure the AFRI programs and to focus the Department's investment in enabling an integrated approach to agriculture and food research, education, and extension. These challenge areas are supported by a single RFA for each.

1) Keep American agriculture competitive while ending world hunger
2) Improve nutrition and end child obesity
3) Improve food safety for all Americans
4) Secure America's energy future
5) Mitigate and adapt to climate change

The key considerations of the new design of the AFRI RFAs are FOCUS, SCALE and IMPACT. In order to achieve significant impacts in addressing these important societal challenges, we must focus our research, education and extension investments. The significantly increased funding levels afford concerted efforts of bringing necessary talents and resources together to ensure the desired outcomes in an extended time frame. Under this guiding principle, the five Challenge Area RFAs solicit applications for larger awards for longer periods of time to enable greater collaboration among institutions and organizations and integration of basic and applied research with deliberate education and extension programs.

In addition to the Challenge Areas RFAs, AFRI also supports research grants in the six AFRI priority areas as specified in the Farm Bill 2008 to continue building a foundation of knowledge critical for solving current and future agriculture and food challenges in a single Foundational Program RFA.

Engineers, especially food engineers, can now find expanded opportunities in the Challenge Areas, as well as the Foundational Program area. For example, the following programs in the Food Safety Challenge Area are suitable for food engineers and other engineering disciplines:

- Prevention, **Detection, and Control** of Shiga toxin-producing Escherichia coli (STEC) from Pre-Harvest through Consumption of Beef Products (**CAP**)
- Prevention, **Detection, and Control** of Food-borne Viruses in Food: A Focus on Noroviruses (**CAP**)
- ***Food Processing Technologies to Destroy Food-borne Pathogens with an Emphasis on Viruses and/or STEC***

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• Addressing Critical and Emerging Food Safety Issues
• National **Education** Programs for Food Safety

Particularly worth of noting is the Food Processing Technologies program. This program aims to help effectively move most promising processing technologies across the technology development "valley of death" to the doors of commercial adaptation. It calls for private-public partnership that involves industry participation and regulatory guidance from get-go. It provides larger funding (up to $5 millions) and longer duration (five years) to ensure adequate integration of multidisciplinary team for design, development and validation of technology leading to commercial deployment. The program is planned to support up to four awards in 2010.

CAP (Coordinated Agriculture Project) is a relatively new funding mechanism that has been successfully tested in other programs in recent years. It calls for a large team of multidiscipline and multi-states to address a large scale issue. For example, the Prevention, Detection, and Control STEC CAP intends to develop comprehensive solutions to Shiga toxin-producing E. coli problems throughout the entire chain from cattle production to beef consumption. Engineers have multiple opportunities to participate including sensors and detection, food safety intervention technology in pre- and post-slaughtering, food processing, packaging, distribution, storage, and food preparation. Food engineers can arise to the opportunity to be a project leader to organize such a CAP, or seek out other initiating efforts to be a member of the team. The funding size (up to $5 million per year and $25 million total for five years) and experience can be quite professionally rewarding.

Engineering opportunities also exist in other Challenge Areas. For example, bioprocessing engineering and material engineering can contribute to the Sustainable Bioenergy program; engineers interested in sensors and detection technologies can participate in animal health program under the Climate Change area. You are encouraged to carefully examine all the opportunities presented in the Challenge Areas. Please keep in mind that most of the programs offer large grants for a large team assembly. You need to be active to seek out such opportunities or create a team and take a lead.

The Foundational Programs offer several programs that engineers can partake. The Nanotechnology program seeks applications that develop nanotechnology enabled food safety intervention technologies. The Reducing Food Allergies program calls for novel solutions, including physical, biological, and chemical processes, to reduce or eliminate allergens in food. It also requests applications in better methods to detect allergens. Given the space limitation, other opportunities are left for the readers to carefully examine.

Overall, the funding available to food scientists in the AFRI this year is estimated at more than $33.5 million, which is a significant increase comparing to $17.6 million in FY 2009. It is clear that the emphasis this year is centered on improving food safety through various approaches including food processing and nanotechnology. Engineering, especially food engineering, should have many opportunities to make significant contributions.

Finally, the NIFA Fellowship Program, anticipated to be released late in May, has an estimated $25 million to offer, and hence is a significant opportunity for pre- and post-doc fellows. Please keep an eye on it if interested.

To conclude this article, I would like to stress the importance of stakeholders' input. To help effectively identify significant scientific opportunities to address critical societal challenges relevant to agriculture and food, the NIFA is actively seeking out for stakeholder inputs and advices. Your suggestions are seriously considered during the AFRI program planning process and always greatly appreciated. For example, multiple advices solicited over the course of recent years formed a solid foundation for the successful establishment of the ***Food Processing Technologies to Destroy Food-borne Pathogens***. Many FED colleagues, include Lund, Heldman, R.P. Singh, Sastry, Barbosa-Cánovas, J. Tang and others, provided invaluable suggestions. The workshop titled "Emerging Food Processing Technologies in North America" lead by Gustavo and Daryl, and sponsored by then CSREES, and its subsequent report published as the special issue of Food Science and Technological International (2008, 14:5) provided a rich collection of assessments of the status and gaps of various emerging processing technologies. Discussions with other stakeholders such as NC-1023 committee also were very helpful. Please consider help NIFA to help you.

If you wish to share your comments about the 2010 AFRI RFAs, and suggestions about the next RFA development, please provide your written stakeholder comments and submit by mail to: Policy and Oversight Branch; Office of Extramural Programs; National Institute of Food and Agriculture; USDA; STOP 2299; 1400 Independence Avenue, SW; Washington, DC 20250-2299; or via e-mail to: RFP-OEP@nifa.usda.gov. In your comments, please state that you are responding to the Agriculture and Food Research Initiative Food Safety RFA.

Also, please be advised that a formal stakeholder meeting for the AFRI program has been scheduled for Wednesday, June 2, 2010 from 8:30 a.m. – 4:30 p.m. at the One Washington Circle Hotel. Notice of the meeting was published in the Federal Register on May 7 and may be found at http://edocket.access.gpo.gov/2010/2010-10690.htm. This is one good opportunity for your input into AFRI program. Be present and provide an oral report is better, but you can always send a written report.
Thanks for your attention reading this briefing. You are always welcome to contact for any further information or sharing your suggestions. I can be reached at (202) 401-6497 or hchen@nifa.usda.gov.

Chair's corner

By Sheryl Barringer

IFT events:
One IFT event you will not want to miss is Symposium 172 Applications of water in food quality in room N426b. ***Shelly J. Schmidt***, Bernard E. Proctor Food Engineering Division Lecturer, will be presenting the results of her research as the 2008 Marcel Loncin prize winner, at 2:15. Her presentation will be followed by a brief business meeting and then a wine and cheese social. Everyone is invited to these events.

The Food Engineering Division Executive Committee meeting will take place at Hyatt McCormick Place - Regency Ballroom C on Sunday, July 18 from 12:00 to 2:00 PM.

http://www.abstractsonline.com/Plan/ViewSession.aspx?sKey=81b14d6c-aa4c-4a22-869e-094efa698cd6&mKey=%7b64C55C22-D314-40A2-98B8-3CE298279EC7%7d>

Major changes to division:
IFT is planning to dissolve divisions and replace them with communities. As one of the strongest divisions in IFT, we have been assured that FED will continue with few changes. One of the proposed changes is that overall dues will increase, and in exchange there will be no division dues. Members will be able to join as many communities as they wish at no additional charge. Communities will continue to have officers, newsletters and plan events, which will be funding by IFT centrally. Blogs where members can exchange views on a variety of topics will be pre-tested in May, then open up to everyone.

Become a volunteer!
If you haven't already, you can go to www.zoomerang.com/Survey/WEB22AKB7HLCME <http://listserv.ift.org/t/1355455/5421542/105311/0/> to let IFT know of your interest to volunteer to help plan next year,s annual meeting. They are seeking volunteers to serve on the committees for the 12 tracks for the meeting, and Food Engineering is one of them. The time commitment is minimal: just a few hours a year to participate in conference calls, foster session development and disseminate track information.

Sheryl Barringer
FED Chair
2009-2010

Student's Corner
Gail Bornhorst

I would like to thank everyone who has decided to participate in the 2010 FED Mentoring Program! In total, we have about 50 people from many different backgrounds who will be a part of the program. All of you that have chosen to be involved will be receiving the contact information for your mentor/mentee and now is your time to shine!

I am very excited about the potential of this program and I hope that the mentor:mentee pairs will be able to have some good conversations during this spring/summer and also have the opportunity to meet during the IFT Annual Meeting. Further details about this meeting will be given to the program participants in the coming months.

Gail Bornhorst
M.S. student

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An update on the IFT FED Paper Competition
Cristina M. Sabliov, Chair of the IFT FED Paper Competition Committee

This year, a total of 43 abstracts were submitted to the IFT Food Engineering Division Paper Competition. The committee selected the best 10 abstracts and the finalists were asked to submit a four-page paper for the next phase of the competition. Of the 10 selected, nine authors submitted the short paper and will be considered for the award.

They are, in alphabetical order:

- Cosmin M. Beliciu (Cornell University). Rheological Properties of Micellar Casein - Soy Protein Mixtures as Affected by Heat Treatment and Concentration.
- Amit Halder (Cornell University). Surface Heat and Mass Transfer Coefficients for Multiphase, Porous-Media, Transport Models with Rapid Evaporation.
- Qingruisi E. Li (University of Illinois at Urbana-Champaign). Investigating the Relationship Between the Critical Relative Humidity and Temperature at which the Glassy to Rubbery Transition Occurs in Amorphous Food Materials.
- Jiakai Lu (Purdue University). Replacement of Interfacial Proteins by Waves of Surfactant.
- Tanuj Motwani (Pennsylvania State University). Dielectric Relaxation as a Novel Tool to Investigate the Dynamics of Water in Starch-Water Systems in the Gelatinization Temperature Range.
- Mecit H. Oztop (University of California, Davis). Finite Element Modeling for Swelling in Whey Protein Gels.
- Pavan Kumar Soma (University of Maryland). Evaluation of Factors Affecting the Internal pH of Xanthan-Chitosan Hydrogel with Change in External pH using Fluorescence Based Technique.
- Nirupama Vaidya (Purdue University). Caking of Amorphous Food Powders: A Direct Numerical Simulation.
- Jessica M. Widjaja (University of California, Davis). Kinetics of Gastric Juice Diffusion in Solid Foods during Digestion.

The awards (places 1, 2, and 3) will be announced at the IFT Meeting. ***Congratulations to all finalists for an outstanding job in their research!***

Meet our newly elected FED officers

Congratulation to **Fernanda Martin-Gonzalez** (left) (Assistant Professor in the Department of Food Science at Purdue University) and **Elena Castell-Perez** (right) (Professor in the Department of Agricultural Engineering at Texas A&M University) who were elected member-at-large and secretary, respectively, of our division for August 2010-July 2011.

Events to remember at the upcoming IFT Annual Meeting

IFT Awards Celebration
Saturday, July 17
5:30 p.m. – 6:45 p.m.
McCormick Place

Networking reception
Saturday July 17
6:45-8:15 pm
McCormick Place

Keynote Session
'Drive — What the Science of Motivation Can Teach You about High Performance'
Sunday, July 18
8:45 a.m.
Daniel Pink, best-selling author of the book, A Whole New Mind, uses four decades of behavioral research to reveal why the traditional approach to high performance backfires on most organizations.
In this provocative and entertaining session, Pink will demonstrate how many common organizational incentives often go wrong—and can reduce both creativity and satisfaction on the job. The people who do what they do because of enjoyment of the task itself routinely outperform those who are motivated by external rewards. With examples from cutting-edge companies and intriguing experiments around the world, you will learn the three key ingredients of intrinsically motivated high performers—and how organizations can create contexts that tap our deepest motivations to produce the highest results. Pink's thinking is reshaping how organizations operate and how individuals navigate their careers. Pink is currently a contributing editor at Wired magazine, and his articles and essays have also appeared in The New York Times, Harvard Business Review, and Fast Company.

A "Taste for Science" Reception, Sponsored by the IFT Foundation
Sunday, July 18
3:00 p.m. - 5:00 p.m.
Monday, July 19
3:00 p.m. - 5:00 p.m.

Fun Run for IFT Scholarships
Join your colleagues at the tenth annual IFT Student Association/IFT Foundation Fun Run in the Windy City.
Monday, July 19
Grant Park
Registration: 5:45 a.m.
Race time: 6:15 a.m.

Food Engineering Symposia and Sessions - IFT-2010

ORAL SESSION
Primary track
252. Utilization of modeling and optimization tools for the food systems
Multidisciplinary - Collaborating Division
060.Creating more sustainable food production methods.

POSTER SESSION
Primary Track
079 - Aquatic Food Products Division: Food engineering posters
080 - Biotechnology Division: Food engineering posters.
081 - Carbohydrate Division: Food engineering posters
082 - Dairy Foods Division: Food engineering posters
083 - Extension & Outreach Division: Food engineering posters.
084 - Food Chemistry Division: Food engineering posters.

088 - Fruit & Vegetable Products Division: Food engineering posters
089 - International Division: Food engineering post
090 - Muscle Foods Division: Food engineering posters.
091 - Nutraceuticals & Functional Foods Division: Food engineering posters
092 - Refrigerated & Frozen Foods Division: Food engineering posters.

Primary Track and Collaborating Division

071 - Emerging technologies and ingredient
085 - Food Engineering
086 - Food Engineering
087 - Food Engineering
134 - Food Safety and defense
146 - Product development
156 - Sensory sciences
230 - Food processing and packaging
243 - Sustainability
290 - Food Engineering: Food, heath, and nutrition

SUNRISE SESSION

Primary Track

007 - How to obtain and manage AFRI competitive grants

Collaborating Division

009 - The role of water in food quality

SYMPOSIUM

Primary Track

270 - Modeling the food digestion process – in vitro, in vivo, in silico
Primary Track and Collaborating Division
052 - Optimization of spray drying for flavor and food ingredient encapsulation: Application of nanotechnology and computational fluid dynamics to improve Volatile Organic Compounds (VOC) retention and ingredient encapsulation
115 - Texture: Where sensory experience and analytical knowledge meet.
252 - Utilization of modeling and optimization tools for the food systems

Secondary Track

055 - Innovations in refrigeration and freezing (of dairy products).
110 - Bringing sustainability to your products with 10 key principles
120 - Novel nonlinear inactivation kinetics models and risk assessment tools for controlling food safety using nonthermal technologies
170 - Automation and high throughput pathogen/toxin screening technologies for food safety and food defense

Secondary Track and Collaborating Division

172 - Application of water in food quality
173 - Food texture design and optimization: Texture measurement.
209 - Safety, environmental and regulatory aspects of potential use of nanosilver in food and food-related products.
251 - Future "clean and green" separation technologies for the food and nutraceutical industry.

Collaborating Division

165 - Food structure changes through innovative processing technologies.

OTHER

0.21 - Food Engineering Division Executive Committee
Sunday, July 18, 2010 12:00 - 2:00 PM Food Engineering Division business meeting and reception

001 - Food Engineering Division business meeting and reception
Monday, July 19, 2010 3:00 - 5:00 PM

FED members honored

2010 IFT Achievement Award Winners and new IFT Fellows

from IFT website

Research and Development Award

Evan Turek, Kraft Foods Inc was part of a Five-Member Team Representing the Washington State University Microwave Sterilization Consortium. Other members include Juming Tang, Professor, Washington State University; C. Patrick Dunne, U.S. Army Natick Soldier Research Development and Engineering Center; Douglas Hahn, Hormel Foods Corporation; Kenny Lum, Seafood Products Association. The consortium also includes The Ferrite Company, Rexam PLC, Graphic Packaging and Ocean Beauty Seafoods, LLC.

Nicholas Appert Award

R. Paul Singh
Distinguished Professor of Food Engineering,
University of California

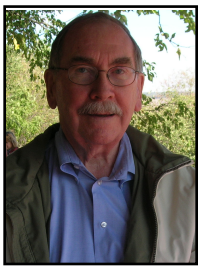
Bor S. Luh International Award:

Syed Rizvi
International Professor,
Cornell University

Babcock-Hart Award

Levente Diosady
Professor, University of Toronto, Canada

2010 IFT Fellows



J. Peter Clark
Consulting Engineering

Charles Onwulata
Lead Scientist,
USDA ARS

Arthur Teixeira
Professor,
University of Florida

Visit the FED web-site and see all the information about our Division - http://baen.tamu.edu/ift/FED2-IFT/FED09.html

FOOD ENGINEERING PROGRAMS

FOOD ENGINEERING EDUCATION IN NORTH AMERICA

By Dennis R. Heldman

Food Engineering education has evolved in many different ways over the past 50 years. The purpose of this article is to quantify the visibility of food engineering at educational institution in North America.
The results to be present are based on an evaluation of program, with specific attention to curricula, course titles and emphasis areas or options available to the student. The programs evaluated include 42 programs within North America that meet the minimum standards for Food Science programs, as established by IFT. In addition, graduate programs in Food Science (or closely related areas) at 49 institutions as identified on the IFT website were included in the evaluation. In addition to an evaluation of Food Engineering within Food Science at the educational institutions, the emphasis on food engineering within engineering programs has been included. These evaluations are based on published information about programs and courses, and do not include information about numbers of students pursuing the various educational programs.

Based on the evaluation, six different areas of food engineering education were identified:

1. Undergraduate programs in Food Science, and meeting the minimum core competency for food processing and engineering.
2. Undergraduate Food Science programs, offering a Food Engineering option or emphasis.
3. Undergraduate engineering programs, with curricula in biological engineering and significant course content dedicated to biological systems.
4. Undergraduate engineering programs leading to a degree in Biological Engineering (or closely related title), and with an option or emphasis in Food Engineering.
5. Graduate programs in Food Science, and with an emphasis in Food Engineering.
6. Graduate programs in engineering, and with an emphasis in Food Engineering.

Many of the educational programs identified are the result of collaborative efforts among two more departments or units at a given institution, and the obvious influence of faculty with interests in food engineering education and research. As might be expected, most of these collaborative efforts occur at the interface between food science and engineering.

1.Undergraduate Food Science Programs

The IFT Education Standards for programs in Food Science include the following statements for one of five core competency areas. The content of the core competency in food processing and engineering includes:
Principles of food preservation including low and high temperatures, water activity, etc.
Engineering principles including mass and energy balances, thermodynamics, fluid flow, and heat and mass transfer
Principles of food processing techniques, such as freeze drying, high pressure, aseptic processing, extrusion, etc.
Packaging materials and methods

The 42 programs meeting the minimum standards established by IFT incorporate these areas of content in several different ways. In the majority of the programs, the curriculum includes at least one course with the title of food engineering (or similar title). In other programs, the above content is incorporated into one or more courses in food processing. Overall, it seems evident that the quantitative content of all courses carrying the title of food processing (or similar title) has increased, as compared to 25 to 30 years ago.

2.Undergraduate Food Science, with Food Engineering option

Three of the 42 programs meeting minimum IFT standards for a Food Science program indicate that students can pursue a Food Engineering option within Food Science. These options are different due to the unique courses offered at each institution. In general, the options include a second course in Food Engineering, in addition to the course required as a part of the core curriculum. In addition, other courses are recommended as electives to strengthen the engineering component of the program.

3.Undergraduate Engineering Programs

An evaluation of engineering programs at the 42 educational institutions with Food Science programs reveals that 33 offer undergraduate degrees in biological engineering, or a closely related title (Biosystems Engineering, Biochemical Engineering, etc.). The relationship of these programs to food engineering was most obvious in the focus on biological systems. More specifically, these curricula included courses on “physical properties of biological materials” and “transport phenomenon in biological systems”. The content of these programs provide the graduates with insights into the challenges of food engineering. These types programs and courses have evolved significantly in the recent 25 years.

4.Undergraduate Engineering, with Food Engineering option

A subset of the educational institutions with undergraduate programs in biological engineering offers an option in Food Engineering. Seventeen of the institutions identified an option in Food Engineering (or a very similar title) within the biological engineering degree program. The requirements for these options usually include courses in the area of food chemistry and food mi-

crobiology. All of these programs have evolved at institutions with visible food science programs and a close collaboration with the program offering the food engineering option.

5. Graduate Programs in Food Science

The IFT website provides a list of 51 graduate programs in Food Science and/or closely related areas. These programs reside at 49 different educational institutions, and 33 of these institutions provide some level of graduate education in food engineering. The typical program included a food engineering emphasis within graduate (M.S., PhD) programs in Food Science. The most consistent evidence of a food engineering emphasis is at least one graduate faculty member with a research interest in one or more topics within food engineering.

6. Graduate Programs in Engineering

A review of engineering graduate programs at the same 49 educational institutions revealed that 16 offer an emphasis in Food Engineering at the graduate level. Most often, these options are available to students pursuing a degree (M.S., PhD) in biological engineering, or similar title. The sixteen programs have at least one member of the graduate faculty with a research interest in food engineering. All of the programs are located with educational institutions with very visible and active Food Science programs. In fact, all sixteen institutions also offer an emphasis in Food Engineering within the Food Science graduate program. In many situations, the same faculty members are members of the graduate faculty in both engineering and Food Science.

Summary and Conclusions

Food Engineering is very visible in both undergraduate and graduate programs at educational institution throughout North America. There are 42 institutions with undergraduate Food Science programs meeting IFT minimum standards, including a core competency in food processing and engineering. Three of these programs offer an option in Food Engineering. There are 33 of these institutions with undergraduate curricula in biological engineering, and 17 of these provide an option in Food Engineering. Seventeen graduate programs in Food Science offer a Food Engineering emphasis, and sixteen of these same educational institutions have Food Engineering graduate programs within engineering, usually as a part of a program in biological engineering. All statistics suggest a significant increase in visibility of food engineering education programs in North America as compared to 35 to 40 year ago.

IFT undergraduate approved programs:
http://www.ift.org/cms/?pid=1000426

IFT graduate program directory:
http://www.ift.org/cms/?pid=1000624

Dr. Heldman has held R&D positions at the Campbell Soup Company, the National Food Processors Association, The National Food Laboratory, and the Weinberg Consulting Group Inc. He served as President of IFT, the Society for Food Science and Technology from 2006-07. Dr. Heldman was elected Fellow in the International Academy of Food Science & Technology in 2006. Currently, he is Adjunct Professor of Food Engineering at the University of California, Davis.

FOOD ENGINEERING PROGRAM IN ARGENTINA

By Cecilia Penci, Laura Iturriaga, Pablo D. Ribotta

In Argentina, for many years, the demand for technical human resources in the food industry has been met by different types of trained professionals such as chemical engineers, biochemists, and chemists (Licentiates) and to a certain extent by agricultural engineers and veterinarians. The highly competitive food industry sector has increased its demands for qualified technical human resources and its search of more specific skills like the design of new products and processes. As a consequence of these demands and following the trend in South, Central and North (Mexico) America in the seventies, specific food engineering programs were started in Argentina. Although at present about 22 universities both public and private offer such programs, the demand for food-related technical human resources is still met in part by chemical engineers and chemists being an example the Chemical Engineering Program at the Facultad de Ciencias Exactas, Físicas y Naturales (Universidad Nacional de Cordoba, UNC) that offers either an Engineering- and Food Science and Technology-oriented degree. The latter includes courses in such areas as Microbiology, Bromatology, Biotechnological Processes and Food Technology.

In Argentina the National Commission for the Evaluation and Accreditation of Universities a decentralized agency of Ministry of Education, Science and Technology is aimed at ensuring and enhancing the quality of both the university degrees and institutions within the Argentinean university system by evaluating and accrediting the programs offered. The CONEAU is in charge of the following: external evaluation of universities, accreditation of undergraduate and graduate programs, and issuance of recommendation on institutional projects for new public universities. The CONEAU has accredited 17 Food Engineering Programs nationwide so far: 12 in public universities and 5 in private ones.

In Argentina undergraduate programs are free of charge for everyone including foreigners; on the contrary graduate programs charge instruction fees which are mostly covered by either partial or full research scholarships granted to students with outstanding academic performance.

In this paper, three different programs accredited by the CONEAU from three public national universities have been chosen for the description of the Food Engineering Program (FEP) in Argentina.

The FEP offered by the Facultad de Agronomía y Agroindustrias (FAA) in the Universidad Nacional de Santiago del Estero (UNSE). Currently, the operating curriculum of the FEP involves a load of 3762 hours in total to be completed in 5 years. It confers a university degree, is permanent in nature, and requires complete secondary education for enrolment. To enter this Program a leveling examination must be taken. The curricular structure of this Program includes five main areas, namely Basic Sciences, Basic Engineering, Food Sciences, Services Engineering, and Processes Engineering.

The Basic Sciences provide the necessary knowledge and preparation for the study and the research of the physicochemical, biological and microbiological processes applicable to food industries. To achieve these aims the students have to pass subjects like Algebra and Geometry; Mathematical Analysis; Physics; Statistics; Thermodynamics; General, Inorganic, Organic, Analytical and Physicochemical Chemistry and Introduction to Engineering. Subjects like Unitary Operations and Transference Phenomena included in the Basic Engineering area, the students are introduced to the fundamental chemical engineer concepts. In order to acquire the basic knowledge about the installation and functioning of the auxiliary services systems of the food industries, courses like Graphical Representation Systems, Materials Resistance, Process Control, Auxiliary Service Technology and Industrial Sanitation and Safety have to be passed. In the last year, Food Science and Processes Engineering Areas aim to facilitate the study of food systems behavior; acquire knowledge on food legislation and about analytical techniques of control; to deepen into the scientific-technological aspects of the food industry and to supply the knowledge of the food industry from a managerial point of view. The courses included at this level are Food Microbiology, Food Biochemistry, Food Analysis and Control, Biotechnology, Economy and Projects Formulation and Evaluation, and two elective subjects chosen out of at least five (Cereals, Fruits and Vegetables, Meats and its byproducts, Milk and its byproducts and Oleaginous).

Education in this program requires thirty subjects as well as examinations on sufficiency in the English language and Computing Science, and the Introductory Workshop to Food Engineering to be passed; the completion of an in-factory Practice of at least 100 hours is mandatory as well. The final exam of the subject Project Formulation and Evaluation requires a Preliminary Project of Investment to be designed and defended by the student in an oral presentation. Training is complemented by undergraduate courses offered by the AUSAS (Association for the Food Area) that keep the total hour load unmodified since they are validated within the optional subjects.

The average population of students doing Food Engineering in the FAA-UNSE is of about 170, while those graduating are 4 yearly in the average though 8 students graduated in 2009. Essentially classes are mostly theoretical and practical in nature. Experimental workshops for the various disciplines are performed in laboratories and foods are elaborated in the facilities of the Pilot Plant as well.

There are no intermediate degrees to be achieved along the Program but food-related graduate programs like the Master and Doctorate in Food Engineering Programs are available. Both were created tending to develop researchers within the field of Food Engineering. The Specialist in Food Science and Technology Program was designed to meet the need of either qualified human resources to work outside the university environment or recent graduates to solve local, regional, national problems on food-connected issues. It aims to graduates from other related careers. The Doctorate in Food Science and Technology was accredited by the CONEAU. This program involves human resources, infrastructure, and equipment of five NW Universities (UNT, UNSa, UNJu, and UNNE) and of four CONICET Researching Institutions: CERELEA, PROIMI, INSIBIO, INIQUI.

The Universidad Nacional del Sur (UNS) is located in the city of Bahía Blanca. This region in the Province of Buenos Aires has a significant fruit, vegetable and oilseed industrial activity. To attend the requirements of this kind of industries the Chemical Engineering Department of the UNS creates in 2001 the Food Engineer curriculum. Today, after several modifications the curriculum includes a General Basic Knowledge Cycle (Algebra and Geometry, Mathematical Analysis, Physics, Technical Drawing, General Chemistry, and Introduction to Engineering). This organization allows establishing a common branch between chemical and food engineering by incorporating gradually courses of science and food technology.

At the end of second year the student has acquired a solid education in basic sciences, including a Biology course, and an introduction to chemical engineering topics, numerical methods, inorganic and organic chemistry. In third year the program includes

courses of basic principles of chemical engineering, Thermodynamics, Heat and Mass Transfer and Fluid Mechanics. These courses introduce students to fundamental engineer concepts about processes of production and food preservation. Food Chemistry and Food Production are specific subjects aimed at training the students in concepts related to the food industry. After they have passed at least 11 courses of the program the students must give an English Practice Exam. In contrast with other Argentinean engineering programs intermediate degrees are not available.

During the two last years, Microbiology and Chemical and Biological Reactors provide the necessary tools to understand and optimize biotechnological processes. Also, subjects like Food Processing (I and II), Processing Equipment, Food Preservation, Food Packaging and Process Control complete the engineering formation of students. Practical classes are performed in laboratories of both the Chemical Engineering Department of the UNS and PLAPIQUI (Chemical Engineering Pilot Plant, UNS–CONICET) laboratories and pilot plant equipments. Researchers and professors from PLAPIQUI are in charge of about 80 percent of the courses leading to Chemical Engineer and Food Engineer degrees from UNS.

When the students have passed at least 23 subjects, they must either develop a professional practice in a food industry in order to improve their technical training or work in a food science research program up to the completion of a 200 hour supervised activity. Like in other engineering curricula in Argentinean Universities, the last courses relate to the Economical Evaluation of Projects and to Environmental Regulations. To graduate the students must design a Final Project under the supervision of a Director, usually a professor/researcher of the UNS, that takes approximately a period of six months.

The Chemical Engineering Department of the UNS has implemented with good results a Tutorial Program (Professors and advanced students) in 2006 to provide help and contention to students with academic problems. Student desertion has decreased since its implementation.

Statistics of graduates (academic performance, contact information) are collected every year in order to have a fluid contact with the graduates for job opportunities. In 2009, 56 students have been started Food Engineer studies in UNS, 8 were doing their professional supervised practice and since 2001, 19 students have been obtaining the Food Engineer Degree.

The Graduate Program in Food Science and Technology is offered by the Chemical Engineering Department of UNS, following the criteria established by the graduate studies directives. Master and Doctoral degrees can be obtained. Doctorate Program last four years and applicants must approve five fundamental courses and five specialisation courses and a proficiency in English exam. A thesis must be developed. Master Program can be completed in two years and requires the approval of five courses (four fundamental and one specialisation courses). Also needs the approval of a proficiency in English exam and the development of a thesis.

The Facultad de Ingeniería Química of Universidad Nacional del Litoral (UNL) created the Food Engineering degree in 1998. The program has length of five years, 32 subjects, and an English exam. Currently, the FEP involves a load of 3775 hours in total. The curricular structure of the Program comprises a basic cycle (two years, 12 subjects) including Algebra and Geometry, Mathematical Analysis, Physics, Thermodynamic, General Chemistry, and Inorganic, Organic Chemistry. A workshop of lecture and text production is included too. Then, a superior cycle (three years) with 16 obligatory subjects (Analytical Chemistry, Transference Phenomenon, Microbiology, Materials Resistance, Graphical Representation Systems, Food Analysis, Food Preservation, Food Technology, Control Process, Economical Engineering). Two optional subjects, a humanist elective subject, a final project and an industrial supervised practice (250 h) complete the last cycle. Practical classes are obligatory whereas theoretical classes depend on the subject. Practical classes are performed in laboratories and pilot plant equipments; it is noteworthy to highlight that the Faculty has three pilot plants with facilities and equipments to develop food processing activities using different technologies in dairy, cereal, oil and vegetal food area.

The students entering to the Food Engineering program at the Facultad de Ingeniería Química usually is about 75 and the number of graduates reach 10 to 25 yearly (2004-2009). Universidad Nacional del Litoral offers graduate programs: Master and Doctoral degrees in Chemical Technology, Master in Food Science and Technology. A Milk and Milk products Science and Technology Specialization is also available.

As was described, the FEP offered at National Universities in Argentina has similar general structure: basic subjects to provide the necessary knowledge and preparation for the study of the physicochemical, biological and microbiological processes applicable to food industries; courses to introduce students on the fundamental engineer concepts; and specific subjects aimed at training the students in concepts related to the food industry. To complete the degree an industrial supervised practice in a food industry must be developed.

Web sites related to the article:
http://www.coneau.edu.ar/
http://faa.unse.edu.ar/ofer.html
http://www.fiq.unl.edu.ar/carreras/ia.htm
http://www.efn.uncor.edu/index1.htm
http://www.uns.edu.ar/carreras/

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Food Process Engineering Research Activities at CSIRO, Australia

By Jay Sellahewa

Agrifood is an important contributor to the Australian economy and the food, beverage and grocery manufacturing industry plays an important role in adding value to Australian raw materials. This industry is Australia's largest manufacturing sector, representing 28% (US$92B) of the total manufacturing turnover. It employs 315,000 people, contributes 4% to Australia's GDP and exported US$23B of value-added products in 2008-09. The Australian food processing industry is highly fragmented and dominated by a large number (7,200) of companies, most of whom are small to medium sized enterprises. Most large multinational food companies operating in Australia have manufacturing as well as R & D facilities.

The tertiary education landscape

As a result of increased market competition for processed foods from other countries (mainly Asia), Australia has to maintain a competitive edge to ensure that the market share of exported value-added foods from Australia is maintained while minimising the amount of imported processed foods. In order to achieve this objective, it is important to develop a good tertiary educational program to produce high quality food scientists, technologists and engineers and to invest funds in the private sector and in publicly funded research organisations to carry out strategic research in food science, technology and engineering.

An undergraduate or a Masters degree in Food Engineering is currently not offered in any Australian university. However, there are a number of universities that offer undergraduate and postgraduate course in Food Science and Technology with electives in food engineering. A number of Universities that teach chemical engineering also offer electives in food engineering. The main Universities that offer Food Science and Technology Courses with electives in food engineering are the University of Queensland, University of NSW, University of Western Sydney, Royal Melbourne Institute of Technology, Victorian University of Technology, Melbourne University, Ballarat University and Curtin University. The Universities of Sydney, NSW, Queensland and Monash offer food engineering electives in their chemical engineering courses.

R&D landscape

Most of the research in food process engineering in the public sector is carried out by the Division of Food and Nutritional Sciences of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), which is Australia's largest government funded research organisation. In response to the consumer trend towards foods for health and wellbeing, quality, convenience, value for money, environmental sustainability and food safety, CSIRO's Process Engineering Science Group is developing core

capabilities that provide the knowledge base which enables the Australian food industry to differentiate, innovate and commercialise new products to capture new markets. This is achieved by applying the fundamental principles of engineering science to adopt and further develop emerging and traditional processing technologies for the conversion of agrifood materials.

Our engineers and scientists work closely together and through a thorough understanding of the unit operations of traditional and emerging (mainly non thermal) food processes, the desired outcomes are delivered to maximise the impact on the Australian food industry and society. These outcomes are achieved through a combination of Horizon 1, 2 and 3 research projects. Horizon 1 work (full cost recovery fee for service) maintains our links with industry. In Horizon 2 work, scientific principles are translated into applied concepts through co-funded pre competitive projects. Horizon 3 projects (funded mainly by internal funds) enable our core capabilities to be maintained and new capabilities to be developed.

Our research activities in food process engineering are based on fundamental principles of process physics, process engineering and food science with applied chemistry, biochemistry and microbiology. This knowledge, together with access to excellent pilot plants and skilled operators puts CSIRO in a strong position to address the requirements of the food processing industry and fulfilling one of Australia's key strategic requirements for a healthy and sustainable Australia.

The multi disciplinary capabilities in CSIRO allow significant synergies to be captured. The skills that the engineers bring in process understanding, modelling and optimisation together with the strong food science skills of the scientists enable research leading to new product concepts and process development to be carried out for industry in an optimum manner because these two activities are inter dependent. An understanding of the effect of process stresses such as heat and shear on structure formation, enzyme activity modulation and modes of microbial inactivation provides a sound basis for development of optimum formulations and the design and scale up of processes to produce products that satisfy the consumer mega trends whilst ensuring that the competitiveness of the industry is maintained. Sophisticated mathematical models are developed and used to understand, design and improve these processes. Some distinctive capabilities in food process engineering at CSIRO are outlined below.

Emerging technologies

During the last ten years, around US$6M was invested in CSIRO to develop emerging (mainly non thermal) technologies. This investment enabled the expansion of our capital investment program and the appointment of a number of postdocs that helped boost our commercialisation program. Through this program, we have developed extensive capabilities in emerging technologies with state-of-the-art equipment and expertise in high pressure processing (HPP), pulsed electric fields (PEF), ultrasonics, cool plasma, e-beam technology, microwave technology and separations technologies (continuous chromatography, membrane processes and the development of molecular imprinted polymers in collaboration with Monash University). Our program of work in emerging technologies includes the creation of enabling knowledge, technology development, applications and demonstrations.

Many of these novel technologies were traditionally developed using an empirical approach. However, we are moving away from this approach and through modelling and the use of novel measuring techniques, have developed a deeper understanding of the physical, biochemical, microbiological and other principles involved with these processes that enable us to redesign equipment and processes to get improved, predictable and desirable outcomes.

Multiphysics modelling

We have made significant progress in multiphysics modelling of novel processes during the last 3 years and we will continue to develop expertise in this area.

In addition to continuing to develop models for heat and mass transfer-based unit operations (such as drying and cooling), in collaboration with Birmingham University, we developed and validated a model for predicting the transient temperature distributions inside a high pressure pilot plant during high pressure thermal sterilisation (HPTS). This model was integrated with a microbial inactivation model and is being used to determine the optimum processing parameters as well as equipment re-design to assure food safety during HPTS. We also tackled the difficult problem of retrieving accurate thermo physical data for HPTS and developed a combined experimental and numerical approach for predicting the compression heating properties of foods and equipment subjected to HPTS. Our expertise in multiphysics modelling has now being extended to other emerging technologies such as ultrasonics and PEF.

Enzyme modulation

We have developed an in-depth understanding of the effect of emerging processes such as PEF, HPP and ultrasonics on the enzyme activity of horticultural products and have identified the required processing conditions using these technologies, together with other variables such as temperature and pH, to inactivate, or to enhance the activity of endogenous enzymes. The capabilities that we have developed through these studies enable us to design processing conditions to maintain product quality and extend shelf life.

Drying

We have developed extensive expertise in drying technology for particulates (mainly of horticultural products) by combining a fundamental approach utilising the principles of heat and mass transfer together with access to a range and variety of pilot scale dryers. These include a newly designed and constructed multipurpose pilot scale dryer where the air flow rate, air flow direction,

temperature and humidity are controlled and the drying curve can be plotted in real time. This dryer, with additions such as airborne ultrasonics and infrared light, facilitates a range of research projects to be carried out, as well as enabling the validation of mathematical models. We are also studying the effect of the drying rate on product structure, which in turn affects the rehydration rate and product quality.

Sustainable food processing

We are developing capability in sustainable food processing, in order to address the growing consumer demand for environmentally sustainable foods with minimal carbon and water footprints. In this new area of research, we are currently carrying out projects in energy minimisation (mainly in drying), water treatment technologies (e.g. electrolysis to inactivate micro-organisms and harmful chemicals in recycled water) and developing strategies for waste minimisation, treatment and value addition. We have also successfully applied life cycle analysis methodologies in a number of commercial projects to identify opportunities for reducing the carbon and water footprints of processed foods.

Process optimisation and control

One of the biggest challenges that food process engineers face is the optimisation of unit operations and whole processing systems to produce foods that are not over processed in order to maintain the sensory and nutritional properties and at the same time ensure that the product is safe and is produced in the most cost effective manner. We are addressing this problem using a process systems engineering approach by integrating all the unit operations and are using process modelling as a valuable tool to find the optimum operating conditions. By taking a multidisciplinary approach and working closely with microbiologists, nutritionalists, sensory scientists and control engineers, we are making good progress in addressing this challenge.

Pilot plant

Our pilot plant, occupying around 3000 m2 (32,300 ft2) has equipment with a capital value of around US$28m and comprising a range of traditional and emerging technologies at several scales to support most unit operations used in the food processing industry, including drying, evaporation, concentration, separation, fractionation, homogenisation, size reduction, extrusion, sterilisation, extraction and processing technologies using microwaves, high pressure, pulsed electric fields, e-beam, cool plasma and ultrasonics.

Our pilot plant is an excellent facility to carry out close to market work and our facilities are regularly used by industry for product and process development and for making small batches of products for test marketing. It is also used extensively in research projects and in validating mathematical models.

Jay Sellahewa is a food engineer with extensive experience in industry, research and technology transfer. Jay is currently managing CSIRO Food and Nutritional Sciences' Process Engineering Sciences Group and leading CSIRO's program on Sustainable Food Processing. Ph: +61 2 9490 8383, email: Jay.Sellahewa@csiro.au, address: CSIRO, Julius Avenue, North Ryde NSW 2113 Australia
Mr Jay Sellahewa, CSIRO (Image: CSIRO)

FOOD ENGINEERING PROGRAM IN INDIA

By Dipika Agrahar Murugkar

Today, several career options are available in India. One can opt for various food technology courses for a bright career. Food processing industry is rapidly growing in India and several employment opportunities are available in various industries. There is good scope of food technology courses, which offer numerous job opportunities in various areas. One can get jobs in food processing industries, research laboratories, hotels, soft drink factories, quality control, rice mills, manufacturing industries and distilleries. Various programs are available in food technology courses including B.Sc. M.Sc and Ph.D. The eligibility criteria for B.Sc. in food technology include 10+2 or equivalent in science. It is three-year full time course. The candidate opting for M.Sc. in food technology should have the Bachelor's degree in science with chemistry. It is two-year full time course. After completion of M.Sc, the candidate can proceed for Ph.D. program.

Institutes offering food technology courses

Food engineering is an important career option available in India. There are under graduate level courses specialising in Food Engineering, which is a 5-year course after high school. An entrance exam under the All India Engineering Entrance given by at least 100,000 students in India every year is the way to gain entry into a Food Engineering course. You are awarded a B Tech

Degree in Food Engineering or Food Technology. There are several colleges and Universities in India, which offer this course. Some of the best institutes in India offering the food technology courses are Central Food Technological Research Institute in Karnataka, Acharya N.G. Ranga Agricultural University in Andhra Pradesh, Haryana Agricultural University in Haryana, Sardar Patel University in Gujarat, Mar Athanasios College for Advanced Studies in Kerala, The Women's Christian College in Tamil Nadu, Dr, Babasaheb Ambedkar Marathawada University, Nagpur University, University of Bombay in Maharashtra and University of Delhi. The colleges and Universities have their own fee structure for the program. Government institutes are partially subsidised while private colleges charge up to $10,000/- per year.

In the development of food engineering, one of the many challenges is to employ modern tools and knowledge, such as computational materials science and nanotechnology, to develop new products and processes. Simultaneously, improving quality, safety, and security remain critical issues in food engineering study. New packaging materials and techniques are being developed to provide more protection to foods, and novel preservation technologies are emerging. Additionally, process control and automation regularly appear among the top priorities identified in food engineering. Advanced monitoring and control systems are developed to facilitate automation and flexible food manufacturing. Furthermore, energy saving and minimization of environmental problems continue to be important food engineering issues, and significant progress is being made in waste management, efficient utilization of energy, and reduction of effluents and emissions in food production. Typically each college has around 25 seats in this programme, which covers subjects given below:

Basic Science and Humanities: Plant Bio chemistry, Introduction to computer applications, Statistics etc
Related Courses: Agronomy and Field crops, introduction to Agriculture, Fundamentals of Horticulture, Plantation crops and spices, Principles of Biotechnology, post harvest Physiology, Apiculture, Plant Physiology, Livestock and fish production management, Rural sociology, fundamentals of extension etc.
Food and Nutrition Sciences: Principals of Human Nutrition, Food Science, Food Chemistry, Food Additives and Preservation techniques, Normal and therapeutic nutrition, Food quality and analytical techniques, Food certification, Speciality foods, Forensic Food Science etc

Food Processing Technology: Principles of Food Processing Technology, Processing of dairy products, fish and marine products, meat and poultry products, Baking, Confectionary and extrusion Technology, Post harvest handling of cereals, legumes and oil seeds, Post harvest processing of fruit and vegetables, spices and plantation crops, utilization of by –products in the food industry.

Food and Industrial Microbiology: Fundamentals of microbiology and mushroom production, food microbiology, fermentation and industrial microbiology, food safety, microbial standards and food sanitation.
Food Engineering: Principles of General Engineering drawing and workshop practise, Introduction to Food Processing Equipment, Refrigeration Engineering and cold chain, Fluid Mechanics and Hydraulics, Energy Generation and Conservation, Heat and mass transfer, Advanced food processing instrumentation and process control, Bio Chemical Engineering, Food Plant Design and Layout, Food Packaging etc.

Food Trade and Business Management: Principals of Agricultural and Resource Economics, Principals of Marketing and Price analysis, Principals of Agricultural Finance and Cooperation, Agri-business management, IPR's and International trade, Food Security and Policy issues, Food Acts Laws and regulations, Entrepreneurship development.
Food Science Hands on Training/ Experimental learning: Preparation of Business plans, Organization of Production, Production and Marketing. This semester includes a project of 3 months duration as Food Science Work experience. Students visit laboratories and institutes to carry out their training work.

After the eight-semester graduation program students can take up the Masters Program in Food engineering. This course is of 2 years duration with 7 semesters with the final 8th semester for dissertation work. This semester decides the area of specialization that you want to work in. There are 4 Universities and Central Food Technological Research Institute (CFTRI) that offers this course. The course work for the Post graduation course is as follows:

Basic Supporting Courses include Computer Programming, Advanced Engineering Statistics, Optimization Techniques in Food Technology and Advanced Food Chemistry.

The core courses include International Food Legislations & Standards, Food Quality Control, Meat & Marine Technology, Modern Fruits & Vegetables Processing Techniques, Advanced Food Packaging, Advanced Beverage Technology, Modern Baking & Confectionary Technology, Processing of Milk & Milk Products and Food Microbiology.

Specialized Courses include Food Engineering Advanced Food Process Equipment Design, Food Plant Design, Food Process Modeling, Rheology & Texture Analysis, Food Production Technology, and Transport Phenomenon in Food Processing, Food Process Management & Control and Simulation of flow patterns in Food Process Equipment.

Prospective major employers for food engineers include companies involved in food processing, food machinery, packaging, ingredient manufacturing, instrumentation, and control. Firms that design and build food-processing plants, consulting firms, gov-

ernment agencies, pharmaceutical companies, and health-care firms also hire food engineers. Among its domain of knowledge and action are:

- research and development of new foods, biological and pharmaceutical products
- development and operation of manufacturing, packaging and distributing systems for drug/food products
- design and installation of food/biological/pharmaceutical production processes
- design and operation of environmentally responsible waste treatment systems
- marketing and technical support for manufacturing plants.

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IFT10

ANNUAL MEETING + FOOD EXPO®

Mark Your Calendar
July 17-20, 2010
Chicago, IL

The 2010 Scientific Program

With the dedication of hundreds of food professionals and after much research, we're offering c... vant and best organized Scientific Program to-date. This year's program will be organized around ke... areas within the industry, and based on core sciences which provide the foundation for all things relate... to food science. The new track structure was designed to meet food professionals' needs by focusing on topic areas of great interest and importance. It also simplifies the program's structure to make it easier for you to find your sessions.

Key Focus Area Program Tracks:

- Food Safety & Defense
- Food, Health & Nutrition
- Emerging Technologies & Ingredient Innovations
- Food Processing & Packaging
- Product Development
- Sustainability
- Public Policy, Food Laws & Regulations
- Education and Professional Development

Core Science Program Tracks:

- Food Chemistry
- Food Microbiology
- Food Engineering
- Sensory Science

Miscellaneous/Announcements

Endowed Professorship in Food Engineering The Ohio State University

The Ohio State University (OSU), College of Food, Agricultural and Environmental Sciences, invites nominations and applications for an endowed food engineering position. The Dale A. Seiberling Professorship in Dairy and Food Engineering includes operating support, a generous start-up package and graduate student stipends from the Jean F. Seiberling Graduate Award in Food Engineering.

This 9-month associate or full professor position (55% research/45% teaching) is joint between the Departments of Food Science and Technology (60%) and Food, Agricultural and Biological Engineering (40%). Office and laboratory space will be in the Parker Food Science and Technology building, Columbus campus. The position is available October 1, 2010, or when mutually convenient.

The successful candidate is expected to:

- Engage in a dynamic extramurally-funded research program in food process engineering.
- Provide leadership to multi-disciplinary teams of researchers at OSU and outside the university.
- Advise graduate and undergraduate students and mentor postgraduate researchers.
- Develop and teach graduate and undergraduate courses that support curricula in food engineering.
- Provide leadership to national professional societies and service to university committees.

To qualify, the candidate must have a Ph. D. degree in food, agricultural, or chemical engineering, or in food science with a strong background in engineering. Applicants should have an international reputation for advancing the food engineering discipline, an outstanding record of scholarly accomplishment in research and teaching, including extramural grant funding, and a demonstrated ability to work collaboratively and mentor associates. Interest in dairy engineering is desirable.
Salary and benefits are competitive. OSU has an excellent faculty and family benefits program.

To apply, please submit: cover letter, C.V., a statement of research plans, a statement of teaching philosophy, names of four references with contact information, transcripts, and three sample publications. Send applications electronically or as hard copies to Search Chair, Prof. Ahmed Yousef, yousef.1@osu.edu, 2015 Fyffe Road, Parker Food Science Building, Columbus, OH 43210. Evaluation by search committee begins June 1, 2010, and continues until a suitable applicant is found.

OSU is an Affirmative Action, Equal Employment Opportunity employer. To build a diverse workforce, The Ohio State University encourages applications from individuals with disabilities, minorities, veterans, and women.

The 4th European Workshop on Food Engineering and Technology

Faculty of Agriculture, University of Belgrade
Belgrade - Zemun, May 27– 28, 2010

Presentations of selected national PhD students in food engineering and technology of 2009/2010 at European level
Julius Maggi Research Award 2010 for the best paper, sponsored by Nestlé
Chairmen: Prof. Viktor NEDOVIC, Belgrade and Prof. Dietrich KNORR, Berlin workshop organised by Section on Food of the European Federation of Chemical Engineering (EFCE) in cooperation with European Federation of Food Science and Technology (EFFoST), United Nations Educational, Scientific and Cultural Organization (UNESCO), and Faculty of Agriculture, University of Belgrade

Food Innovation: Emerging Science, Technologies and Applications

Bayview Eden Hotel, Melbourne, Victoria, Australia
18 – 19 August 2010
www.innovativefoods2010.com

The 5th Innovative Foods Conference will address and discuss the opportunities for 'higher valued' food products across the supply chain for a competitive future. Our target audience will include Agrifood industry representatives researchers, policy makers, suppliers and allied industries from Australia and overseas. The up-dated PROGRAM is on the website.
http://www.innovativefoods2010.com/innovativefoods/images/fiesta2010program6april14.pdf

CALL for ABSTRACTS for POSTER Presentations
Please click here http://www.innovativefoods2010.com/innovativefoods/abstracts.php to submit your abstract
ABSTRACTS ARE DUE BY 31 MAY 2010

IUFOST 2010 CONGRESS: Food Science Solutions in an Evolving World

22 - 26 August 2010, Cape Town, South Africa
http://www.iufost2010.org.za/

17th International Symposium on Drying (IDS 2010)

October 3-6, 2010 Magdeburg, Germany
http://events.dechema.de/ids2010

Scope of the Symposium is to present new results in research, development and applications of drying technologies, bringing together leading researchers and practitioners from the entire world.

Contributions are encouraged in the following areas of drying science and technology: * Fundamentals, modeling, simulation
* Measurement and process control
* Energy and environmental issues
* Process intensification and integration
* Physical properties, product quality
* Particle formulation by drying processes
* Industrial processes and equipment
* Osmotic dehydration, mechanical dewatering
* Drying of wood, pulp and paper
* Drying of food and agricultural materials
* Drying of pharmaceuticals and biomaterials
* Drying of chemicals and polymers

International Conference on Food Innovation FoodInnova

October 25-29, 2010, Valencia, Spain
http://www.foodinnova.com
In association with Elsevier´s journals Trends in Food Science and Technology and Journal of Food Engineering, Current issues in food innovation will be addressed including:
•Innovation in food engineering.
•Innovation in food processing & control.
•Innovation in food. health and wellbeing.
•Innovation in food safety.
•Latest developments in "ohmic" technologies for food.
•Latest developments in food quality assessment.
•Sustainability in the food chain.
•Knowledge Management for Food Innovation.
•Food innovation and education.

2010 EFFoST Annual Meeting

10-12 November 2010 Dublin, Ireland
http://www.effostconference.com/
Attendance at this meeting will enable to you to:
•Learn from leading specialists about new developments in food science and technology with a focus on health and safety
•Share best practice in the field of food health and safety
•Present your latest research in the contributed poster sessions.
•Interact and network with interdisciplinary colleagues from industry and academia to exchange ideas and experiences
•Important dates and deadlines

Abstract submission deadline: 30 June, 2010
Early-registration deadline: 11 September, 2010

6th International CIGR Technical Symposium

TOWARD A SUSTAINABLE FOOD CHAIN, Food Process, Bioprocessing and Food Quality Management
18th - 20th April, 2011
Nantes, France
http://impascience.eu/2011_04_CIGR/

CIGR Section VI (Postharvest Technology and Process Engineering) deals with the engineering principles and technologies in postharvest and processing of agri-food products. It is devoted to follow the trends, promote the advancement and enhance the dissemination and transfer of technology in postharvest and processing at a global scale.

To fulfill better its missions, Section VI of CIGR is organizing the 6th International Technical Symposium : « Toward a Sustainable Food Chain» Nantes – France.

The event follows 5 previous similar events held in each continent, demonstrating the international profile of CIGR : China (2004), Poland (2006), Italy (2007), Brazil (2008), Germany (2009) and Canada (2010). As previous Symposiums, selected papers presented at this Symposium will be published in a special issue of Food and Bioprocess Technology – An International Journal published by Springer.

Six parallel sessions on:
• Postharvest technology
• Processing technologies applied to agricultural and food products
• Properties of agricultural products & foods
• Foods and Sensors, sensing technology and process control
• Mathematical modelling and simulation

• Product monitoring in the supply chain
• Preservation, storage, and distribution
• Engineering for food safety and security
• Energy efficiency and environmental friendliness of agri-food chain
• Agri-food processing equipment

11th INTERNATIONAL CONGRESS ON ENGINEERING AND FOOD (ICEF)

"Food Process Engineering in a Changing World"
May 22-26, 2011
ATHENS - GREECE
http://www.icef11.org/main.php

Food Engineers meet every 3-4 years at ICEF, the International Congress on Engineering and Food, that has been established as the major international event in the field. Greece was awarded by the IAEF delegates the honour and responsibility to organize the next Congress in the series. ICEF 11 will be held in Athens, 22 to 26 May, 2011.

The main objectives of ICEF 11 are to provide the forum for discussion of research results and new scientific knowledge, promote personal contact and synergism, advance interaction between academia and industry and facilitate exchange of information on new processes and equipment.

The Theme of ICEF 11 will be "Food Process Engineering in a Changing World". It will explore how food engineering can contribute to the solution of vital problems in a world of increasing population and complexity under severe constraints of limited resources of raw materials, energy and environment.

23rd IIR International Congress of Refrigeration

August 21-26, 2011
Prague, Czech Republic
www.icr2011.org

The International Institute of Refrigeration (IIR, www.iifiir.org) is the only independent intergovernmental organization which promotes knowledge of refrigeration and associated technologies that are necessary for life in a science-based, cost-effective and environmentally sustainable manner including:
•Food quality and safety from farm to consumer
•Comfort in homes and commercial buildings
•Health products and services
•Cryology
•Energy efficiency
•Use of non-ozone depleting and low global warming refrigerants in a safe manner.

IIR congresses are milestone events held once every 4 years, bringing together very large numbers of refrigeration stakeholders from all parts of the world. ICR2011 in Prague will be a highly successful event.

UPCOMING EVENTS

Meeting name	Location	Abstract deadline	Meeting dates
CIGR 17th www.bioeng.ca/cigr2010/	Quebec City Canada	January 18, 2010	June 13-17, 2010
International Probiotic Conference (www.probiotic-conference.net/)	Kosice Slovakia	April 1st, 2010	July 15-17, 2010
ASABE International Meeting (www.asabemeetings.org/)	Pittsburg, PA	October 31, 2009	June 20-23, 2010
The 2010 IFT Annual Meeting & Expo (www.ift.org)	Chicago, IL	December 15, 2009	July 17-20, 2010
UIFoST -15th (www.iufost2010.org.za)	Cape Town South Africa	February 7, 2010	August 22-26, 2010
FoodInnova (http://www.foodinnova.com)	Valencia, Spain	June 30, 2010	October 25-29, 2010
EFFoST (http://www.effostconference.com/)	Dublin, Ireland	June 30, 2010	November 10-12, 2010
CIGR 18th (http://impascience.eu/2011_04_CIGR/)	Nantes, France	September 15, 2010	April 18-20, 2011
11th ICEF (http://www.icef11.org/main.php)	Athens, Greece	September 15, 2010	May 22-24, 2011
23rd ICR (www.icr2011.org)	Prague, Czech Republic	5th of November, 2010	August 21-26, 2011

Editor's Comments
Stephanie Jung

I would like to thank our contributors from Argentina, Australia, and India for their descriptions of the food engineering program in their country, as well as Dennis Heldman for his overview of the U.S. engineering programs.

The 2010 IFT Annual meeting & Food Expo is just around the corner and hopefully the summary of the major events of the meeting is going to help you in getting ready for a great meeting. Do not miss the opportunity during the meeting to talk with the FED finalists of the graduate student competition!

This issue of the newsletter also features our FED members being awarded by IFT. Congratulations to you all! And congratulation to our new officers.

In the next issue, highlights of the IFT meeting will be reported with a photo gallery! Hope to see you in the Windy City.

Stephanie

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FEDNEWSLETTER

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