

## Registration Information

- \$1,100 Early-bird Registration Fee (U.S.) by July 11, 2014
- \$1,200 Regular Registration Fee (U.S.)

For course registration, please go to the IGP website ([www.grains.ksu.edu/igp](http://www.grains.ksu.edu/igp)) and under "Upcoming Courses" click on the "IGP-KSU Extrusion Processing" link.

Hotel rooms and other meals are not included in the registration fee.



## Hotel Information

### Holiday Inn at the Campus

1641 Anderson Avenue, Manhattan, KS  
Phone: 785-539-7531

Single/Double Room: \$99.95 + tax

A block of rooms has been reserved at the Holiday Inn at the Campus at a special rate until July 12, 2014.

Make your reservation directly with the hotel, and mention that you are with the KSU Grain Science Extrusion Course in order to obtain the special rate.

## Registration Discounts

If two or more people from the same organization enroll, each is entitled to a 10% discount. College students will receive a 20% discount on providing written endorsement of student status from a professor in their department. Students have the option of receiving two KSU Division of Continuing Education credits. Tuition and DCE charges will apply in that case, in addition to the course fee. For more details on registration for DCE credits, contact Dr. Sajid Alavi ([salavi@ksu.edu](mailto:salavi@ksu.edu)).

## Questions or Special Needs

Please contact one of the following if you have a special dietary need or are physically limited:

**IGP** ([igp@ksu.edu](mailto:igp@ksu.edu))

Phone: 785-532-4070/Fax: 785-532-6080

or

**Sajid Alavi**, [salavi@ksu.edu](mailto:salavi@ksu.edu) course instructor

Dept. of Grain Science and Industry

Phone: 785-532-2403/Fax: 785-532-4017

[www.grains.ksu.edu/extrusion](http://www.grains.ksu.edu/extrusion)

## Who Should Attend

Technical and managerial personnel in the food, pet food, and feed industries and ingredient companies desiring training in fundamentals and operations; entrepreneurs who want to set up an extrusion-based business and would like to develop a business plan; and researchers interested in learning the latest trends in extrusion processing. The course is tailored for U.S. and international participants, and presents an excellent opportunity to develop contacts with experts and industry people from all over the world.

## Comments from Past Participants

*"Every aspect was informative and some sections gave in-depth knowledge on application/processing... I have several suggestions/recommendations to take back to my company."*

*"This short course was really wonderful. Please tell me every time whenever these type of courses (are) held. I'll be grateful to join them."*

*"Awesome! Real world case studies (in the business planning session) are great. This separates this extrusion course from any other I have attended. Perfect!"*

*"I had fun and learned a lot (at the hands-on sessions). I was able to adjust fat, BPV (back pressure valve), and RPM (screw speed)."*

*"Good hands-on experience with the extruders."*

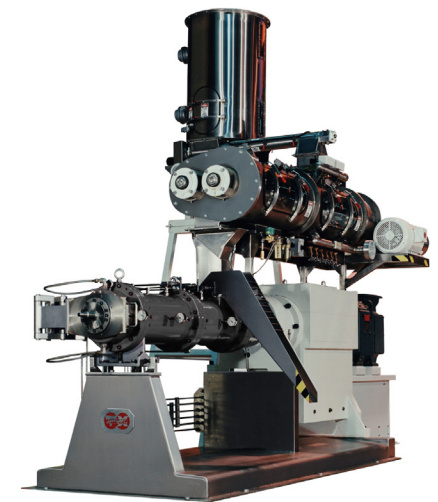
*"An excellent course. I would love to recommend (this to) anyone ... for an enrichment of fundamentals (of extrusion)."*

*"Very good high level overview (of ingredient functionality)."*

*"Good examples and practical problems (covered under troubleshooting)."*



## Extrusion Processing: Technology and Commercialization



**August 5-8, 2014**

IGP Conference Center  
Dept. of Grain Science and Industry  
Kansas State University  
Manhattan, Kansas USA

**Optional Supplement:  
Pet Food Workshop**

August 4, 2014

**KANSAS STATE**  
UNIVERSITY



## Course Description

### This course will cover topics including:

- principles of extrusion processing
- raw material selection
- equipment and control systems
- post-processing operations
- extruded products (including breakfast cereal, snacks, textured soy protein, pet food, and feed for poultry, animal and aquatic species)
- business planning and commercialization
- lab sessions and hands-on experience with pilot-scale extrusion equipment

The course is jointly organized by the Dept. of Grain Science & Industry and Dept. of Agricultural Economics at Kansas State, with active participation by industry partners. The Kansas State Extrusion Lab has a strong emphasis on service, research and teaching and is primarily housed in the Bioprocessing and Industrial Value-Added Program building. It has a variety of facilities including lab-scale and pilot-scale twin and single screw extruders, and a pilot-scale gas-fired dryer.

## Learn the Basics of Extrusion and Business Aspects

Extrusion processing of food and feed products is a multibillion dollar industry in the U.S. and Europe. This course will cover the state-of-the-art technology including different types of extruders, dryers and control systems. The processing of various food, pet food and feed products will be described. Participants will be exposed to sensory evaluation of foods, a critical step in the product development process, through a special hands-on lab session. The intricacies of setting up an extrusion-based

business will be addressed including capital decision making and strategic planning. Case studies will be conducted with emphasis on both U.S. and developing world markets.

## Speakers

**Koushik Adhikari**, Associate Professor  
Food Science, University of Georgia

**Sajid Alavi**, Professor  
Grain Science and Industry, KSU

**Vincent Amanor-Boadu**, Associate Professor  
Agricultural Economics, KSU

**Fadi Aramouni**, Professor  
Food Science Institute, KSU

**Michael Bachelor**, Engineer  
Bachelor Controls, Inc., Sabetha, KS

**Topher Dohl**, Research Coordinator  
Wenger Manufacturing, Inc., Sabetha, KS

**Keith Erdley**, Drying Technical Service  
Wenger Manufacturing, Inc., Sabetha, KS

**Douglas Hanify**, Director of Technology  
Spray Dynamics, Ltd., St. Clair, MO

**Eric Maichel**, Extrusion Lab Manager  
Grain Science and Industry, KSU

**Brian Plattner**, Process Engineering Manager  
Wenger Manufacturing, Inc., Sabetha, KS

**Brad Strahm**, Principal  
The XIM Group, LLC, Sabetha, KS

**Bhadriraju Subramanyam**, Professor  
Grain Science and Industry, KSU

**Note:** A significant feature of the IGP-KSU Extrusion Course is a hands-on session on the science and practice of sensory evaluation and consumer acceptance studies for new products.

## Course Outline

### Day 1 – August 5 (Tuesday)

**7:30 a.m.** Registration

**8:00 a.m.**

- Ingredient Functionality
- Extrusion Hardware and Design
- Extrusion Operation and Process Variables
- Extrusion Applications – Feed and Pet Food

**12 Noon** Group Luncheon

**1:00 p.m.**

- Drying and Toasting
- Hands-on Session on Pilot-Scale Extruders

**6:00 p.m.** Banquet

### Day 2 – August 6 (Wednesday)

**8:00 a.m.**

- Extrusion Applications – Food
- Coating of Snacks and Cereals
- Extrusion Control Systems
- Extrusion Troubleshooting

**12 Noon** Group Luncheon

**1:00 p.m.**

- Principles of Die Design
- Hands-on Session on Pilot-Scale Extruders

### Day 3 – August 7 (Thursday)

**8:00 a.m.** Textured Soy Protein

**10:00 a.m.** Instrumental/Analytical Techniques

**11:00 a.m.** Field trip to Wenger Manufacturing

### Day 4 – August 8 (Friday)

**8:00 a.m.**

- Sensory Aspects of Extrusion Products
- Overview of the Product Development Process
- Plant Sanitation and Pest Management

**12 Noon** Group Luncheon

**1:00 p.m.**

- Business Plan: Capital Decision Making
- Business Plan: Strategic Planning
- Case Study and Active Interaction

## Special 10-Year Edition

### Optional Supplement: Pet Food Workshop August 4, 2014

This is the 10th anniversary edition of the KSU Extrusion Course. Register for an optional supplemental one-day Pet Food Workshop on August 4, 2014. This workshop can be attended as a stand-alone participation or together with the Extrusion Processing: Technology and Commercialization Course.

The Pet Food Workshop will consist of industry experts and academic speakers from the area of pet nutrition and processing, and will provide latest information on pet food ingredient trends, nutritional requirements for dogs and cats, specialty treats, sensory evaluation/palatability tests and safety/HACCP issues. It will also include a “capstone lab session” involving formulation exercises for pet food recipes.

## Registration Information

*(Only for Optional Supplement:  
Pet Food Workshop)*

\* \$200 Early-bird Registration Fee (U.S.)  
by July 11, 2014

\* \$250 Regular Registration Fee (U.S.)

No registration discounts other than the “Early-bird” discount applicable for the Optional Supplement. To register for the Pet Food Workshop on August 4, visit the IGP website ([www.grains.ksu.edu/igp](http://www.grains.ksu.edu/igp)) and under “Upcoming Courses” click on the “IGP-KSU Pet Food” link. For more details on this Supplemental Pet Food Workshop, please contact Dr. Sajid Alavi ([salavi@ksu.edu](mailto:salavi@ksu.edu)).