

# DEPARTMENT OF FOOD SCIENCE

## Strategic Plan 2008-09 through 2012-13



*College of Agricultural Sciences*

*April 24, 2009*



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# STRATEGIC PLAN 2008-2013

## DEPARTMENT OF FOOD SCIENCE

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### VISION STATEMENT

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The Department of Food Science will be a leader in the integration of teaching, research and service, recognized nationally for its preeminent undergraduate program and internationally for innovative research in the context of graduate education.

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### MISSION STATEMENT

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The Department of Food Science provides science, education, and outreach contributing to an abundant supply of affordable, safe, nutritious, and appealing food.

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### THE NATURE OF THE DEPARTMENT

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Penn State has a large and comprehensive department of food science with strengths in the research, education and outreach missions as well as in the core disciplinary areas of chemistry, engineering, microbiology and to a lesser degree nutrition. Our new facility, the largest food science building in the United States, has strengthened our ability to accomplish our programs and positions us for growth. Administratively, the department is located in the College of Agricultural Sciences where among the programs in the college, it represents the part of the food system closest to and most influenced by the consumer. (Appendix 1 contains further discussion of the nature of food science as well as the relationship between the Department of Food Science and the food system).

A sustained recruitment effort initiated in the last planning cycle has been very successful. The number of students enrolled has grown consistently while maintaining academic standards (Figure 1). We now have one of the largest food science programs in the US with facilities that will allow further growth. The new laboratories, pilot plants, classrooms and our unique access

to a real manufacturing facility—the Berkey Creamery—have all strengthened our teaching programs. Our students further enrich their coursework with internships, international experiences, and research and through leadership opportunities in our active Food Science Club. Graduates continue to enjoy excellent employment prospects and report high levels of satisfaction with the program. We maintain strong connections with our alumni and food industry professionals through the Food Industry Group (FIG), alumni social events and online social networking.

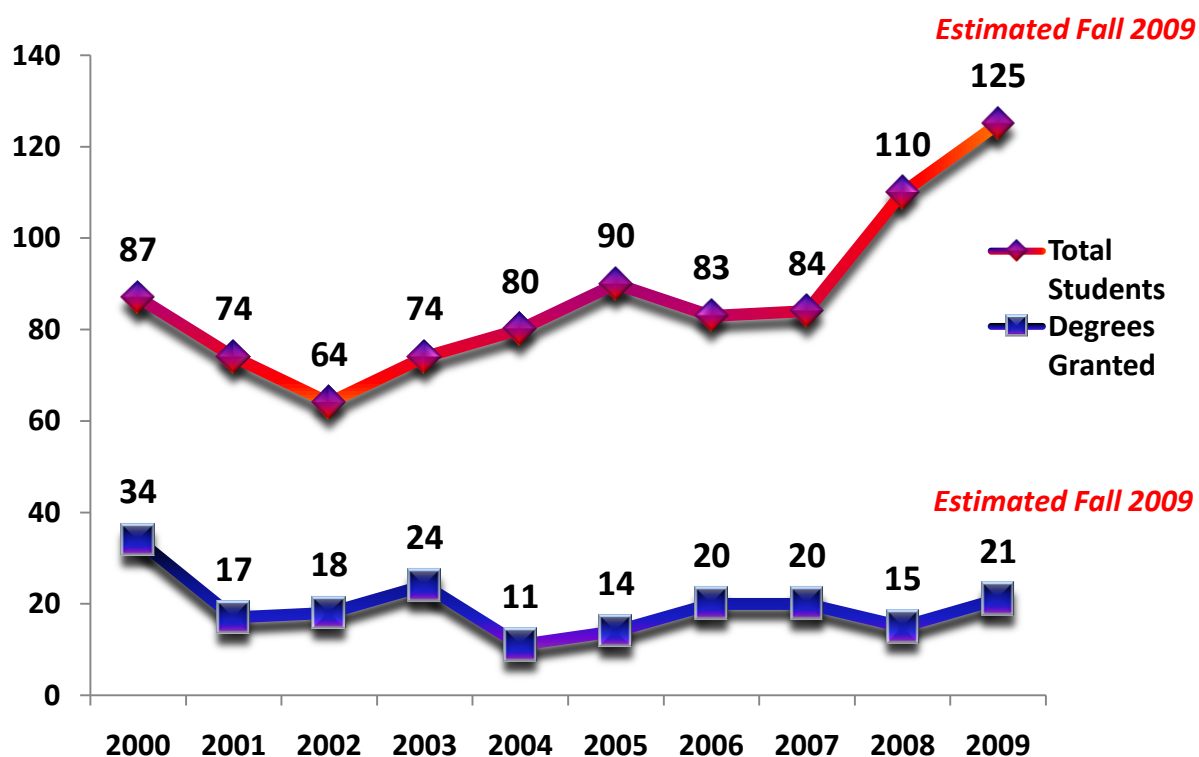


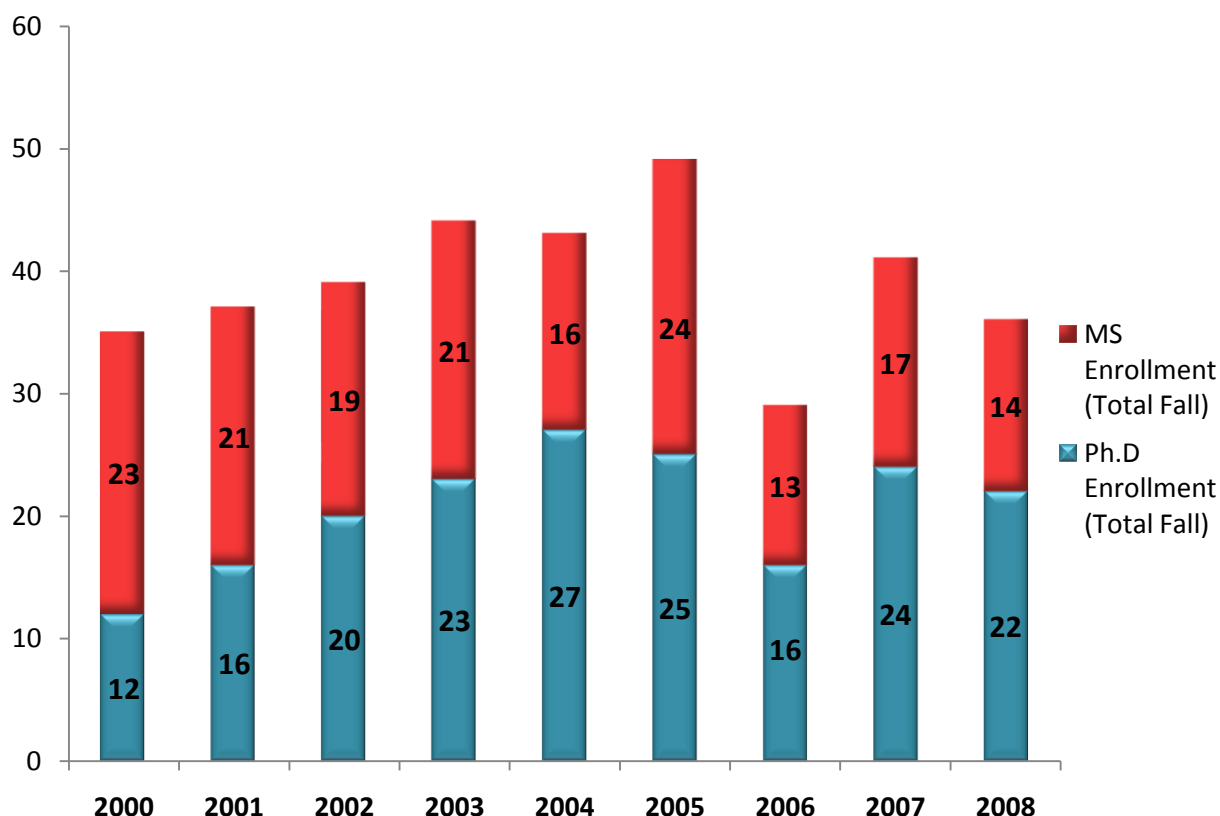
Figure 1: Total undergraduate enrollment with time

The department maintains strong and productive research programs in the disciplines traditionally associated with food science. For the past decade we have structured our research efforts around six impact groups. The cocoa, chocolate and confectionery; the dairy foods manufacturing; and the plant and mushroom products groups provide expertise in commodities traditionally important in Pennsylvania. The food safety group and the ingredients as materials groups provide basic science support. The family and community food systems group represents our efforts in community nutrition education. In the current planning cycle, we will reconsider our existing research organization in the light of the growing importance of health and wellness initiatives.

As a complement to our internal efforts, the Center for Food Manufacturing (CFM) is a university-industry research partnership housed in the department with a vision of transforming the food industry from recipe-based to performance-based manufacturing. The

CFM attracts a large group of technical specialists from the food processing industry for biannual meetings at University Park. These meetings provide a showcase for departmental research efforts, and they have provided insight for faculty into the practical applications of their research.

We effectively integrate our graduate teaching and research missions in graduate education. We have consolidated the course requirements at the graduate level and increased the breadth of optional courses available. The number of graduate students enrolled has increased in recent years. The number of PhD students exceeded the number of MS students for the first time in 2004, suggesting an increased depth to our research efforts.



*Figure 2: Number of MS and PhD with time*

The Department of Food Science has provided outreach and/or training programs (e. g. Food Microbiology Short Course, Ice Cream Short Course, Ice Cream 101, Pasteurizer Operators Workshop, Cultured Dairy Products Short Course, HACCP, and Sanitation Short Course) to the food industry since its foundation. The improved facilities in our new building have allowed us to strengthen our outreach activities. With travel costs escalating, the food industry is turning to alternative, on-site training opportunities for their employees and we are considering on-line/distance education options for our outreach programs.

The Berkey Creamery housed in our department is the largest facility of its type in the United States, and our teaching, research and extension/outreach programs benefit from its presence.

Our undergraduate students use the production-scale facility in their classes and for work experiences a creamery Internship can provide. Our graduate students use the creamery facilities to conduct practical research in a real manufacturing setting. Access to the facility and practical manufacturing expertise strengthens our extension and outreach programs. The expanded salesroom raises our profile on campus and provides us a showcase for our programs that we will develop in this planning cycle.

More quantitative measures of the size and scope of the department and changes over time are provided in Appendix 2.

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## DIRECTIONS FOR CHANGE

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The future strength of our department lies in the importance of the questions we address. At a global scale, the twin problems of hunger and obesity, the relationship between diet and wellness, and the consequences of our choice to process food crops for energy uses all demand and understanding of the science of foods. More locally, the food processing industry is an important part of the state and national economy and historically a part that has been relatively resistant to recession. The success of the food industry depends on the skills of our graduates as well as the outreach education and research solutions offered by the department.

Our department has a long history of using strategic planning to guide our development (summarized in Appendix 3). In our previous plan (2005-08), we looked at strategic change in the department in response to four major initiatives: improving consumer health and wellness, enhancing the undergraduate program, the move to our new building and ensuring the atmosphere in the department supports our values. We made progress towards all of these initiatives but they remain important and they provide a helpful thematic introduction to the 2008-2013 plan.

### **INITIATIVE 1: IMPROVE CONSUMER HEALTH AND WELLNESS**

The proper role of food science in supporting a healthy diet was a major feature of the last planning cycle and identified the “human-food interface” as a productive area of study. To be effective we need to think beyond a traditional producer focus towards an understanding of the perspectives of consumers on food and the consequences of their dietary choices. In response to this challenge, we have repositioned our existing research programs, formed partnerships outside the department, and hired new faculty members to expand our internal research base.

- **New Partnerships** – Many of our faculty members have developed research partnerships with researchers at Penn State and elsewhere to answer questions connected to the health consequences of food. For example, Dr. Bob Roberts is partnering with the Georgetown University Medical Center to develop a probiotic drink and test its effectiveness on the microbial fauna and health outcomes in children; Dr. John Coupland is working with neuroscientists in the Department of Nutritional Sciences and the Hershey Medical Center

to investigate the ways the taste and rewarding nature of how fat affects eating behavior; and Drs. Dudley and Knabel are collaborating with scientists and clinicians at the Hershey Medical Center on a research project aimed at developing novel molecular subtyping methods for tracking and controlling community and healthcare associated Methicillin-Resistant *Staphylococcus aureus* (MRSA).

We have also held a series of retreats with the Department of Nutritional Sciences to strengthen collaborative links between faculty members. Developing these connections is an important feature of our plan for the next five years.

- **New Faculty** – Within the last two years, we have hired four new tenure-track faculty members. We hired new faculty members (Ryan Elias, Josh Lambert) with expertise in food chemistry and an interest in health and wellness issues. Dr. Elias' program is focused on oxidation processes in food and their control while Dr. Lambert has training as a toxicologist and is interested in the mechanisms by which food components in the diet can affect health outcomes. Together and in collaboration with existing programs in the department, they provide a connection between the chemistry and properties of food and the chemistry and health of the consumer.

Food choice is a second key aspect of the human-food interface; only when food is selected and eaten can its components affect the biology of the consumer. Dr. John Hayes will join the faculty as a sensory scientist with interest in food preference and choice.

A third way food affects health is through promoting or inhibiting the activity of beneficial bacteria present in human intestines, and by serving as a potential source of bacteria that cause illness. Dr. Ed Dudley is a new faculty member with expertise in molecular microbiology applied to the important food pathogen *E. coli* O157 H7. In the current plan we are seeking to hire a microbiologist interested in the human gut as a microbial ecosystem vital to health.

## **INITIATIVE 2: ENHANCE THE FOOD SCIENCE UNDERGRADUATE PROGRAM**

In the last planning cycle we set a goal of strengthening and growing our undergraduate program. Since then our undergraduate program has grown from 90 to 110 (fall 2005-fall 2009) while maintaining near full employment for our graduates and high academic standards (for example 34 out of 110 students in fall 2008 made the Dean's list). We have achieved substantial growth in our undergraduate program largely by setting strategic direction (summarized in Appendix 5) and the concerted hard work of a team of faculty and staff. In particular, the dedicated support of Dr. Naveen Chikthimmah, our recruitment coordinator, has provided the level of focused effort and personal attention that is largely responsible for our success. In the next strategic planning cycle, we look for further growth while ensuring our standards are not compromised.

We also began a process of defining measurable learning outcomes for our undergraduate program. We will complete this effort in the current planning cycle and look at ways we can change our curriculum to deliver these outcomes more effectively and efficiently.



**INITIATIVE 3: COORDINATE OUR MOVE INTO THE NEW BUILDING TO MAKE THE BEST USE OF OUR NEW RESOURCES AND OPPORTUNITIES**

Physically moving into the new facility was a significant and critical task effectively accomplished in the previous planning cycle. Our ongoing efforts involve ways to use these new resources to transform our programs. Very often, this requires making changes to align faculty and staff responsibilities to take advantages of the new opportunities. For example, we are able to take better advantage of the new pilot plants as part of our industrial outreach efforts because we were able to hire Dr. Kerry Kaylegian, pilot plant coordinator/director of industrial outreach, to support these connections. In the next planning cycle, we seek to develop similar personnel support for our teaching laboratories.

**INITIATIVE 4: ENSURE THE ATMOSPHERE IN THE DEPARTMENT REFLECTS OUR VALUES**

In the previous planning cycle, we considered the values we hold as a department (Appendix 6) and identified three for special attention: respect, leadership and scholarship. We made progress in each of these areas, a reenergized social committee organized some memorable and well-attended events, faculty and staff were able to participate in leadership development programs, and our seminar series has been enhanced. In the current plan we will look at the value of scholarship throughout our planning efforts as well as maintaining a supportive environment for members of the department.



These three initiatives informed our current strategic planning process but as part of the planning process we decided to shift the format and look at how they apply to our efforts on a program-by-program basis. (Details of the planning process used are included in Appendix 3). Our 2008-2013 plan is structured around: research, undergraduate education, graduate education, outreach programs, as well as the academic support units essential to our success. Finally, a sixth section is added on the changes in departmental operations needed to support these programs.

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## STRATEGIC INITIATIVES 2008-09 THROUGH 2012-13

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### RESEARCH

Strategic initiatives in research are usually considered part of a subset of graduate education, but here we consciously separate our initiatives for research productivity from those for educational outcomes (see *Undergraduate Education*).

#### Goal 1: Secure resources to support quality research

- a) Fill two remaining open faculty positions: microbial ecology of the human gut and biomolecular materials science (food engineering/packaging). Position descriptions are provided in Appendix 7.
- b) Solicit funds from both traditional and non-traditional sources including:
  1. Competitive grants – increase submissions to a broader range of programs and agencies
  2. Industry – actively seek collaborations with industry including building strategic alliances
  3. Foundations & NGO's – research on health and wellness, as well as, environmentally sustainable food systems should position the department for funding from non-governmental organizations
- c) Build endowments for support of research through faculty chairs and graduate fellowships (see also *Departmental Operations* Goal 1).
- d) Increase research support from services (pilot plant use, sensory evaluation center, instrumentation facilities, and short courses).
- e) Expand the Center for Food Manufacturing with increased company membership and faculty participation.

#### Goal 2: Facilitate collaboration both internally and externally

- a) To better facilitate collaboration, consider the restructuring of the impact groups.
- b) Build strategic relationships with international universities.
- c) Appoint more adjunct faculty and courtesy appointments and encourage our own faculty to seek courtesy appointments in other departments.
- d) Pursue collaborative research initiatives with the Department of Nutritional Sciences and Hershey Medical Center.
- e) Lead/participate in college efforts on the food/fuel/fiber system especially in bioplastics and biopolymers.
- f) Increase interaction with the Huck Institutes of the Life Sciences, especially as it relates to infectious disease.

#### Goal 3: Improve the intellectual atmosphere of the department

- a) Strengthen the seminar series:
  1. Encourage each faculty member to present a seminar, preferably a paper presented at an international conference, once every two years.

2. Develop sources for funding outside speakers.
  3. Require post-docs to give a seminar.
  4. Use the EA Day funds to invite leading speakers from outside Penn State.
- b) Continue emphasis on funding and training of Ph.D. students.
  - c) Use departmental resources to recruit the best, most diverse students possible.

## **OUTREACH**

Our vision is for Penn State Food Science to be the recognized leader in the integration of food science outreach teaching, research and service to meet the needs of the food industry and public by developing and delivering outreach programs that increase the competitiveness and profitability of the food industry and enhance the well-being of the public. To that end we will pursue three goals.

### **Goal 1: Address the educational and research needs of the food industry, food entrepreneurs, and the consuming public**

- a) Develop and disseminate a needs/resource assessment and use the findings to prioritize our outreach programs with regard to: our target audiences; faculty and staff resources required; returns to the department; and how this information aligns with university, college and departmental strategic goals.
- b) Identify and evaluate new or existing outreach programs that can be offered on-line.
- c) Increase the visibility of the department's capabilities and facilities by:
  1. Marketing faculty expertise for industry-sponsored research projects, outreach activities, and industry training.
  2. Continuing to promote our pilot plant facilities.
  3. Developing new and continuously updating existing Food Science outreach-related websites, brochures and other marketing materials.
  4. Work with the College of Agricultural Sciences, Office of Conferences and Short Courses, to develop a system for maintaining and enhancing accurate, up-to-date databases for managing and advertising outreach programs.
  5. Increasing the use of the pilot plants in department-sponsored short courses by food industry personnel and food entrepreneurs.
- d) Serve the technical and educational needs of the food industry by supporting the college's strategic effort to hire two food processing educators in the Capitol and Southeast regions of PA. These individuals will interact with Food Science faculty and staff to provide new and established food processors and food entrepreneurs with guidance and resources to ensure their economic viability and longevity.
- e) Serve the educational needs of the general public by supporting the college's strategic effort to hire an extension nutrition/health faculty member. This person will interact with Food Science faculty and staff and be responsible for developing community nutrition education and programs (e.g., weight management for adults and youth, diabetes education, dealing with aging health related issues).

### **Goal 2: Identify new and strengthen existing outreach partnerships at the departmental, university, state, national, and international levels**

- a) Partner with local, national, and international agencies to develop and disseminate educational programs to the food industry.
- b) Lead efforts to develop regional (e.g., Mid-Atlantic, Northeast) collaborations in one or more outreach program areas to reduce redundancy, increase efficiency, and expand our reach to a broader food industry clientele.

### **Goal 3: Provide leadership and support to Cooperative Extension Issues**

Identify, plan, and organize Food Science extension-related initiatives that are consistent with the college's reframing of Cooperative Extension.

## **UNDERGRADUATE EDUCATION**

### **Goal 1: Improve the quality of undergraduate education in food science**

- a) Complete the development of educational objectives for the food science curriculum, and use this list of outcomes to assess the food science curriculum. Based on the assessment, revise the curriculum as appropriate.
- b) Improve quality of teaching by encouraging interaction among faculty members to share best practices.
- c) Improve quality of academic advising by ensuring that all faculty member advisors are aware of the current resources and protocols.
- d) Maintain and upgrade equipment and facilities in the teaching labs. Develop a plan for obtaining needed equipment and instrumentation, and for keeping equipment and instrumentation in good repair. The plan should include financial and staff resources.
- e) Assess allocation of resources in support of extracurricular activities.
- f) Consider offering specific courses by methods other than in a traditional resident education format. Two possible courses that might be offered by distance education are "Food Facts and Fads," FDSC 105, and "Introduction to Food Science," FDSC 200.



### **Goal 2: Enhance recruitment and retention**

- a) To enhance student retention in the major, develop food science courses designed for first-year and second-year students. In particular, further developing a first-year seminar with an emphasis on issues related to food science.
- b) Actively recruit students into the major, according to the strategic plan for recruitment (Appendix 5). To ensure that recent success in recruitment continues, maintain the current level of personnel resources in support of recruitment activities.
- c) Develop an enrollment target for total number of undergraduates and for the demographic distribution of enrollment among first-, second-, third-, and fourth-year students. Ensure that the academic quality of incoming students remains high and that

the target enrollment number is consistent with the high educational quality of the program. Taking into account the educational quality of the program and the limitations of personnel and physical resources, our current total enrollment goal is 150 students.

### **Goal 3: Consider new and/or revised programs**

This could include new majors closely related to food science (administered within the Department of Food Science), new options for the food science major and an integrated B.S./M.S. program in Food Science.

## **GRADUATE EDUCATION**

### **Goal 1: Improve Educational Outcomes for Graduate Students**

We will evaluate curriculum requirements and outcome expectations for the Master of Science and Doctor of Philosophy degrees in Food Science and implement procedures to help students achieve these outcomes in a timely manner. We will make recommendations to modify our graduate course offerings and curriculum requirements so that they are in line with the defined outcomes of our program.

- a) Review expectations and more clearly define differences in educational outcomes between the M.S. and Ph.D. degree programs.
- b) Ensure adequate student progress in the graduate program by outlining strategies to encourage communication between graduate students, their thesis advisor, and their thesis committee so that research objectives are clearly defined early in the program and timely progress toward their completion is achieved.
- c) Finalize changes to Fundamentals of Food Science, 597A-D.
- d) Make recommendations to the faculty on new graduate courses that utilize the expertise and interests of our faculty members, address emerging areas of food science, and that take integrative and multidisciplinary approaches towards subject matter.
- e) Consider new ways of offering Food Science graduate degrees within our department such as identifying areas of emphasis in Microbial Food Safety, Homeland Security, Packaging, or Sensory Science or offering joint degrees with other departments.

### **Goal 2: Recruit graduate students of the highest quality**

- a) Develop new recruiting materials both online and for general distribution to other departments throughout the country.
- b) Develop strategies to increase the diversity of our program by recruiting students from underrepresented groups (including domestic students), and those from the basic science and engineering departments.
- c) Evaluate our admissions process and make improvements to it so that it is more rapid, transparent, and effective.



## ACADEMIC SUPPORT UNITS

The new Food Science Building maintains three unique food manufacturing pilot plants, a sensory evaluation center and a licensed creamery that are recognized strengths of the food science department. These facilities contribute to the teaching, research and outreach mission of the department. Additional opportunities for the pilot plants to more fully support the department's mission are evident. These academic support units are in a unique situation to support the department for the foreseeable future.

### **Berkey Creamery Goal: Use the processing facility to enhance the teaching, research, and outreach endeavors of the department**

- a) Improve the quality and safety of the creamery products by implementing an effective recall plan for the numerous cultured dairy products manufactured by Berkey Creamery.
- b) Maintain the equipment in the production rooms and update or replace them when needed. Plan for their eventual replacement on a scheduled basis so that teaching quality will not be compromised.
- c) Increase the exposure of programs, short courses and undergraduate recruitment opportunities in the College of Agricultural Sciences in general, and the Department of Food Science in particular.
- d) Support internships that support the development of students in Food Science.

### **Pilot Plants Goal: To enable the Food Science Pilot Plants to be state-of-the-art facilities supporting education, research, and outreach**

- a) Develop and implement a budget for the pilot plant to provide the resources (staff, materials, maintenance) needed to meet the goal of the facilities.
- b) Develop and implement a standardized contract to facilitate industry use of the Pilot Plants.



### **Sensory Evaluation Center Goal: An active sensory center supported by contract projects which provides resources to researchers and educational opportunities to students**

- a) Maintain sufficient projects to support the operating costs of the laboratory (labor, supplies, hardware, software, etc.) by promoting the facility through:
  1. Advertising materials and website
  2. Participation in college and departmental facility tours
  3. Presence at trade shows
- b) Minimize use of resources by selecting sustainable and efficient practices.
- c) Support internships and wage payroll opportunities that support the development of students in Food Science.

## DEPARTMENTAL OPERATIONS

The Departmental Operations section addresses the ability to efficiently utilize our facilities and resources in order to promote our department and programs in a positive atmosphere that reflects our values. Following a decade of budgetary cuts and recycling, the department's budget was reduced or remained flat and we anticipate further reductions in the future. As a result of these and other cuts, nearly every category of departmental spending has been significantly reduced. A consequence of this has been a reduction in staff numbers while at the same time, many administrative functions from the university and college have been transferred to the unit level.

### Goal 1: Increase departmental financial support through increased endowments

During the building campaign, the department did very well at generating support for the new building. Our goal is to continue to build on that momentum and further increase support for our students, faculty and programs.

- a) Develop a strategically targeted campaign message and goals with the Development Office
- b) Pilot a new development collaboration project within the college where the Development Office assigns an associate director of development to strategically target funds for the Department of Food Science.
- c) Actively participate in *The Campaign for Penn State Students* where departments assist in raising student support funds.

### Goal 2: Improve departmental infrastructure

Within the last year, the department has seen a reduction in its staff size by the loss of two staff positions, the most noticeable of which is the receptionist position which often handled a myriad of support duties. As a result, the duties have been absorbed by overwhelmed staff that are already handling multiple job functions. In order to keep pace with an ever-changing work environment, the department must find new ways to ensure high quality administrative support and greater continuity.

In addition, one of the biggest successes our department has witnessed over the past several years has been the addition of a recruitment coordinator. Through the creation of this new position, the department's undergraduate enrollment continues to climb largely due to the personal, one-on-one interactions with potential students. It is our goal to maintain this position on an ongoing basis.

- a) Work with staff to build cross-functional teams to address competing workload issues.
- b) Build more breadth and depth among staff by fostering cross-training opportunities to allow staff to acquire new skills.
- c) Increase employee recognition to demonstrate value and respect for their efforts.
- d) Continue support of the recruitment coordinator position to continue upward student enrollment levels (see also *Undergraduate Education Goal 2*).
- e) Find new ways to increase staff size and ensure equitable workload distribution. For example, hire a staff assistant to assist with development fund raising goals, monitor

giving contributions, as well as assist with other departmental duties where there is insufficient staffing.

**Goal 3: Continue to foster a welcoming environment and a positive atmosphere for working and learning**

The department continues to have a keen awareness of shared values that are designed to better attract and retain students, faculty and staff. Such values are essential to fulfilling our mission with integrity, while we constantly seek ways to promote diversity, respect, leadership and scholarship.

- a) Continue to sponsor events designed to support morale and mutual respect that are well attended and popular.
- b) Look for new ways to promote diversity through social events that build a positive *esprit de corps*.
- c) Continue to encourage faculty and staff to participate in leadership programs and professional development opportunities.
- d) Continue to promote scholarly engagement through seminars with internal and external speakers, collaborative research discussion groups, and honors and awards.

**Goal 4: Improve departmental communications**

Due to the new logistical layout and dispersal of the administrative offices and faculty and student offices, there is no longer a centralized point of interaction. We must find new ways to streamline and foster positive communications within the department to help bridge the communication gap.

- a) Develop a communication structure to disperse news and information in a timely fashion. This may include use of the website and/or the development of a newsletter.
- b) Install a visitor board to promote tours, company visits and visits by other public and/or government officials.

**Goal 5: Package departmental duties in supporting college events**

Departmental resources are used to support various college events and programs (i.e., Ag. Progress Days, Farm Show, Spend-a-Summer Day, etc.) which are important but impact already limited departmental resources.

- a) Develop a marketing strategy based upon determining which events are better suited for promoting teaching, student recruitment, promoting cutting-edge research, and/or outreach.
- b) Form faculty and staff work groups to focus on specific events, based upon the marketing strategy for each event.
- c) Develop promotional materials that can be used for multiple events

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**RELATIONSHIP TO THE COLLEGE OF AGRICULTURAL SCIENCES  
2008-09 THROUGH 2012-13 STRATEGIC PLAN**

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The college's 2008-2013 Strategic Plan is focused around six strategic initiatives.



- a) Entrepreneurship
- b) Water quality and quantity
- c) Energy
- d) Food, diet and health
- e) Pest prediction and response
- f) Enhancements to the student experience for resident, distance, and extension students

While programs in the Department of Food Science may overlap with many of these, our major efforts are in (a), (d) and (f).

**(a) Entrepreneurship** – Our outreach efforts have traditionally been focused on supporting existing food companies but we are placing an increased emphasis on providing the resources entrepreneurs need to succeed. Initiatives to support entrepreneurship through outreach programming are found in the *Outreach* and *Academic Support Unit* sections of the strategic plan.

**(d) Food, Diet and Health** – In recent years the relationships between food with diet and between diet and health have emerged as driving questions for food scientists. Many of our research initiatives are based on supporting these efforts, in particular supporting and developing new and existing faculty members.

**(f) Enhancements to the student experience for resident, distance and extension students**

The Department of Food Science has maintained a strong student-centered approach to all of its programs. Important initiatives in this plan include:

- A major effort to define and track learning outcomes at both the undergraduate and graduate level.
- Focus our outreach programming on measured stakeholder needs.
- Enhancing the use of pilot plants, Berkey Creamery manufacturing facilities and sensory evaluation center to support educational efforts.
- Improving the effectiveness of our teaching labs through improved staffing.

The Strategic Framework for Diversity in the College of Agricultural Sciences (covering the period 2004-2009) emphasized four important issues addressed in this plan as:

- **Campus climate/intergroup relations.** See *Departmental Operations* Goals 3 and 4
- **Access/success.** We anticipate continued growth of both our undergraduate and graduate programs and supporting diversity is emphasized in our recruitment plans.
- **Education/scholarship.** Improving educational outcomes is considered in relation to undergraduate, graduate and outreach students and improving scholarship is considered in *Research* Goal 3.
- **Institutional viability/vitality.**

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## RESOURCES AND PRIORITIZATION

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The majority of the initiatives planned do not require additional resources and will be accomplished as part of normal departmental operations. However, the department is in a position to grow substantially as a result of its new facilities and the relevance of its programs as a part of a consumer-focused college. To realize this growth will require investment.

First, we have two faculty positions (microbial ecology of the human gut and biomolecular materials science essential to *Research* Goal 1) approved and ready to begin the search. Position Descriptions are included as Appendix 7. We also support the college initiative for an extension nutrition/health faculty member responsible for community nutrition education and programs (*Outreach* Goal 1).

Second the staffing levels in this department have been historically low compared to the rest of the college and have recently fallen further. We seek new support for:

- Undergraduate Education Goal 1: Additional staff and financial support for the teaching labs.
- Departmental Operations Goal 2: Increased main office staff support (e.g., a staff assistant to assist with development fund raising goals, monitor giving contributions, as well as assist with other departmental duties where there is insufficient staffing.

and continuing support for:

- Undergraduate Education Goal 2: Continued support for a recruitment coordinator
- Academic Support Units, Pilot Plant Goal 1: Continued staff support for pilot plant operations.

Beyond the department, we also support the college's goal for:

- Outreach Goal 1: Support the college initiative to hire two food processing educators in the Capitol and Southeast regions of PA. Note these individuals need not be based in the Department of Food Science.

It should be stressed that in some of these cases the resources will be generated from within the department and by generating external revenue streams but some will need temporary support from the college.

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## APPENDIX 1

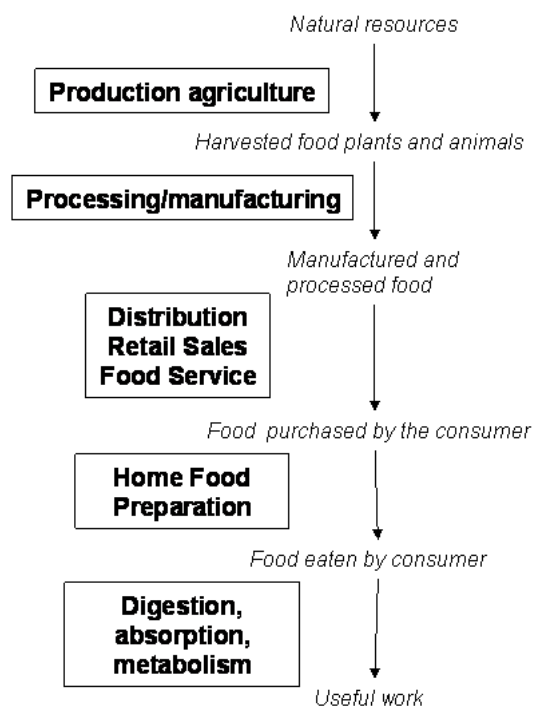
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### THE ROLE OF THE DEPARTMENT OF FOOD SCIENCE IN THE FOOD SYSTEM

**What is "the" Food System?** The food system may be thought of in several complementary ways:

- As a system within the larger economic environment, as part of a “consumer culture.” As a segment of the economy. It includes all those activities contributing to the generation of food (meaning what the consumer eats).
- As a hierarchical set of systems: local, regional, national or international.
- As a description of paths of information flow and its interpretation, especially from customer to provider.
- As a description of customer/provider relationships. In each relationship the provider must understand the desires of the customer, and ideally the relationship will take into account the desires of all customers beyond that up to the consumer.
- As a description of the paths of material flow toward consumer. As such, it can be useful for determining economic "value added."

In the context of this plan it is most helpful to focus on the last, “material flow” view of the system. A highly simplified figure summarizing some of the steps in this system is shown right. Production agriculture is all of the processes of growing plants and animals and converting them to products not directly consumable. Food processing and manufacturing is all of the steps needed to convert these products into something that can be sold as food or a food ingredient. This might be as simple as a farmer washing apples for farm-gate sales but more likely involves some industrial operations at another site (e.g., processing the apples to make canned pie filling or pectin to sell to a jelly manufacturer). The next steps describe the diverse paths that these products may take before being purchased by the consumer. Often this will involve a wholesale-retail chain but the food service path is increasingly important. The purchased food may be subject to further processing by the consumer in the home (i.e., cooking) but is finally eaten. The last stage of the process takes place inside the human body and describes the breakdown of food molecules and their biological use. This does not describe all of the food eaten but is probably valid for most of the typical American diet.



In a free market, the driver of material flow in this system is consumer preference as perceived by the suppliers (hence information flow in the reverse direction is crucial to understanding the above diagram). However, consumer preference may only be expressed in response to choices offered. Food companies will typically exert as much influence as possible to harness the power of consumer choice in the food system for economic gain. A food product is a brand which draws value from both its material properties and also from the psychological and sociocultural benefits it brings to the consumer. A food company seeking to increase its brand value may seek to use food science to improve the material properties of the product but will more often resort to marketing in an effort to influence the intangible aspects. In practice, working food scientists often report to a marketing department and this relationship reveals the fact that material properties are only one contribution to the overall brand value of the product. Importantly a consumer's *perception* of the product is likely to have huge influence on the purchase decision and hence the whole food system regardless of the actual material properties.

The food dollar is not equally spread over all sectors of the system and is concentrated approximately equally in the food service and food retail sectors, significantly less in the food processing/manufacturing sectors and much, much less in the production agriculture sectors. The College of Agricultural Sciences is skewed almost exclusively to the production side of the system and the Department of Food Science to the production and manufacturing sectors.

### **What is Food Science, and how does it relate to "the" Food System?**

Food science is currently understood among its practitioners in the US as a group of disciplines (chemistry, microbiology, engineering, nutrition) brought to bear on scientific and technical questions concerning the material nature of food. Often the questions addressed by food science are related to practical problems associated with unit operations in food processing and manufacturing. Since industrial processes are designed based on engineering principles (even if based on recipe knowledge), answers to the science questions are often applied based on engineering-based analyses. There is no conceptual basis for excluding a scientific discipline from food science as long as it may be brought to bear on food-related questions. The traditional emphasis on certain disciplines is largely historical. Food science is not itself a discipline.

Scientific and technical questions concerning the material nature of food can occur at any stage of the food system. Typically these are focused in the processing and manufacturing sectors but may arise during distribution, in food retail and service sectors, during home preparation or even in the food as it passes through the human body.

Food science is important in transforming the economic value of agricultural produce as it contributes to the viability of the processing and manufacturing sectors, in particular the food industry. An important contribution of food scientists is to product development. Increasingly the recipe for new products is developed by culinary artists and marketers, and then transferred to food scientists/technologists to make it practical for mass manufacture and marketing. Marketers define a food product for the consumer; food scientists and

technologists make it possible. Another major responsibility of the food scientist in industry is in trouble-shooting technical questions, sometimes in real time, in processing or manufacturing. The speed and volume of large-scale processing places a premium on the knowledge of a person who can quickly solve such problems. People of wide academic and non-academic backgrounds are involved in both of these problems and so there is again a premium on being able to work with people who see the problem from a different perspective. Communication skills are critical under any circumstances, but there is a special premium on them when working with a team under pressure.

Our treatment of the food system so far focuses on the transformation of materials and the consequent development of an economic system driven by consumer choice to which food science contributes. However, the product choices made by the consumer and influenced by the contribution of food science to formulate products and influence their brand value constitute a diet, and diet constitutes a huge influence on health and wellness. Therefore consumer health and wellness is an important indirect outcome of the practice of food science not immediately obvious in the material transformation model proposed. How then can food science connect to nutrition?

Nutrition is generally considered as a component discipline of food science. However in practice the treatment of nutrition in Food Science curricula is often cursory (IFT requires only a single class and nutrition was strikingly omitted from the learning outcomes required as part of program evaluation) and academic collaborations between food scientists and nutritionists are limited. One useful, but conservative, application of nutrition in food science as a contribution to the "health and wellness" of consumers would be to study the classical food chemistry and microbiology-associated questions related to potential bioactive components in or added to foods. More aggressive application of nutrition would be to attempt to determine the nature of bioactivity of foods and their components or to study the effect of food components on host metabolism (nutrigenomics). In either case, it would seem that close collaboration with faculty members in nutrition programs would be appropriate. Food science expertise is also well suited to the study of food structure/functionality within the colon for example, an area about which little is known. Food microbiology might be reasonably expanded to include this milieu, and the nature of food ingredients which influence it, including prebiotics, would fit naturally as well.

Of course, the health and wellness outcomes are strongly coupled to commercial outcomes of food science, as many food companies maintain a strong interest in nutrition as a marketing tool. Importantly, the marketing value is driven by consumer belief in the health outcomes and only indirectly by scientific evidence which leads to potential ethical issues associated with the development and marketing of "healthy" foods. Ingredient advertisements in trade journals often refer to what consumers think rather than the scientific evidence. Structure-function claims allow one avenue for nutrition/health marketing on the food label, and even a simple declarative statement (e.g., with added isoflavones) may be sufficient to influence consumer behavior. Both seem to be preferred over the insipid language of "qualified" health claims.

### **The Penn State Department of Food Science and its relation to “the” Food System**

The Penn State Department of Food Science emphasizes the core disciplines of food chemistry and food microbiology in a traditional way. In food chemistry, a major emphasis is on ‘ingredients as materials.’ This approach addresses ingredient technology from a “functional properties” perspective, but instead of characterizing functional properties by idiosyncratic empirical methodology (e.g., foaming capacity), it attempts to describe physical behavior in more fundamental terms. An attempt is made to relate chemical structure to physical function at scale levels from the molecular to the macroscopic. More recently, we have begun to explore the ways the chemistry of food affects the biochemistry of the human body and health outcomes for the consumer. This work has been largely conducted in partnership with faculty members outside the department but reflects an important shift in the values we attach to food.

Food microbiology is a field of study that integrates and applies knowledge within the disciplines of Food Science and microbiology to preserve, process, package, and distribute foods that are wholesome and safe to eat. The department has particular strength in destruction of foodborne pathogens (notably in meat, dairy foods and plant products) with a strong outreach focus. The growth of microorganisms in fermentations and as probiotics is also studied. Additional campus resources for students and faculty studying food microbiology are available through the Departments of Veterinary Science, Dairy and Animal Science, Poultry Science, Agricultural and Biological Engineering, Biology and Molecular Biology, and Microbiology and are integrated through the Huck Institute for Life Sciences. In addition to research concerning microbial food pathogens, strong outreach programs are in place for state and regional industry.

Food engineering is limited in scope within the department per se. Additional capacity is available in the Agricultural and Biological Engineering department. The Center for Food Manufacturing is administered through the department and provides contact with numerous companies. Aspects of food engineering are evident in the departmental emphases on processing and manufacturing of foods of special importance to PA in particular mushrooms, dairy products, and confectionery. The new pilot plant facilities (wet, dry, and pathogen pilot plants) offer an opportunity to enhance our engineering capabilities.

The Berkey Creamery manufacturing facility and the salesroom are a unique resource administered through the Department of Food Science. The manufacturing facility provides opportunities for student internships and for demonstrating concepts in undergraduate coursework. The creamery is also a major contributor to many processing and manufacturing outreach programs through the department. Further integration of the creamery manufacturing plant into departmental programs represents an important opportunity. The visibility of the Berkey Creamery provides an opportunity to educate the University community about the food system and the role of Food Science in it.

Nutrition is currently represented in the department primarily as nutrition education, with a strong but diminishing cooperative extension emphasis. A large nutrition science program and a much larger nutrition education/dietetics program exists in the Department of Nutritional

Sciences (located in the College of Health and Human Development). Nutrition elsewhere in the College of Agricultural Sciences focuses on animal nutrition. The increasing consumer interest in health and wellness through food argues that food scientists educated in our programs should be well grounded in nutrition and recent efforts have sought to develop better research and teaching relationships with the Department of Nutritional Sciences.

Extension efforts tend to aim at providing technical support for small and mid-sized companies, not in a proprietary way but group-wise after identifying needs in common with industry sectors. A special feature of our department is the number and breadth of the courses designed for industry specific industry segments.

The Department of Food Science has made relatively few contributions to aspects of the food system beyond the processing/manufacturing sector described above. Business questions tend to be addressed outside the department, within the college primarily through the agricultural economics department and the Agricultural Business Management (ABM) undergraduate program. A minor in food business is available but largely not used by Food Science undergraduates. On the other hand, many undergraduates take courses in this area as supporting courses. A once-co-listed product development course is now only offered as an ABM course, as the technical base in this course (open to students with no Food Science coursework) does not justify the FDSC (Food Science) designation. Most Food Science students do not take coursework concerning the food system or food marketing.

Aspects of the food system downstream of manufacturing are traditionally studied by the Hotel, Restaurant, and Institutional Management program (HRIM, located in the College of Health and Human Development). It does not have a strong technical base, but is more business and hospitality oriented. The Department of Food Science interacts with HRIM primarily through outreach food safety programs oriented toward restaurants.

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## APPENDIX 2

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### DEPARTMENTAL PERFORMANCE METRICS

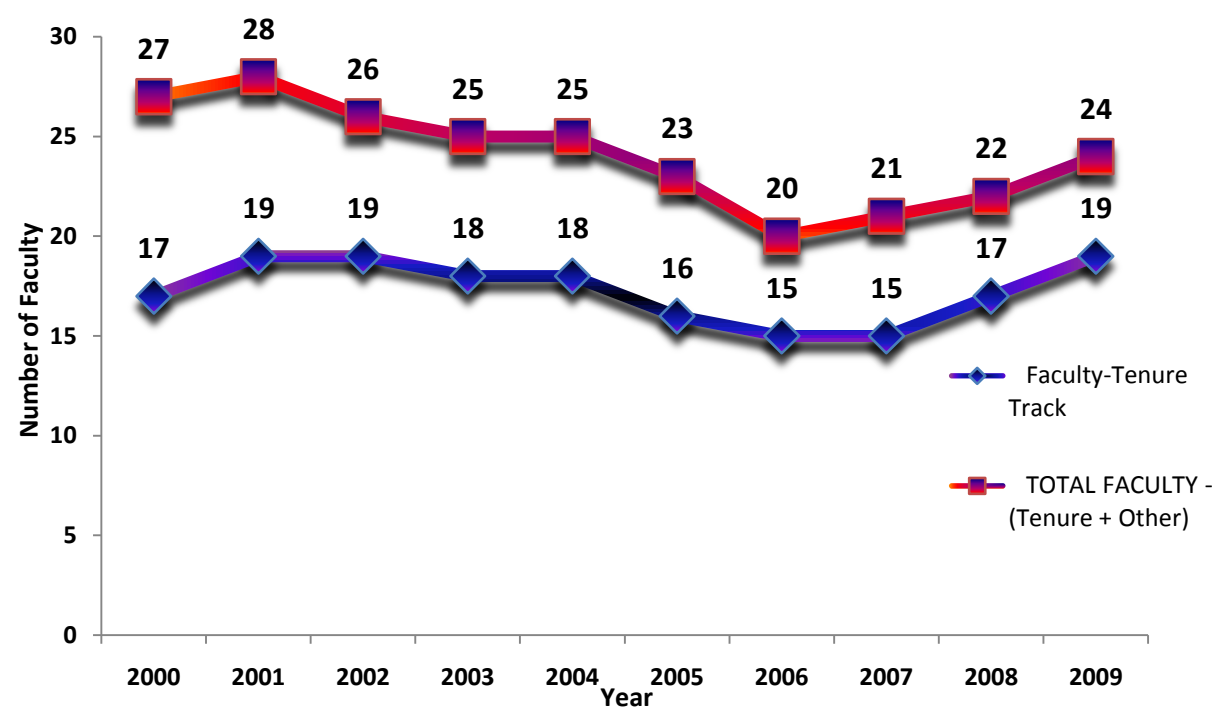


Figure 3: Faculty Headcount

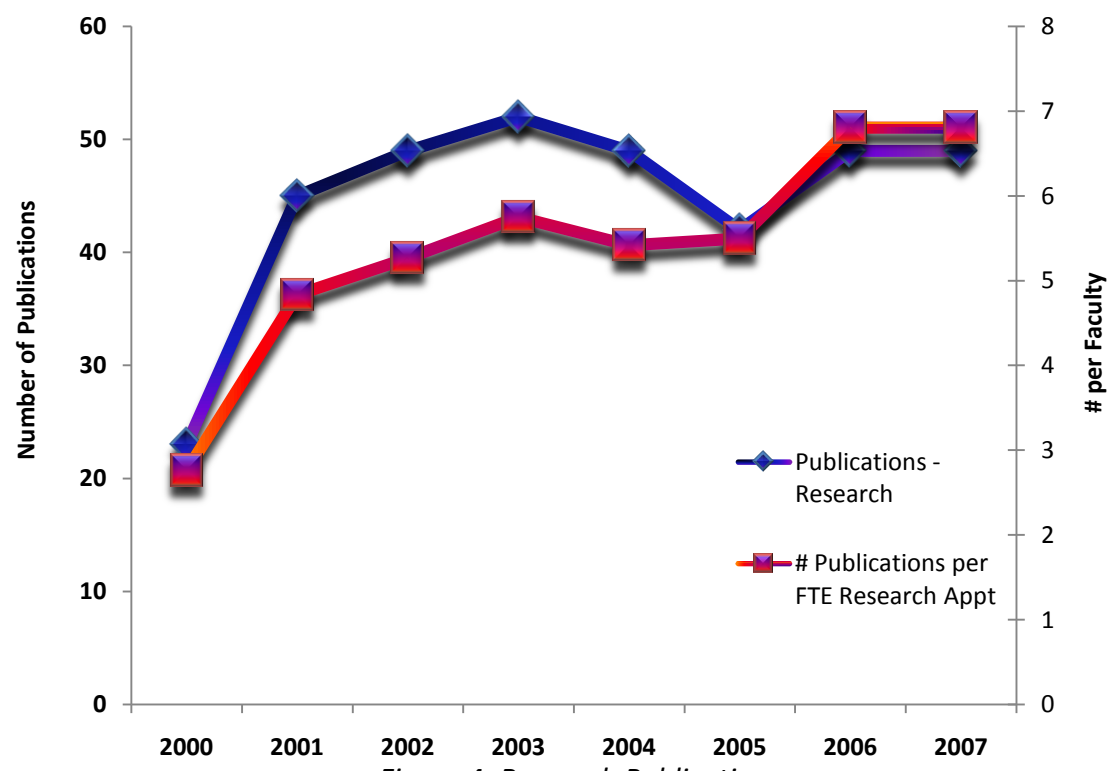


Figure 4: Research Publications



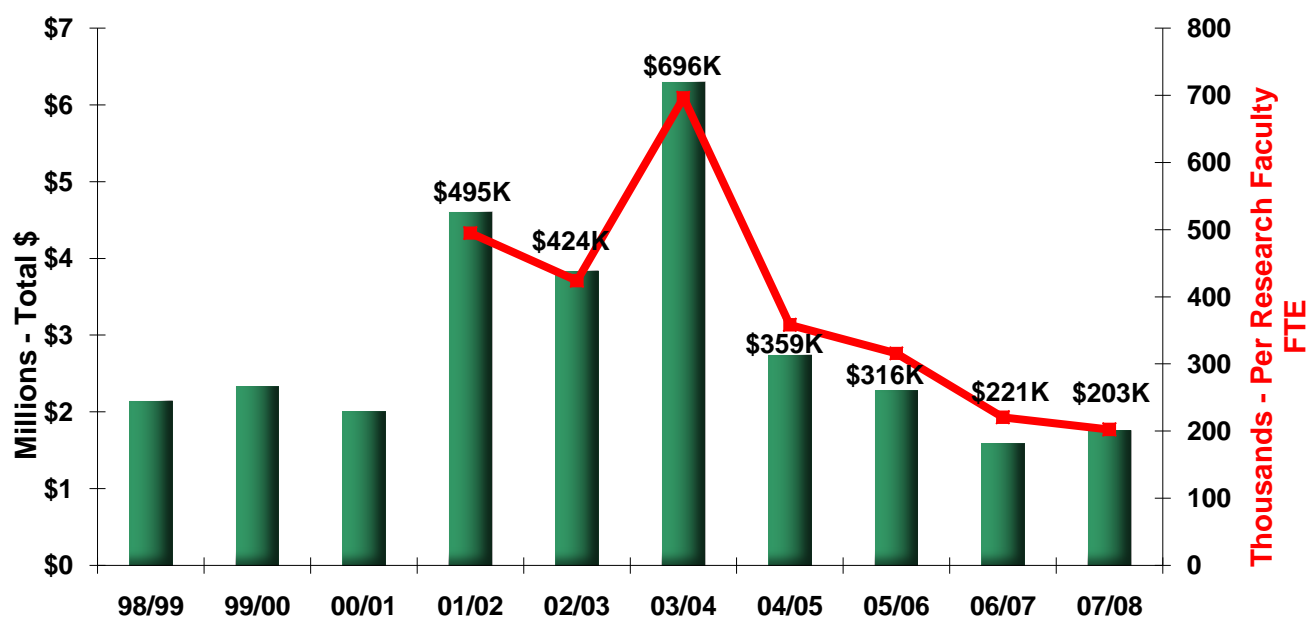


Figure 6: Funding Per Research Faculty FTE

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### APPENDIX 3

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#### HISTORY OF STRATEGIC PLANNING IN THE DEPARTMENT OF FOOD SCIENCE

Food Science at Penn State began in 1966 when faculty members from the Dairy Science, Horticulture, Animal Science, and Poultry Science Departments initiated the Division of Food Science and Industry to administer an undergraduate program in Food Technology and a graduate program in Food Science. The first undergraduate and graduate degrees were awarded in 1968. In 1970, the name of the undergraduate program was changed to Food Science. In 1975, the Department of Food Science came into being, composed of faculty members from Dairy Science (9, from Dairy Manufacturing), Horticulture (3), Animal Science (2), and Poultry Science (2). The formation of the new department represented a decision to move away from vertical integration in the four commodity departments and to establish a new interdisciplinary unit. The considerable discussions concerning the rationale for initiating the Division, the programs, and the department will not be described here, even though these discussions were certainly strategic in nature. It is worth noting that the resources of the department at its inception were primarily the faculty positions, not technical support. In addition, the faculty members were spread over four locations: Borland Lab, the Horticultural Processing Lab, the Meats Lab, and the Poultry Processing Lab. Insight into the status of the incipient department may be gained from the September 1975 USDA Review of the program (by the time the report was received, the department had been formed). A subsequent USDA Review (of the research in both the Food Science and Nutrition programs) was conducted in March, 1979. These two reviews were research reviews conducted by the USDA to monitor the

use of Hatch funds. While guidance from the review team is implicit in the reports, they cannot be considered to represent strategic planning by the department.

In 1982, College of Agriculture Dean Smith requested that departments prioritize teaching, research, and extension programs. In December, the faculty discussed and approved three one-page reports, which were combined and transmitted by then-head Phil Keeney to Dean Smith. An April, 1985, document prepared by Phil Keeney for the 1985 CSRS Review Team included a two-page section on the mission and priorities of the department. The teaching and research priorities were verbatim from the 1982 reports.

In July of 1985, Associate Dean Jim Starling requested that each department develop plans to respond to a 20% increase or a 20% decrease in faculty numbers. On the basis of discussion at three Food Science faculty meetings, Phil Keeney prepared a report that was further reviewed by the Food Science faculty before it was transmitted. The following Fall the new department head, Lowell Satterlee, prepared a document titled "The Strategic Plan. Food Science One Year Later." From the title it is clear that this document implicitly considered the 1985 report to have been a strategic plan.

In 1990, Lowell Satterlee convened an *ad hoc* committee (Dimick, Kuhn, Marezki, Thompson) to consider "the strategic plans for Food Science teaching, research and extension, how these plans relate to one another, and how they will eventually create the department's strategic plan." In September a four-page preliminary draft was sent by Lowell Satterlee to Jim Starling, and in October Gerry Kuhn shared with the Food Science faculty a much-revised final document.

In November, 1991, at Lowell Satterlee's request, the Food Science Administrative Advisory Committee (Dimick, Knabel, Marezki, Thompson, and Ziegler) initiated discussion about "how we can move forward to complete the strategic planning process for the department." At about this time, Lowell Satterlee announced he would step down as head as of April, 1992, and Gerry Kuhn agreed to serve as interim head. Discussion of strategic planning became very much a faculty-driven exercise. A two-day retreat was held February 29 and March 1, 1992 (planned and run jointly by Satterlee, Kuhn, Knabel, Thompson, and Ziegler), at which strategic issues for research, teaching, and extension were identified. In March, Lowell Satterlee appointed a Strategic Planning Committee (Ziegler, chair; Thompson, vice chair; Marezki; and Beelman) to take over strategic planning from the Administrative Advisory Committee. The third in a series of subsequent departmental strategic planning meetings was held all day August 6 and continued August 10. Based on these three sessions, a draft document (dated August 24) was put together and circulated by Greg Ziegler in September to the faculty for comment (in academic year 1992/93 the Strategic Planning Committee was Kilara, chair; Beelman, Brown, Miller, and Ziegler).

While the department was working toward a grass-roots planning document under interim leadership, the University and the college were also engaged in an important strategic planning activity, referred to as the "Futuring Process." A College Future Committee (CFC) had been named, and by early October a draft with recommendations was produced. Because this

document made several recommendations considered inimical to the interests of the Food Science faculty, the faculty immediately applied its strategic energies to responding to this document. The response communicated to the college drew upon the strategic thinking in the department to date. An unfortunate effect of the CFC activities and CFC report was that the departmental strategic plan never progressed past the draft stage. Although the faculty did not further formally consider the draft plan, a related strategic plan did appear in a Departmental Handbook in 1993, titled "Partial Strategic Plan Developed by the Food Science Faculty."

In November and December of 1993, incoming department head Don Thompson worked with the Strategic Planning Committee (Beelman, chair; Brown, Miller, Kilara) to draw up a thoroughly revised draft document to serve as the basis for a two-day retreat in January. By the end of January a completed plan was printed and distributed to the faculty, including five-year goals and one-year action plans. For the remainder of that planning period the Strategic Planning Committee organized an annual two-day retreat to consider revisions to the five-year goals and to construct new action plans. In September 1996, a formal external review of the department was conducted. The review team was asked to make its primary objective a critique of the strategic plan. In its report, the team stated, "the department has developed a flexible, well thought-out strategic plan that appears to have broad faculty input and buy-in that will provide a flexible blueprint for charting the department's future course."

The 1998 Strategic Plan took into account two important changes in the planning environment at Penn State in 1997: in March the College of Agricultural Sciences published a completely new Strategic Plan, and in September the University Planning Council distributed a wholly new University document, "Planning for the Twenty-First Century." In addition, Bob Steele, Dean of the College of Agricultural Sciences, visited a Department of Food Science faculty meeting in December 1997, to provide specific feedback on the departmental strategic plan. As a result of the changed planning environment, the revisions made that year were more extensive than in previous years.

Although the 1999 Strategic Plan continued to be a document revised yearly, but looking five years into the future, the 1999 Strategic Plan differed from previous plans in some fundamental ways. For the first time, Strategic Goals were written in terms of the desired outcomes of our efforts rather than as the efforts themselves. Consequently, the Action Plans became the statements of what would be done and performance indicators related to each Strategic Goal as measurements of impact (although not comprehensive ones).

The 2000-2004 Plan was developed in the early weeks of 2000, and it was conceived as a rolling five-year plan for the period 2000-2004. Incoming department head John Floros participated in the January planning retreat, and this is the plan that was in effect when he joined the department that July. The plan remained in effect until the 2003-2007 planning effort was initiated early in 2002 with a February planning retreat attended by faculty, staff and students. The retreat dictated a substantial re-examination of the integration of departmental activities, and that re-examination naturally led to substantial changes in the strategic plan. As with previous strategic plans in the Department of Food Science, this version was a rolling five-year plan. The Strategic Goals were understood to be for the five-year period from July 1, 2002,

through June 30, 2007. The Action Plans referred to those things that would be accomplished in the period from July 1, 2002, to June 30, 2003 and were intended to be revised each year based on progress. Much thought went into development of appropriate and useful Performance Indicators. The Performance Indicators relate most directly to the Strategic Goals, and were selected to give us insight into our progress toward those goals. In addition to working with the department head, John Floros, the Strategic Planning Task Force (SPTF) (Thompson, chair, Anantheswaran, Maretzki, Merrill, Palchak, and Robert Roberts) worked with the Chairs of the Programmatic Committees and of the Impact Groups in an iterative manner as appropriate. Consequently, the development of this Strategic Plan reflected extensive input from faculty and staff members.

The Food Science strategic planning committee (SPC) was appointed in February 2005 by the department head, John Floros, and consisted of faculty and staff with responsibilities in teaching, research, outreach, administration, and creamery operations (Coupland, chair, Brown, Knabel, Thompson, Ziegler, Merrill and Ford). The faculty members on this committee served on one or more of the CoAS's focus study groups that played an integral part in the college planning process. At the committee's request, the department head was also an active member of the committee. The SPC employed a number of resources during its planning process including the college's 2005-2008 strategic plan, the department's previous plan, input from internal and external stakeholders, the CoAS Food Science Study Group's report, other units' strategic plans as well as information specific to other Food Science programs. Interestingly for the first time the college had taken a systems approach to its strategic plan and the report of the Food Sciences study group as part of this effort provided a useful starting point for the Food Science departmental plan. The department's external advisory board provided useful feedback representative of some of our external stakeholders. The board consists of leaders in the food industry, government and academia and since 2003 has reviewed and provided feedback and guidance on the department's programs and previous strategic plan. The board discussed a draft of this plan at an all-day meeting on April 2005.

To address internal stakeholders, an all-day departmental retreat was held (2/25/05) to gain input from faculty, staff, and students on topics centered on department values and working environment, future research foci, the undergraduate program and future departmental hires. In addition, a number of open discussions were held during March and April 2005 on specific issues relating to the future direction of the department and to gain specific input on proposed goals for the plan. These meetings were organized and led by the SPC and by other groups within the department who were assigned specific topics and issues to address. The SPC and Committee chairs encouraged an ongoing electronic dialogue. Before final submission to the Dean's office, the Food Science strategic plan was presented in draft to department members at a second retreat (5/13/05) and to targeted external groups such as previous members of the Food Science Study Group, the Food Industry Group (FIG) and the Food Science External Advisory Board for final review and comments.

**The Current Planning Process** – The Department Head, John Floros, appointed the Strategic Planning Committee (Coupland, chair, Thompson, Ziegler, Lambert, Dudley, Knabel, Palchak, Ripka) and it convened in February 2008. The committee took an early decision to draw from

the broad thematic initiatives in the 2005-2008 plan, but to take a more programmatic look at the breadth of the department's functions. The committee also decided to separate the quantity and quality of research from initiatives related to graduate education. The department held a retreat on May 30, 2008, and used the resources at the Team Decision Center to rapidly develop SWOT analyses for six major areas (research, outreach, undergraduate education, graduate education, academic support units and departmental operations). This data was used by the relevant programmatic committees and ad-hoc groups to develop drafts of the strategic initiatives proposed. The drafts were discussed at a day-long retreat with the Advisory Board (October 20, 2008) and then revised for a half-day faculty/staff retreat (November 14, 2008).

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## APPENDIX 4

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### **STRATEGIC PLAN FOR UNDERGRADUATE RECRUITMENT**

This strategy identifies the distinguishing elements of the program that we will promote in our recruitment activities and the target markets most responsive to our message. Our success will be judged by the changes in the number of students accepted into the undergraduate program in Food Science.

**Distinguishing Elements of the Program** – Food itself is ubiquitous, enjoyable and inherently interesting. Food Science provides the scientific basis necessary to produce abundant quantities of safe, tasty and nutritious food. An undergraduate education in the subject is real science driven by real and important questions and concerned with familiar and tangible materials. Key distinguishing elements of the undergraduate program in Food Science are:

- The subject is inherently interesting, “hands-on” science dealing with real-world topics and familiar materials. Students can see the application of their classes immediately in the supermarket or the in the kitchen and later as they move into the workforce.
- Our department offers a friendly, small-college atmosphere with good contact between students and faculty.
- A close association with a large and important industry base provides excellent career prospects in the field and internship opportunities prior to graduation.
- Our state-of-the-art facilities and connection with the Berkey Creamery as part of the larger Penn State identity.
- We provide excellent scholarship opportunities.

**Prioritization of Resources** – We will use the following scheme to prioritize our efforts to where we expect the best returns. We expect that, over a period, greater effort should be devoted to activities in the higher categories. Within these guidelines, we stress our commitment to increasing the number of members of underrepresented groups in our student body and activities targeting members of these groups will be prioritized.

Class 1 activities involve groups and individuals in a position to influence a decision to enroll in or transfer to our program as well as activities that will empower someone else to effectively recruit for us. Within this group we will actively initiate and maintain personal contact with:

- DUS students interested in science and technology, and DUS advisors. We will prioritize activities at University Park while maintaining a level of contact with other campuses (esp., Berks, Altoona)
- Sophomores and juniors in selected majors (Chemistry, Chemical Engineering, Biology, Microbiology, Horticulture, Animal Science and pre-Med) as well as undergraduate coordinators in these programs.
- Families/individuals that have approached us with an interest in enrolling in the program (e.g., family visits to the department).
- Advocates for the program (FIG, extension educators, and committed high school teachers).

Class 2 activities are designed to reach a wider audience and hopefully encourage some of them to become Class 1 contacts. Many Class 2 activities will include adding a recruiting component to other departmental outreach and communications programs (e.g., ensuring the undergraduate program is visible in the creamery salesroom, providing some recruitment materials/activities at a Farm Show or Ag. Progress Day event) or may be in response to University or external initiatives (e.g., BioDays, Take our Daughters and Sons to Work, visiting school groups). We will respond to any such requests at an appropriate level, but we will not actively initiate programs nor necessarily take a leading role in program delivery. The level of response will depend on the anticipated yield of the event (i.e., number of contacts and potential for moving people into Class 1 contacts) and our existing relationships with the people asking us to be involved.

Class 3 activities include groups and individuals that have an interest in Food Science, but are not in a position to immediately make or affect a decision to enroll at Penn State. We will respond politely without unduly diverting resources to activities unlikely to be productive (e.g., providing an out of state teacher a link to online resources).

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## APPENDIX 5

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### **EFFORTS TO REDUCE COSTS AND IMPROVE EFFICIENCIES**

Listed below are items from the Department of Food Science and the creamery regarding our efforts to reduce expenses:

1. We collapsed the receptionist position in the department for a total estimated savings of about \$17,500.

2. The new copiers we purchased can scan and fax, which helped us reduce our faxing/copying expenses (no confirmed numbers).
3. We reduced the number of overall ingredient vendors who supply dairy ingredients to the creamery - this consolidation has saved us several thousands of dollars in freight cost.
4. The creamery purchased a whole tractor-trailer load of milk powder and netted a savings of almost \$12,000 in purchase/freight cost (something we could not do in Borland).
5. The creamery purchased bulk lots of frozen strawberries and peaches, amounting to a one-year supply of each, realizing a savings of \$2,800 dollars in freight cost.
6. Finally, the sales in the creamery have increased by almost \$250,000, which has helped offset added costs from higher fuel prices and transportation.

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## APPENDIX 6

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### STATEMENT OF VALUES

The department considers itself an intellectual community in which academic freedom and responsibility to the community are in harmony. The Department of Food Science endorses the core values in the College of Agricultural Sciences 2005-2008 Strategic Plan and in particular we value:

- An atmosphere of mutual respect that promotes open sharing and thoughtful consideration of opinions
- Creativity and innovation
- Cultural diversity
- Excellence and productivity in the scholarship of integration of education, research and service
- Leadership and teamwork
- Openness to change
- Research conducted in the context of graduate education
- The ability of food scientists to collaborate across disciplines and solve complex problems for the common good
- The competitiveness of the food industry
- The health and wellness of the population

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## APPENDIX 7

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### POSITION DESCRIPTIONS OF OPEN FACULTY POSITIONS

1. **Assistant Professor Food and Biomaterials Engineering/Packaging** (75% research, 25% teaching)

**Research responsibilities:** Establish a strong externally-funded research program in food engineering, with an emphasis on materials science and engineering. Appropriate research areas would include food packaging, bio-based materials, nanotechnology, or polymer science.

Significant resources available to the successful candidate include access to extensive pilot plant facilities and high-end research instrumentation for materials characterization. The candidate will be expected to collaborate with colleagues in the Department of Food Science ([www.foodscience.edu](http://www.foodscience.edu)) and others across the University, especially the Materials Research Institute (<http://www.mri.psu.edu/>).

**Teaching responsibilities:** Develop and teach a graduate-level course in the candidate's field of specialization, and an undergraduate course on food packaging. Supervise graduate students in thesis research and advise undergraduate students.

**Qualifications:** Applicants should have a Ph.D. in Food Science, Food Engineering, Chemical Engineering, Materials Science and Engineering, or a relevant field of specialization. Postdoctoral experience is highly desirable. Applicant should possess a willingness to work as part of a multidisciplinary team.

## **2. Assistant/Associate/Full Professor of Microbial Ecology of the Human Gastrointestinal Tract 75% Research/25% Teaching**

The Department of Food Science at the Pennsylvania State University is seeking a tenure-track faculty member (assistant, associate or full professor—depending on qualifications and experience) with an interest in the microbial ecology of the human gut. The successful candidate will be expected to develop a strong, externally funded research program that focuses on the influence of the microbial flora of the gut on the health of the human host. Potential areas of research interest include, but are not limited to, the influence of prebiotics on the intestinal microbial ecology; interaction of specific organisms, or groups of microorganisms with the host; development of strategies to enhance beneficial or inhibit pathogenic groups of microorganism in the gut; development of an understanding of the microbial population dynamics in the human gut as a function of diet and disease. Toward this end the successful candidate will be expected to take advantage of substantial opportunities for collaboration within the Department of Food Science ([www.foodscience.psu.edu](http://www.foodscience.psu.edu)) and other units in the College of Agricultural Sciences ([www.cas.psu.edu](http://www.cas.psu.edu)) including the Gastroenteric Disease Center ([www.ecoli.cas.psu.edu](http://www.ecoli.cas.psu.edu)), as well as across the university including the Department of Nutritional Sciences, the Huck Institute of the Life Sciences ([www.huck.psu.edu](http://www.huck.psu.edu)) and The College of Medicine and the Milton S. Hershey Medical Center ([www.hmc.psu.edu](http://www.hmc.psu.edu)).

### **Teaching Responsibilities Include:**

- a) Develop and teach a graduate-level course in microbial ecology of the gastrointestinal tract and its effect on health and wellness



- b) Teach an undergraduate course in the candidate's area of interest/expertise or as departmental needs dictate
- c) Supervise graduate students in thesis research projects and advise undergraduate students.

**Qualifications for the Position include:**

- a) Ph.D. in food science, microbiology or related field, with a strong background in microbial ecology of the gastrointestinal tract and its effect on health and wellness
- b) Postdoctoral experience in the areas of microbial ecology of the gastrointestinal tract and the role of probiotics and prebiotics in health and wellness is highly desirable.
- c) Willingness to work as part of a multidisciplinary team on a systems biology approach to detect, track and control foodborne pathogens.

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**APPENDIX 8**  
**SUMMARY OF STRATEGIC INITIATIVES 2008-09 THROUGH 2012-13**

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**RESEARCH**

**Goal 1: Secure resources to support quality research**

**Goal 2: Facilitate collaboration both internally and externally**

**Goal 3: Improve the intellectual atmosphere of the department**

**OUTREACH**

**Goal 1: Address the educational and research needs of the food industry, food entrepreneurs, and consuming public**

**Goal 2: Identify new and strengthen existing outreach partnerships at the departmental, university, state, national, and international levels**

**Goal 3: Provide leadership and support to Cooperative Extension issues**

**GRADUATE  
EDUCATION**

**Goal 1: Improve Educational Outcomes for Graduate Students**

**Goal 2: Recruit graduate students of the highest quality**

**UNDERGRADUATE  
EDUCATION**

**Goal 1: Improve the quality of undergraduate education in food science**

**Goal 2: Enhance recruitment and retention**

**Goal 3: Consider new and/or revised programs**

**ACADEMIC  
SUPPORT UNITS**

**Berkey Creamery Goal: Use the processing facility to enhance the teaching, research, and outreach endeavors of the department**

**Pilot Plants Goal: To enable the Food Science Pilot Plants to be state-of-the-art facilities supporting education, research and outreach**

**Sensory Evaluation Center Goal: An active Sensory Center supported by contract projects which provides resources to researchers and educational opportunities to students**

**DEPARTMENTAL  
OPERATIONS**

**Goal 1: Increase departmental financial support through increased endowments**

**Goal 2: Improve departmental infrastructure**

**Goal 3: Continue to foster a welcoming environment and a positive atmosphere for working and learning**

**Goal 4: Improve departmental communications**

**Goal 5: Package departmental duties in supporting college events**