

Department of Food Science Strategic Plan: Part 2

The Department of Food Science is the oldest Food Science Department in the Nation; the major academic center for Food Science in New England; and the only research oriented Department of Food Science in Massachusetts. Food Science is naturally a multidisciplinary field combining research in chemistry, biology, nutrition, and engineering. Thus our faculty have traditionally worked together closely and in recent years have extended their multidisciplinary work to other Departments including Polymer Science, Microbiology, Chemistry, Chemical Engineering, Veterinary and Animal Sciences, Math and Statistics, Resource Economics and the Stockbridge School of Agriculture.

Vision:

Our research and graduate program is known for its emphasis on fundamental food science research compared to many other departments that only have a focus on food commodities. In addition, the Fergus Clydesdale Foods for Health and Wellness Center established an emerging interdisciplinary research area that combines food science and nutritional biochemistry, which is not common in many other Food Science Departments. Our Department also has strong industry partnership through our Strategic Research Alliance (SRA). The SRA is one of the largest and oldest industry partnerships in Food Science with 25 dues paying members and a 19 year history. Finally, we also have a strong Industrial Advisory Board that was established in 1990 and has helped the Department raise over \$10 million. These funds support 2 endowed chairs, 4 graduate research assistants, 6 graduate scholarships, 15-20 undergraduate scholarships, student travel to scientific meetings, and general research and Departmental support.

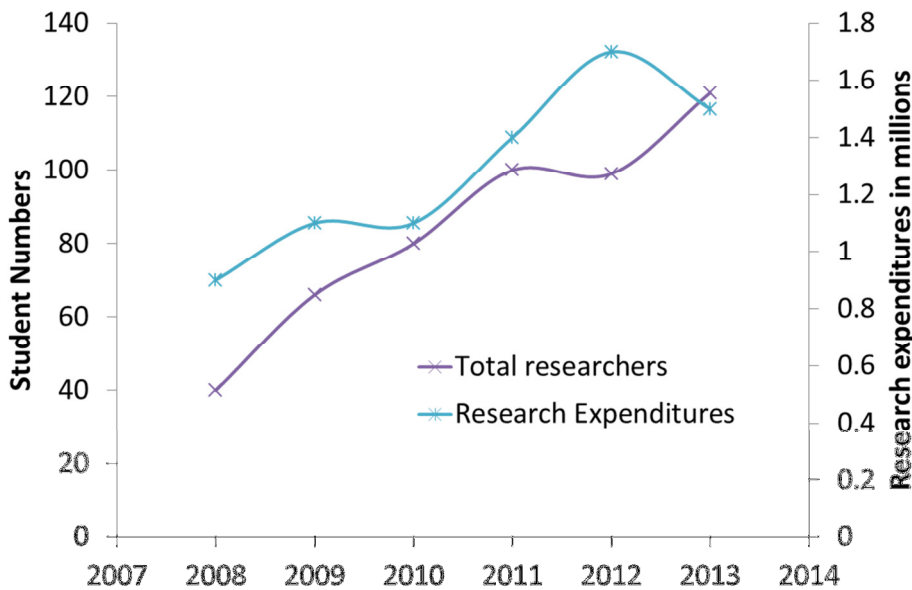
Besides being the oldest Food Science Department in the U.S., UMass Food Science is also one of the best according to analysis by both the *National Research Council* and *Academic Analysis*. Our Department rankings are highly driven by our publication record and ability to obtain federal grants from the National Institute of Food and Agriculture. Of the Department's 14 faculty members, 9 have received national research awards in the past 5 years. This includes 3 Assistant Professors who have also recently received young scientist's awards.

The field of Food Science involves the application of fundamental scientific principles from physics, chemistry, and biology to find solutions to food production, safety, healthfulness, and quality. Thus, the faculty is very entrepreneurial as their research must find practical solutions to complex problems. Therefore, the faculty work closely with industry and have numerous patents. In addition, we hold several annual workforce seminars and courses for the food industry. We anticipate that this trend will continue especially since the research arms of many food companies have been reduced and thus funding research projects at Universities is often more economically viable.

Realizing our Vision

Space:

The number one challenge for the continued success of the Food Science Department is space. The Food Science Department has experienced rapid growth in the past 5 years. This is especially true in our laboratories as our number of total researchers (grad students, visiting scholars, post docs, undergraduate students, etc.) has more than tripled in the past 5 years and our research expenditures have increased over 1.5 fold.



Even before this growth, the Food Science department was already short of space as determined by the laboratory space assessment carried out by the Wilson Architects group.

	Existing Space	Needed Space	Net
Office	4411 ft ²	8626 ft ²	
Research	15,875 ft ²	19,904 ft ²	
Teaching	6,400 ft ²	6,424 ft ²	
Total	27,349 ft ²	34,954 ft ²	-7605 ft ²

Since the survey we have been lucky to have 5 labs added via the Clydesdale Foods for Health and Wellness Center (approximately 4000 ft²) that was paid for by a \$1.8 M Food Science fund raising

campaign and a match from the University. However, in these and other renovations we have lost 1084 ft² for infrastructure upgrades (mainly for an acid neutralization system and air handling equipment). This means that by the Wilson survey we are still undersized by 4689 ft².

Since the Wilson assessment our faculty numbers have grown by 2 and we have lost the Gloucester Marine Station laboratory and had to absorb that faculty position into Chenoweth. In the fall of 2016, we will also have to find laboratory space for an additional faculty as Micha Peleg is retiring and his current lab in Ag Engineering is in extremely poor condition and thus is unsuitable for a new faculty member. Finally, we have just completed a \$1.9 M endowment, which will add an additional faculty to our Department in the fall of 2017.

With our rapid growth we are already extremely short on space and we do not have any available space for our next two faculty hires. A +\$2 M upgrade to our food processing pilot plant was recently completed and it will be best utilized if it is easily accessed by our faculty. In addition, Food Science strength is our interdisciplinary research, which is fostered by our entire faculty being in the same building. Therefore, it does not make sense to move a segment of our faculty out of Chenoweth.

The Provost, College and Campus Planning and Facilities have started discussions on how to solve our space problem. While the solution has not been decided, it is obvious that any solution will require major resources to fund additional renovations in Chenoweth.

Research Funding: UMass Food Science has been one of the most successful Food Science Departments in the country at getting funding from the National Institute of Food and Agriculture through competitive grants. However, we realized that we needed to expand our funding base which led to the development of The Fergus Clydesdale Health and Wellness Center and the hiring of 3 faculty with expertise in Functional Foods. These faculty have expertise in nutritional biochemistry and this has allowed us to obtain NIH funding. We recently further expanded our funding base by partnering with Natick Army Labs to get several Department of Defense grants. We are also now engaging in more toxicology work and thus are hoping we might be able to obtain EPA funding. Finally, we continue to expand our industry funding which has been aided by our Advisory Board and the members in our Strategic Research Alliance.

Emerging Areas: In order to remain competitive and highly ranked, the Department will need to stay current with emerging areas in foods science. One such area is food security and sustainability as rapid population growth could potentially lead to world-wide food shortages. Thus, future faculty hires could be in areas such as improved utilization of plant proteins, water conservation, technologies for decreased food waste, and food by-product utilization. In the Health and Wellness area, research in nutrigenomics (how one's genetics impacts the utilization and bioactivity of food components), sensory receptor impact on dietary behavior, and clinical analysis of food bioactivity could be areas for new faculty. Food Safety areas could include antibiotic resistant pathogens, produce safety, and allergenicity.

Administrative structure: Our rapid growth has placed large demands on our office and laboratory staff. We are in the process of hiring another office staff position which will help tremendously. The

Department also has four research technician positions. These are not traditional research techs as they support our teaching labs, general Department activities (e.g. web page, building management, and lab safety), equipment training and maintenance, ordering lab supplies and conducting research. These technicians support the microbiology, chemistry, processing, and health and wellness groups and are critical in our administrative duties.

Faculty recruitment and retention including tenure: We have been very fortunate to have hired outstanding new faculty who are receiving numerous research awards and grants. It's likely that no other Food Science Department has better Assistant Professors. Faculty retention can be challenging as such great faculty are often recruited by other Universities. To help overcome this challenge, the Department created a Clydesdale Scholar position in our most recent fund raising campaign. The faculty appointed to the Clydesdale Scholar will hold the position for 5 years and received \$20-30,000 in research support. Therefore, if a faculty receives an offer from another University, they could be named the Clydesdale Scholar as part of the retention package. The diversity of the Department continues to improve as we have 5 female faculty compared to 1 in 1996.

More support is needed for Associate and Full Professors. For example, an internal grant funding program for research instrumentation is needed to help faculty expand into new research areas or replace equipment that was originally purchased on start-up funds. Better definitions on the qualification required for advancement from associate to full professor are needed to provide better career planning strategies. An additional full professor promotion level would provide incentive for faculty to continue to be successful throughout their career.

Doctoral Program

UMass Food Science Doctoral Program has received very high rankings from the National Research Council and Academic Analytics. This has resulted in a large increase in grad student applications and a major increase in our enrollment. For example, there were 27 PhD students in 2010 at the time of the NRC ranking which has increased to 49 in 2014.

In an attempt to increase our PhD student numbers and increase our research productivity we have been in contact with four of the top 10-ranked Food Science and related programs in China (Chinese Agriculture University, Northwest Agriculture and Forestry University, Jiangnan University and Ocean University of China) to develop a mechanism for recruiting more students. These partnerships were made possible by fellowships from the Chinese Scholarship Council (Ministry of Education of China). Unfortunately, the fellowships only support living expenses. Originally, the University supported 10 curriculum fee waivers for these outstanding students and we were able to fill all 10 positions. The University then changed this policy to provide a 1 year curriculum fee waiver with the faculty paying the remaining years. Since this policy change, we now have only one Chinese Scholarship Council scholar so the potential income increase to the University which was expected by requiring faculty to pay curriculum fees, has not been realized.

We feel that the original curriculum fee waiver was well justified since it attracted the top students from the top Food Science programs in China and increased research productivity, both of which would help

Food Science maintain its top ranking and provide scientific data that could be used as the basis for securing external government and industry research funding. In addition, all of these students must return to China after their Ph.D. training where they will become vital force for science and economic development. A return to the original curriculum fee waiver arrangement would therefore have many benefits and would be in line with other international fellowships that receive curriculum fee waivers.

Food Science graduate student recruiting is very competitive with our main competing Universities being Cornell, Rutgers, and Purdue. Our assistantship levels are slightly below these institutes but competitive. However, these Universities all fund on-campus grad student visits. The funds for these visits at our competing Universities is provided centrally. Obtaining similar funds would make us much more competitive in grad student recruiting.

Food Science has always had excellent job placement. However, changing times require PhD student to have many different skills in private sector jobs. Formal courses in business and management would be very helpful for our students. We realize that such courses are sometimes available but it would be worthwhile if these opportunities could be expanded so students could fit them into their curriculum. The same is true for courses that teach university instruction methods.

Master's Program

Food Science has a very viable MS program with an outstanding job market. In fact, job opportunities are probably greater at the MS level than the PhD level. These job opportunities mean that many students do not continue onto their PhD. Therefore, the number of English first language PhD students is often limited. Since we have traditionally required our TAs to be English first language students, we often recruit MS student for our TA positions. All Food Science programs offer funding for MS student who enroll in the thesis option. Most of these programs also offer tuition or at least in-state tuition waivers. If tuition waivers for MS students receiving assistantships are no longer allowed, as has been proposed, it would be devastating to our MS program, our alumni base in the food industry and our excellence in teaching (ranked in the top 3 of all University Departments in the Student Satisfaction Survey for 8 years in a row), which is in part due to our excellent TAs.

We have both active 5 year BS/MS and 1 year profession MS program. These programs have the potential for expansion but this is not currently possible due to our space constraints.

Summary: The Department of Food Science has demonstrated excellence in every area of its academic activities, and its accomplishments have received worldwide recognition. With the addition of the newly hired outstanding young faculty, our current program is stronger than it was when it received the NRC's top ranking. To maintain this status, we will need to persist in our efforts and create new partnerships with other institutions and the private sector. We have all the elements in place to become even more successful than we are now but our space constraints might limit our options for further development. Hopefully, with the campus working hard to find a solution to this predicament, we will remain one of the most prominent and highly ranked Food Science Departments in the world and continue to excel.