



**UMass Food Science Alums and Industry Friends have done it again!!!!** Thanks to the outstanding dedication and generosity of our Alumni and Industry friends the Food Science Department is ranked **number one** in the entire University in total development donations. This is truly remarkable considering we are a small Department competing with much larger Departments, many of which graduate hundreds of students per year.

## Top 10 UMass Departments in Total Development Donations

DEPARTMENT	2009 COMMITMENT	2008 COMMITMENT	2007 COMMITMENT	TOTAL COMMITMENTS 2007-2009
<b>Food Science</b>	<b>\$809,260.00</b>	<b>\$1,083,479.29</b>	<b>\$886,623.55</b>	<b>\$2,779,362.84</b>
Computer Science	\$323,326.02	\$1,091,556.02	\$745,836.01	\$2,160,718.05
Chemistry	\$165,724.89	\$1,426,381.86	\$548,296.80	\$2,140,403.55
Political Science	\$197,416.57	\$1,313,701.50	\$259,629.55	\$1,770,747.62
Electrical & Computer Engineering	\$197,275.86	\$646,993.04	\$816,887.67	\$1,661,156.57

Being the top Department in development donations once again establishes our Department as a campus leader thus prompting the University to make investments in our programs. The most exciting of the investments is that for the first time in over 25 years, the Food Science Department is seeing the first major renovations in Chenoweth Lab as we begin construction on the Fergus Clydesdale Foods for Health and Wellness Center. The first steps of these renovations will include 4 new laboratories on the third floor. The old kitchen and sensory labs are being converted into a cell culture facility, room 322 will become a bioactive food component lab and room 327 will be split into a natural products lab and a new teaching lab. In addition, the building is getting new handicap accessible bathrooms and a much needed electrical upgrade. These renovations will give us state of the art facilities to conduct research on the impact of food components on health and wellness, a critical research area as our nation struggles to deal with the rising cost of health care of which foods and diet are a vital component.

## Chenoweth Labs Before Renovation



## Chenoweth Labs During Renovation



## Coming next newsletter: Chenoweth Renovated!

In addition to the renovations on our current labs, the University has also begun the engineering design for new Foods of Health and Wellness laboratories. These labs will be constructed in the space previously occupied by the Hospitality and Tourism Management Department's kitchen, classroom and Howard Johnson dining room. The University agreed to begin the engineering design because of the tremendous generosity of our alumni and industrial friends who have already donated \$1.5 million out of our \$2.0 million goal. Once we reach our funding raising goal, construction will begin on a Food Biopolymers and Colloids Lab and a Functional Food Lab.

Once again our **students** continue to excel in scholarship and research. I would like to first give special recognition to the **Northeast section of IFT**. NEIFT has been giving support for scholarships and Food Science Club activities for many years. This effort has been spearheaded by many alumni with tremendous leadership by **Shirley (Cullen) Barber** and in recent years by Liisa Holcomb. Over the past 14 years, NEIFT has provided over \$200,000 to our students primarily in the form of scholarships. This year our students were again great beneficiaries of their generosity with graduate students Chris Aurand (McLandsborough Lab), Thaddao Waraho (Decker Lab) and Elsin Hagan (McLandsborough Lab) and undergraduate Alissa Allen receiving scholarships.

Chris Aurand



### NEIFT Scholarship Winners

Thanks once again to our generous alumni, we were able to offer **11 Alumni scholarships** to new Food Science students. The Alumni Scholarships plus our Buttrick and Perrozzi scholarships have been a major part of our ability to attract new students into the Department. Through these scholarships and other activities by our Departmental Recruiting Committee (Drs. Park, McLandsborough, Levin and Xiao) we will have a record 68 students this fall including 16 freshman. This is over a 400% increase in our undergraduate enrollment over the past 15 years.

### 2008-2009 Food Science Scholarship Recipients

#### Alumni Scholarships (new majors)

Alissa Allen  
 Ashley Horner  
 David R. Johnson  
 Kevin Johnson  
 Pui Ying Lee  
 Sara Martin  
 Julia Morgan  
 Stephan D. Warner

#### NRE Scholarship Awards

Ashley Han	Ascension Farmers
Ashley Han	New York Farmers
Kaitlin Ewald	New York Farmers
Ashley Horner	New York Farmers
Jacqueline Mathews	New York Farmers
Daniel Vollmer	New York Farmers

#### Buttrick Scholarship (\$2500 total)

Kaitlin Ewald  
 Russell Fortin  
 Jacqueline Mathews  
 Daniel M. Vollmer

#### Alumni Scholarships (freshman and transfer)

Jeffrey A. Barish  
 Anna M. Konde  
 Brian Wilson

#### Perozzi Scholarship (\$1000 total)

Peter Rowell

#### Nilsson Scholarship (\$1000 total)

Ashley Han

Our students have been extremely successful at winning honors from the American Oil Chemist Society (AOCS). This year was no exception as **Young-Hee Cho** (McClements Lab) and **Thaddao Waraho** (Decker Lab) AOCS Honored Student Awards. In addition, **Thrandur Helgason**, a University of Iceland student who did his research under Dr. Weiss at UMass won the Thomas H. Smouse Memorial Fellowship and a Honored Student Award. This marks the 8<sup>th</sup> straight year that UMass Food Science students have won AOCS awards.



From left to right: Thaddao Waraho, Eric Decker, Young-Hee Cho, Thrandur Helgason and Julian McClements

The faculty have been an extremely busy during the spring and early summer.

Dr. **Robert Levin** has just completed his four years of work for his monumental book on "Rapid Detection and Characterization of Foodborne Pathogens by Molecular Techniques". The book should be in print before the end of this year. In response to the recent outbreaks of E. coli O157:H7, Bob's research group has also polymerase chain reaction (PCR) technique that can be used to detect dead versus live E. coli O157:H7 in only three hours. Dr. Levin's group has also developed a technique to enumerate the number of dead and live *Vibrio vulnificus* (a lethal human pathogen in shellfish) cells following refrigerated and frozen storage.

As usual, Dr. **Micha Peleg** has been traveling the world as one of the most sought after plenary speakers in Food Engineering. He recently gave lectures on non-linear microbial inactivation at the Monterrey Institute of Technology in Mexico and at the Institute of Food Thermal Processing Specialist's Annual Meeting in San Antonio TX. He was also an invited speaker to the AOCS 100th Annual Meeting in Orlando where he discussed modeling the kinetics of complex reactions having competing mechanisms. Micha along with Mark Normand and Maria Corradini have made a few contributions to the Wolfram Demonstration project (freely downloadable) in the areas of Food Engineering and Risk Assessment and Kinetics. You can access these demonstrations at <http://demonstrations.wolfram.com/search.html?query=Peleg&submit.x=10&submit.y=6>

Dr. **Yeohwa Park** has given several talks on conjugated linoleic acid (CLA) for prevention of obesity and osteoporosis at UMass's BioTap Program as well as in the Comparative & Experimental Medicine Seminar Series at the University of Tennessee, Knoxville. She also gave a paper at Experimental Biology and presented an invited talk on meats as functional foods in a session sponsored by IFT's Muscle Foods Division. Yeonhwa has also been working hard on the National Academy of Science's Institute of Medicine committee for improving the nutrition of the school lunch program.

Dr. **Ron Labbe** spent most of the semester on sabbatical and was recently appointed Adjunct Professor, Department of Microbiology and Immunology at University of Nuevo Leon, Monterrey, Mexico. Ron has had a long term relationship with faculty in Monterrey for many years, congratulations to his adjunct appointment.

Drs. **Kali Shetty** and **Julian McClements** have also been very busy with the research and teaching including numerous invited talks at several meetings. More can be read about their research below.

When I haven't been running around with the challenges of a building renovation, I been working with the Institute of Medicine's Food Forum on symposia on Nanotechnology and I have given talks at an IFIC coordinated session at IFT and the UMass Culinary Conference on processed foods and an AOCS short course on a lipid oxidation. In addition, I had the fortunate opportunity to attend and give a talk at the New Zealand IFT.

Below is a summary of the research of our newest faculty, **Hang Xiao**.

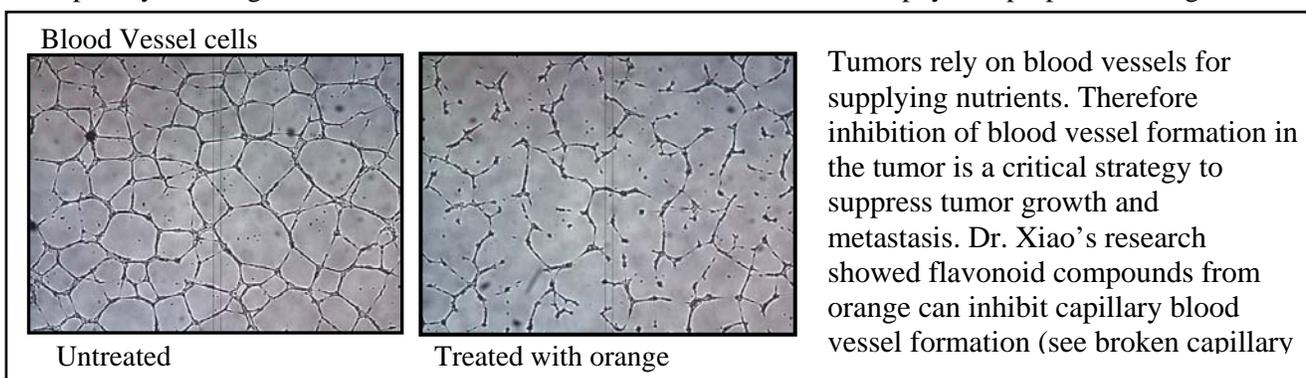


With the decreased death rate from heart diseases, cancer has become the number one killer of both men and women under age 85 years in the United States. Accumulating evidence has indicated that cancer is a preventable disease. It was estimated that more than two-thirds of human cancers could be prevented through appropriate modification in lifestyle, such as diet. Epidemiological evidence has indicated that diet abundant in fruits and vegetables may reduce the risk of cancer, and this effect has been attributed to bioactive components present in these foods.

Dr. Xiao's research is focused on the development of diet-based strategies for cancer prevention. Currently, Dr. Xiao's group is investigating the cancer preventive effects of several classes of bioactive compounds isolated from commonly consumed fruits and vegetables, such as orange, blueberry, and onion. The major approach of Dr. Xiao's research is the utilization of chemical, biochemical & molecular biology in cell cultures combined with *in vivo* animal models for human cancers. The illustration below shows photos of cell culture models used in Dr. Xiao's laboratory. Another important aspect of Dr. Xiao's research is on the interactions between dietary compounds and commonly used pharmacological drugs, such as cholesterol-lowering and anti-inflammatory drugs. Recent findings from Dr. Xiao's research have shown that combination of certain dietary compounds and cholesterol-lowering drugs (e.g., Lipitor) can significantly enhance the cancer fighting effects of each agent used individually. These findings hold great promise because they have provided scientific basis for the development of novel strategies for cancer prevention by combination of dietary components and cholesterol-lowering drugs.

This year, Dr. Xiao has been awarded the Healey Endowment Faculty Research Grant to study hydroxylated polymethoxyflavones, a class of novel compounds isolated from orange peel. Dr. Xiao will use a rat model to determine the inhibitory actions of three major hydroxylated polymethoxyflavones on the development of colon cancer, and mechanistic studies will also be conducted to elucidate molecular mechanisms of these unique compounds. Collaborating with Drs. McClements, Decker, and Park in the department, Dr. Xiao has secured a grant from Office of Commercial Ventures & Intellectual Property (UMass). Dr. Xiao is the only one receiving this award from Amherst campus. The grant will be used to further develop a novel encapsulation technology to deliver bioactive food components to the specific regions of digestive tract for enhanced their health-promoting effects. The primary purpose of this project is to bridge the gap between the basic work obtained in the laboratory, and the application work needed to demonstrate the practical utilization of the technology in the pharmaceutical and food industries.

This month, our department has just been awarded a graduate training fellowship grant (USDA) entitled "Food Science Graduate Training in Food and Health with Emphasis on Ingredient Delivery Systems and Food Policy", with Dr. Xiao as the principle project leader, and Drs. Decker, McClements, and Park as co-investigators. The award will provide stipend for three Ph.D. students for 3 years training in the Department. The goal of this training program is to utilize both interdisciplinary teaching and research activities to educate students on how the physical properties of ingredient delivery



systems in food products impact the chemical stability and health-promoting efficacy of bioactive food components. In addition, the training program has innovative experiential and mentoring opportunities that combine Food Science, Nutrition, Functional Foods and Food Policy.

## Food scientists deliver essential nutrients in tastier, more stable microgels



*March 4, 2009* Nutritionists are nearly unanimous in recommending that Americans should eat significantly more omega-3 fatty acids and consume them in foods, not in vitamin pills. The health-promoting fats are found in fish and some other food sources. But if we don't like fish, can't prepare it well, can't afford it more often, or all of the above, what are we to do?

Food scientist **Julian McClements** and colleagues at the Center for Health and Wellness are now investigating more economical and reliable ways to incorporate omega-3 fatty acids into foods. They're developing new microgel capsules to trap the omega-3 fatty acids, chemically stabilize them to prevent spoilage, and allow them to be easily incorporated in beverages, yogurts, dressings, desserts and ice cream, for example. All this without sacrificing taste, appearance or texture. Among other things, omega-3s are essential for normal growth in children and a recognized aid to heart health in adults.

In previous studies, McClements, an expert in food-based delivery systems, and his co-workers found that certain milk and soy proteins are good at preventing omega-3 fatty acids from going rancid. The researchers now want to find a way to economically produce large amounts of powdered omega-3 microgel particles rich in these anti-oxidant proteins from food-grade materials. To do this, they're concentrating on new "structural" techniques for surrounding the delicate fish oils in a protective biopolymer microgel of water, antioxidant protein, and dietary fiber. These microgel particles resemble the familiar gelatin dessert, Jell-o, except that they're microscopic.

Food as medicine is an unfamiliar concept to many American consumers, according to McClements and Eric Decker, chair of the Food Science Department. Many don't remember the first wave of nutraceuticals introduced in the 1940s and 1950s when vitamin-fortified flour, cereals and milk were "unbelievably successful" in eliminating once-common diseases such as goiter and rickets caused by vitamin deficiencies, Decker notes.

While it's becoming more common to hear of consumers picking up blueberry juice as a hedge against memory loss or whole-grain bread to ward off colon cancer, the United States remains one of the least receptive societies to the idea of food as preventive medicine compared to places like Japan and New Zealand. Nevertheless, because of their public health value, nutraceuticals are becoming a "hot topic" among North American nutritionists and food scientists. The new generation of food scientists hopes to build on the earlier successes to address modern public health problems, more widespread but perhaps no less disabling and costly to society – obesity, diabetes, heart disease, osteoporosis, cancer. Specifically, UMass Amherst researchers like McClements are not only looking at cheaper, more reliable ways to incorporate nutrients like omega-3 fatty acids in food, but at molecules known as phytosterols from oats, for example, that can lower cholesterol, and flavonoids in orange peel that show promise for killing cancer cells.

With recent new grants from the USDA, McClements is already looking ahead to the next big thing in nutraceuticals: Time-release nanolaminated coatings around fat droplets for delivery at different levels in the human body. For example, he and colleagues are learning to coat droplets with dietary fibers so some will break down in the mouth to deliver flavor immediately while others break down in the stomach or small intestine to deliver peptides that signal fullness or satiety. Still others might be designed not to break down until they reach the large intestine, where the laminated droplets would deliver anti-hypertensive or cancer-fighting food compounds that can't survive digestive acids in the stomach. By manipulating food structure, McClements and other food scientists are also exploring ways to increase solubility in the small intestine so more of the nutrients are absorbed. "More studies are needed before we can justify further work on tailoring foods to match an individual's genetic makeup," McClements adds, but that's coming, as well, he predicts.

Europeans will readily pay more for food that promises to boost health, Decker observes. And in the past 20 years Japan has launched one of the most far-reaching public health campaigns anywhere, to increase nutraceutical consumption to control heart-disease-related health care costs and other problems. Watch for international companies to team up with food science programs like the Health and Wellness Center to do the same.

From: In the Loop

# Why sugar lovers should think brown

By Kristin Palpini 01/02/2009



If you're going to eat sugar, gobble up the dark brown kind.

According to new research by the University of Massachusetts, brown sugar has better protective health properties when consumed than the 35 other international, natural sweeteners examined in the study. Brown sugar, which is less refined than the white granules typically sold in markets, contains more beneficial antioxidants than other sugars.

The research was conducted by **Kalidas Shetty**, a UMass food science professor, who said he did his study- and other similar food evaluations - in an effort to help people live healthier lives by making smart diet decisions. Shetty also worked with Lena G. Ranilla of the University of San Paolo, Brazil, on the research.

"We're eating less whole foods today which removes the protective factors of food from our diets," Shetty said. "I'm not saying we should be eating a lot of brown sugar," Shetty continued. "If you're going to eat sweets, you may as well eat less refined ones."

To do his research, Shetty collected natural sugar samples from across the globe. Among those tested were store-bought white sugar, maple syrup, corn syrup, date sugar, cane sugar, muscovado, mishri and palm sugar. Honey was not tested. All of Shetty's experiments were lab studies conducted outside of living organisms. Extracts from the sugars were analyzed for their total phenolic compound content. Phenolic compounds are a plant-produced group of antioxidants that give red wine and tea their healthy benefits.

In this first test Shetty learned that dark brown sugars contain 4,741 micrograms of phenolic compounds per gram. The average white sugar only contains 18 micrograms. Additional testing showed that brown sugar phenolic compounds, particularly dark brown sugars from Peru and Mauritius and U.S. date sugar, had the highest antioxidant levels, which in turn inhibited 82-88 percent of potentially harmful free radicals.

Antioxidants are important to human health because they react with free radicals- unstable oxygen molecules actively searching to react with another chemical. If free radicals react with undesirable partners, the results can lead to negative health effects such as pancreatic cancer and pulmonary disease.

Shetty's research could also be beneficial to people with Type 2 diabetes. Sweeteners were tested for their ability to stop alpha-glucosidase activity, an enzyme that moderates blood glucose levels. "Diabetes is characterized by a rapid rise in blood glucose levels after meals," Shetty said. "Inhibiting alpha-glucosidase which is the target of several drugs used to treat diabetes can help prevent a spike." Most sweeteners derived from sugar cane, including dark brown sugar, inhibited alphasglucosidase levels of 25-50 percent. Date sugar inhibited enzyme levels by 75 percent and sweeteners based on corn syrup blocked alpha-glucosidase levels by 77-81 percent.

"These results indicate that a strategic choice of dietary sweeteners, especially less refined sugars close to the original nature of the ingredients found in whole plants, also has potential in managing Type 2 diabetes and related complications," Shetty said. "This provides a strong rationale for further animal and clinical studies for better diet design."

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**Source URL:** <http://www.gazettenet.com/2009/01/02/why-sugar-lovers-should-think-brown>

Finally, in some very sad news, former faculty, Department Head and IFT president, Jack Francis passed away this spring. Jack's charm, wit and intelligence will be missed.



## **FREDERICK JOHN (JACK) FRANCIS**

**October 9, 1921 - June 27, 2009**

AMHERST, Jack Francis, 87, died peacefully Saturday, June 27<sup>th</sup>. Jack was born in Ottawa, Ontario Canada, to the late Mary and Roland Francis. He became a United States citizen in 1964. Jack enlisted in the Royal Canadian Air force as a fighter pilot and also served in the Canadian Infantry in World War II. In 1952 he married the late Jean Dalton Burrows from Guelph, Ontario. Jack received his BA and MA from the University of Toronto, and his PhD from the University of Massachusetts. In 1954 he joined the Department of Food Technology at UMass serving as Department Head from 1971-1977. His life long contribution to Food Science is illustrated by his numerous professional awards including the Chancellor's Medal at the University of Massachusetts, the Nicolas Appert Medal and the Carl R. Fellers Award and the International Award by the Institute of Food Technologists (IFT). In addition, Jack served as president of the IFT and Phi Tau Sigma (the honor society for food science). He has been chairman of the board of the American Council on Science and Health, and is a fellow of the American Association for the Advancement of Science, among others. Jack also served on boards from the National Institutes of Health including the National Cancer Institute, the USDA, the Department of Defense and the National Science Foundation. His work allowed him to travel extensively and work with food scientists from Europe, India, Brazil, China and the Caribbean. Locally Jack was an avid gardener and fisherman as all who know him will attest. He currently holds the Guinness Book World Record for the longest philodendron. Jack was predeceased by his beloved wife, Jean Burrows Francis in 1998. He is survived by his three children, Mardie Francis Clayton, John Burrows Francis and his wife Catherine, and Laurie Jean Francis-Wright and her husband Tim, and six grandchildren, Sarah Margaret Clayton, Bill Francis Clayton, Mary Catherine Francis, Colleen Elizabeth Francis, Ethan Campbell Francis-Wright and Leah Hult Francis-Wright. A Funeral Service for Jack will be held on July 1, 2009, at 11:00AM at the Douglass Funeral Service, 87 N. Pleasant St., Amherst, MA 01002, followed by burial in the South Amherst Cemetery. Contributions in lieu of flowers may be directed to the American Diabetes Association or the Michael J. Fox Foundation from Parkinson's Research.

A handwritten signature in black ink, appearing to read "Eric Decker". The signature is fluid and cursive, with a large initial "E" and "D".

Eric Decker  
Department Head