

UC Davis

Department of Food Science and Technology Newsletter

Volume 1, Number 1

Spring, 1989

Chairman's Column

Alumni will have missed receiving the folksy annual newsletter that has been a year-end tradition in recent years. In keeping with the changes taking place on campus (and the availability of desk-top publishing!), we are trying something a little different. Our hope is to reach you twice a year, spring and fall, with this new format, and to extend our contact to other colleagues who have an interest in our departmental family.

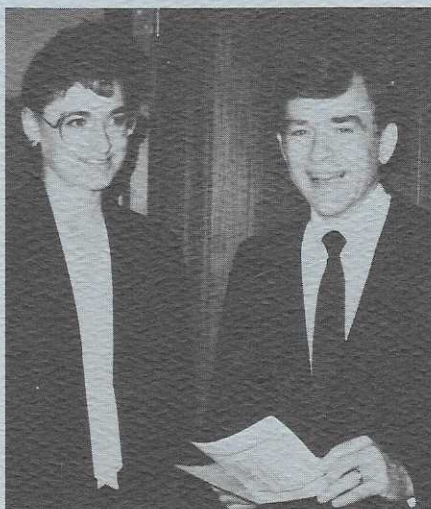
There are changes on campus. Since July, 1987, Dr. Theodore Hullar has been Chancellor, replacing Dr. James Meyer who served 18 years in that role. After 17 years as Department Chairman Bernie Schweigert went back to being a professor in the department, although not an ordinary professor! Campus enrollment stands at 22,000, on its way to an ultimate 25,000. This has caused space pressures everywhere, especially in the Chemistry Department which is expanding into the Food Science and Technology space in the Chemistry Annex Building. Dr. Shoemaker has already moved to Cruess Hall and others from Chem Annex will move into the old Environmental Toxicology building as soon as it is refurbished for our needs. Alumni will remember E. Tox. as the building closest to Cruess Hall so our faculty will experience geographical proximity for the first time in our history.

Opportunity for joint programs between departmental Cooperative Extension Specialists and ladder faculty has been enhanced through an evolving reorganization of the Experiment Station. Administration of the statewide Experiment Station has been decentralized to the various campuses of the University. One result is that Extension Specialists are now administratively a part of Food Science and Technology. Another is that we have added specialist Chris Bruhn to our department; she is addressing the difficult area of consumer attitudes and issues related to foods.

Elsewhere in this newsletter are articles on new food engineering faculty members Kathryn McCarthy and John Krochta. We are recruiting now for a new food microbiologist, having added a lipid chemist in the person of Bruce German about 18 months ago.

The reason for the newsletter is to help us stay in touch. Another way to do that is to join us at the 50th Annual IFT Convention in Chicago. The University of California will again have an area designated at the IFT Cocktail Hour, 6:00 to 7:30 pm June 27, 1989. Plan to attend and renew old acquaintances. We would like to see you again.

Larry Merson



Diana Beymer, Food Tech Club President, and Larry Merson discuss plans for the NCIFT Student Recognition Banquet which was held January 26 at the University Club.

California Dairy Foods Research Center Established

UC Davis and Cal Poly San Luis Obispo were selected by the National Dairy Board as joint sites for one of six dairy foods research centers in the United States. The California center is supported by over \$1.2 million annually from the National Dairy Board and California dairy industry groups including the California Milk Advisory Board, the California Manufacturing Milk Advisory Board, marketing boards, the Dairy Council of California, the Dairy Institute of California, and the California Creamery Operators Association. Director of the Center is Tom Richardson, Shields Professor of Dairy Food Science at UC Davis.

In its first year of activity the center received support for 18 research projects at UC Davis under the direction of 17 different principal investigators from six departments, including ten from Food Science and Technology. Projects are in the general areas of genetic engineering and biotechnology, dairy foods nutrition, dairy foods safety, and dairy food science and technology. Approximately ten projects have been funded at Cal Poly San Luis Obispo in the general areas of membrane technology, cheese and cultured products, new dairy food product development, and dairy foods and health.

Alumni:

Please Return

Enclosed Survey



Rose Marie Pangborn

Rose Marie Pangborn Receives Macy Award

The Minnesota Section of IFT has presented the Harold Macy Food Science and Technology Award to Professor Rose Marie Pangborn. This award was established to honor people who have helped to advance the profession and practice of food technology. It is presented in recognition of an outstanding example of food technology transfer or cooperation between scientists in areas of service represented by universities, government, or private industry. The award honors the late Harold Macy, a founding father of IFT and Dean Emeritus at the University of Minnesota. In addition to an inscribed plaque, Professor Pangborn will receive a \$1,000 honorarium and will be invited to address the Minnesota Section of IFT.

Professor Pangborn's contributions to technology transfer include research, teaching, and outreach programs. In addition to undergraduate teaching, where she instructs 40-50 students annually in sensory science, since 1956 Professor Pangborn has been the major professor for over 40 graduate students. Most of these students currently have leadership roles in sensory science in industry. Professor Pangborn gives about ten invited lectures each year, and she and her colleagues have authored over 180 publications, many of which provide foundations for sensory science methodology. In 1983 Professor Pangborn initiated the annual Chemical Senses Day, designed to bring researchers primarily from California together to present papers and discuss sensory science methodology.

Faculty Awards

Bob Feeney has been elected a Fellow of the Division of Agricultural and Food Chemistry of the American Chemical Society. This honor was bestowed by the Division during its annual award banquet at the ACS meeting in Los Angeles in September.

The Southern California Section of IFT has selected **Bernie Schweigert** as Food Man of the Year. Dr. Schweigert has also been named the Ivan Parker Lecturer this year by the International Association of Milk, Food and Environmental Sanitarians. The association is establishing a scholarship endowment fund in Dr. Schweigert's name.

Bob Price was elected an IFT Fellow. Dr. Price is also the Chair-elect of the Northern California Section of IFT.

Paul Singh received the 1988 IFT International Award in recognition of his efforts to promote the international exchange of ideas in food technology.

The Finnish Society of Food Science and Technology has elected **Rose Marie Pangborn** an Honorary Fellow. She was also selected by New Mexico State University in Las Cruces to receive an Outstanding Alumnus award at the university's centennial ceremonies last fall.

Faculty Service

David Reid was recently selected as a member of the Management Committee of the *Journal of the Science of Food and Agriculture*. He is also the US receiving editor for this journal.

The American Dairy Science Association elected **John Bruhn** to their Board of Directors at their annual meeting in Edmonton, Alberta, Canada.

Barbara Schneeman has been appointed a member of the Dietary Guidelines Advisory Committee. This committee is sponsored jointly by the Departments of Agriculture and Health and Human Services with the purpose of providing sound and current dietary guidance to consumers.

Two departmental faculty members are serving as Associate Deans in the College of Agricultural and Environmental Sciences. **Erica Barrett** is Associate Dean of Resident Instruction and Student Affairs, and **John Whitaker** is Associate Dean of Academic Affairs.

Sabbaticals

Dieter Gruenwedel is spending a sabbatical-in-residence at Davis. He is studying structural toxicology, examining the effects of heavy metals such as mercury on the chiroptical properties of DNA in chromosomes. To aid in this work, he has been developing software for use with a circular dichroism instrument, which he has interfaced with a Zenith 286 workstation.

Paul Singh is spending a one-year sabbatical at the Pillsbury Research and Development Group in Minneapolis. During his stay there, Dr. Singh has been involved with several projects on computer-aided process design.



Bruce German

ILSI Future Leader Award to Bruce German

Bruce German has been selected to receive the International Life Science Institute (ILSI) Nutrition Foundation Future Leader Award. This research award is given to promising nutrition scientists in their first academic position. The award includes \$15,000 per year research funding for two years. Dr. German will investigate how fatty acids from the diet are incorporated into cell lipid membranes and how this affects cell function.

Dr. German joined our department in 1987. His credentials include a B.S. with honors in Biology and an M.S. in Plant Biochemistry both from the University of Western Ontario and a Ph.D. in Food Chemistry from Cornell University where he studied with Professor Kinsella. Prior to coming to Davis, Dr. German was a postdoctoral research associate at Cornell.

New Faculty

Kathryn McCarthy

Dr. Kathryn McCarthy joined our faculty last fall as an Assistant Professor. She holds a joint appointment in the Departments of Food Science and Technology and Agricultural Engineering. Dr. McCarthy received her B.S. in Chemical Engineering from Michigan State University, M.S. in Food Science at UC Davis, and Ph.D. in Food Engineering at UC Davis. After completing her degree in 1987, she worked as a post-doctoral researcher and lecturer in our department. Dr. McCarthy's research interests include modeling and experimental work in fluid mechanics and heat transfer. Current work includes modeling foam drainage, determining rheological parameters of fluid foods in a continuous lift viscometer, and examining extrusion of food products.



Kathryn McCarthy

John Krochta

Dr. John Krochta has been appointed Professor in the Departments of Food Science and Technology and Agricultural Engineering and will join our faculty this spring. Dr. Krochta received his B.S. degree from Purdue University in Chemical Engineering and his M.S. and Ph.D. degrees in Chemical Engineering from UC Berkeley. He graduated first in his chemical engineering class at Purdue with highest honors, and was awarded a Regents' Fellowship and NDEA Fellowship in Chemical Engineering at UC Berkeley.

Since 1971, Dr. Krochta has been a research chemical engineer at the Western Regional Research Center (WRRRC), Agricultural Research Service, US Department of Agriculture in Albany, CA. His work at WRRRC included aspects of fruit and vegetable harvesting, handling and cleaning, food and nutrient losses, water pollution prevention, water and energy conservation, biochemical separations, and conversion of agricultural materials to fuels and chemicals. He has published over 40 papers. Dr. Krochta's current research includes the development of edible films and coatings to control mass transfer in

foods. He received USDA Merit Awards for Outstanding Research in 1986 and for Creative Research and Superior Performance in 1987.

Dr. Krochta has also served as an invited lecturer and acting instructor with the Department of Chemical Engineering, UC Berkeley. He is a registered Professional Chemical Engineer and a member of the American Institute of Chemical Engineers, Institute of Food Technologists, American Chemical Society, American Society of Agricultural Engineers, and Sigma Xi.

John and his wife Marg enjoy a three year old son, Michael. Marg has been Director of Aging Services with Catholic Charities in San Francisco for the past few years and plans to pursue her interests in the field of aging and physical therapy in the Davis-Sacramento area. Marg's other interests include matting-framing, swimming and gardening. John's outside interests include piano, jogging and psychology. If you attend the 50th IFT Convention in Chicago this June, look for John performing with the Harry Couden NCIFT Combo.

Retirements

Walt Jennings

An open house was held by Dr. Jennings last September to mark his University retirement on December 31, 1988. Dr. Jennings requested that no speeches, gifts, cards or other activities mark this event. He joined the faculty at UC Davis in 1954 after obtaining his B.S. and M.S. degrees in Food Science and his Ph.D. in Agricultural Chemistry, all from UC Davis. Dr. Jennings' research career focused on all aspects of gas-liquid chromatography techniques and the composition of flavor volatiles. He has authored or co-authored over 160 publications and pioneered the area of high resolution glass capillary gas chromatography.

Marty Miller

Professor Marty Miller was honored by colleagues and friends at a retirement party last year. Dr. Miller joined the Food Science and Technology faculty in 1959 after completing his Ph.D. in Microbiology at UC Davis. Dr. Miller obtained A.B. (Bacteriology) and M.S. (Food Science) degrees at UC Berkeley. His research interests include yeast taxonomy, life cycles, and their role in food production and spoilage, and also fruit dehydration. Dr. Miller is a Fellow of the Institute of Food Technologists and also the American Academy of Microbiology. In spite of his retirement, Dr. Miller has been on call-back to help teach courses in Mycology and Introduction to Food Processing.

In Transition

R. A. Bernhard has begun a phased retirement program. Dr. Bernhard is currently on 50% retirement and scheduled for full retirement in 1994.

R. C. Pearl is scheduled to begin retirement from the department in August, 1989. After that time, Bob plans to continue to work part time at the University, with Food Science and Technology and also with University Extension helping organize and coordinate short course activities.

B. S. Schweigert has also begun a phased retirement program. He is currently on 50% retirement and scheduled for full retirement in 1991.

ATTENTION EMPLOYERS!!

Student Placement Service

Both our campus student placement center and our department are eager to help you find qualified graduates to fill your positions. We would appreciate copies of your vacancy listings. Send or phone position announcements to our department librarian **Carol Cooper** (916-752-1467) or **Jim Buhlert** (916-752-3685) who will post them. To arrange for interviews on campus contact **Nancy Tibbits** (916-752-2861) at the Career Planning and Placement Center.

Student Resumes

We are compiling resumes for June and September graduates. If you may have positions available and are interested in receiving copies, contact **Carol Cooper** (916-752-1467).



Janet Tietyen

Tietyen Receives General Foods Fund Fellowship

Janet Tietyen, M.S. student, is one of six recipients of 1988-89 General Foods Fund Fellowships. These fellowships are offered to encourage graduate work related to nutrition research or nutrition education and consumer communication and are renewable up to three years. The annual award is \$10,000. Janet is a native of Kentucky. She received her B.S. in Dietetics in 1982 from the University of Kentucky and worked there as a research dietitian prior to beginning graduate studies at Davis. Janet's thesis research concerns characterization of the potential health benefits and functional properties of oat bran. She is working with Professor **Barbara Schneeman**.

Scholarship Recipients

- Alice C. Bridge Memorial Scholarship**
Diana Beymer
- California Creamery Operators Association, Inc. Scholarship**
Diana Beymer
- California Dairy Industries Association Scholarship**
Raymond Jensen
- California League of Food Processors Scholarship**
Diana Beymer
Raymond Jensen
- Clorox Annual Scholarship**
Jean-Xavier Guinard
- Luther D. and Marie M. Davis Scholarship**
Diana Beymer
Linda Chan
Asako Nakai
- General Dillingham Produce Industry Scholarship**
Raymond Jensen
- General Foods Fund Fellowship**
Janet Tietyen
- Food Processors Sanitation Award**
Deborah Richardson
- Foodsters Scholarship**
Michele Yaffee
- Institute of Food Technologists Sophomore Scholarship**
Carol Koenigsberger
- Institute of Food Technologists Junior/Senior Scholarships**
Linda Chan
Aria Dharmawan
Tony Yeung
- Institute of Food Technologists - H. J. Heinz Company Scholarship**
Diana Beymer
- The Tom and Valley Knudsen Foundation Scholarship**
Myung Yi
- Sherman J. Leonard Memorial Award**
Sanguansri Charoenrein
Ernest Perez
San Land Young
- Robert K. Malcolm Scholarship**
Diana Beymer
Herbert Wang
- Emil Mrak Prize in Food Science**
Michelle Arvonen
- Newhall Land and Farming Company Scholarship**
Herbert Wang
- Thomas A. Nickerson Memorial Scholarship**
Sangsuk Oh
- David D. Peebles Scholarship**
Diana Beymer
Tony Yeung
- George W. Pierce Scholarship**
Aria Dharmawan
- The Bernard S. and Alta Schweigert Food Science Award**
Pojanee Paniangvait
- George F. Stewart Memorial Award**
Eve Fagrell
Liping Yu
Michele Yaffee

Student News

Sanguansri (UE) Charoenrein recently was awarded third place in the NATAS (North American Thermal Analysis Society) student competition at the

society's meeting in Orlando, FL. UE's paper was entitled "The Use of DSC (Differential Scanning Calorimetry) to Study the Kinetics of Heterogeneous and Homogeneous Nucleation of Ice in Aqueous Systems." She is completing her Ph.D. this spring with Professor **David Reid**.

The Department at a Glance

Personnel

- * 27 Professors: Diversity in disciplines (chemists, biochemists, biologists, microbiologists, engineers, nutritionists, food scientists, sensory scientists)
- * 10 Emeritus Professors
- * 6 Joint Appointments (Engineering, Nutrition)
- * 6 Cooperative Extension Specialists (dairy products, marine resources, fruits and vegetables, food preservation/ biotechnology, meat/engineering, consumer food marketing, plus two emeritus)
- * 20 Staff Research Associates
- * 20 Clerical Staff (management, secretarial, accounting, advising, library, storeroom)
- * 10 Physical Support Staff (machine shop, electronics, pilot plant, dishwashers)
- * 2 Associate Deans (historically a Chancellor, 4 Associate Deans, and Department Chairs for Bacteriology, Biochemistry, Environmental Toxicology, and Nutrition)

Facilities

- * Chemistry Annex
- * Cruess Hall
- * Institute of Marine Resources
- * Pilot Plant for Food Processing
- * Machine Shop
- * Departmental Library
- * Moving to Environmental Toxicology, 1991

Teaching Programs

- * Undergraduate Majors

Food Science	70 students
Food Biochemistry	60 students
Consumer Food Science	10 students
- * Food Science Graduate Group 75 M.S. students
- * Various Ph.D. programs 21 students

(Ag. Chem, Microbiology, Biochemistry, Genetics, Engineering)

- * Various short courses and conferences

Research Programs (Highlights)

- * **Food Biotechnology and Molecular Biology**
Genetic transformations of caseins (Richardson), understanding bacterial spores (C. Price), protein secretion by yeasts (Ogrydziak), muscle cell development (Bandman), ELISA detection of microbial enzymes (Merson), DNA yeast taxonomy (Phaff)
- * **Microbial Food Safety and Spoilage**
Anaerobic-aerobic shifts in Salmonella (Barrett), Listeria (Barrett, Richardson), C. botulinum growth at pH < 4.6 (Merson), yeasts and molds, (Miller), yeast biology (Phaff), food spoilage (York)
- * **Nutrition and Toxicology**
Oxidative damage to tissue, antioxidants, selenium-containing proteins (Tappel), dietary fat and fatty acid metabolism (German), dietary fiber (Schneeman), toxicity of carcinogens and mercury (Gruenwedel), Maillard reactions and Amadori compounds (Gruenwedel, Russell), nutrients and contaminants in milk (J. Bruhn)
- * **Enzymology**
Biochemistry of enzymes (Feeney, G. Smith, Whitaker), lipid oxidation (German), seafoods (Haard), beer (Lewis), fruits (Luh), plants (Mazelis), secretion by yeasts (Ogrydziak) and bacteria (C. Price), dairy products (Richardson), oxidative damage (Tappel)
- * **Chemical Modification of Proteins**
(Feeney, Whitaker)
- * **Brewing**
A unique program (Lewis)
- * **Sensory Science**
Sensory properties of foods (Pangborn), psychophysics and sensory methodology (O'Mahony)
- * **Instrumental Analysis and Properties of Foods**
Gas-liquid chromatography (Bernhard, Jennings), HPLC (Bernhard, German), NMR (G. Smith), mass spectroscopy (Russell), electron spin resonance (Russell), cryomicroscopy (Reid), circular dichroism (Gruenwedel), differential scanning calorimetry (Reid), solid state NMR (M. McCarthy), computer interfacing (Russell, Shoemaker), viscometry (Shoemaker)
- * **Food Engineering/Physical Chemistry/Technology**
Canning and thermal preservation (Merson), freezing (Reid, Singh), dehydration (M. McCarthy, Miller, Singh), modified atmosphere storage (Ogrydziak), concentration gradients by magnetic resonance imaging (M. McCarthy), rheology (K. McCarthy, Shoemaker), systems engineering (Singh), water activity (Reid), packaging (Henderson, Luh), food irradiation (C. Bruhn, Schweigert), energy management (Singh), edible films (Krochta), fish processing (R. Price), meat processing (Bandman, Schweigert, Zeidler), tomato processing (Marsh), aqueous foams and emulsions (German, K. McCarthy, M. McCarthy), extrusion (K. McCarthy, Zeidler), consumer-processor interactions (C. Bruhn)

Faculty Research Interests

Since this is the first departmental newsletter with this format and wide distribution, we would like to introduce you to our faculty and their research interests. Parenthetical expressions indicate discipline of academic training.

Everett Bandman

Tissue culture studies of muscle cell development, growth and disease; biochemistry of muscle proteins; factors affecting the transformation of muscle into meat. (Molecular Biology)

Ericka L. Barrett

Regulation of shifts between aerobic and anaerobic metabolism in enteric bacteria; microbially-related problems of food storage and spoilage. (Microbiology)

Richard A. Bernhard

General food chemistry; food flavor chemistry; pyrazine chemistry; chemistry of natural products; terpenes; essential oils; vitamins; instrumental methods of analysis. (Organic Chemistry and Plant Physiology)

Christine M. Bruhn

Research and education focused on consumer attitudes toward food safety, quality, wholesomeness, and pricing, with the objective of helping the food industry better meet consumer expectations. (Consumer Behavior)

John C. Bruhn

Dairy bacteriology; dairy chemistry; processing of dairy foods. (Microbiology)

J. Bruce German

Chemistry and biochemistry of lipids; the role of dietary fat in tissue and cell function; essential fatty acid metabolism and synthesis of bioactive metabolites; enzymology of lipid oxidation. (Food Chemistry)

Dieter W. Gruenwedel

Genotoxicity of mutagens, carcinogens, and environmental contaminants found in foods; toxicology of trace elements and heavy metals; physical chemistry of food components; study of internal can corrosion processes. (Physical Chemistry, Cell Physiology)

Norman F. Haard

Food biochemistry; science and technology of marine food products; utilization of fishery by-products and unconventional species; role of endogenous enzymes in seafood quality, application of enzymes in seafood processing. (Biochemistry)

Jerald M. Henderson

Materials handling; food engineering; mechanical design, solid mechanics and packaging. (Engineering)

John M. Krochta

Edible foods and coatings to control mass transfer in foods; process modifications to reduce water and energy use; conversion of agricultural surpluses to fuels and chemicals; biochemical separations. (Chemical Engineering)

Michael J. Lewis

Yeast physiology; cereal physiology; brewing technology. (Microbiology and Biochemistry)

Mendel Mazelis

Plant biochemistry; enzymology of amino acid metabolism with special emphasis on lysine, sulfur-containing amino acids and proline regulatory mechanisms. (Biochemistry)

Kathryn L. McCarthy

Application of modeling to describe heat transfer and fluid mechanics in food systems; experimental work in food rheology to be applied to optimizing processing conditions and developing a research program in extrusion. (Food Engineering)

Michael J. McCarthy

Food engineering; modeling of heat, mass and momentum transfer during processing of foods; nuclear magnetic resonance. (Chemical Engineering)

R. Larry Merson

Application of chemical engineering to processing foods; heat and mass transfer, thermal processing, vacuum canning, heat resistance of microorganisms and enzymes; separation methods, membrane processes, crystallization. (Chemical Engineering)

David M. Ogrydziak

Protein secretion and processing in the yeast *Yarrowia lipolytica*; genetic manipulations of microorganisms as sources of enzymes or other fermentation products useful in food processing; modified atmosphere storage of seafoods. (Microbiology)

Michael A. O'Mahony

Sensory psychophysics, methodological aspects of using man as a sensory instrument. (Psychophysics)

Rose Marie Pangborn

Sensory properties of foods: Interaction of appearance, odor, taste and texture in foods, beverages and model systems; correlation of sensory with instrumental and chemical analyses; the role of saliva in perception; nutritional status and sensory perception. (Food Science)

Robert C. Pearl

Effect of raw material, cultural and handling practices on processed fruit and vegetable product yields and quality; fruit and vegetable handling and processing. (Plant Science)

Chester W. Price

Role of RNA polymerase in regulating gene expression in the spore-forming bacterium *Bacillus subtilis*; mechanism of carbon and nitrogen catabolite control and regulation of extracellular enzyme synthesis in bacteria. (Microbiology)

Robert J. Price

Processing of seafood products; food microbiology; food plant sanitation and waste utilization. (Microbiology)

David S. Reid

Physico-chemical aspects of the freezing process in model systems and food systems; role of water in food systems; ion-polymer interactions in gel systems. (Physical Chemistry)

Thomas Richardson

Chemistry and technology of dairy food products; structure-function relationships in milk proteins; applications of enzymes to food processing. (Biochemistry)

Gerald F. Russell

Chemistry of volatile food components; flavor and odor compounds; analysis of toxic and carcinogenic compounds in foods; use of computers for laboratory and process automation. (Food Chemistry)

Barbara O. Schneeman

Effect of processing on the composition and bio-availability of nutrients in foods; dietary influences on digestive mechanisms. (Nutrition)

Bernard S. Schweigert

Nutritional changes in food processing; B vitamins, food safety and nutrition; processing of meat products; food irradiation; public issues in food science and nutrition. (Biochemistry and Nutrition)

Charles F. Shoemaker

Food rheology; interfacial phenomena in food systems; microcomputer technology in food analysis and process control. (Physical Chemistry)

R. Paul Singh

Food engineering; mathematical description of biological processes during processing and storage; energy efficiency improvements in food processing unit operations; computer simulation of quality changes during storage. (Agricultural Engineering)

Gary M. Smith

Mechanisms of enzyme action; heme proteins; microbial metabolism; nuclear magnetic resonance; dairy chemistry. (Biochemistry)

Aloys L. Tappel

Oxidative biological damage to tissues; quantification of damage to lipids, proteins, enzymes and nucleic acids, with emphasis on nutrients,

polyunsaturated fats and vitamin E; properties of proteins containing trace element selenium, in context of nutrition. (Biochemistry)

John R. Whitaker

Role of enzymes in quality of foods; naturally occurring enzyme inhibitors in foods; improvement of food proteins. (Biochemistry)

George K. York

Food spoilage and food poisoning bacteria, thermobacteriology, chemical preservatives, waste disposal, food plant sanitation; home food preservation. (Microbiology)

Gideon Zeidler

Processing of red meats, poultry and egg products; packaging to extend shelf life; new ingredients and their functionality in meats; extrusion technology. (Food Engineering and Food Technology)

EMERITUS FACULTY**A. Wade Brant**

Processing of meat and poultry products. (Food Technology)

Edwin B. Collins

Fermentations; bacterial physiology; bacteriophages; food-spoilage problems. (Microbiology)

Walter L. Dunkley

Milk and its products, particularly milk flavors and milk processing; food processing. (Food Technology)

Robert E. Feeney

Biochemistry of proteins and enzymes; development of reagents for chemical modification of proteins; improvement of foods by chemically

modifying proteins; antifreeze proteins. (Biochemistry)

Walter G. Jennings

High resolution glass capillary gas chromatography; volatile (flavor) components of foods; sampling techniques for GC analysis; improvement of instrumental methods in the field of gas-liquid chromatography and spectrometric analysis; development of micro open tubular HPLC. (Food and Analytical Chemistry)

Bor S. Luh

Chemistry and biochemistry of food processing and storage stability; chemical constituents and contaminants in food; food packaging and new food products. (Food Chemistry)

George L. Marsh

Chemistry of food deterioration; canning, freezing and evaporation technology; fruit and vegetable processing. (Food Technology)

Martin W. Miller

Ecology, taxonomy and identification of yeasts; role of yeasts and molds in food production and/or spoilage; native food fermentation; fruit dehydration. (Microbiology)

Herman J. Phaff

Yeast biology; taxonomy, ecology of yeasts. (Microbiology)

Lloyd M. Smith

Chemistry of lipids and lipid complexes; relation of lipids to processing and storage of foods, quality control for edible fats, cooking oils and shortenings. (Food Chemistry)

Clarence Sterling

Botany; plant anatomy; morphology; microscopic, submicroscopic and molecular structure of foods. (Botany)

Research Projects

As space permits in this and future issues, current research projects by various faculty members will be briefly described. This issue includes research by John Whitaker, Bob Price, Michael McCarthy and John Krochta. Collaborators and extramural funding sources are also indicated.

John R. Whitaker

Factors which influence the biological value of beans (*Phaseolus vulgaris*, L.). (NSF; Valdemiro Sgarbiari, University of Campinas, Brazil, collaborating).

Common beans represent a major food source for many people in the world. However, beans have a low nutritional value because of methionine levels which decrease even further on storage. They may also contain several antinutritional factors (enzyme inhibitors, lectins, phytic acid, etc.). In addition, the major proteins have low digestibility. This project examines the further causes of poor nutritional value and how to correct them.

Improvement of functional properties of milk proteins by limited hydrolysis. (Dairy Foods Research Center)

β -Lactoglobulin and α -lactalbumin are major proteins of milk and almost all of the protein of whey. They have good nutritional properties but poor functional properties. Therefore, much of the whey proteins are used for animal feed. This research is aimed at correcting the functional properties of the proteins via limited proteolysis to produce controlled size peptides.

Protein engineering of plant enzymes. (Biotechnology Research and Education Program; in cooperation with R. Doi, Biochemistry; C. Kado, Plant Pathology; R. Rodriguez, Genetics; and I. Segel, Biochemistry)

The team is studying the properties of several rice isozymes. The genes of individual isozymes are to be expressed in *Bacillus subtilis*, in relatively large amounts so that the application of these enzymes in starch modification can be studied. Factors affecting incorporation of the genes and expression of the enzyme will be studied.

Search for means to prevent enzymatic browning in fruits and vegetables. (USDA/BARD; with V. Kahn, Volcani Institute)

Polyphenyl oxidase is one of the most deteriorative enzymes in plant tissues, causing major browning problems. By understanding the mechanism of the action of the enzyme, the researchers hope to be better able to control its activity. The mechanism by which ascorbic acid, NaHSO_3 and thiol compounds inhibit the enzyme are being elucidated. K_{cat} destruction (suicide) of the enzyme is also being studied.

Naturally occurring α -amylase and protease inhibitors.

Common beans contain up to 5% (by weight of protein) of α -amylase inhibitors and 0.2% protease inhibitors. These proteins bind tightly to salivary and pancreatic α -amylases and pancreatic proteases to decrease digestibility of starch and proteins. They are antinutritional factors. This project investigates these inhibitors and the mechanism of enzyme inhibition.

Robert J. Price

On-board handling of albacore tuna for alternative markets. (US Dept. of Commerce)

The overall objective is to improve the quality of albacore tuna labelled for use in alternative non-cannery markets. Specific objectives are to determine the shelf life of frozen and fresh albacore tuna under controlled handling and storage conditions on albacore tuna quality. The data will be used to develop specific recommendations on handling practices and freezing methods for use by the seafood industry in developing alternative fresh and frozen markets.

Michael J. McCarthy

Moisture transport in unconsolidated porous media during drying: Use of nuclear magnetic resonance imaging as an experimental probe. (NSF; with Stephen Whitaker, Chemical Engineering)

Current theoretical calculations and experimental observations clearly indicate that local heterogeneities play a crucial role in the drying process. To fully understand food drying, the influence of these local heterogeneities must be incorporated into both a theoretical framework and experimental measurements. The theoretical analysis is based on the method of large-scale averaging which has been successful in simpler systems. Experimental studies will make use of magnetic resonance imaging both to quantify the heterogeneities in a porous medium and to measure the local volume averaged saturation during drying. It is anticipated that these studies in model systems will lead to better understanding of water transport during drying of foods.

John M. Krochta

Edible films and coatings for food products - fundamental study of the use of protein films and coatings as moisture and gas barriers to maintain food quality.

Foods quickly lose fresh character when they lose moisture to the air, or when moisture moves from one component of the food to another, or as oxygen diffuses into the food to enhance respiration or oxidation. Edible films from natural ingredients formed on food surfaces or between food components could prevent product moisture loss, create optimum product internal atmospheres, and prevent browning and microbial attack. Proteins will be used to produce films in emulsions with various vegetable oil materials. Enzymatic modification of proteins will be investigated with the goal of producing edible films with tailor-made moisture- and gas-barrier properties.

Food Science Ph.D. Proposal Update

A ten-year effort to establish a Ph.D. in Food Science on the Davis campus moved one step closer to fruition earlier this year. A proposal for such a program received all the necessary campus review and was forwarded to the University Office of the President with Chancellor Hullar's strong support in late January. From there the proposal will go to the system-wide Coordinating Council for Graduate Affairs, the body that approves all new graduate programs for the University. Beyond that, only campus authorization would be needed to start the program, which could begin as early as Fall Quarter, 1989.

Until the proposal is approved, Food Science students obtaining Ph.D.'s from UC Davis do so under the supervision of our faculty, but in a related major such as Agricultural and Environmental Chemistry, Genetics, Biochemistry, Microbiology, Nutrition, or Agricultural Engineering. This graduate group system will still continue after the establishment of a Ph.D. in Food Science, but students will have one more option in choosing a field of study.

Bernie Schwelgert, Paul Carroad, Gerry Russell, and the late Duane Brown were instrumental in developing the proposal over the years. David Ogrydziak has effectively spearheaded the final drive to prepare the most recent document.

18th Annual Western Food Industry Conference

This conference will be held at UC Davis March 28-30, 1989. The theme of the conference is "Looking Ahead through Education." Program topics are selected by a committee representing conference sponsors to update and further the scientific and technical expertise of western food processors. Co-sponsors of the meeting are the Northern and Southern California sections of IFT, the California Dairy Industry Association, and UC Davis. Registration fee for the three-day conference is \$65. For further information contact Shirley Rexroat (916-752-2191) or Bob Pearl (916-752-0981), Department of Food Science and Technology, University of California, Davis, CA 95616.

Picnic Day

April 15, 1989

International Freezing and Refrigeration Conference at UCD

"Technical Innovations in Freezing and Refrigeration of Fruits and Vegetables" is the theme of this conference to be held in Davis July 9-12, 1989. The purpose of the meeting is to examine technical and scientific advances relating to the processing, storage and transportation of chilled and frozen horticultural products. Program topics will include raw material preparation and handling; frozen products; chilled products; the use of refrigeration in quarantine; transportation and storage. Research papers have been submitted from the US, Europe and Asia.

Conference co-sponsors are UC Davis, the Refrigerated and Frozen Foods Division of IFT, the International Institute of Refrigeration, the Fruit and Vegetable STG of IFT, the Refrigeration Research Foundation, ASHRAE, the American Frozen Food Institute, and the National Food Processors Association.

Registration fee is \$200 before May 31, 1989; \$250 after that date. Detailed programs will be available after April 1. For information contact Ann Sandoval, (916-752-0981), Department of Food Science and Technology, University of California, Davis, CA 95616.

Student Internships

For students, internships provide an opportunity to obtain relevant food industry experience while still in school. For industry, they provide technically competent workers and an opportunity to preview potential employees. Often interns return to permanent positions after graduation. If your company is interested in establishing an internship, contact Nancy Tibbits at the Career Planning and Placement Center, 916-752-2861.

Companies providing internships during 1988 include:

Smuckers

Raymond Jensen - Shipping and receiving supervisor

Campbell's Research Division

Carl Kruegermann - Research assistant in vegetable research division

Blue Diamond Company

Jessica Jessen - Assistant research and development technician, also performed sensory evaluation

S. C. Johnson & Son, Inc.

David Serini - Sensory evaluation

Contadina Foods

Michelle Arvonen - Research and development on tomato products

Dole Technical Center

Julie Hsu - Sensory internship

Position Announcement

Microbiologist Assistant Professor

The Department of Food Science and Technology seeks a microbiologist for a tenure-track position as Assistant Professor and Assistant Microbiologist in the Agricultural Experiment Station. The candidate will be expected to use molecular or classical approaches in developing a research program that investigates microorganisms or microbiological problems of importance to foods or food processing.

Applicants will be selected for interviews on the basis of research accomplishments, potential for developing a strong research program, and ability to train, teach, and advise students in food science and related basic disciplines. Graduate training at Davis uses the Graduate Group system, and the appointee would direct Ph.D. and M.S. students from the Microbiology, Food Science, Biochemistry, and/or Genetics Graduate Groups, depending on research interests. Undergraduate teaching responsibilities will be coordinated with the four microbiologists currently in the Department and will be within the appointee's area of specialization. A Ph.D. in Microbiology or related field is required.

Send curriculum vitae, publication list, statement of research interests, and the names and addresses of four references to: Dr. C. W. Price, Department of Food Science and Technology, University of California, Davis, CA 95616. To assure consideration, please submit application by May 1, 1989. UC Davis is an Equal Opportunity/Affirmative Action Employer.

Program for Egg Processing Research Is Hatched

A Program for Egg Science and Technology is being established at UC Davis. Co-directors of the program are Gideon Zeidler and Annie King (Avian Science Department). The program will administer research projects to address the needs of the egg industry, including improved utilization and marketability of new and existing products. Research will receive funding from the California Egg Commission, with \$115,000 allocated so far the first year. Three departments on campus (Avian Science, Food Science and Technology, and Agricultural Engineering) are cooperating in getting the program established.

Recent Graduates

B.S. Degrees Awarded

Consumer Food Science

Susan Katherine Loeffler
Gwen Alice Newhall - Gourmet Valley
Foods, Woodland, CA

Food Biochemistry

Terence Lee
Peter Norton Lostroh
Michelle Phuong-Mai Ngo
Ronald Midyett
Cindy Faye Toy
Carol Lynn Trimble

Food Science

Nejah Abdulsamed
Jeanne Renee Banks - Campbell's
Research Institute, Davis, CA
Douglas Jon Berg - Mother's Cookies,
Oakland, CA
Kraig Robert Bergmann - Quaker Oats, St.
Joseph, MO
Kendrick Alan Chan - Anheuser Busch,
Fairfield, CA
Molly Patricia Clark
Eve A. Fagrell - Thomas Payne,
Burlingame, CA
Lars Masa Fujisato - graduate school
Harjanto Kusuma Halim - graduate school,
UC Davis
Brenda Jean Hammett - Coca-Cola Foods,
Houston, TX
Ye-Li Huang - Sorrento Cheese, San Jose,
CA
Jessica Marie Christine Jessen
Natalie Michiko Kimura
Suanne Jean Klahorst - Genencor, South
San Francisco, CA
Carl Christian Kruegermann
Melissa Lai Mantong - graduate school,
UC Davis
Michele Karen Mitchell - Golden Grain,
San Leandro, CA
Wendy Anne Nilmeier - Sconsa's,
Oakland, CA
Gerald Edmund Schlenker
David Robert Sereni, Jr. - Tragon,
Redwood City, CA
Timothy Arvid Sheldon - FMC, Fresno,
CA
Augustus Lee Staton IV - graduate school,
UC Davis
Rosanna Carlotta Trevisan
Janice Jennifer Uy Wang
Benjamin Hughes Weitzel - Dole Packaged
Foods, San Jose, CA
Lorne Eric Wood

M.S. Degrees Awarded

Signe Bengard

Food Science (A. C. Noble)
Effect of hedging upon herbaceous
character of cabernet sauvignon wine.
Kendall-Jackson Winery, Lakeport, CA

Robert Jawn Bertheau

Food Science (C. Ough)
Interactions of ascorbic acid and sulfur
dioxide in grape juice.
Gundlach-Bunschau Winery, Sonoma,
CA

Bernd Andreas Bruenner

Food Science (B. S. Luh)
Effect of blanching on the stability of
undermilled Calrose rice.
Ph.D. program, UC Davis

Michael Scott Eckstein

Food Science (R. B. Boulton)
A simulation model for a winery
operation.
Robert Mondavi Winery, Oakdale, CA

Florence Nicole Hardy

Food Science (R. A. Bernhard)
Use of carbohydrate fragments as
precursors to pyrazines.
Genencor, S. San Francisco, CA

Cheng-Fang Kao

Food Science (R. A. Bernhard)
Pyrazine formation in lactose/casein
derived model systems.
Univ. of N. Carolina, Chapel Hill

I-Nan Connie Lin

Food Science (D. W. Gruenwedel)
Investigation of the mutagenicity of
N-nitrosothioproline.

Andrew Mark Long

Food Science (N. F. Haard)
Absorption and functional roles of
carotenoids in trout.
General Mills, Minneapolis, MN

Casey James McClellan

Food Science (L. F. Bisson)
A study of glucose transport in
Saccharomyces cerevisiae.
Family winery, Walla Walla, WA

Susan Ann Miller

Food Science (W. D. Brown and R. J.
Price)
The effectiveness of chemical
preservative systems, singularly or
in combination, on the shelf life
extension of vacuum packaged
rockfish fillets.
Kal Kan, Vernon, CA

Ernest Perez

Food Science (M. J. McCarthy)
Magnetic resonance imaging to obtain
moisture profiles and moisture
dependent diffusion coefficient during
apple drying.
Calreco, Van Nuys, CA

Michael Walter Silacci

Food Science (J. C. Morrison)
Changes in water soluble, chelator
soluble, and NaOH soluble pectins
in 'Cabernet Sauvignon' grape berries
during maturation.
Beaulieu Vineyards, Rutherford, CA

Anne Vie

Food Science (M. O'Mahony)
Sequential sensitivity analysis:
Refinements to the model using
predictions for the triangle test.
Dept. Food Science & Tech., UC
Davis

Jo Ellen Beth Wayne

Food Science (C. F. Shoemaker)
Rheological characterization of fluid
dairy products.
Kelco, San Diego, CA

Ph.D. Degrees Awarded

Charles Kerry Houston, Jr.

Agricultural and Environmental
Chemistry (R. A. Bernhard)
Significance of CO₂ compressibility
in supercritical fluid
chromatography.
Varian, Walnut Creek, CA

Christina Wu Nasrawi

Nutrition (R. M. Pangborn)
Oral sensory responses and salivation
induced by the irritation of capsaicin.
California State University, Fresno

Bong Soo Noh

Agricultural and Environmental
Chemistry (T. Richardson)
The use of radiolabelled milk
proteins to study thermally-induced
protein interactions in milk systems.
Seoul Women's Univ., Seoul, Korea

Jane Sung-En Tang

Microbiology (E. L. Barrett)
Studies of nitrate-linked formate
dehydrogenase in *Salmonella*
typhimurium.
Lawrence National Laboratory,
Livermore, CA

Albertus Johannes Viljoen

Agricultural and Environmental
Chemistry (A. L. Tappel)
Separation and characterization of rat
kidney and liver selenium-containing
proteins.
Returned to South Africa

Staff News

Several staff members were selected for Special Performance and Outstanding Achievement Awards. Recipients include Kathryn Boor, Mike Cummings, Julie Heil, Rudy Inderbitten, Dennis Lewis, and Shirley Rexroat.

This year marked an employment milestone for the following staff:

Sam Matoba	10 years
Peggy Royale	10 years
Teri Wolcott	15 years
Carol Cooper	20 years
Mike Cruikshank	20 years
Julie Heil	20 years
Ernie Burton	30 years

Vicky Crampton retired last spring after 27 years with the department. Vicky joined the staff in 1961. During her career at Davis, she worked with Professors York, Vaughn, Whitaker and Miller. Originally Vicky helped with food microbiology laboratory classes and worked on tomato projects. Later she was very active in olive processing research programs. Recently she has been involved with Dr. Miller's yeast and mold research and helped maintain yeast culture collections.

Pilot Plant Facilities Available

Up to a half day of use of the processing facilities in our pilot plant is available to companies and individuals without charge. The pilot plant is equipped with an evaporator, driers, heat exchangers, freezers, canning and retorting equipment. Our facilities can also be used on a service agreement basis for projects where there is no commercial facility available. For more information contact Ernie Burton, Pilot Plant Superintendent, at 916-752-3689.

Extruder Acquired

Our department has acquired a single screw extruder which is presently being installed in our pilot plant. This unit has been used to process starch-based foods with a throughput up to 45 pounds per hour. We are incorporating extrusion technology into undergraduate and graduate courses, as well as beginning research programs in that area. For information regarding current research or potential applications of extrusion at the industry level, contact Dr. Kathryn McCarthy at 916-752-1487.

Student Recruitment

Many of our students first learn about Food Science and become interested in our majors by direct contact with a friend or family member who is in this field. If you know of people who may be interested in studying Food Science and would like more information, please provide us with their names and addresses. We'll send them information about our department and our campus.

The UC DAVIS DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY NEWSLETTER will be published twice yearly to inform our alumni and friends about faculty, staff, student and alumni activity, curriculum developments, research results, and other topics of interest. We welcome your suggestions, corrections and comments. Address communications to:

Teri Wolcott
Newsletter Editor
Department of Food Science and
Technology
University of California
Davis, CA 95616
phone: 916-752-8449

Alumni Tell Us about You

We are interested in hearing from you, and your classmates are too. Please help us keep our mailing list up to date by completing the enclosed form and returning it to us. Include any news items about yourself that we could share with our alumni. Also send addresses of others that we can add to our mailing list.

Name _____ Degree & Date _____

Address _____ Business _____

City _____ State _____ Zip _____

Your title _____

Address _____

New address? (please check)

Home () Business ()

City _____ State _____ Zip _____

News about yourself _____

IN MEMORIAM



Reese H. Vaughn

Professor Emeritus Reese H. Vaughn, 80, died November 5, 1988 in Davis. A native of Farrigut Iowa, Dr. Vaughn had been a faculty member of the University of California since 1936. He taught 16 years at UC Berkeley prior to joining our department in Davis in 1952. He was an authority on food microbiology, fermentation, and spoilage. His work included the problem of softening in olives and cucumbers, wine fermentation, and sanitation in food processing operations.

Dr. Vaughn earned a bachelor's degree in biology in 1930 from Simpson College, Iowa, and a doctoral degree in sanitation and food bacteriology from Iowa State College in 1935. During his career he received a Rockefeller Foundation Grant for research and teaching in Brazil and a Fulbright Award for teaching in Greece. In 1957 he was elected to the Royal Society of Health in London. Dr. Vaughn served as chairman of NCIFT in 1962 and as chair of our department from 1963 to 1966. He retired from the University in 1976.

Dr. Vaughn is survived by his wife Marjorie, three sons, two daughters, and nine grandchildren. The Reese H. Vaughn Scholarship has been established in his memory. Contributions can be made to this fund in care of the Department of Food Science and Technology, UC Davis, Davis, CA 95616.

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