INNOVATION & DISCOVERY

FROM SHELLY NICKOLS-RICHARDSON  
DEPARTMENT HEAD

The Department of Food Science and Human Nutrition (FSHN) at the University of Illinois at Urbana-Champaign is dedicated to implementing education, research, and outreach programs designed to provide a safe, nutritious, and affordable food supply that enhances human health. To this end, students and faculty work collectively toward learning, discovering, and disseminating new knowledge and in applying novel technologies to achieve the departmental mission.

Research in FSHN covers a range of topics from post-harvest processing of raw materials to applying nutritional therapy in clinical settings, synergized by a unique combination of food science, human nutrition and hospitality management expertise within a single department. Faculty areas of interest include the application of engineering and materials science to food design; food safety and security; biochemical and molecular approaches to nutrition for health promotion and disease prevention; and integrated food, nutrition, and health for creating novel foods and exploring dietary patterns.

Highlighted in this report are accomplishments from 2014, a year during which many infrastructure upgrade were launched. We look forward to innovative research benefiting high quality, nutritious and pleasing food, human health and wellness.

Sincerely,

Dr. Shelly Nickols-Richardson  
Head, Department of Food Science & Human Nutrition

ABOUT THE DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION

| $3.6M | 100th | 96th | 54,700 | 169 |
| Grants and Contracts Expenditures in 2014 | Faculty, 2013-2014 | Percentile for Faculty with an Award | Percentile for Authors with a Citation | Square Footage for Research | Degrees (BS, MS, PhD) Conferred 2013-2014 |
| 34 | 100th | 100th | 100th | 100th |
| 22 tenure system, 12 specialized faculty | Data from Academic Analytics* | Data from Academic Analytics* | Data from Academic Analytics* | Data from Academic Analytics* |

*Comparisons made to 52 Food Science and 72 Nutrition Programs; Academic Analytics, 2012
Research Highlights

Over $138,600 from Pfizer Inc. to examine conjugated estrogens and bazedoxifene in metabolic and reproductive health.

Over $500,000 from the United States Department of Agriculture to model transport mechanisms and quality changes in foods during freeze-thaw cycle.

Nearly $500,000 from the United States Department of Agriculture grant to study use of a nanoencapsulated vitamin B1 derivative for control of fungal pathogens.

$300,000 from Gerber Foundation to examine how dietary sugars modulate infant intestinal microbiome and metabolome.

$1.9 million from U.S. National Institutes of Health to explore in vivo actions and selectivity mechanisms of health promotion in botanical estrogens.

Over $67,000 from Wrigley Co. to study identification and quantification of odor important compounds in spearmint oils.

Over $629,000 from the United States Department of Agriculture to evaluate a 12-week intervention targeting early adolescent children using an after-school, peer-education model to teach children to balance calories, select healthful foods, and build healthy eating patterns.

Over $415,000 from Mead Johnson to investigate dietary interventions and brain development and cognitive function as mediated through the gut-brain-microbiome axis.

Illinois Department of Agriculture Grant to study use of a nanoencapsulated vitamin B1 derivative for control of fungal pathogens.
RESEARCH HIGHLIGHTS

TOTAL RESEARCH & DEVELOPMENT (R&D) EXPENDITURES*
FY10 – FY14

FY10  $3.70M
FY11  $3.69M
FY12  $3.95M
FY13  $3.65M
FY14  $3.32M

* Sponsored project expenditures (grants and contracts) by the home department of the principal investigator instead of the unit receiving the grant.

TOTAL SPONSORED FEDERAL R&D EXPENDITURES*
FY10 – FY14

FY10  $4.00M
FY11  $4.28M
FY12  $5.35M
FY13  $4.27M
FY14  $3.68M

*Expenditures from sponsored research project funds (grants and contracts) plus overheads deducted from these funds. Includes amounts subtracted from these funds to pay subcontractors.

EXPENDITURE DISTRIBUTION BY SOURCE TYPE
FY13 – FY14

- Self-supporting, FWS, Land-grant (18.1%)
- Gifts and Endowments (6.0%)
- Grants and Contracts (23.8%)
- Institutional (5.8%)
- State Appropriations and Tuition (46.4%)

FEDERAL AGENCY FUNDS, 2008-2012

- U.S. Department of Agriculture ($52M)
- National Science Foundation ($4M)
- U.S. Department of Health and Human Services* ($2M)
- Other (DOED, EPA, NOAA, NASA) ($3M)

* Includes NIH. Academic Analytics, 2014.
<table>
<thead>
<tr>
<th>Research Resource</th>
<th>Description</th>
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<tr>
<td><strong>Food Science and Human Nutrition Pilot Plant</strong></td>
<td>The Department of Food Science and Human Nutrition Pilot Processing Plant is a 10,000 square foot food pilot plant serving the needs of the Food Science &amp; Human Nutrition department, along with others across the University. The facility has space for food production, as well as teaching and research activities.</td>
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<td><strong>Botanical Estrogens Research Center</strong></td>
<td>Little is known about the activities and safety of botanical dietary supplements being widely consumed by women to obtain benefits of estrogens from plant sources. The Botanical Estrogen Research Center provides basic information on how botanical estrogens work and the activities that they exhibit.</td>
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<td><strong>Human Nutrition Assessment Laboratory</strong></td>
<td>Located in Room 199 Bevier Hall, the Human Nutrition Assessment Laboratory is a shared resource for investigators intending to conduct studies in which anthropometric and body composition, dietary intake and vital signs will be measured. Depending on study protocol, the laboratory may also be used to collect biological samples with human participants. The lab supports clinical interventions and behavioral and community based research programs.</td>
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<td><strong>Bevier Café</strong></td>
<td>Staffed and managed by FSHN students, Bevier Café is also a real-life classroom laboratory, offering students the opportunity to study and experience the problems and issues related to managing quantity food service operations, including production, service, and financial control. The Spice Box is a student-run restaurant associated with FHSN's Hospitality Management program. Senior students are responsible for planning, staffing, executing and evaluating a financially viable themed fine dining meal.</td>
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<td><strong>Spice Box Restaurant</strong></td>
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<td><strong>Illinois Transdisciplinary Obesity Prevention Program</strong></td>
<td>I-TOPP is an innovative research-based PhD/MPH degree program with a focus on obesity prevention and child health and wellbeing. Funded by the USDA’s National Institute of Food and Agriculture, I-TOPP also provides opportunities for cross-disciplinary interactions between University of Illinois faculty, scholars and international leaders through the Visiting Faculty Program, Lecture Series, and Biennial Symposium.</td>
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<td><strong>Integrated Bioprocessing Research Laboratory</strong></td>
<td>The mission of the Integrated Bioprocessing Research Laboratory (IBRL) is to advance research and education focused on renewable food, fuel and fiber-based processing platforms and to stimulate bio-economic development in the State of Illinois through translational scale-up of developed technologies leading to commercialization.</td>
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INTERDISCIPLINARY RESEARCH

AN INTERDISCIPLINARY ETHOS

At many universities, the fields of food science and human nutrition are pursued separately, even housed within different campus departments.

The University of Illinois Department of Food Science and Human Nutrition combines both disciplines and hospitality management under one conceptual roof, allowing for synergistic combinations of expertise.

Nutritionists wanting to examine the health outcomes of a particular lipid, vitamin, or other compound can easily work with food scientists to develop foods that encapsulate a nutrient for greater bioavailability. A food scientist wanting to assess the health impact of a new food processing technique has multiple departmental colleagues with whom to consult and collaborate.

This interdisciplinary ethos extends to other campus departments, and to other universities and organizations as well. On this page are a sampling of such interdisciplinary efforts.

STRONG KIDS

The Synergistic Theory and Research on Obesity and Nutrition Group, or STRONG Kids Program, is a cross-disciplinary project examining how genetic, family, community, child care provider, cultural, and media factors contribute to the development of childhood weight imbalance, obesity, health behaviors and health beliefs.

In addition to Food Science and Human Nutrition faculty, STRONG Kids includes faculty from kinesiology and community health, social work, medicine, and human and community development.

FAMILYRESILIENCY.ILLINOIS.EDU/RESEARCH/STRONG_KIDS_SYNERGISTIC.HTML

UP AMIGOS

The Universities of San Luis Potosi and Illinois: A Multidisciplinary Investigation on Genetics, Obesity and Socio-Environmental Factors, under the acronym ‘UP AMIGOS’ seeks to identify factors at multiple levels of analysis linked to health outcomes and amenable to intervention in the battle against obesity and its associated metabolic risk factors. The project focuses primarily on the Hispanic population in the United States as originating in Mexico.

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KRAFT FOOD COLORS

A new three-year, $1.4 million research collaboration between Kraft Foods Group, Inc. and the University of Illinois will focus on the economic and technical feasibility of extracting food colors from corn for incorporation into food and beverages.

The project’s interdisciplinary team includes faculty from food science and human nutrition, crop sciences, agricultural and biological engineering, and agricultural and consumer economics.

GO.ILLINOIS.EDU/KRAFTFOODCOLORS

INSTITUTIONAL AFFILIATIONS

Many faculty have positions with other campus research organizations, such as the Beckman Institute and the Institute for Genomic Biology.

University of Illinois College of ACES
RESEARCH ACCOMPLISHMENTS

PEPSICO GRANT TO STUDY THE STATE OF SUGAR ON CEREAL PRODUCTS: SHELLY J. SCHMIDT

COLLEGE OF ACES OFFICE OF RESEARCH FUTURE INTERDISCIPLINARY RESEARCH EXPLORATIONS (FIRE) GRANT: YOUNGSOO LEE, PAWAN TAKHAR, SOO-YEUN LEE AND TWO COLLABORATORS FOR PROJECT ‘SODIUM REDUCTION IN SNACK FOODS VIA OPTIMIZED DELIVERY OF SODIUM DELIVERY SYSTEM’

TWO U.S. PATENTS ISSUED: TIMOTHY GARROW; YONG-SU JIN

TOP 1% OF CITATIONS IN ACADEMIC FIELD AND PUBLICATION YEAR: M. T. NAKAMURA, ET AL. (2014). REGULATION OF ENERGY METABOLISM BY LONG-CHAIN FATTY ACIDS. PROGRESS IN LIPID RESEARCH, 53, 124-144.

EDITOR-IN-CHIEF POSITIONS: KELLY ANNE TAPPENDEN, JOURNAL OF PARENTERAL AND ENTERAL NUTRITION; KAREN CHAPMAN-NOVAKOFSKI, JOURNAL OF NUTRITION EDUCATION AND BEHAVIOR

COLLEGE OF ACES OFFICE OF INTERNATIONAL PROGRAMS MATCHING GRANT: HAO FENG, JUAN ANDRADE, AND NICKI JENE ENGESETH

UNIV. ILLINOIS DIVISION OF NUTRITIONAL SCIENCES VISION 20/20 GRANT FOR COLON CANCER BIOMARKERS: HONG CHEN

JOHN ERDMAN JR.: GILBERT A. LEVEILLE AWARD AND LECTURESHP FROM THE INSTITUTE OF FOOD TECHNOLOGISTS AND THE AMERICAN SOCIETY FOR NUTRITION

SHARON M. DONOVAN SPITZE LAND-GRANT PROFESSORIAL CAREER EXCELLENCE AWARD
ON THE COVER: ERK5, A NOVEL KINASE, RECRUITED TO TRANSCRIPTION START SITES OF HORMONE ACTIVATED ERα-REGULATED GENES
FROM: ZEYNEP MADAK-ERDOGAN, ASSISTANT PROFESSOR