

# RICHARD H. LINTON, Ph.D.

## Business

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<b>Degree Received</b>	<b>Institution</b>	<b>Date</b>
Ph.D. Food Science	Virginia Tech	1994
M.S. Food Science	Virginia Tech	1991
B.S. Biology	Virginia Tech	1988

## Professional Academic Experience

Associate Director of Competitive and Integrated Programs, Agriculture Research Programs, Purdue University	2006 - present
University Faculty Scholar, Purdue University	2004 - present
Professor, Department of Food Science, Purdue University	2002 - present
Director, Center for Food Safety Engineering, Purdue University	2001 - present
Sabbatical Leave – Massey University, Auckland, New Zealand (4 months)	2001 - 2002
Assistant Director, Agricultural Research Programs, Purdue University	1999 - 2006
Associate Professor, Department of Food Science, Purdue University	1998 - 2002
Assistant Professor, Department of Food Science, Purdue University	1994 - 1998
Lab Instructor, Food Science Department, Virginia Tech	1988 - 1994

## Awards and Honors (Leadership)

Purdue University Cooperative Extension Team Award – Retail Food Safety Programs	2008
Elected Fellow, Institute of Food Technologists	2008
Purdue School of Agriculture – Millionaires Club	2006, 08
Purdue School of Agriculture Team Award – Detection of Foodborne Pathogens	2006
Myron Solberg Award – Institute of Food Technologists (IFT) award for Worldwide Excellence for Collaboration among Academia, Industry, and Regulatory	2006
Purdue “A Seed for Success Award” for \$1 Million in Grantsmanship	2004-06, 08
Purdue University Cooperative Extension Association - Junior Award	2004
Harold Macy Award - IFT award for Excellence in Research and Outreach	2004
Chairman for the National Alliance for Food Safety and Security	2004-06
Vice Chairman for the National Alliance for Food Safety and Security	2003-04
Gamma Sigma Delta – Award of Merit for Extension and Outreach	2003
Executive Board for the Conference for Food Protection	2002-08
Executive Board for the National Alliance for Food Safety & Security	2002-present
Executive Board for the International HACCP Alliance	2000-2008
Graduate of the Indiana Agricultural Leadership Program	1998-2000
Department of Food Science Outstanding Teacher Award	1998, 2002, 06
USDA Group Honor Award of Excellence for “Safe Food for the Hungry” (member)	1996

## Memberships in Academic, Professional and Scholarly Societies

Conference for Food Protection	National Alliance for Food Safety and Security
Gamma Sigma Delta - Agricultural Honor Society	National Registry for Food Safety Professionals
Indiana Environmental Health Association	Phi Tau Sigma
Institute of Food Technologists	Sigma Xi
International Association of Food Protection	

## A. EXCELLENCE IN LEADERSHIP

## ***1. Leadership Training***

### **a. Indiana Agricultural Leadership Program (IALP) – 1998-2000.**

i. Description: This 2-year leadership program focused on development of leadership skills and a better understanding of agriculture and agribusiness. Ten 4-day sessions were held over the 2-year period. Visits were made throughout the state of Indiana to various agricultural businesses, governmental agencies and research facilities. The program also included a week long visit to Washington, DC (to better understand national agricultural policy and policy development procedures) and a 2-week visit to Israel and Turkey (to better understand international perspectives related to agriculture).

### **b. University of Nebraska Recently Appointed Administrator Workshop - 2000**

i. Description: This 3-day program goal is to “assist faculty, staff and administrators of the Institute of Agriculture and Natural Resources (IANR) to grow professionally by addressing critical needs in teaching, research, extension and service and to provide assistance in dealing with individual and institutional change and transition.” Program participants include recently appointed center directors, department heads, associates deans, and deans from various land grant colleges.

### **c. Committee on Institutional Cooperation Academic Leadership Program (CIC-ALP) - 2004**

i. Description: The CIC, an academic consortium of Big Ten universities and the University of Chicago, coordinates the Academic Leadership Program, which is designed to develop the leadership and managerial skills of faculty who have demonstrated exceptional ability and administrative promise. The program is specifically oriented to the challenges of academic administration of major research universities and designed to help faculty members prepare to meet them. The program consists of three 2 ½ day workshops, held on three different CIC campuses throughout the year. Academic Deans nominate prospective participants; up to six Purdue faculty attend the program yearly.

### **d. USDA-CSREES - New Dean/Director/Administrator and National Program - 2006**

i. Description: This 3-day USDA-CSREES led program provides information and leadership skills for newly appointed administrators of agriculture involved in research, extension, and/or teaching. The program provides information related to essential leadership skills such as the federal budget process, the importance of the Farm Bill, how land-grants influence the budget, the role of CARET, new partnerships and programs, E-systems (eXtension, e-grants), planning and accountability, fund raising, grant opportunities, and overall strategic planning.

## ***2. Leadership Recognition (Examples)***

### **a. Institute of Food Technologists Harold Macy Award (2004)**

i. This national award recognizes an individual each year that has demonstrated leadership in developing effective research and outreach programs. The primary criteria for award selection are program development that demonstrates integration of research and outreach activities between academia, industry, and regulatory agencies.

### **b. A Seed for Success Award (2004, 2005, 2006, 2007, 2008)**

i. This new award, given at Purdue University, is presented to faculty that has acquired at least \$1 million in funding during a fiscal year. Linton’s award was presented for funding related to improved detection of foodborne microbial and chemical contaminants.

### **c. Junior Award for Purdue Extension (2004)**

i. The Junior award is presented to a faculty member, with less than 10 years experience that has developed Extension and outreach programs having a significant impact in the state and nationally.

#### **d. University Faculty Scholar (2004)**

i. This 5-year appointment and award, from Purdue University, is “designed to recognize outstanding faculty who are on an accelerated path for academic distinction.” Linton was selected for this appointment based on excellence in research and outreach programs.

#### **e. Purdue School of Agriculture Research Team Award (2006)**

i. Award given to the most recognized multi-disciplinary research team that provides significant research impact in Agriculture. This award was given to the “food biochip detection team” that worked to develop various microbial detection platforms to detect foodborne pathogens. Linton’s role was to assemble the team, through his efforts with the Center for Food Safety Engineering, in 2001. In the 5-year period, the team was successful in acquiring over \$5 million in funding and publishing over 70 peer reviewed research publications.

#### **f. Institute of Food Technologists Myron Solberg Award (2006)**

i. This award recognizes leadership in the establishment of, successful development of, and the continuation of industry, regulatory and academia collaborative efforts. Linton was recognized for his efforts in bringing these groups together to solve difficult problems and issues within the food manufacturing and food retail industries.

#### **g. Purdue School of Agriculture Millionaires Club (2006, 2007, 2008)**

i. This new Purdue University award is presented to faculty in the College of Agriculture that have acquired at least \$1 million in funding during a fiscal year. Linton’s award was presented for his overall effort obtaining the Center for Food Safety Engineering funding.

#### **h. Fellow – Institute of Food Technology (2008)**

i. Recognition by the largest professional food science organization in the world conferred for outstanding and extraordinary contributions in the field of food science and technology.

#### **i. Purdue University Cooperative Extension Service Association (PUCESA) Team Award (2008)**

i. Award given to the most recognized, multi-disciplinary team that provides impactful Extension programming to the State of Indiana, and nationally. This award was given to the “retail food safety programming team” that has developed and provided educational programs for the retail food industry throughout the state and country. Linton’s role was to develop and assemble the team, which included Purdue Cooperative Extension Educators (from 71/92 counties), The Restaurant and Hospitality Association of Indiana, Indiana University, and state/local health departments. Linton has provided state-wide leadership since 1995 for this program which has educated more than 70,000 Indiana retail food managers.

### ***3. University and State Leadership***

#### **a. Center for Food Safety Engineering**

i. Description – The Center for Food Safety Engineering, or CFSE, was formed in 2001. CFSE focuses on developing enhanced methods for hazard detection and creating improved ways to control hazards in our food system. Linton accomplishes the Center’s goals by building research teams through collaborative efforts involving 5 different schools including agriculture, consumer and family sciences, engineering, science, and veterinary sciences. In the past 5 years, 49 research faculty, 42 staff, and over 100 students have been involved in CFSE research projects. The CFSE mission is “to develop new knowledge, technologies, and systems to detect and prevent chemical and microbial contamination of foods.” Project research focuses on four objectives, which are:

- Developing diagnostic tools for rapid identification of biological and chemical foodborne contaminants
- Developing models to predict and track foodborne contaminants

- Identifying, designing and evaluating alternative processing, handling, packaging, transport, and storage systems to minimize and/or reduce food contaminants, and,
- Developing technology transfer of information and knowledge related to food safety for the food industry, government agencies, academia, and the public.

ii. Leadership role – Linton has been responsible for the strategic development of all of the research, outreach, and reporting efforts associated with CFSE and a USDA-ARS cooperative agreement that is associated with CFSE. Some of his major administrative accomplishments include:

- Increasing the funding of the cooperative agreement from \$1 million to \$2 million/year (2003)
- Establishing and actively managing an annual budget for the Food Safety Engineering Project and CFSE
- Developing a competitive grant process to fund research and outreach projects
- Developing a working relationship with the Eastern Regional Research Center of USDA-ARS
- Creating a website to communicate the efforts of the Food Safety Engineering Project and Center for Food Safety Engineering ([www.cfse.purdue.edu](http://www.cfse.purdue.edu))
- Coordinating interdisciplinary research teams across departments and schools at Purdue
- Establishing the multi-school “Center for Food Safety Engineering”
- Developing and coordinating annual workshops for the Center for Food Safety Engineering
- Establishing international collaboration with China and India

#### **b. Retail Food Safety Programs**

i. Description – In 1998, Linton initiated seed funding to establish a training network for Extension Educators and local health departments that could, in turn, offer retail food certification courses for retail food establishments. Today, through Linton’s leadership, more than 50 2-day retail food certification courses are offered throughout the state each year with a participant level of over 2000 people/year. Although first starting in the state of Indiana, the curriculum that Linton developed has now become a national program, ranking as the #1 program for supermarket operations and #2 program for restaurants (the engagement section of this document explains this program in more detail).

ii. Leadership role – Linton has led to coordination, training, and curriculum development for the past 8 years for this program.

#### **c. Agricultural Research Programs (Associate Director of Competitive and Integrated Programs )**

i. Description – In 2006, Linton was promoted from Assistant to Associate Director of ARP. In this role, he is responsible for coordinating efforts associated with interdisciplinary and integrated efforts in the College of Agriculture.

ii. Leadership role – Linton has led development, writing, implementation, and reporting efforts for the USDA Plan of Work through the College of Agriculture, Consumer and Family Sciences, and Veterinary School. He has also developed a new College-level award, The “Spirit of the Land Grant Mission Award” that recognizes faculty that have an integrated and impactful discovery, learning, and engagement program. This award is presented to an individual faculty member each year with a \$10,000 cash award for their program and a \$1500 honorarium.

### ***4. National Leadership***

#### **a. National Alliance for Food Safety and Security (NAFSS) – Chairman**

i. Description - The goal of NAFSS is to initiate food safety projects assuring the highest applicability to food safety problems while being of the highest scientific merit. NAFSS provides the mechanism to enable participating universities and USDA-ARS to focus their collective scientific expertise and resources on the multiple components, issues and questions regarding all aspects of food safety. Frequent consultation with partners at government regulatory agencies by administrators and

scientific personnel is a major element of the activities of NAFSS. Collaboration within NAFSS occurs among its partner members, government agencies, producer associations, private industry and consumer organizations.

ii. Leadership role – Linton served as Chairman of NAFSS from 2004-2006. He currently serves on the Executive Board, and the Operations Committee. As chair, he was responsible for leading the effort between the 18 University consortia and fostering the partnership with USDA-ARS.

**b. Conference for Food Protection (CFP) – Executive Board, Committee Chair, Program Chair**

i. Description - The Conference for Food Protection is a non-profit organization that originated in 1971. The structure of the conference provides a representative and equitable partnership among regulators, industry, academia, professional organizations and consumers. The goal is to identify problems, formulate recommendations, and develop and implement practices that ensure food safety. New rapidly developing food technologies and marketing innovations challenge all groups involved in food production and monitoring to work together to enhance the quality of our food supply. The Conference for Food Protection meets at least biennially to provide that forum.

ii. Leadership role – Linton has been selected to serve as Chairman of two significant committees (Retail HACCP committee, and Time as a Public Health Control), and also serves as the only academic representative to the Science and Technology Council (selected the past 8 years in this roll) and to the Executive Board (selected to serve a 6-year term). Linton is seen as an important liaison, bringing regulatory and industry together on difficult and controversial issues affecting retail food safety. In 2006, he developed and led a national workshop, integrating food industry, regulatory, and consumer groups, called “Interventions for *Listeria monocytogenes* in Retail Food Establishments.” In 2008, Linton was selected as co-chair of Council III (Science and Technology) and he is the only academician selected for that leadership role.

## B. EXCELLENCE IN ENGAGEMENT ACTIVITIES

**1. General Program Overview:** Dr. Linton's nationally recognized Extension and outreach programs focus on **delivery of knowledge to reduce the risk of foodborne illness**. Specific areas of expertise include: 1) Retail food safety and, 2) Hazard Analysis Critical Control Programs (HACCP). To achieve these outreach goals he has developed hands-on training modules focusing on food safety during transport, processing, and for food retail establishments. Extension audiences have included personnel from the food processing industry, Extension Educators, state/local health agencies, 4-H youth, high school teachers, and consumers. His programs are highly regarded in Indiana, nationally, and internationally. He is continually asked to interact with the industry to help solve problems.

Dr. Linton's programs translate into significant impacts in Indiana. He has developed food safety programs for different state/commodity associations and created a training network that covers the entire state. Several programs have been developed for the Indiana Restaurant and Hospitality Association, Indiana Retail Grocers Association, Indiana State Poultry Association, and the Indiana Pork Producers. Using a train-the-trainer method, he instructs Extension Educator staff and state/local health agencies on principles of food safety so they can, in turn, teach the information at the county and state level creating a very significant impact. He is most noted for two train-the-trainer Extension programs called "Food Safety Day" (retail food stores) and "Food Safety: It's in Your Hands" (food processing industry). He is most proud of his coordination of a retail program called "ServSafe." He developed this program that generates funds at the county level. Excess funds are then used to support a competitive grant program developed by Linton to foster collaborations between Extension staff and local regulatory staff. All materials are accessible at county Extension offices and on the Internet. Many programs have been translated into Spanish.

In the food processing industry, Dr. Linton's expertise has been focused on developing programs to teach and then reinforce the principles of food safety, HACCP and sanitation. He has worked with multiple companies and instructed them on HACCP-based principles for the dairy, meat and poultry, seafood, and fruit and vegetable industries. He is involved in developing and coordinating 3-5 national programs/year and visits 2-3 international countries/year to provide HACCP workshops.

Dr. Linton, along with colleagues from Indiana University, has developed the leading food safety textbook: ***Essentials in Food Safety and Sanitation*** and a full training curriculum including a student's guide, trainer's kit, and supervisor's guide. To complement the training curriculum, Linton and colleagues developed a nationally recognized retail food manager's certification testing program. The program ranks 2<sup>nd</sup> of only 4 recognized national certification programs. As a result of this program, he was selected by the Conference for Food Protection (CFP) to serve (8 years) as the only academic representative on the Science and Technology Council. He was also elected as chair of the *National Retail HACCP Committee* of CFP for two consecutive terms, and is currently chairing the "*Time as a Public Health Committee*". As a result of his efforts, the Food Marketing Institute (FMI), a national group representing 26,000 members of the grocery store industry, selected him as the only academic representative to develop model "generic food safety HACCP plans" to provide guidance for businesses in the retail food industry. More recently, FMI selected him to co-author a retail food safety training program for grocery stores nationwide called ***Retail Best Practices to Food Safety and Sanitation***. In total, Linton has been involved in the writing of 10 retail food safety textbooks in English, two in Spanish (published in 2004), and two full training programs.

## 2. Examples of Significant Engagement Programs in Food Safety

### a. ESSENTIALS OF FOOD SAFETY AND SANITATION: A Retail Food Safety Certification

**Program Description and Significance:** The *Essentials of Food Safety and Sanitation* and *SuperSafeMark*<sup>™</sup> programs are nationally recognized retail food safety curricula and certification programs for retail food handlers. Each program is designed as an 8-hour or 16-hour program and is linked with a retail food certification exam developed by Linton and others in cooperation with the National Registry of Food Safety Professionals. The curricula for this program include a textbook, study guide, and instructor's guide and have been translated into several different languages. To complement these materials, a customized supermarket version was also written called *Retail Best Practices for Food Safety and Sanitation*.

**Program Audiences:** Retail food managers, corporate and academic trainers, college students.

**Statewide/Nationwide/International Impacts:** These programs have been identified as *the leading food safety texts and program for retail food establishments (restaurants, supermarkets, etc.)*. Indiana's largest supermarket chain, Marsh Supermarkets, as well as national chains including WalMart, the Kroger Company, Albertsons, and Safeway, have adopted the program to train and certify their employees. A new website has also been developed specifically for Extension Educators that provides information related to retail food safety and offers programs to the community using *Essentials of Food Safety and Sanitation* and *Retail Best Practices to Food Safety and Sanitation* ([www.retailfoodsafety.org](http://www.retailfoodsafety.org)). Each month, 4-5 programs are offered throughout the state. In 2006, 71 food certification programs were offered to over 3,000 Indiana retail food operators.

**Program Outcomes:** This curriculum is currently the top selling retail food safety curriculum used for non-restaurant operations. As of June 2008, more than 80,000 textbooks have been sold in the United States and over 10,000 have been sold internationally. The development of the *Essentials of Food Safety and Sanitation* curriculum led to a relationship with several important retail food safety partners including Professional Testing Inc., the National Registry of Food Safety Professionals, and Learnsomething.com<sup>™</sup>. Most importantly, this program stimulated a 4-year process to develop a nationally recognized retail food safety certification program and exam. Only three other food safety exams are recognized in the United States. This collaboration resulted in 7 refereed journal publications, a series of 12 textbooks, 48 presentations at national meetings, 4 presentations at international meetings, and development of the first Internet based retail food certification course.

### b. FOOD SAFETY DAY: A Retail Food Safety Program

**Program Description and Significance:** "Food Safety Day", a retail food safety program, is Dr. Linton's most successful Extension program in terms of numbers. The initial project goal was to develop a curriculum that emphasized safe food handling practices for workers in retail food establishments in Indiana. Our state employs over 150,000 people in nearly 16,000 retail food establishments, creating a significant state training need that this curriculum is fulfilling. The program is divided into four learning modules; Understanding Foodborne Illness, Good Personal Hygiene, Preventing Cross-Contamination, and Avoiding Temperature Abuse.

**Program Audiences:** The initial audience for this program was health department personnel and Extension Educators in a train-the-trainer program. However, the ultimate audience for this program is retail food managers and retail food workers. The program has also been used extensively for school foodservice and institutional feeding operations.

**Statewide/Nationwide/International Impacts:** Within Indiana, approximately 3,000 food handlers attend the Food Safety Day program each year. Several other states have adopted Food Safety Day as a model program for food handler training. Maryland has recently incorporated Food Safety Day as part of their mandatory retail food handler training requirements. The Spanish version of the program is being widely used in South America and Central America. To date, over 50,000 people have been

educated using this program that is offered at least monthly throughout Indiana. In 1998, a one-day event in Indiana brought in over 700 people and over 8,000 participants attended in 2006.

**Program Outcomes:** The hard copy curriculum in Spanish and English is now available (<http://www.retailfoodsafety.org>) for download on the World Wide Web. Four Extension publications, curriculum access on the Internet, and two talks at national meetings are all important outcomes from this USDA/CSREES project. This program created a unique collaborative relationship between Extension Educators and county health inspectors. The program received statewide recognition; Linton was awarded the “Lifetime Honorary Membership” by the Indiana Environmental Health Association for program development, leadership and teamwork.

**c. SERVSAFE™ : A Retail Food Safety Certification**

**Program Description and Significance:** The ServSafe™ program is a 16-hour retail food certification program developed by the Educational Foundation of the National Restaurant Association. Working with the Indiana Restaurant and Hospitality Association, Purdue Extension now offers this 2-day program 15 to 20 times/year as a result of Linton’s coordination. In total, over 12,000 retail food managers have been certified through this program with a passage rate of 93%.

**Program Audiences:** Retail food managers, Extension Educators and health department staff.

**Statewide/Nationwide/International Impacts:** Within Indiana, about 400 food managers are educated and certified through this program each year. Other states (Virginia, Arkansas, Kansas, Nebraska), adopted this train-the-trainer model for offering the ServSafe™ program in their states. The table below highlights the program numbers and success:

**Impact of the Serve Safe™ Program**

Year	Participants	County \$	Scores (%)	Certified (%)
2000	596	5,960	91.3	93.8
2001	611	6,110	90.8	92.4
2002	783	7,830	91.8	92.8
2003	919	9,910	92.1	93.1
2004	1,981	19,810	91.5	92.5
2005	2,245	22,450	92.0	94.1
2006	1856	18,560	92.4	95.1
2007	1498	14,980	91.5	93
2008	1617	16,170	92.0	91.3
<b>Total</b>	<b>12,106</b>	<b>\$121,060</b>	<b>91.4%</b>	<b>93.4</b>

**Program Outcomes:** This program has created a new working relationship between Extension Educators and local health departments. Linton created a website that includes program updates and important information related to retail food safety specifically for Indiana, <http://www.foodsci.purdue.edu/outreach/retailfoodsafety/>. Here Extension Educators and public health officials can access important retail food safety information. Due to Linton’s effort, Extension Educators and county health department officials are now collaborating on several other retail food safety programs within the state. The most rewarding aspect of this program is the opportunity to give back to the Educators. Part of the program development funds were used to establish a grant opportunity for Extension Educators. The most recent RFP resulted in thirteen proposals funded in the amount of \$3,175.

**d. HAZARD ANALYSIS CRITICAL CONTROL POINT PROGRAMS (HACCP)**

**Program Description and Significance:** HACCP is a systematic food safety program that is a mandatory regulatory requirement in certain food industries including meat/poultry, seafood, and fresh juice. An important part of the regulatory requirement includes training and certification programs.

**Program Audiences:** The main audiences for this program are management, quality assurance, and quality control managers for food processing industries. Through Linton’s leadership and coordination,

several workshops have been offered in Indiana, other U.S. states, and internationally. Audiences have included producers of duck, chicken, turkey, ostrich, beef, pork, egg, dairy, seafood, fruit, vegetable, ingredient, and pharmaceutical industries.

**Statewide/Nationwide/International Impacts:** Linton's workshops were offered to 63 different firms in Indiana. Providing the program enables these industries to comply with state and federal food regulations and stay in business.

**Program Outcomes:** Over the past 5 years, the workshop curriculum was individually tailored for use in several 3 - 4 day workshops in Indiana (10), other U.S. states (17) and in international countries (6). Each of the HACCP curriculums developed by Linton contains a notebook with all of the U.S. regulatory requirements, important information related to HACCP, and state/regional contacts. The International Meat and Poultry HACCP Alliance certification program recognizes each of these programs and named Linton a "lead instructor."

The greatest success story for the HACCP program is collaboration with other universities. Linton has formed a partnership with Michigan State and The Ohio State University called the "Great Lakes HACCP Assistance Team." Extension and research specialists from each university collaborate to develop curriculum, lead workshops, and provide assistance to the tri-state Midwest region. An evaluation indicating impact from a workshop is presented below:

*"Dr. Linton and the Great Lakes HACCP Team provided the training that we really needed! Your efforts are critical to saving the pork industry in Indiana." Scott Wiggins, Monon Meat Packing.*

#### **e. THE BETTER PROCESS CONTROL SCHOOL**

**Program Description and Significance:** The Better Process Control School teaches the mandatory certification program for supervisors in the canned food industry that thermally processes foods. This school satisfies training requirements specified in the FDA and USDA regulations.

**Program Audiences:** The main audiences for this program are management and operators for low acid and acidified food products that are thermally processed and shelf stable.

**Statewide/Nationwide/International Impacts:** This program is provided as a service for the canned food industry and for the regulatory agencies that inspect canned foods. Purdue offers one or two schools each year. Linton is involved in several other additional BPCS each year.

**Program Outcomes:** The Better Process Control School is a collaborative effort of Purdue University, the Food and Drug Administration, and the Food Products Association. In the past 10 years, programs offered with Linton serving as an instructor resulted in 1,464 participants with a certification pass rate of 97% (national average is 83%).

#### **f. THE PURDUE FOOD DEFENSE SIMULATION**

**Program Description and Significance:** Purdue University's Department of Food Science held the nation's first defense computer simulation for food companies and other food defense stakeholders. The simulation was developed by Purdue faculty from the Food Science Department, the Krannert School of Management, and the Purdue Homeland Security Institute's Synthetic Environment for Analysis and Simulation (SEAS) Laboratory. Purdue Food Science graduate students and computer programmers from SEAS modeled the food supply chain from supplier to manufacturer to retailer, developed inputs for ten company-based teams (three bulk ingredient companies, four processors, and three retailers) plus a USDA team, a Food and Drug Administration team, and two media sources. The modeled supply chain included products and their ingredients; geographic production, warehousing and shipping information; quantities of production and sales; economic impacts associated with food product recalls; and public health impacts for each U.S. state.

**Program Audiences:** Over forty representatives from industry, state/local/federal regulatory agencies, emergency management, public health agencies, and state/national media joined the USDA Director of Homeland Security in the one-day program.

**Statewide/Nationwide/International Impacts:** This program was developed as a one-day program to assist the food industry to make better decisions for inherent and intentional food contamination. Since 2005, the program has been offered three times each year to food defense stakeholders throughout the United States.

**Program Outcomes:** The Purdue Food Defense Simulation has provided many outcomes because of our collaboration. A new graduate level course was developed in 2005 that brings together students from Food Science, Agriculture Economics, Computer Science, and Public Health. Through Linton's efforts, two nationally competitive grants have been secured. The Centers for Disease Control is funding the simulation to help the state of Indiana in their food defense preparedness efforts. More recently, Purdue University was funded by USDA-CSREES to develop food defense curricula for graduate level education and distance education modules for the food industry. Kansas State and the Indiana School of Public Health and Environmental Affairs have partnered with Linton on this effort.

### **3. Participation in Extension Conferences, Schools, Workshops, Short Courses**

#### **a. Conferences/Workshops – United States (Since 2000; 28 prior to 2000)**

(In each program, Linton was an instructor. \* indicates Linton developed a majority of program content).

29. "Purdue Citrus Juice Aseptic Workshop" (2001), 81 participants, 3-day workshop, Tropicana, Bradenton, FL.
30. "Essentials of Food Safety and Sanitation Train-the-Trainer Program" (2001), 41 participants, 2-day workshop, program coordinator for the Annual National Environmental Health Association Meeting, Atlanta, GA.\*
31. "Developing and implementing HACCP for the Fruit Juice Industry" (2001), 63 participants, 3-day workshop, Hickory Creek, MI.\*
32. "HACCP for Poultry Products." (2001), 55 participants, 3-day workshop, University of Arkansas.\*
33. "Detection of Microbial and Chemical Contaminants in Foods" (2001), 58 participants, 2-day national workshop, Indianapolis, IN.\*
34. "Purdue Gatorade Processing Workshop" (2001), 55 participants, 4-day workshop, Purdue University.
35. Workshop coordinator and speaker for the Center for Food Safety Engineering Annual Meeting (2001), 57 participants, Indianapolis, IN\*.
36. "Food Safety Issues Affecting the Grocery and Manufacturing Industry" (2001), 86 participants, invited speaker for the Food Industry Executives Association annual meeting, Naples, FL.
37. "Essentials of Food Safety and Sanitation Train-the-Trainer Program" (2002), 33 participants, 2-day workshop, program coordinator for the Annual National Environmental Health Association Meeting, Minneapolis, MN.\*
38. "Developing and Implementing HACCP for the Fruit Juice Industry" (2002), 22 participants, 3-day workshop, Indianapolis, IN.\*
39. "Purdue Gatorade Processing Workshop" (2002), 42 participants, 5-day workshop, Purdue University.
40. "SuperSafeMark Retail Food Safety Program" (2002), 51 participants, 2-day workshop, Indianapolis, IN.\*
41. Workshop coordinator and speaker for the Center for Food Safety Engineering Annual Meeting (2002), 37 participants, Wyndmoor, PA.
42. "HACCP for Poultry Products" (2002), 37 participants, 3-day workshop, University of Arkansas.\*
43. "HACCP using Predictive Microbiology" (2002), 54 participants, 1-day workshop, University of Arkansas.\*
44. "Serving Safe Food " (2003), 28 participants, 3-day workshop, University of Arkansas.\*
45. "HACCP for the Poultry and Egg Industry" (2003), 63 participants, 3-day workshop, University of Arkansas.\*

- 45-52. “FMI SuperSafeMark Program” (2003), 2-day retail food safety and food certification workshop, 210 participants presented in 7 different U.S. cities (Los Angeles, Dallas, Washington DC, Pittsburgh, Chicago, Boston, Portland).\*
53. “Agrosecurity Workshop at Purdue University – School of Agriculture” (2003), Co-organizer and speaker (2 presentations), 52 participants, Purdue University, West Lafayette, IN.\*
54. “Integration of Food Protection for the Retail Food Sector” (2004), Biosecurity Alliance Meeting, 80 participants, Kansas State University, Manhattan, Kansas.\*
55. Workshop coordinator and speaker for the Center for Food Safety Engineering Annual Meeting (2003), 52 participants, West Lafayette, IN.
56. “Food Safety and Food Quality Programs for Food Entrepreneurs” (2004), 34 participants, Indiana Farm Bureau, Indianapolis, IN.\*
57. “Time as a Public Health Control” (2004), 368 participants, Conference for Food Protection, Phoenix, AZ.\*
- 58-62. “FMI SuperSafeMark Program” (2004), 2-day retail food safety and food certification workshop, 327 participants presented in 5 different U.S. cities (Atlanta, Minneapolis, Phoenix, Raleigh, Chicago).
63. “Control of *Listeria monocytogenes* at Retail Food Establishments” (2004), 2-day workshop for FDA, USDA, and the supermarket industry, FMI, Washington, DC.
64. “Food Biosecurity Simulation for the Food Industry” (2004), 31 participants, 1 day simulation for the Department of Food Science Industrial Associates, Purdue University.
65. Pepsi, Quaker Oats Aseptic Processing Workshop (2004), 52 participants, Purdue University.
66. “Cold Chain Management Program” (2004), 7 participants, Cochran Fellowship Program, Purdue University.
67. “Food Safety Management for the Poultry Industry” (2004), 53 participants, 3-day workshop, University of Arkansas.
68. “Development and Implementation of HACCP and Prerequisite Programs” (2004), 30 participants, West Lafayette, IN.
69. “Food Safety Management Programs and HACCP for the Food Industry” (2005), 213 participants, Annual Purdue Pest Control Conference, West Lafayette, IN.
70. “Food Biosecurity Computer Simulation” (2005), 19 participants, West Lafayette, IN.
71. “Application of Chlorine Dioxide for Inactivation of Pathogens and Spoilage Organisms in Food Systems” (2003), 63 participants, presented at Penn State University, Department of Food Science.
72. “Use of Chlorine Dioxide Gas in the Food Industry” (2005), 416 participants, presented at DuPont, Experiment Station - Wilmington Delaware.
73. Workshop coordinator and speaker for the Center for Food Safety Engineering Annual Meeting (2004), 48 participants, Philadelphia, PA.
74. “Development and Implementation of HACCP and Prerequisite Programs” (2004), 43 participants, West Lafayette, IN.
75. “Biosensor Development and the Center for Food Safety Engineering” (2005), 50 participants, presented at the Homeland Security Technical Showcase, Purdue University.
76. “Using Computer-based Simulations to Assess Decision Making Capabilities for Bio-security Scenarios” (2005), 47 participants, Michigan State University.
77. “Computer-based Simulations to Improve Decision Making Capabilities for Biodefense” (2005), 23 participants, Purdue University.
78. “Improving Decision Making Capabilities for Food Defense” for the IFT Food Safety and Quality Conference (2005), 314 participants, New Orleans, LA..
79. “Developing Food Safety Management Programs for the Pet Food Industry” (2005), 73 participants, Masterfoods. Columbus, OH.
80. Workshop coordinator and speaker for the Center for Food Safety Engineering Annual Meeting (2005), 67 participants, West Lafayette, IN.
81. “An Introduction to Thermal Processing and Food Safety” (2005), 91 participants, Pace Foods, Rochester, MN.

82. “Thermal Processing, Food Safety, Food Quality and packaging considerations for Aseptic Processed Foods” (2005), 84 participants, Gerber Foods, Little Rock, Arkansas.
83. “Food Biosecurity Computer Simulation” (2005), 36 participants, West Lafayette, IN.
84. “Interventions for *Listeria monocytogenes* in Retail Food Establishments” (2006), 271 participants, Conference for Food Protection Meeting, Columbus, OH. (Linton coordinated the program that included 12 speakers from around the country – he also served as one of the speakers.)
85. “The Top 10 Things every Professional Should Know about Retail Food Safety” (2006), 63 participants, presented at the Kroger Foods Corporate Food Safety Meeting, Cincinnati, OH.
86. “Food Safety – What can Consumers do to Prevent Food Contamination?” (2006), 64 participants, presented to the West Lafayette Homemakers Association, West Lafayette, IN.
87. “Emerging Food Safety Concerns” (2006), 27 participants, presented to the Dean’s Advisory Council, West Lafayette, IN.
88. “Development and Implementation of HACCP and Prerequisite Programs” (2006), 24 participants, West Lafayette, IN.
89. Workshop coordinator and speaker for the Center for Food Safety Engineering Annual Meeting (2006), 58 participants, Ocean City, NJ.
90. “If Popeye Can Eat Spinach, Why Couldn’t We?” (2007), 327 participants, presented to the Indiana Annual Hort. Congress Meeting, Indianapolis, IN.
91. “Food Safety: Where are We and Where Do We Need to Be?” (2007), 114 participants (invited luncheon speaker), presented to the Indiana Annual Hort. Congress Meeting, Indianapolis, IN.
92. “The California Spinach Crisis: Lessons Learned” (2007), 56 participants (invited speaker), presented to the University Industry Consortium Meeting, Minneapolis, MN.
93. “FMI SuperSafeMark Program” (2007), 2-day retail food safety and food certification workshop, 119 participants presented in Indianapolis, IN.
94. “Developing HACCP Programs” (2008), 1-day course teaching the seven principles of HACCP. 15 participants, presented at Butterfield Foods, Noblesville, IN.
95. “Principles of Food Safety and Sanitation for Non-Profit Food Organizations” (2008), 1-day course teaching the principles of food safety for food preparers. 37 participants, presented for Indiana Food Finders, West Lafayette, IN.
96. “Food Pathogen Research” (2008), 11 participants, presented for Tata Chemicals (India), West Lafayette, IN.
97. “Development and Implementation of HACCP and Prerequisite Programs” (2008), 26 participants, West Lafayette, IN.
98. “Novel Technologies for the Detection and Control of Pathogenic Microorganisms.” (2008), Military Research and Development Meeting. Lake Tahoe, NV (Keynote presentation).

**b. Conferences/Workshops – International (4 prior to 2000)**

5. Workshop presenter for the “International Food Safety Issues” workshop of the Chartered Institute of Environmental Health International Congress (2000), 1536 participants, Harrogate, England.
6. Lead instructor for “Safe Food Handling Practices, HACCP, and Sanitation for Caribbean Resort Hotels” (2000), 63 participants, 3-day workshop, Barbados.
7. Workshop presenter and keynote speaker (3 talks) for the “International Congress for Food Safety” (2001), 458 participants, San Jose, Costa Rica.
8. Workshop presenter (3 talks) for the “International Food and Nutrition Workshop” (2001), 7 delegates, West Lafayette, IN.
9. Workshop organizer and presenter (4 talks) for “A Discussion of Global Food Safety Issues: From the Farm to the Fork” (2002), 70 participants, Auckland, New Zealand.
10. Workshop presenter (1 oral presentation) for the “Global HACCP Workshop” (2002), 106 participants, Chicago, IL.
11. Workshop presenter (1 oral presentation) for the “Chartered Institute of Environmental Health International Food Safety Conference” (2002), 548 participants, London, England.

12. Speaker (1 oral presentation) at the “4th International Conference of Predictive Modeling in Food, Quimper, France” (2003), 919 participants, Quimper, France.
13. Speaker (2 oral presentations) at the “5th International Conference of Food Science and Technology” (2003), 410 participants, Wuxi, China.
14. Organizer and panel member at the “3<sup>rd</sup> IFT International Food Safety and Quality Conference” (2003), 514 participants, Orlando, FL, USA.
15. Organizer and presenter for “3-day HACCP workshop for Central Americans” (Cochran Program), (2003), 4 participants, West Lafayette, IN.
16. Organizer and presenter (3 oral presentations) for 2-day International workshop – “Critical Control Points for Food Safety” (2004), Auckland, New Zealand.
17. Organizer and presenter (2 oral presentations) for 2-day International workshop – “International Food Safety and Security Challenges” (2004), Dunedin, New Zealand.
18. Presenter (1 oral presentation) for 3-day International workshop – “Integration of Research and Outreach to Optimize Food Safety Programs” (2004), San Jose, Costa Rica.
19. Presenter (2 oral presentations) for 3-day International workshop – “Building Relationships among Scientists in China and the United States”(2005), Wuxi, China.
20. Presenter (1 oral presentation) for 2-day International workshop – “Purdue University Computer Simulation Program for Food Defense” (2005), European Commission, Brussels, Belgium.
21. Presenter (1 oral presentation) for 2-day International workshop – “The National Alliance for Food Safety and Security – Building Partnerships between Universities, Government, and the Food Industry”(2005) Ministry of Science and Technology, Beijing, China.
22. Organizer and presenter for 1-day International workshop – “Molecular Day – Rapid Methods for Detection of Microorganisms” (2005), Kansas State University, Manhattan, KS.
23. Presenter (6 oral presentations) for 3-day International workshop – “Thermal Processing and Aseptic Processing and Packaging Technologies” (2006), PepsiCo Asia, Xiamen, China.
24. Organizer and presenter for 1-day International workshop – “Molecular Day – Rapid Methods for Detection of Microorganisms” (2006), Kansas State University, Manhattan, KS.
25. Presenter (6 oral presentations) for 3-day International workshop – “Thermal Processing and Aseptic Processing and Packaging Technologies” (2007), PepsiCo Asia, Ho-Chin-Min City, Vietnam.
26. Presenter (6 oral presentations) for 3-day International workshop – “Thermal Processing and Aseptic Processing and Packaging Technologies” (2007), PepsiCo, Sao Paulo, Brazil.
27. Invited Key Note Address – “Emerging International Issues in Retail Food Safety” (2007), ABRAS International Retail Grocers Convention, Sao Paulo, Brazil.
28. Organizer and presenter for 1-day International workshop – “Molecular Day – Rapid Methods for Detection of Microorganisms” (2007), Kansas State University, Manhattan, KS.
29. Presenter (2 oral presentations) for 2-day International program – “Center for Food Safety Engineering Activities” and “Pathogen Detection and Control” (2008), Chinese University of Hong Kong, Hong Kong.
30. Presenter (2 oral presentations) for 2-day International program – “Center for Food Safety Engineering Activities” and “Pathogen Detection and Control” (2008), Hong Kong Polytechnic Institute, Hong Kong.
31. Presenter (1 oral presentation) for 3-day International program – “Collaboration with Purdue University, USDA-ARS and China”, Jiao Tong University, Shanghai, China.
32. Organizer and presenter for 1-day International workshop – “Molecular Day – Rapid Methods for Detection of Microorganisms” (2008), Kansas State University, Manhattan, KS.
33. Presenter (Invited Talk) for 3-day International program. “The Forefront of Technology for Microbial Detection.” (2008), International U.S./European Food Safety Meeting. Amsterdam, Holland (Invited talk).
34. Presenter (Invited Talk) for 2-day International program. “Using a Computer-based Food Simulation for Food Traceability and Tracking Systems” (2009), International U.S./European Food Safety Meeting. Friesing, Germany (Invited Keynote presentation).

**c. Better Process Control School (Since 2000 – 28 FDA Schools; 1932 Participants)**

1. Coordinator and Lead Instructor for “Better Process Control School”
  - 2000 (51 participants: Purdue)
  - 2001 (226 participants: Purdue, Quaker Oats, Mullins Food Products, Ross Laboratories)
  - 2002 (78 participants: Purdue, Mead Johnson)
  - 2003 (111 participants: Purdue, Quaker Oats, Mead Johnson)
  - 2004 (217 participants: Purdue, HP Hood, Mead Johnson)
  - 2005 (278 participants: Purdue, Mead Johnson, ConAgra, HP Hood, Purdue, PepsiCo, Pace)
  - 2006 (453 participants: Purdue, Mead Johnson, HP Hood, MorningStar Foods, PepsiCo, Coca-Cola, Pace, Nestle Nutrition, Wornick Company)
  - 2007 (174 participants: Purdue, IN State Board of Health, Mead Johnson, HP Hood, PepsiCo, Novartis Nutrition)
  - 2008 (251 participants: Purdue, Novartis Nutrition, PepsiCo, Nestle, Whitewave, Mead Johnson)

**d. Distance Learning (Since 2000; 1 prior to 2000)**

2. “Retail Food Safety Regulations in Indiana and Nationwide” (2000), 18 IHETS sites, 3-hour program delivered to Extension Educators and local health departments.
3. “Factors Effecting Growth and Death of Microorganisms and the Use of Predictive Microbiology” (2000), 37 in-class participants. Linton developed three lectures for a distance education Master’s program offered by University of Arkansas.
4. “Essentials of Food Safety and Sanitation” Learnsomething.com™ has collaborated with Linton to develop an interactive Internet accessible 2, 8, and 16-hour retail food safety program.
5. “Interactive HACCP Distance Education Course for Sub-Management Level Personnel” (2003). Linton authored Internet accessible and CD-based 8 module course for food safety and food quality management programs for the food industry.
6. “Food Safety Program – HACCP, GMPs, and Prerequisite Programs” (2004). Linton developed a 5-module course on food safety developed for the food processing industry and offered as a CD-ROM and as an interactive web site.
7. “Food Safety – What’s all the Noise About? (2008). A podcast offered through University of Illinois Extension, May 2008.
8. “Food Safety – Emerging Issue to Think About (2008). A satellite communication offered to Extension Educators throughout the country, through the University of Illinois Extension program, over 800 sites connected for the program, May 2008.
9. Development of 5 module series for “Food Safety for Fruit and Vegetable Products” in English and Spanish that includes general produce food safety, soil contamination and control, manure contamination and control, water contamination and control, and plant contamination and control (available for download in outreach programs at [www.foodsci.purdue.edu](http://www.foodsci.purdue.edu)).

**e. Extension Invited Talks (Since 2000; 40 prior to 1998)**

40. “The Food Safety Engineering Project at Purdue University” (2000), 24 participants, Agricultural Administration, Purdue University.
41. “Emerging Food Safety Issues and Concerns” (2000), 30 participants, Department of Horticulture, Purdue University.
42. “Food Safety: Purdue’s Response to Important Issues” (2000), 41 participants, Purdue Back to School Alumni Weekend, Purdue University.
43. An Update of HACCP Requirements and Programs in the Food Industry” (2000), 61 participants, Annual Purdue Cooperative Extension Meeting, Purdue University.
44. “Food Safety: Purdue’s Response to Important Research and Outreach Issues” (2000), 26 participants, presented to State Legislators, Agriculture Administration, Purdue University.

45. "Food Safety – Why all the Hype these Days?" (2000), 95 participants, Indiana High School Teachers Association Meeting ACTE, Indianapolis, IN.
46. "Emerging Food Safety Issues Affecting the Fruit, Vegetable, and Wine Industries" (2001), 155 participants, Indiana Horticultural Congress Meeting, Indianapolis, IN.
47. "Inspection and Auditing Procedures for Convenience Store Facilities" (2001), 18 participants, WAWA corporate headquarters, Philadelphia, PA.
48. "Food Safety Issues Affecting the Food Processing Industry" (2001), 22 participants, Mid America Food Processors Annual Meeting.
49. "The Relationship of HACCP, SOP's, and Sanitation" (2001), 22 participants, Mid America Food Processors Annual Meeting.
50. "Statistical Process Control" (2001), 22 participants, Mid America Food Processors Annual Meeting.
51. "New regulations and requirement for Juice HACCP" (2002), 81 participants, presented to the Indiana State Department of Health and local health departments, Indianapolis, IN.
52. "Growth and Death of Microbes in Foods" (2003), 113 participants, presented to the Tippecanoe Health Department for retail food managers and workers.
53. "The Concept of Potentially Hazardous Foods" (2003), 113 participants, presented to the Tippecanoe Health Department for retail food managers and workers.
54. "Food Safety, Food Quality and the Emerging Changes for Retail Food Storage, Preparation, and Service" (2005), 391 participants, presented to Rosen College of Food Science and Nutrition, Orlando, FL.
55. "Improving Decision Making Capabilities for Agriculture Protection and Food Defense" (2006), 84 participants, presented, as the key note speaker, at the International Life Science Institute Science Committee, Washington, DC.
56. "Food Safety and Food Quality Programs" (2006), 13 participants, presented to Harlen Bakeries, Indianapolis, IN.
57. "*Listeria monocytogenes* at Retail: Science and Interventions" (2006), 191 participants, presented at the Indiana Environmental Health Association Annual Meeting, West Lafayette, IN.
58. "Extrinsic Factors that Impact the Growth of Microorganisms,"(2007), 44 participants, presented at the Indiana State Department of Health, Indianapolis, IN.
59. "The Pathogen Modeling Program,"(2007), 44 participants, presented at the Indiana State Department of Health, Indianapolis, IN.
60. "Use of HACCP Programs for Reduced Oxygen Packaged Foods Sold at Retail," (2007), 44 participants, presented at the Indiana State Department of Health, Indianapolis, IN.
61. "Use of Novel Intervention Strategies to Reduce Pathogen Levels for Strawberries" (2007), 126 participants, presented at the California Strawberry Commission, Monterey, CA.
62. "Food Safety and Song: Sing Along with Rich Linton" (2008), 246 participants, presented at the Indiana Crop Improvement Annual Meeting (keynote address) Indianapolis, IN.
63. "Developing a HACCP Plan for Retail Food Establishments" (2008), 179 participants, presented at the Indiana State Healthy Department Annual Regulatory Meeting, Indianapolis, IN.
64. "Food Safety and Song: Do You Hear What I Hear" (2008), 358 participants, presented at the Midwest Food Processors Association Meeting (keynote address), Traverse City, MI.
65. "Microbial Detection: The Forefront of New and Emerging Technologies." (2008), 212 participants, presented at the European Food Technology Program 08, Amsterdam, Holland.
66. "Novel Technologies for the Detection and Control of Foodborne Pathogens" (2008), 738 participants, presented (Keynote) at the Military Research and Development Meeting, Lake Tahoe, NV.
67. "Food Safety and Song – What's all the Noise About?" (2008), 29 participants, presented at the Lafayette Optimists Club, Lafayette, IN"
68. "Food Safety and Song – Sing Along with Rich Linton" (2008), 117 participants, presented for Tate and Lyle, Decatur, IL
69. "Food Safety – Our Past, Our Present, and, Our More Important Future" (2008), 64 participants, presented at the Purdue Food Science 25 year Celebration, West Lafayette, IN.

70. "The Potential Use of Chlorine Dioxide Gas as an Antimicrobial Agent for Produce" (2009), 57 participants, presented as the Malcolm Trout Lecture, Michigan State University, East Lansing, MI.

#### **f. Evidence of Interdisciplinary Activity**

One of Linton's strengths is his ability to collaborate with other departments on campus. He has secured nationally competitive funded projects with the following departments at Purdue University: Foods and Nutrition, Agricultural and Biological Engineering, Horticulture, 4-H youth, Animal Sciences, and Restaurant, Hospitality, Institutional, and Tourism Management.

On a frequent basis, he collaborates with academic colleagues within the state (Indiana University), and nationwide (Cornell University, Michigan State, The Ohio State University, University of California Davis, North Carolina State, University of Arkansas, Virginia Polytechnic Institute and State University). He also works with state regulatory agencies (State Department of Health, local health departments) and state trade organizations (Restaurant and Hospitality Association of Indiana, Indiana Retail Grocers Association, Indiana State Poultry Association, Indiana Pork Producers). Nationwide, he is actively involved in numerous interdisciplinary food safety team committees. Most recently, he served 2 consecutive terms as Chairman of the National Alliance for Food Safety and Security – an 18 University consortium.

Linton's capability to form, lead, and participate in interdisciplinary teams is demonstrated from a letter written to former Food Science Department Head Dr. Philip Nelson by Virginia A. Caine, Director of the Division of Public Health, Marion County Health Department. *"Dr. Linton helped coordinate and produce the curriculum by working with members of academia, state and local health inspectors, and private consultants. He also provided us with some of the finest, most knowledgeable presenters from academia for this program. His expertise, input and time made the Food Safety Day program the success it was. ...we are looking forward to continuing our working relationship with Dr. Linton and your staff."*

#### **4. Extension Publications (since 2000; 13 to 2000)**

14. **Linton**, R. H., C. Corridon, S. Gandy, M. Greene, M. Kantor, D. Miller. 2000. Feeding the community safely. Maryland Cooperative Extension Publication. Includes a series of 71 slides, supplemental learning materials, and a pre- and post- test to evaluate knowledge gain.
15. Rangarajan, A., E. Bihn, R. Gravani, D. Scott, M. Pritts, and R. **Linton**. 2000. Food Safety Begins on the Farm – A Growers Guide to Good Agricultural Practices for Fresh Fruits and Vegetables. Cornell University Extension Publication.
16. **Linton**, R. H. 2001. Controlling Food Safety Using the HACCP Approach and Prerequisite Programs. Purdue CES, FS13-W. pp 1-4.
17. **Linton**, R. H., and Susan Steeves. 2004. Target Chlorine Dioxide Gas at Bacteria. Microbial Update International. Vol. 9; No. 2.
18. **Linton**, R. H. 2005. Eat More Fruit and Vegetables... But Make Sure They are Safe. National Registry of Food Safety Professionals, *E-Zine*, March 2005
19. **Linton**, R. H. 2005. An Update on Acrylamide in Foods. National Registry for Food Safety Professionals, *E-Zine*, April 2005
20. **Linton**, R. H. 2005. New Responses to Food Allergens. National Registry for Food Safety Professionals, *E-Zine*, May 2005
21. **Linton**, R. H. 2005. School is Out... HACCP is In. National Registry for Food Safety Professionals, *E-Zine*, June 2005
22. **Linton**, R. H. 2005. Mad Cow Strikes Again in the United States. National Registry for Food Safety Professionals, *E-Zine*, July 2005
23. **Linton**, R. H. 2005. Risky Business: Microbial Risk Assessments. National Registry for Food Safety Professionals, *E-Zine*, September 2005
24. **Linton**, R. H. 2005. 2005 Food Code Provides a New Perspective on the term Potentially Hazardous. National Registry for Food Safety Professionals, *E-Zine*, January 2006

25. **Linton, R. H.** 2006. It's Springtime: Are we all Ready for CFP? National Registry for Food Safety Professionals, *E-Zine*, May 2006
26. **Linton, R. H.** 2006. What's up with the Bird Flu? National Registry for Food Safety Professionals, *E-Zine*, July 2006.
27. **Linton, R. H.** 2006. An Update on the 2006 Spinach Outbreak and Produce Safety. National Registry for Food Safety Professionals, *E-Zine*, September 2006.
28. **Linton, R. H.** 2006. Producing Safer Produce: A New Era in Food Safety, *E-Zine*, January 2007
29. **Linton, R. H.** 2007. What in the World is Melamine? National Registry for Food Safety Professionals, *E-Zine*, May 2007.
30. **Linton, R. H.** 2007. Botulism in the News. National Registry for Food Safety Professionals, *E-Zine*, October 2007.
31. **Linton, R. H.** 2008. Fruit and Vegetable Food Safety: Our Newest Food Safety Challenge. FoodBytes, March 2008.
32. **Linton, R. H.** 2008. 15 Years Later... *E. coli* O157:H7 is Still Kicking.. National Registry for Food Safety Professionals, *E-Zine*, April 2008.
33. **Linton, R. H.** 2008. An Update on the Produce-Associated Outbreak with *Salmonella* Saintpaul. National Registry for Food Safety Professionals, *E-Zine*, July 2008.
34. McSwane D. and **Linton, R. H.** 2008. Top 10 Food Safety List for Thanksgiving. National Registry for Food Safety Professionals, *E-Zine*, November 2008.
35. **Linton, R. H.** 2009. Found a Peanut... and it was Rotten. National Registry for Food Safety Professionals, *E-Zine*, March 2009.

## C. EXCELLENCE IN DISCOVERY

Linton continues to be very successful in obtaining nationally competitive funding, mentoring graduate students, publishing in scientific journals and presenting at national and international meetings. He has averaged 3-4 referred journal publications and 6 presentations at national/international meetings each year. Linton has brought in nearly \$1.8 million in research grants and gifts to support his personal research program. Additionally, he manages a \$2 million/year project focusing on detection of biological and chemical agents in food which has led to the development of the Center for Food Safety Engineering, where he serves as director. The CFSE has created \$17 million in research support to the University.

Linton's two main areas of research are predictive microbiology and non-thermal means of food preservation. The former, focuses on the study of microbial growth and inactivation of foodborne microorganisms in different types of food systems (Publications 12, 13, 14, 16, 26, 30, 36, 37, 40, 41). To study these interactions, Linton developed mathematical models to describe the kinetics of microbial growth and microbial inactivation in foods. His work has shown that mathematical models are an important resource for estimating and decreasing food safety risks and food quality problems. Model development is a very important tool for researchers and food processors when developing strategies to inactivate or prevent the growth of foodborne pathogens.

With a heavy Extension appointment, Linton also tries to solve industry problems through applied research. A key problem identified recently is the safety of fruits and vegetables. Traditional methods, other than heat processing, are not effective in assuring the safety of fruits and vegetables. Non-traditional methods that do not incorporate heat are currently being studied in Linton's laboratory. Linton has worked with food engineers to study different systems of food preservation that do not use heat. Several non-thermal systems have been studied and applied to food systems including ozone, chlorine dioxide, organic acids, and chemical food preservatives (Publications 11, 16, 18, 19, 22, 23, 24, 25, 28, 31, 32-35). Linton also has an interest in understanding the food processing environment and development of food safety systems to reduce the risk of foodborne illness. His special areas of expertise are in microbial assessments of the food processing environment and a study of HACCP systems and sanitation practices (Publications 9, 10, 17, 20, 21, 29, 38, 39).

Linton has a strong record for acquiring state and nationwide funding and an excellent reputation for ensuring that the research plan is complete including graduate student involvement, presentations at national meetings, and published manuscripts. His greatest accomplishment has been to integrate outreach and research through a series of published books (Books 2-9) related to retail food safety. This series of texts, sold nationally and internationally, assemble all of the recent technology and information related to food safety practices for retail foods.

### 1. Research Publications (Total)

#### a. Refereed Papers (\*corresponding author)

1. **\*Linton, R. H., M. D. Pierson, and J. R. Bishop.** 1990. Increase in heat resistance of *Listeria monocytogenes* Scott A by sub lethal heat shock. *Journal of Food Protection.* 53:924-927.
2. **\*Linton, R. H., J. B. Webster, M. D. Pierson, J. R. Bishop and C. R. Hackney.** 1991. The effect of sub lethal heat shock and growth atmosphere on the heat resistance of *Listeria monocytogenes* Scott A. *Journal of Food Protection.* 55:84-87.
3. **\*Linton, R. H., W. H. Carter, M. D. Pierson and C. R. Hackney.** 1995. The use of a modified Gompertz equation to model non-linear survival curves for *Listeria monocytogenes* Scott A. *Journal of Food Protection.* 58:946-954.
4. **\*Linton, R. H., W. H. Carter, M. D. Pierson, C.R. Hackney, and J.D. Eifert.** 1996. Use of a modified Gompertz equation to predict the effects of temperature, pH, and NaCl on the inactivation of *Listeria monocytogenes* Scott A heated in infant formula. *Journal of Food Protection.* 59:16-23.
5. Lutgring, K. R., R. H. **\*Linton, N. J. Zimmerman, M. Peugh and A. J. Heber.** 1997. Distribution and quantification of bioaerosols in poultry slaughtering plants. *Journal of Food Protection.* 60:804-810.

6. Eisel, W. G., R. H. **\*Linton** and P. M. Muriana. 1997. A survey of microbial levels for incoming raw beef, environmental sources, and ground beef in a red meat processing plant. *Food Microbiology*. 14:273-282.
7. **\*Linton**, R. H., W. G. Eisel, and P. M. Muriana. 1997. Comparison of conventional plating methods and Petrifilm™ for the recovery of microorganisms in a ground beef processing facility. *Journal of Food Protection*. 16:1084-1088.
8. Marks, J., W. Stadelman, R. **\*Linton**, H. Schmieder, and R. Adams. 1998. Tenderness analysis and consumer sensory evaluation of ostrich meat from different muscles and different aging times. *Journal of Food Quality*. 21: 361-369.
9. Wong, E., R.H. **\*Linton**, and D.E. Gerrard. 1998. Reduction of *Escherichia coli* and *Salmonella seftenberg* on fresh pork using ultraviolet light. *Food Microbiology*. 15: 415-423.
10. **\*Linton**, R.H. and D.Z. McSwane 1998. A comparison of perspectives about the critical areas of knowledge for safe food handling in food establishments. *Journal of Environmental Health*. 60: 8-15. (This manuscript was selected to be republished in *Best of Food* (2001) 1st ed. National Environmental Health Association, Denver, CO.)
11. Han Y., A. M. Guentert, R. S. Smith, R. H. **\*Linton**, and P. E. Nelson. 1999. Efficacy of chlorine dioxide gas as a sanitizer for tanks used for aseptic juice storage. *Food Microbiology*. 16: 53-61.
12. Rattray, J., J. D. **\*Floros**, and R. H. **Linton**. 1999. Computer-aided microbial identification using decision trees. *Journal of Food Control*. 10: 107-116.
13. Chhabra, A., H. Carter, R. H. **Linton** and M. A. **\*Cousin**. 1999. A predictive model to determine the effects of pH, milkfat, and temperature, on thermal inactivation of *Listeria monocytogenes*. *Journal of Food Protection*. 62: 1143-1149.
14. **\*Xiong**, R., G. Xie, A. S. Edmondson, R. H. **Linton**, and M. A. Sheard. 1999. Comparison of the Baranyi model with the modified Gompertz equation for modeling thermal inactivation of *Listeria monocytogenes* Scott A. *Food Microbiology*. 16: 269-279.
15. **\*McSwane**, D. Z. and R. H. **Linton**. 2000. Issues and Concerns in HACCP Development and Implementation for Retail Food Operations. *Journal of Environmental Health*. 62: 15-18.
16. Dock, L.L., **\*J.D. Floros**, and R.H. **Linton**. 2000. Effect of pH modification and preservative action on the heat resistance of *Escherichia coli* O157:H7 in apple cider. *Journal of Food Protection*. 66: 1026-1031.
17. **\*Wong**, E. and R. H. **Linton**. 2000. Reduction of *Salmonella senftenberg* and *Escherichia coli* on pork skin using chlorine dioxide gas solutions. *Reviteca – Journal of Food Technology*. 11: 23-30.
18. Han, Y., D. M. Sherman, R. H. **\*Linton**, S. S. Nielsen, and P.E. Nelson. 2000. The effects of washing and chlorine dioxide gas on survival and attachment of *E. coli* O157:H7 to green pepper surfaces. *Food Microbiology*. 17: 521-533.
19. Han, Y., D. M. Sherman, R. H. **\*Linton**, S. S. Nielsen, and P.E. Nelson. 2000. Inactivation of *Escherichia coli* on uninjured and injured green pepper surfaces by chlorine dioxide gas as demonstrated by confocal laser scanning microscopy. *Food Microbiology*. 17: 643-655.
20. **\*McSwane**, D. Z. and R. H. **Linton**. 2000. Using the World Wide Web to deliver food safety courses for retail food managers. Second NSF International Conference on Food Safety Proceedings: *Preventing Foodborne Illness through Science and Education*. 2: 335-344.
21. **\*Linton**, R. H. and D. Z. McSwane. 2000. The Challenges of Retail HACCP Development and Implementation. Second NSF International Conference on Food Safety Proceedings: *Preventing Foodborne Illness through Science and Education*. 2: 55-64.
22. Han, Y., J. D. Floros, R. H. **\*Linton**, S. S. Nielsen, and P. E. Nelson. 2000. Response surface modeling for the inactivation of *Escherichia coli* O157:H7 on green peppers (*Capsicum annuum* L.) by chlorine dioxide gas treatment. *Journal of Food Protection*. 64: 1128-1133.
23. Han, Y., **\*Linton**, R. H., Nielsen, S. S., and Nelson, P. E. (2001). Reduction of *Listeria monocytogenes* on green peppers (*Capsicum annuum*) by gaseous and aqueous chlorine dioxide and water washing, and its growth at 7°C. *Journal of Food Protection*. 64:1730-1738.

24. Han, Y., J.D. Floros, R. H. **Linton**, S. S. Nielsen, and P.E. Nelson 2001. Response surface modeling for the inactivation of *Escherichia coli* O157:H7 on green peppers (*Capsicum annuum*) by ozone gas treatments. *Journal of Food Science*. 67: (3).
25. Chhabra, A., H. Carter, R. H. **\*Linton** and M. A. Cousin. 2002. Thermal Inactivation of *Listeria monocytogenes* in different pH conditions and milkfat levels. *International Journal of Food Microbiology*. 78: 235-243
26. **\*Linton**, R. H. 2002. Center for Food Safety Engineering at Purdue University (USA). *Food Safety and Security*. September 2002: 2-5.
27. Du, J., Han, Y., and R. H. **\*Linton**. 2002. Inactivation by chlorine dioxide gas of *Listeria monocytogenes* onto different apple surfaces. *Food Microbiology*. 19:481-490.
28. Han, Y., R. H. **\*Linton**, Nielsen, S. S., and P. E. Nelson. 2002. A comparison for methods of recovery of chlorine dioxide-injured *Escherichia coli* O157:H7 and *Listeria monocytogenes*. *Food Microbiology*. 19:201-210.
29. Heber, A.J., M.J. Peugh, N.J. Zimmerman, and R.H. **Linton**. 2002. Poultry slaughtering plants: ventilation system performance. *ASHRAE Transactions*. 108(2):129-144.
30. Guentert, A. M. and R. H. **\*Linton** 2003. Growth and survival of selected pathogens in margarine-style table spreads. *Journal of Environmental Health*. 65(9): 9-15.
31. Han, Y., B. Applegate, R. H. **\*Linton**, and P. E. Nelson 2003 Decontamination of *Bacillus thuringiensis* spores on selected surfaces by chlorine dioxide gas. *Journal of Environmental Health*. 66 (4):16-20.
32. Du, J., Y. Han, and R. H. **\*Linton** 2003 Efficacy of chlorine dioxide gas in reducing *Escherichia coli* O157:H7 on apple surfaces. *Food Microbiology*. 20:583-591.
33. Han, Y., T. Selby, K. Schneider, P. E. Nelson, R. H. **\*Linton** 2004. Decontamination of strawberries using batch and continuous chlorine dioxide gas treatments. *Journal of Food Protection*. 67(11) 2450-2455.
34. Han, Y. and R. H. **\*Linton** 2004. Fate of *Escherichia coli* O157:H7 and *Listeria monocytogenes* in strawberry juice and acidified media at different pH values and temperature. *Journal of Food Protection*. 67(11) 2443-2449.
35. Han, Y., R. H. **\*Linton**, and P. E. Nelson 2004. Effects of recovery, plating, and inoculation methods on quantification of *Escherichia coli* O157:H7 and *Listeria monocytogenes* from strawberries. *Journal of Food Protection*. 67(11) 2436-2442.
36. **\*Linton**, R. H. and F. Ozadali. 2005. Fighting Foodborne Illness: De-bunking Processing Myths. *The Journal of Pediatric Nutrition and Development*. (109): 14-24.
37. Guentert, A. M., R. H. **\*Linton**, J. B. Luchansky, and M. A. Cousin 2005. Behavior of *Listeria monocytogenes* in pH-modified chicken salad during refrigerated storage and temperature abuse. *Journal of Environmental Health*. 68(1) 31-37.
38. Guentert, A. M., R. H. Mohtar, R. H. **\*Linton**, M. Tamplin, and J. B. Luchansky. 2006. Modeling the behavior of *Listeria monocytogenes* in pH-modified chicken salad during cold storage and temperature abuse conditions. *Journal of Food Process Engineering*. 29:89-117.
39. Selby, T., A. Berzins, C. Corvalan, A. Grant, D. Gerrard, and R. **\*Linton**. 2006. Microbial heat resistance of *Listeria monocytogenes* and the impact on ready-to-eat meat quality after post-package pasteurization. *Meat Science*. 74(3): 425-434.
40. Heber, A.J., M.W. Peugh, K.R. Lutgring, N.J. Zimmerman and R.H. **\*Linton**. 2006. Poultry slaughter plants: Concentrations of microbial aerosols. *ASHRAE Trans*. 112(2):644-655.
41. Schultze, K. K., R. H. **\*Linton**, M. A. Cousin, J. B. Luchansky, and M. L. Tamplin. 2006. A Predictive Model to Describe the Effects of Temperature, Sodium Lactate and Sodium Diacetate on the Inactivation of a serotype 4b strain of *Listeria monocytogenes* in a Frankfurter Slurry. *Journal of Food Protection*. 69(7): 1552-1560.
42. Schultze, K. K., R. H. **\*Linton**, M. A. Cousin, J. B. Luchansky, and M. L. Tamplin. 2007. Effect of Growth Conditions and Fat Level on Thermal Inactivation of *Listeria monocytogenes* in Frankfurter Systems. *Food Microbiology*. 24(4) 352-361.

43. Mahmoud, B. S. M. and R. H. \***Linton**. 2007. Inactivation kinetics of inoculated *Escherichia coli* O157:H7, *Listeria monocytogenes* and *Salmonella spp.* on strawberries by chlorine dioxide gas. *Food Microbiology*: 24: 736-744.
44. Harper, N. and R. H. \***Linton**. 2008. Survival and growth of foodborne microorganisms in processed and individually wrapped cheese slices. *Journal of Environmental Health*. 70(7) 31-39.
45. Mahmoud, B. S. M. and R. H. \***Linton**. 2008. Inactivation kinetics of inoculated *Escherichia coli* O157:H7, and *Salmonella enterica* on lettuce by chlorine dioxide gas. *Food Microbiology* 25 244-252.
46. Mahmoud, B. S. M. and R. H. \***Linton**. 2008. Inactivation kinetics of inoculated *Escherichia coli* O157:H7, and *Salmonella Poona* on whole cantaloupe by chlorine dioxide gas. *Food Microbiology* 25(7) 857-865.
47. Kim, J. and R. H. \***Linton**. 2008. Identification of a Non-Pathogenic Surrogate Organism for Pathogenic Bacteria Treated with Chlorine Dioxide Gas. *Food Microbiology* 25 597-606.

**b. Published Research Abstracts (Since 2000; 17 prior to 2000)**

18. "Retail HACCP - challenges and perspectives." R. H. **Linton**. Conference for Food Protection 2000 Meeting, Milwaukee, WI. Paper # 2.
19. "Effect of washing and chlorine dioxide gas on survival and attachment of *Escherichia coli* O157:H7 to uninjured and injured green pepper surfaces." Y. Han, R. H. **Linton**, D. M. Sherman, S. S. Nielsen, and P. E. Nelson. 2000 Institute of Food Technologists Meeting, Dallas, TX (Oral). Paper # 84-3.
20. "Development of HACCP and GMP's train-the-trainer program for food processing establishments." R. H. **Linton** and J. D. Eifert. 2000 Institute of Food Technologists Meeting, Dallas, TX (Poster). Paper # 39E-1.
21. "Food safety fair: a food safety curriculum for consumers and retail food handlers." R. H. **Linton** and W. D. Burgess. 2000 Institute of Food Technologists Meeting, Dallas, TX (Poster). Paper # 39E-2.
22. "A train-the-trainer program for educators or retail food safety certification programs." D. Z. McSwane and R. H. **Linton**. 2000 National Meeting for the National Environmental Health Association. One-day special topics workshop.
23. "The Challenges of Retail HACCP Development and Implementation." R. H. **Linton** and D. Z. McSwane. 2000 Second NSF International Conference on Food Safety: Preventing Foodborne Illness Through Science and Education, Savannah, GA (Poster). Paper D-6.
24. "Using the World Wide Web to deliver food safety courses for retail food managers." D. Z. McSwane and R. H. **Linton**. 2000 Second NSF International Conference on Food Safety: Preventing Foodborne Illness Through Science and Education, Savannah, GA (Oral). Paper 10-6.
25. "Emerging Food Safety Issues: A Perspective from the United States." R. H. **Linton**. 2000. Chartered Institute of Environmental Health International Congress Meeting, Harrogate, England.
26. "Poultry Food Safety: Lessons Learned from the United States." R. H. **Linton**. 2000 Chartered Institute of Environmental Health International Congress Meeting, Harrogate, England.
27. "Mathematical modeling of thermal destruction of *Listeria monocytogenes* Scott A in infant formula." R. Xiong, J.F. Meullenet and R. H. **Linton**. 2001 Institute of Food Technologists Meeting, Dallas, TX (Poster). Paper # 59F-34.
28. "Response surface modeling for the inactivation of *Escherichia coli* O157:H7 on green peppers (*Capsicum annuum*) by gaseous chlorine dioxide and ozone treatments." Y. Han, J. D. Floros, R. H. **Linton**, S. S. Nielsen, and P.E. Nelson. 2001 Institute of Food Technologists Meeting, Dallas, TX (Poster). Paper # 88E-7.
29. "Effectiveness of online courses." D. McSwane and R. H. **Linton**. 2001 National Environmental Health Conference Meeting, Atlanta, GA (Oral).
30. "Reduction of *Listeria monocytogenes* on green peppers (*Capsicum annuum*) by gaseous and aqueous chlorine dioxide and water washing, and its growth at refrigerated temperature." Y. Han, R. H. **Linton**, P. E. Nelson, and S. S. Nielsen. 2001 International Association of Food Protection Annual Meeting, Minneapolis, MN (Poster). Paper # P12.

31. "Effects of pH and temperature on inactivation of *Escherichia coli* O157:H7 in a model apple cider system." D. Ripberger, R. H. **Linton**, and J.D. Floros. 2001 International Association of Food Protection Annual Meeting, Minneapolis, MN (Poster). Paper # P16.
32. "Comparison of predictive models for a 4-log thermal reduction of *Listeria monocytogenes* when growth conditions differed." A.T. Chhabra, R. H. **Linton**, W. H. Carter, and M. A. Cousin. 2001 International Association of Food Protection Annual Meeting, Minneapolis, MN (Poster). Paper # P104.
33. "Reduction of *Salmonella senftenberg* and *Escherichia coli* on the surface of pork carcasses treated with chlorine dioxide gas." R. H. **Linton**. 2001 International Congress for Food Science and Technology, San Jose Costa Rica (Poster).
32. "Design and evaluation of a microbial testing strategy in food processing plants." R. H. **Linton**. 2001 International Congress for Food Science and Technology, San Jose, Costa Rica (Poster).
33. "Inactivation of *Listeria monocytogenes* on lettuce by gaseous and aqueous chlorine dioxide gas and chlorinated water." C. B. D'lima and R. H. **Linton**. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Poster). Paper # 15D-4.
34. "Methods to recover *Escherichia coli* O157:H7 and *Listeria monocytogenes* on strawberries." Y. Han, and R. H. **Linton**. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Poster). Paper # 15D-5.
35. "Inactivation of *Escherichia coli* O157:H7 and *Listeria monocytogenes* on strawberries by chlorine dioxide gas." Y. Han, R. H. **Linton**, and P.E. Nelson. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Poster). Paper # 15D-5.
36. "Inactivation of *Listeria monocytogenes* inoculated on different apple surfaces using chlorine dioxide gas." J. Du, Y. Han, and R. H. **Linton**. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Poster). Paper # 15D-7.
37. "Microbial reduction strategies using gaseous or vaporized antimicrobial agents for fruits and vegetables." R. H. **Linton** and Y. Han. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Oral). Paper # 19-5.
38. "Growth and survival of selected pathogens in margarine-style table spreads." A. M. Guentert and R. H. **Linton**. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Poster). Paper # 61C-5.
39. "Thermal inactivation kinetics of *Listeria monocytogenes* in ready-to-eat bologna." T. L. Selby A. Berzins, A. L. Grant, T. A. Haley, A. K. Bhunia, D. E. Gerrard and R. H. **Linton**. 2002 Institute of Food Technologists Meeting, Anaheim, CA (Poster). Paper # 97-10.
40. "Non-thermal pathogen reduction for *Escherichia coli* on apple surfaces using chlorine dioxide gas." J. Du, Y. Han and R. H. **Linton**. 2002 International Association of Food Protection Annual Meeting, San Diego, CA (Poster). Paper # 148.
41. "Comparison of dipping, spotting, and spraying methods to inoculate *Listeria monocytogenes* on green pepper surfaces." Y. Han and R. H. **Linton**. 2002 International Association of Food Protection Annual Meeting, San Diego, CA (Poster). Paper # 159.
42. "The Center for Food Safety Engineering at Purdue University" R. H. **Linton**. 2002 Food and Agricultural Science Exhibition, Washington, DC (Poster).
43. "Decontamination of *Bacillus thuringiensis* spores on selected surfaces by chlorine dioxide gas." Y. Han, B. Applegate, R. H. **Linton** and P. E. Nelson. 2003 American Society for Microbiology Biodefence Research Meeting, Baltimore, MD (Poster).
44. "The use of gaseous chlorine dioxide and ozone on pathogen reduction in fresh produce." R. H. **Linton** and Y. Han. 2003 - 16<sup>th</sup> Annual International Fresh Cut Produce Association Meeting, Tampa, FL.
45. "Inactivation of *Salmonella* spp. on the outer surfaces of cantaloupes using chlorine dioxide gas." R. A. Rosentrader, D. Delgado, Y. Han, R. H. **Linton** and P. E. Nelson. 2003 Institute of Food Technologists Meeting, Chicago, IL (Poster). Paper # 104A-11.
46. "*Listeria monocytogenes* on strawberries, in strawberry juice and in acidified media as affected by storage time, pH, and temperature." Y. Han and R. H. **Linton**. 2003 Institute of Food Technologists Meeting, Chicago, IL (Poster). Paper # 104A-16.

47. "Growth and inactivation of *Listeria monocytogenes* in pH-modified chicken salad during cold storage: a predictive model for risk assessment." A.M. Guentert, R.H. **Linton**, R.H. Mohtar, M.L. Tamplin, J.B. Luchansky, and M.A. Cousin. 4th International Conference of Predictive Modeling in Food, Quimper, France.
48. "Comparison of Inoculation Methods to Determine the Efficacy of Chlorine Dioxide Gas and Chlorinated Water Treatments to Reduce *Escherichia coli* O157:H7 on Strawberries." Y. Han and R. H. **Linton**. 2003 International Association of Food Protection Annual Meeting, New Orleans, LA. Paper # T-26.
49. "A Predictive Model For Growth And Inactivation Of *Listeria monocytogenes* in pH-Modified Chicken Salad During Cold Storage." A.M. Guentert and R. H. **Linton**. 2003 International Association of Food Protection Annual Meeting, New Orleans, LA. (Poster) Paper # P-166-26.
50. "Application of Chlorine Dioxide in the Food Industry." Y. Han, R. H. **Linton**, and P. E. Nelson. 2003 - 5th International Food Science and Technology Conference, Wuxi, China. (Oral) Paper 2-B-2.
51. "U.S. Response to Food Safety Concerns in Fresh Produce and Juice." R. H. **Linton**. 2003 - 5th International Food Science and Technology Conference, Wuxi, China. (Oral) Paper 2-A-1.
52. "Preharvest Food Safety Concerns for Retail Food Establishments." R. H. **Linton**. 2003 - 3rd IFT International Food Safety and Quality Conference, Orlando, FL.
53. "Utilization of bioluminescent bacterial strains for online evaluation of bacterial decontamination efficacy." Taliaferro, T.M., B. M. Applegate, Jr., Y. Han, B. N. Paxson, M. Budzik, R. H. **Linton**, P.E. Nelson, D. E. Nivens, and B. M. Applegate. 2003. ASM Biodefense Research meeting: "Future Directions for Biodefense Research: Development of Countermeasures," Baltimore, MD.
54. "Decontamination of *Bacillus thuringiensis* spores on selected surfaces by chlorine dioxide gas." Han, Y., B. M. Applegate, R. H. **Linton**, P. E. Nelson. 2003. ASM Biodefense Research meeting: "Future Directions for Biodefense Research: Development of Countermeasures," Baltimore, MD.
55. "Time as a Public Health Control." R. H. **Linton**. 2004 - 3rd Annual International Food Safety Workshop, Massey University, Auckland, New Zealand. (Oral).
56. "Treatment Systems for Fruit and Vegetable Decontamination." R. H. **Linton**. 2004 - 3rd Annual International Food Safety Workshop, Massey University, Auckland, New Zealand. (Oral).
57. "International Food Biosecurity Challenges." R. H. **Linton**. 2004 - 3rd Annual International Food Safety Workshop, Massey University, Auckland, New Zealand. (Oral).
58. "Food Science, Food Safety, and Food Security at Purdue University." R. H. **Linton**. 2004 University of Otago International Food Safety Forum, University of Otago, Dunedin, New Zealand. (Oral).
59. "New and Novel Non-thermal Technologies for Reduction of Foodborne Pathogens." R. H. **Linton**. 2004 University of Otago International Food Safety Forum, University of Otago, Dunedin, New Zealand. (Oral).
60. "Extension's efforts to the hospitality and foodservice industry. " R. H. **Linton**. 2004 Institute of Food Technologists Meeting, Las Vegas, NV (Oral). Paper # 7-6.
61. "Effects of chlorine dioxide gas treatment on microbial safety and quality of mushrooms. " T. L. Selby, E. Wong, Y. Han, D. E. Gerrard, and R. H. **Linton**. 2004 Institute of Food Technologists Meeting, Las Vegas, NV (Poster). Paper # 49F-14.
62. "Comparison of spot, spray, and dip inoculation methods to determine efficacy of chlorine dioxide gas and chlorinated water treatments in reducing *Salmonella* spp. on green peppers " Y. Han, N. G. Bright, B. M. Applegate, R. H. **Linton**. 2004 Institute of Food Technologists Meeting, Las Vegas, NV (Poster). Paper # 114C-13.
63. "Extension's efforts to the hospitality and foodservice industry." R. H. **Linton**. 2004 Institute of Food Technologists Meeting, Las Vegas, NV (Invited Symposium Speaker – Oral). Paper # 6A.
64. "Recent Development in *Listeria monocytogenes* Research" R. H. **Linton** and J. D. Denton. 2004 International Association of Food Protection Annual Meeting, Phoenix, AZ (Oral). Paper # 507.
65. "Reduction of *Salmonella* spp. on orange surfaces using chlorine dioxide gas" E. Wong, T. L. Selby, Y. Han, and R. H. **Linton**. 2005 Institute of Food Technologists Meeting, New Orleans, LA (Poster). Paper # 36E-92.

66. "Food biosecurity awareness and education through computer simulation modeling" R. H. **Linton**, L.H. Choi, K. K. Schultze, T. L. Selby, M. Reckowsky, T. H. Bhatt, C. H. Hsieh, F. Tangri, S. Mehta, and A. Chaturvedi. 2005 Institute of Food Technologists Meeting, New Orleans, LA (Poster). Paper # 54A-1.
67. "Heat inactivation of *Listeria monocytogenes* in TSYE broth and high and low fat frankfurter broths" K. K. Schultze, R. H. **Linton** M. A. Cousin, T. L. Selby, J. B. Luchansky, and M. L. Tamplin. 2005 Institute of Food Technologists Meeting, New Orleans, LA (Poster). Paper # 89E-20.
68. "Effects of chlorine dioxide gas treatment on microbial safety and quality of fresh meat. T. L. Selby, E. Wong, Y. Han, D. E. Gerrard, and R. H. **Linton**. 2005 Institute of Food Technologists Meeting, New Orleans, LA (Poster). Paper # 89F-31.
69. "Decontamination of raw almonds using chlorine dioxide gas. M. Wihodo, Y. Han, T. L. Selby, P. Lorcheim, M. Czarneski, G. Huang, and R. H. **Linton**. 2005 Institute of Food Technologists Meeting, New Orleans, LA (Poster). Paper # 99E-12.
70. "The Use of Computer Modeling Approaches to Improve Decision Making." R. H. **Linton**. 2005 Institute of Food Technologists Meeting, New Orleans, LA (Invited Symposium Speaker).
71. "Decontamination of whole cantaloupes using a pilot-scale chlorine dioxide gas treatment system" Y. Han, T. Selby, F. Yang, S. Hu, P. E. Nelson, and R. H. **Linton**. 2005 International Association of Food Protection Meeting, Baltimore, MD.
72. "Effects of Processing Treatments on FT-IR-based classification of dead *E. coli* K12 cells in comparison to live cells." Y. Burgula, M. Cousin, B. Applegate, R. **Linton**, B. Ruehs, and L. Mauer. 2006 Institute of Food Technologists Meeting, Orlando, FL (Poster) Paper # 03A-03.
73. "Decontamination of apples effect using a pilot plant chlorine dioxide treatments system." F. Yang, Y. Han, T. Selby, M. Cousin, and R. **Linton**. 2006 Institute of Food Technologists Meeting, Orlando, FL (Poster) Paper # 78F-19.
74. "Inactivation of *Listeria monocytogenes* and *Salmonella* spp. on stainless steel and polyethelene surfaces by chlorine dioxide gas." T. Tseng, Y. Han, J. Wu, and R. **Linton**. 2006 Institute of Food Technologists Meeting, Orlando, FL (Poster) Paper # 54A-28.
75. "Decontamination of apples effect using a pilot plant chlorine dioxide treatments system." F. Yang, Y. Han, T. Selby, M. Cousin, and R. **Linton**. 2006 Institute of Food Technologists Meeting, Orlando, FL (Poster) Paper # 78F-19.
76. "The use of chlorine dioxide technologies as an antimicrobial treatment for surfaces and for different food systems." R. H. **Linton**. 2006 Institute of Food Technologists Meeting, Orlando, FL (Invited Symposium Speaker - Oral). Paper # 084-1.
77. "Survival and growth of foodborne microorganisms in processed and individually wrapped cheese slices. N. Harper, B. Wing, T. Selby, Y. Han, K. Schultze, and R. **Linton**. 2006 International Association of Food Protection Meeting, Calgary, CA. Paper # T2-10 (Oral).
78. "Food safety and food defense simulation: A realistic approach. W. Crawford, A. Valadez, K. Chong, Aparna Kothapalli, D. Schroeder, T. Bhatt, C. Hsieh, A. Chaturvedi, and R. **Linton**. 2006 International Association of Food Protection Meeting, Calgary, CA. Paper # T4-01 (Oral).
79. "Reduction of *Salmonella* inoculated onto different tomato surfaces by gaseous chlorine dioxide. A. Bhagat, and R. **Linton**. 2006 International Association of Food Protection Meeting, Calgary, CA. Paper # P4-27 (Poster).
80. A novel mathematical modeling approach to determine inactivation of *Listeria monocytogenes* F4244 and *Escherichia coli* O157:H7 C7927 exposed to gaseous chlorine dioxide. T. Selby, C. Corvalan, N. Vaidya, Y. Han, Z. Xue, and R. **Linton**. 2006 International Association of Food Protection Meeting, Calgary, CA. Paper # P5-18 (Poster).
81. "Inactivation kinetics of inoculated *Escherichia coli* O157:H7 and *Salmonella* spp. on iceberg lettuce by chlorine dioxide gas. S. M. Mahmoud and R. **Linton**. 2007 International Association of Food Protection Meeting, Orlando, FL. Paper # P1-34 (Poster).
82. "Viewpoint: The science behind the definitions of potentially hazardous food in the Food Code, R. **Linton**. 2007 International Association of Food Protection Meeting, Orlando, FL. Paper # RT5 (Invited Symposium Speaker).

83. "Inactivation kinetics of inoculated *E. coli* O157:H7, *L. monocytogenes*, and *Salmonella* spp. on strawberries by chlorine dioxide gas." S. Mahmoud, A. Bhagat, and R. **Linton**. 2007 Institute of Food Technologists Meeting, Chicago, IL (Oral) Paper # 136-03
84. "Reduction of *Salmonella Agona* on inoculated alfalfa seeds by chlorine dioxide gas." J. Kim, S. Koh, and R. **Linton**. 2007 Institute of Food Technologists Meeting, Chicago, IL (Poster) Paper # 042-02
85. "Improving the safety and quality of fresh produce using chlorine dioxide gas." R. **Linton**. 2007 Institute of Food Technologists Meeting, Chicago, IL (Invited Symposium Speaker) Paper # 042-02.
86. "Selecting surrogate microorganisms for evaluation of chlorine dioxide gas treatment." J. Kim, S. Koh, A. Bhagat, A. Bhunia, and R. **Linton**. 2007 American Society of Microbiology Annual Meeting, Toronto, CA (Poster) Paper # 0152P/P-058.
87. "Reduction of Salmonellae inoculated on orange surface by gaseous chlorine dioxide." A. Bhagat, B. Mahmoud, J. Kim, and R. **Linton**. 2007 American Society of Microbiology Annual Meeting, Toronto, CA (Poster) Paper # 083P/P-002.
88. "Reduction of Salmonellae inoculated on orange surface by gaseous chlorine dioxide." A. Bhagat, and R. **Linton**. 2007 American Society of Microbiology Annual Meeting, Toronto, CA (Student Presentations) Paper # 275P.
89. "Development of a Food Defense Curriculum for Food Defense Stakeholders." R. H. **Linton**. 2007. Extension Disaster Education Network, Hilo, HI (Poster).Paper # P-7.
90. "Efficacy of chlorine dioxide gas, aqueous chlorine dioxide and sodium hypochlorite treatment in eliminating *Listeria monocytogenes* biofilms present on meat processing equipment surface." R. Vaid, Q. Xu, R. H. **Linton**, and M. Morgan. 2008. Institute of Food Technologist Annual Meeting, New Orleans, LA. (Poster) Paper # 052-19).
91. "Inactivation of Inoculated *Escherichia coli* O157:H7, *Listeria monocytogenes* and *Salmonella* Poona on Whole Cantaloupe by Chlorine Dioxide Gas. B.S.M. Mahmoud, and R. H. **Linton**. 2008. American Society of Microbiology, Boston, MA (Poster) Paper # 144-03).
92. "Reduction of *Salmonella* Inoculated onto Alfalfa Sprouts. A. Bhagat, J. Kim, and R. H. **Linton**. 2008. International Association of Food Protection Annual Meeting, Columbus, OH, (Poster) Paper # 1-36) (Student part of Division Graduate Paper Competition).
93. "Mammalian cell receptor, Hsp60 on microfluidic biochip allows improved capture and detection of *Listeria monocytogenes*." O.K. Koo, B. Jagadeesan, K. Burkholder, Y.Liu, M. Ladisch, R. Bashir, R. **Linton**, and Arun Bhunia. 2008. FoodMicro 2008 meeting, Scotland (Poster) Paper 157.
94. "Using Stakeholder Input to Develop Multi-Institutional Graduate Education Programs. R. H. **Linton**, and A. Nutsch. 2009. Third Annual DHS University Network Summit, Washington, DC (Speaker) Panel 10.

**c. Books (since 2000; 1 prior to 2000)**

2. McSwane, D.Z., N. Rue, and R. H. **Linton**. 2000. *Essentials in Food Safety and Sanitation* – Second Edition. Prentice Hall: Princeton, N.J. 458 pps.
3. McSwane, D. Z., N. Rue, L. Pong, and R. H. **Linton**. 2000. *Essentials in Food Safety and Sanitation* – Instructor's Guide. Prentice Hall: Princeton, N.J. 203 pps.
4. McSwane, D. Z., N. Rue, L. Pong, and R. H. **Linton**. 2000. *Essentials in Food Safety and Sanitation* – Study Guide. Prentice Hall: Princeton, N.J. 140 pps.
5. McSwane, D.Z., N. Rue, and R. H. **Linton**. 2003. *Essentials in Food Safety and Sanitation* – Third Edition. Prentice Hall: Princeton, N.J. 440 pps.
6. McSwane, D.Z., R. H. **Linton**, and N. Rue. 2003. *Retail Best Practices Guide to Food Safety and Sanitation*. Prentice Hall: Princeton, N.J. 435 pps.
7. McSwane, D.Z., R. H. **Linton**, and N. Rue. 2003. *Supervisors Guide to Food Safety and Sanitation*. Prentice Hall: Princeton, N.J. 338 pps. .

8. McSwane, D. Z., N. Rue, and R. H. **Linton**. 2003. *Food Safety Fundamentals*. Prentice Hall: Princeton, N.J. 326 pps.
9. McSwane, D.Z., R. H. **Linton**, and N. Rue. 2004. *Guía Del Supervisor – Las Mejores Practicas De Seguridad E Higiene En La Venta Directa De Alimentos Al Consumidor*. Prentice Hall: Princeton, N.J. 339 pps.
10. McSwane, D.Z., N. Rue, and R. H. **Linton**. 2005. Chinese version of *Essentials in Food Safety and Sanitation – Third Edition*. Prentice Hall: Princeton, N.J. 440 pps.
11. McSwane, D.Z., R. H. **Linton**, and N. Rue. 2005. *Conceptos Esenciales de Seguridad e Higiene de los Alimentos*. Prentice Hall: Princeton, N.J. 412 pps.
12. McSwane, D.Z., R. H. **Linton**, and N. Rue. 2006. *The 2005 FDA Food Code Update – What you Need to Know*. Prentice Hall: Princeton, N.J. 16 pps.
13. McSwane, D. Z., R. H. Linton, and N. Rue. 2007. *Guide to Food Safety*. Prentice Hall: Princeton, N.J. 400 pps.
14. McSwane, D. Z., R. H. Linton, and N. Rue. 2008 *Guide to Food Safety (Spanish Translation)*. Food Marketing Institute, Washington, DC. 401 pps

#### **d. Books Chapters**

1. Linton, R. H., Han, Y., Selby, T. L., and Nelson, P. E. (2006) Gas/vapor-phase decontamination treatments for produce. In “*Microbiology of Fruits and Vegetables*.” Ed. G. M. Sapers, J. R. Gorny, and A. E. Yousef. CRC Press, LLC.

## **2. Graduate Student Involvement (Since 2000; 3 prior to 2000)**

### **a. As a Major Professor**

4. Diane Ripberger (1999 – 2001). MS thesis title: “The effect of non-thermal preservation on the inactivation of foodborne microorganisms in fruit and vegetable products.” Initial job: Product Development Project Manager, Frito Lay Foods, TX.
5. Travis Selby (2000 – 2002) MS thesis title: “Post Pasteurization technologies for inactivation of pathogens on ready-to-eat luncheon meats.” Continued on toward a Ph.D. under Linton at Purdue.
6. Carol D’lima (2001 – 2002) MS thesis title: “Use of Chlorine Dioxide for the Inactivation of *Listeria monocytogenes* and *Escherichia coli* O157:H7 on lettuce.” Continued on toward a Ph.D. at North Carolina State University.
7. Ann Guentert (1999 – 2003). MS thesis project title: “Behavior of *Listeria monocytogenes* in pH-Modified Chicken Salad during Cold Storage and Temperature Abuse.” Initial Job: Student Counselor, School of Science, Purdue University.
8. Krista Schultze (Schneider) (2003 – 2005). MS thesis title: “The thermal inactivation of *Listeria monocytogenes* on the surface of hot dogs with and without antimicrobial agents.” Initial job: Product Development Scientist, General Mills, MN.
9. Travis Selby (2003 – 2006). PHD dissertation title: “Use of Optical Density and Mathematical Modeling to Predict Microbial Inactivation Kinetics (D- and z-values) from Microbial Survival Curves after Exposure to Gaseous Chlorine Dioxide.” Initial Job: Director of Food Safety and Quality, Johnsonville Meats, WI.
10. Arpan Bhagat (2005 – present) Ph.D. dissertation area: “A tunnel system using chlorine dioxide gas.” Initial Job: Director of Food Safety, Really Cool Foods, Richmond, IN.

### **b. As a Committee Member (Since 2000; 8 prior to 2000)**

8. Amy Chhabra (1996 – 2000). PhD dissertation title: “Predictive modeling to estimate the inactivation of *Listeria monocytogenes* due to temperature, pH, and fat content.”
9. Yingchang Han (1998 – 2000). PhD dissertation title: “Inactivation of minimally processed and refrigerated fruits and vegetables by ozone and chlorine dioxide gas.”
10. Kristin Naschansky (1999 – 2001). Master’s thesis title: “Rapid Detection of *Listeria monocytogenes* employing immunomagnetic separation and electrical impedance spectroscopy.”

11. Lynn Choi (1999 – 2001). Master's thesis title: "Use of enzymes to indicate destruction of *Escherichia coli* O157:H7 in apple cider processed by thermal or non-thermal methods."
12. Mindy Shroyer (1999 – 2002). Master's thesis title: "Rapid detection of *Listeria monocytogenes* using spectfluorometric measurement of alkaline phosphatase from tissue culture cells."
13. Carol Rainford (2001 – 2003). Master's thesis title: "Plasmin System Components in Cheddar Cheese: Location, Activity, and Effect of Microbial Protease."
14. Carol Mejia (2001-2003). Master's thesis title: "Effects of Select Dairy Bacteria on the Plasmin System in Milk."
15. Nathan Bright (2002-2003) Master's thesis title: "A Model 2-component Bacteriophage/Bioluminescent Reporter Detection Assay Using Filamentous Phage M13 and an F' *Escherichia coli* Host."
16. Tao Geng (2001-2004) Ph.D. dissertation title: "Study of antibodies to stress induces cellular antigens of *Listeria monocytogenes* and its detection using a fiber optic biosensor in food."
17. Kristin Naschansky (2002-2004) Ph.D. dissertation title: "Cytotoxicity and cell-based sensors for detection of *Listeria monocytogenes* and *Bacillus cereus*."
18. Amanda Stewart (2003-2004) Masters thesis title: "Rapid concentration and recovery of pathogens in vegetables using membrane separation."
19. Will Dominguez (2002-2004) Master's thesis title: "Multiplex PCR for the detection of foodborne pathogens: *Escherichia coli* O157:H7, *Salmonella enterica*, and *Listeria monocytogenes*."
20. Kauline Davis (1999 – present). PhD dissertation project: "Genomic fingerprinting and identification of *Escherichia coli* O157:H7 in foods."
21. Tiffany Taliaferro (2002-present). Master's thesis project: "Construction of bioluminescent *Bacillus cereus* for the sporadic activity of gaseous chlorine dioxide and thermal processing."
22. Yash Burgula (2003-present). Master's thesis project: "Development of FT-IR methods for detection of select pathogens from foods."
23. Senay Simsek (2004-2006). Ph.D. dissertation project: "Plant microbe interactions."
24. Willette Crawford (2005-present). Master's thesis project: "*Listeria monocytogenes* in Ham."
25. Aaron Nagel (2005-2008). Master's thesis project: "Construction and Evaluation of Whole-Cell Biological Systems for Detecting Chemical Threat Agents in Food Safety and Defense Applications."
26. Jae Wook Yoon (2005-2008). YanYun Chen (2005-present) Ph.D. dissertation project: "Area: Bioluminescence in bacteria."
27. Jamie Auer (2006-present). Ph.D. dissertation project: "Mechanism of bacterial inactivation by chlorine dioxide gas."
28. Bonnie Co (2006-present). Ph.D. dissertation project: "Area: Biosensor AFM modeling."
29. Richa Vaid (2008-present). Master's thesis project: "Aseptic processing of ready-to-eat meats."
30. David Schroeder (2006-present). Ph.D. dissertation project: "Area: Food Chemistry."
31. Claudia Ionita (2007-present). Ph.D. dissertation project: "Area: Food Microbiology."

### **C. Service on Editorial Boards**

Journal of Food Protection Editorial Board (2000-2006)  
 Journal of Food Microbiology Editorial Board (2004-present)  
 Ad Hoc Reviewer: Journal of Food Science (1998-present), Journal of Food Microbiology (1998-2003), International Journal of Food Microbiology (2000-present), Journal of Food Science reviewer (2001-present)

### **D. Service on Competitive Grant Reviews**

USDA National Research Initiatives program reviewer (1998, 1999, 2000, 2002, 2003, 2004, 2006)  
 USDA CSREES Special Research Program, reviewer (1999, 2001)  
 Food Safety Consortium (2003, 2004, 2006)  
 USDA SBIR, reviewer (1998-present)

### 3. Research Grants and Awards Received Since 2000

<b>a. As a Principal Investigator (Share to Linton since 1994 = \$ 11,781,749)</b>				
<b>Date</b>	<b>Project Title</b>	<b>Funding Source</b>	<b>Amount</b>	<b>Investigators</b>
1999 - 2000	Maximizing implementation and effectiveness of food safety education and training programs for Indiana food handlers	USDA/CSREES	\$30,000	Linton (34%) Burgess, Santerre
2000 – 2003	Novel methods to sanitize fruits and vegetables using chlorine dioxide gas	USDA/CSREES	\$427,435	Linton (87%) Nelson, Handa
2001 – 2003	Effect of inoculation on efficiency of chlorine dioxide gas and chlorinated water to decontaminate produce	FDA	\$324,236	Linton (90%) Nelson, Han
2003	International conference of food science and technology	Purdue Research Foundation	\$898	Linton (100%)
2003	Development of an interactive HACCP distance education course for sub-management level personnel	The Stoughton Group	\$42,423	Linton (100%)
2004	Initial validation trial for CCR kit	BioVitesse	\$4,388	Linton (100%)
2004-2008	Detection and Control of Foodborne Hazards	USDA/ARS	\$10,000,000	Linton (100%)
2004 - 2005	Development and implementation of a Better Process Control School for Indiana-based Food Manufacturers	Indiana Value Added Grant	\$14,868	Linton (100%)
2004 - 2007	Improving the safety of fresh fruits and vegetables using chlorine dioxide gas using a miniaturized industrial-sized tunnel system	USDA-CSREES	\$599,790	Linton (82%) Borquin, Nelson Applegate,
2005 - 2006	Survival and growth of foodborne microorganisms in individually wrapped cheese	The Kroger Food Company	\$27,988	Linton (100%)
2005-2007	Food Biosecurity: An integrated approach using computer-based modeling, hazard detection/identification, and intervention/decontamination	USDA	\$138,000	Linton (51%) Bhunia
2005	Measured Response Simulation for Food Protection	Indiana State Department of Health	\$24, 356	Linton (100%)
2006-2008	Development of a National Educational and Outreach Program for Food Safety and Food Defense	USDA-CSREES	\$599,887	Linton (50%) Maier, Fields Getty, Castner McSwane
2007	Phase II: National Center for Food Protection and Defense	University of Minnesota	\$20,400	Linton 100%)

<b>b. As Principal Investigator Unrestricted Gifts (Share to Linton since 1994 = \$ 162,040)</b>				
1998 – 2006	Food safety research and outreach programs	Individuals and Companies	\$162,540	Linton (100%)

<b>c. As a Co-Principal Investigator (Share to Linton since 1994 = \$ 4,280, 790)</b>				
1998 – 2000	Non-thermal methods to produce safe apple cider	Indiana Office of Commission of Agriculture	\$37,848	Floros, Linton (50%), Hirst
1998 – 2000	Inactivation of microorganisms in fruits and vegetables by ozone and chlorine dioxide gas	USDA/CSREES	\$208,731	Nelson, Floros, Linton (22%)
1999-2003	New Technology and Systems to Detect and Prevent Chemical and Microbial Contaminants	USDA/ARS	\$7,000,000	Woodson Linton (50%)
2000 – 2001	Train the trainer in SQF 2000: an integrated HACCP program	USDA-CSREES	\$216,000	Sumner, Hackney, Pierson, Linton (10%), Schaffner

2000 – 2001	Fresh juice HACCP alliance and train-the trainer program	USDA-CSREES	\$184,000	Bourquin, Hirsch, Linton (10%),
2000 – 2002	Reducing microbial risks in fruits and vegetables with Good Agricultural Practices in the U.S.	USDA-CSREES	\$200,000	Gravani, Linton (10%)
2000 – 2002	Instructional technology for improving integrations of food safety into food processing education	USDA-CSREES	\$99,500	Diefes, Linton (5%)
2000 – 2001	An interdepartmental approach to food safety and quality outreach using the internet	Purdue University	\$66,209	Santerre, Linton (18%), Almanza, Ghiselli,
2001 – 2002	Effect of beef carcass aging method on meat tenderness, flavor, and microbial assessment	Indiana Office of Commission of Agriculture	\$44,001	Lemenager Arseneau, Claeys, Forrest, Linton (11%)
2003	Predictive models for thermal inactivation of <i>Listeria monocytogenes</i> on the surface of hot dogs	National Alliance for Food Safety	\$96,177	Cousin, Linton (49%), Luchansky, Tamplin
2003	Technical training in the hazard analysis critical control point system (HACCP) at Purdue University	USDA-FAS	\$14,819	Akridge, Linton (50%)
2003	HACCP training project – hazard analysis critical control point	The Stoughton Group	\$20,495 (subcontract)	Sigurdson, Linton (100% subcontract)
2003 - 2004	Mechanisms of inactivation of bacteria and spores by chlorine dioxide gas	National Science Foundation	\$100,000	Margurum, Linton (40%), Applegate,
2004	Cold Chain Management 2004	USDA-FAS	\$34,071	Dooley, Linton (50%)
2003 - 2006	Use of GFP and LUX to track pathogen contamination, growth and inactivation on produce	USDA/CSREES	\$500,000	Turco, Applegate, Ruehs, Linton (12.7%)
2005- 2007	<i>Listeria monocytogenes</i> contamination of deli meat slicers: Risk and communication	National Alliance for Food Safety	\$225,000	Todd, Ryser, Jaykus, Linton (15%)
2007 - 2010	Enhancing and expanding the retail food safety consortium	USDA/CSREES	\$599,000	Nummer, Schaffmer, Linton (16%), Marcy
2008- 2011	A Multidisciplinary Approach to Develop a Safe and Effective Chlorine Dioxide Gas System for Controlling Pathogens in the Produce Industry.	USDA Specialty Crops	\$350,000	Morgan Linton (50%)

## **D. EXCELLENCE IN LEARNING**

Dr. Linton was active in teaching until he was offered an expanded administrative appointment in 2006. Throughout his teaching tenure, he developed curriculum and instructional materials for two graduate level, three undergraduate level courses, and four special topics courses. Additionally, he worked with several students on Independent Study courses and enjoyed serving as a guest lecturer in many university courses each year. In the three courses that he taught most frequently, he interacted with approximately 65 students/year. He utilized guest lecturers from industry, academia, and government, on-site visits to food processing facilities, visual demonstrations, interactive activities, and the World Wide Web to expand the classroom experience. He focused on current information and technology with a primary goal of preparing students for real world occupations. He stressed the theoretical sciences but emphasized the importance of applied learning. In addition to his own classes, Linton provided guest lectures in 10-15 classes each year. He was also active in several other teaching activities which included being an advisor for the senior honors research program, an instructor for “Professor in the Classroom,” and a leader in 4-H programs.

In each of the courses that Linton developed, he received high teaching evaluations from his students and his student numbers show an increasing trend over the past years. He prides himself in his ability, enthusiasm and effectiveness in the classroom as demonstrated by the 1998, 2002, and 2006 departmental teaching awards and invitations to teach classes for other colleagues.

### **1. Courses Taught and Short Description (Since 1998; 355 students)**

1. *FS 161 Science of Food* – Introductory course for food science and non-food science majors representing the second highest enrollment (n=96). Linton developed all materials and was the instructor for 3 years until taking on a 25% administrative role in Agricultural Research Programs.
2. *FS 222 Safety of Foods: Headline Topics* - Introductory course, unique to Purdue University, focusing on current food safety issues. Linton develops new content each time the course is taught.
3. *FS 482 Senior Seminar* – Course developed to prepare students for jobs or graduate school.
4. *FS 491 Retail Food Safety* – Course offering with specific instruction of retail food safety management and regulations.
5. *FS 591 Development of HACCP Programs* – Customized course developed specifically for students that have an interest in working in the food industry or for regulatory inspection agencies.
6. *FS 591F Food Safety Certification* – Course developed in 2005 that provides certification for retail food programs, the FDA Better Process Control School, and HACCP.
7. *FS 653 Food Microbiology* – Graduate level course focusing on concepts of food microbiology.
8. *FS 691 Food Biosecurity* – Graduate level course focusing on concepts of decision making processes and food defense.

### **2. Contributions Made to Course and Curriculum Development**

In each course that Linton develops, he provides a wealth of reading materials, visual activities, plant site visits, and computer applications to complement in-class instruction. For each course, a notebook containing class notes and handouts is provided to every student at the beginning of the semester. Additionally, relevant texts, consumer, trade, and research articles, newspaper clippings, and current literature are held on reserve in the library to aid student study. In 2003, Linton developed a website for his FS653 course. The site provides all lecture materials, links to additional information to enhance student learning, and videos prepared by Linton to increase student comprehension of lab skills.

### 3. Recognition Received from Students and Other Evidence of Impact on Students

Dr. Linton consistently receives high scores with strong evidence from student evaluations that his teaching methods and effectiveness have continuously improved over the years.

#### a. Courses taught, number of students and evaluations (since 2000)

Year	Course/Title	University Cafeteria Student Rating Core Questions <sup>1</sup> – Median Values (out of 5)					
		Students	1	2	3	4	5
2000	FS 653/Food Microbiology	26	4.8	4.8	4.5	4.4	4.7
2001	FS 222/Safety of Foods: Headline Topics	42	4.9	4.9	4.8	4.9	5.0
2001	FS 491/Retail Food Safety	16	5.0	5.0	5.0	5.0	5.0
2001a	FS 653/Food Microbiology	8	4.7	4.7	4.7	4.5	5.0
2001b	FS 653/Food Microbiology	14	5.0	5.0	4.9	4.8	5.0
2003	FS 222/Safety of Foods: Headline Topics	19	4.6	4.4	4.7	4.6	4.9
2003	FS 653/Food Microbiology	16	5.0	5.0	4.9	4.8	5.0
2004	FS 653/Food Microbiology	13	4.9	4.8	4.6	4.8	4.9
2005	FS 591/Food Biosecurity Simulation	7	ND <sup>2</sup>	ND	ND	ND	ND
2005	FS 591/Food Certification	40	4.8	4.8	4.6	4.7	4.8
2005	FS 653/Food Microbiology	22	4.8	4.8	4.6	4.8	4.9
2005	FS 591/Food Biosecurity Simulation	5	5.0	5.0	5.0	5.0	5.0
2007	FS 653/Food Microbiology	16	4.6	4.8	4.8	5.0	5.0
		<b>Average</b>	<b>4.7</b>	<b>4.8</b>	<b>4.7</b>	<b>4.8</b>	<b>4.8</b>

<sup>1</sup>University Questions

1. My instructor motivates me to do my best work.
2. My instructor explains difficult materials clearly.
3. Course assignments are interesting and stimulating.
4. Overall, this is one of the best courses I have ever taken.
5. Overall, this instructor is among the best teachers I have known.

<sup>2</sup>ND = not done

#### 4. Other teaching responsibilities

Linton has been an advisor for the senior research project of students in the Undergraduate Honors Program in Food Science and has also been the faculty advisor and coach for the Food Science College Bowl team. He is an instructor for the “Professor in the Classroom” program each year. He teaches critical topics in food safety for high school students. Each semester, Linton averages 2-3 visits to state high schools. His largest audience was 450 students.

In 2005, Linton was also a PI on two USDA National Needs Fellowships in the area of Food Defense.

#### a. Linton serves as a guest lecturer several times each semester, examples include (since 2000):

- “Microbiology of Meat and Poultry” ANSC 351 (2000 - 2003)
- “HACCP and GMP’s in the Meat Industry” ANSC 351 (2000 – 2003)
- “Mandatory HACCP Regulations for the Meat/Poultry/Seafood Industries” FS 410 (2000 - 2003)
- “Food Safety - Why all the fuss?” BTNY 207 (2001)
- “Antimicrobial Ingredients” FS 591L (2000, 2004, 2005, 2006)
- “Important etiologic agents involved with foodborne disease” BTNY 207 (2001)
- “HACCP regulations for the meat, poultry, seafood & juice industry” FS 540 (200 - 2005)
- “Food Safety and Microbiology” FS 161 (2000 - 2001)
- “Food Safety and Food Quality Programs” FS 161 (2000 - 2001)
- “Food Fermentations” FS 161 (2000)
- “Food Safety During the Holidays” FS 161 (2000)
- “Food Safety: Why the Interest, Why the Concern?” F&N 350 (2000)

- “Food Safety Policy” Agriculture Policy (2002)
- “Food Safety in the United States” F&N 201 (2002, 2003)
- “Food Safety and Biosecurity” AG 201 (2002 - 2004)
- “Important Food Safety Related Regulations in the United States” FS 410 (2006)

## **5. Undergraduate Teaching Activities**

1. Mila Wihodo (2004 - 2005) – Undergraduate honors project: “Evaluation of chlorine dioxide for reduction of *Salmonella* in almonds. Student was the recipient of the 2005 Undergraduate Student Research Award.
2. Nigel Parker (2005) – Undergraduate research project: “Survival and growth of foodborne microorganisms in processed and individually wrapped cheese.” (led to one peer reviewed publication in the *Journal of Environmental Health*)

## **6. Teaching Awards and Honors**

1. Department of Food Science Outstanding Teacher Award (1998). Purdue University.
2. Department of Food Science Outstanding Teacher Award (2002). Purdue University.
3. Department of Food Science Outstanding Teacher Award (2006). Purdue University

## E. EXCELLENCE IN UNIVERSITY SERVICE

At Purdue, Linton has been very active within the department and within the College of Agriculture. Linton is also very involved serving on committees to solve problems in the state of Indiana and nationally. He has served as the chair of two food microbiology faculty search positions in the department and has coordinated the development of a reference manual for all faculty and staff. In the School of Agriculture, he has served as Chair of the Agenda and Policy Committee.

### 1. University or Departmental Services (Examples of significant leaderships roles since 1998)

#### a. Departmental Committees (Examples)

Food Microbiologist Search (Chair)	1998
Program Operations	1998-2000
Extension and Continuing Education	1998-2000
Molecular Microbiologist Search (Chair)	2000
Strategic planning committee for “Interaction with Industry”	2001
Department Head Search	2002-2003
Bioanalytical Chemist (Chair)	2003-2004

#### b. School Committees (Examples)

Agenda and Policy (Department Representative)	1996-1999
Agenda and Policy (Chair)	1998-1999
Roadmapping “Partnerships and Collaboration” (Chair)	2001-2002
AP Promotions and Advancement Committee (Chair)	2003-2004
Director of Sponsored Programs, Agriculture Research Programs (Chair)	2005-2006
Area Promotion Committee, College of Agriculture	2005-2007
College of Agriculture Strategic Plan Review Committee	2007
College of Agriculture SAM Reporting Committee (Chair)	2007-2008

#### c. University Committees (Examples)

United Way Campaign	2001
Consumer Family Sciences Core	1998, 2003
Campus Grievance Steering	1999-2001

#### d. State/National Committees (Examples)

Conference for Food Protection - Science and Technology Council	1998-2006
Conference for Food Protection – Retail HACCP (Chair)	1998-2000
National Registry of Food Safety Professionals - Advisory Board	1998-present
Academic Representative, Science and Technology Council, Conference for Food Protection	1998-present
Professional Testing Inc. -Advisory Board	1998-present
Food Safety, Nutrition, and Consumer Issues for IN Farm Bill Issues (Chair)	2001
Pathogen Modeling Program Advisory Committee Member	2001-present
National Alliance for Food Safety and Security - Board Member, Operations Committee, Vice Chairman	2001-present
Pasteurized Egg Corporation – Scientific Advisory Board	2002-2003
Institute of Food Technologists Continuing Education Committees	2002-2004
Conference for Food Protection – Time as a Public Health Control (Chair) and Pathogen Growth Committees, Executive Board	2002-2006
Institute of Food Technologists International Food Safety & Quality	2003-2005
Institute of Food Technologists International Food Safety & Quality (Chair)	2004-2006
National Alliance for Food Safety and Security (Chair) (2 terms)	2004-2006
PepsiCo Scientific Advisory Board for Innovative Food Processing	2006 - present
Food Products Association Science Advisory Board	2006 – present

Conference for Food Protection – Science and Technology Council III (Chair)	2008 – 2012
Food Safety Executive Educational Advisory Committee	
– Food Safety Summit	2008 – present
International Association of Food Protection	
Committee on the Control of Foodborne Illness	2008 - present
Manufactured Food Regulatory Programs Standards Committee	2008 - present