

## VITA

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### **EDUCATION:**

1994 B.S. Texas A&M University. Biomedical Science  
1997 M.S. Texas A&M University. Food Science and Technology  
2001 Ph. D. Texas A&M University Food Science and Technology

### **PROFESSIONAL EXPERIENCE:**

1996. **Quality Assurance Laboratory Technician.** Baskin Robbins Manufacturing Plant, Bryan, TX. Duties included all QA testing and laboratory analyses including calculations of butter fat and total solids, pH, food safety and sanitation (GMPs, SSOP, SOP), taste panels, record keeping, and trained personnel in GMP, SSOP, and SOP.

1995-1996 **Graduate Research/ Teaching Assistant.** Department of Poultry Science, Texas A&M University. Researched focused on postmortem electrical stimulation and how this procedure affects postmortem metabolism and tenderness levels in broilers and ducks. Assisted in teaching Poultry Processing and Products class and laboratory.

1996-1998 **Quality Control Superintendent.** Sanderson Farms, Inc., Bryan, TX. Trained/managed QC technicians, supervisors, and laboratory technicians, responsible for microbiological sampling, and laboratory and microbial analyses, developed/organized and maintained quality control documents, pre-operational and operational sanitation procedures, standard operating procedures, GMPs, HACCP, food safety and customer audits, and shelf-life studies, trained personnel in GMP, SSOP, SOP, and HACCP.

1998-2000 **Graduate Research/ Teaching Assistant.** Department of Poultry Science, Texas A&M University. Research focused on muscle metabolism and meat quality associated with pale, soft, and exudative meat in turkeys. Focused on marination techniques and the role of chilling in the development of poor meat quality. Teaching responsibilities included Poultry Processing and Products, Undergraduate Seminar, and assisting in Product Development.

01/2001 – 12/2002 **Assistant Professor.** Department of Food Science and Technology, Virginia Polytechnic Institute and State University. Research areas include muscle metabolism, further processing quality improvements, and improving pale, soft, and exudative meat through marination ingredients. Other responsibilities include advising graduate and undergraduate research and teaching Poultry Processing and Products, Introduction to Food Science, Advanced Physiology and Anatomy of Domestic Animals (Graduate, skeletal muscle section), Meat and Animal Products Evaluation and Processing, and Principles of Meat Science (graduate and undergraduate).

01/2003 – present     **Assistant Professor.** Department of Animal and Food Sciences, International Center for Food Industry Excellence, Texas Tech University. Research areas include improving meat quality and process efficiency for poultry processors, listeria control in ready to eat poultry products, pre-harvest and post-harvest food safety interventions, antemortem and postmortem causes and remediation techniques of pale, soft, and exudative meat, determining functionality of non-meat adjuncts in further processed poultry. Other responsibilities include teaching Principles of Food Technology (distance education), Poultry Processing and Products, Seminar (Graduate), Consumer Selection and Utilization of Meat Products, guest lecturer in Anatomy and Physiology, General Animal Science, and Selection and Care of Meat, and advising graduate and undergraduate research.

### **CERTIFICATION:**

1. Developing and Implementing HACCP plans in Meat Plants (U.S. Poultry and Egg Association)
2. Advanced HACCP (HACCP Alliance)
3. ServSafe Instructor Certification

### **INTERNATIONAL EXPERIENCE:**

1. United States Department of Agriculture Foreign Agricultural Services (FAS) program food safety and quality instructor – Ramalah, Palestine; Palic, Serbia
2. ANECA (Mexico Poultry Industry Convention) speaker and coordinator (2001 to present)

### **MEMBERSHIP IN PROFESSIONAL AND HONORARY SOCIETIES:**

#### **Professional:**

##### **Poultry Science Association (PSA)**

1. Elected Board of Directors member 2007-2010
2. Associate Editor for Processing and Products section in the Journal of Poultry Science (2001-present)
3. Associate Editor for Production section in the Journal of Poultry Science (2004-present)
4. Poultry Science Association Chair of 2007 Marination Symposium (2007)
5. Poultry Science Association Abstract review panel for Eggs, Meat Science and Muscle Biology (2007)
6. Poultry Science Association Strategic Planning Evaluation Committee member (2005-present)
7. Poultry Science Association Chair Long Range Planning Committee (2006-2007)
8. World Poultry Science Association member (1994-present)
9. Poultry Science Association professional member (1994-present)

##### **Institute of Food Technologists (IFT)**

10. Institute of Food Technologists – Muscle Foods Division elected Member at Large (2006-2008)
11. Institute of Food Technologists professional member (1996-present)

12. Institute of Food Technologists Abstract Review panel for Muscle Foods Division (2007)
13. Institute of Food Technologists Symposium Review panel for Muscle Foods Division (2007)
14. Institute of Food Technologists – Committee on Divisions member (2005-20006)
15. Institute of Food Technologists - Committee on Distance Education member (2005-2006)
16. Institute of Food Technologists – chair of New Officer workshop (2005-2006)

#### Multi-State Projects

17. Multi-state Project S-292: The Poultry Food System: A Farm to Table Model (2001-present)
18. Multi-State Project S-295: Enhancing Food Safety Through Control of Food-borne Disease Agents (2004-present)

#### Texas Tech University

19. Faculty Senate Secretary (2006-2007)
20. Faculty Senate Ad-hoc member (2005-2008)
21. CASNR Commencement Program committee member (2005-2008)
22. CASNR Alumni and Friends Association Advisory Board Member (2005-2006)
23. CASNR Recruitment and Retention Committee member (2005-2006)
24. CASNR Commencement Program committee member (2005-2006)
25. CASNR Masters at a Distance Task Force committee member (2005-2006)
26. Enrollment Management Committee member (2006-2007)
27. Food Science and Technology Department Graduate Committee Member (2001-present)

#### Grant Review Panels

28. USDA Higher Education Grant Proposal Panel Member (2005-2006)
29. SBIR grant ad-hoc grant reviewer (2005-2006)

#### VPI&SU

30. CALS Committee on Research and Extension Program Policy (2002) CALS Academic Program Policies Officer (2001-2003)
31. University sponsor for IFT Champions (2002)

### **HONORS AND AWARDS:**

1. Graduate Student Certificate of Excellence – Poultry Science Association 2000
2. Southeastern Poultry Science Scholarship Fall 2000
3. Nicholas Communication Award – Poultry Science 1999
4. Southeastern Poultry Science Scholarship Fall 1999
5. Graduate Student Certificate of Excellence – Poultry Science Association 1999
6. Graduate Research Council Research Competition winner – Texas A&M University 1995

### **AREA OF EXPERTISE:**

**PATENTS:** total of   1

Alvarado, C., Brashears, M., **Brashears, M.T.**, Brooks, J.C., Sapelli, P., Piazza, M., Fanzoni, S., Felappi, F., Tolettini, N., 2007. Method and System for Preserving Food. US Patent Number 60/968,411, Date of Issue 8/28/2007.

## **PUBLICATIONS:**

### **Books: total of 1**

1. Editor for "Poultry Meat Processing" book – 2<sup>nd</sup> edition. CRC Press

### **Book Chapters: total of 4**

1. **Alvarado, C. Z.** and L. D. Thompson, Poultry Meat: Carcass Composition and Characteristics. In *Encyclopedia of Animal Science*. W.G. Pond and A.W. Bell (eds.) Marcel Dekker, New York.
2. **Alvarado, C. Z.** Food Chemistry: Principles and Applications, Second Edition. Ed Y. H. Hui Science Technology System, PO Box 1374, West Sacramento, CA 95691.
3. **Alvarado, C. Z.** and C. M. Owens. Poultry Chemistry and Biochemistry in Handbook of Food Science, 2006. C. Z. Alvarado. Ed. Y. H. Hui. Volume 1, 31:1-31:14.
4. **Alvarado, C. Z.** Poultry Processing Quality in Handbook of Food Science, 2006. C. Z. Alvarado. Ed. Y. H. Hui. Volume 1, 33:1-33:13.

### **Reviewed:**

1. Reviewer of *Introductory Foods 11/e* by Marion Bennion and Barbara Scheule, Prentice Hall (2002)

**Books and Book Chapters Edited: total of 5**

**Refereed Journals: total published 29, in press 2**

### **Published:**

1. **Zocchi, C.** and A.R. Sams, 1999. Research Note: Tenderness of broiler breast fillets from carcasses treated with electrical stimulation and extended chilling times. *Poultry Science*, 78:495-498.
2. **Alvarado, C. Z.** and A. R. Sams, 2000. The influence of postmortem electrical stimulation on rigor mortis development, calpastatin activity, and tenderness in broiler and duck pectoralis. *Poultry Sci.* 79:1364-1368.
3. **Alvarado, C. Z.** and A. R. Sams, 2000. Rigor mortis development in turkey breast muscle and the effects of electrical stunning. *Poultry Sci.* 79: 1694-1698.
4. Quinn, B. P., N. G. Marriott, and **C. Z. Alvarado**, W. N. Eigel and H. E. Wang, 2002. HACCP Plan Assessment of Virginia Meat and Poultry Processing Plants. *Dairy Food and Environmental Sanitation*. Dairy, Food, and Environmental Sanitation (22) 11:858-867.
5. \*Schilling, M.W., N. G. Marriott, J. C. Acton, and **C. Z. Alvarado**, 2002. Chemical properties of restructured boneless pork produced from PSE and RFN pork utilizing modified food starch, sodium caseinate, and soy protein concentrate. *Scientific*

Committee of the 48th International Congress of Meat Science and Technology, Rome, Italy

6. **Alvarado, C. Z.** and A. R. Sams, 2002. The Role of Carcass Chilling Rate in the Development of Pale, Soft, and Exudative Turkey Pectoralis. *Poultry Sci.* 81:1365-1370.
7. \*Schilling, M.W., N. G. Marriott, J. C. Acton, C. Anderson-Cook, S. E. Duncan, and **C. Z. Alvarado**, 2003. Utilization of response surface modeling to evaluate the effects of non-meat adjuncts and combinations of PSE and RFN pork on the texture of boneless cured pork *J. Muscle Foods. Meat Sci.* 65:547-553.
8. \*Schilling M.W., L.E. Mink, P. S. Gochenour, N. G. Marriott, and **C. Z. Alvarado**, 2003. Utilization of Pork Collagen for Functionality Improvement of Boneless Cured Ham Manufactured from Pale, Soft, and Exudative Pork. *Meat Sci.* 65:547-553.
9. **Alvarado, C. Z.**, and A. R. Sams, 2003. Injection marination strategies for remediation of pale, exudative broiler breast meat. *Poultry Sci.* 82:1332-1336.
10. \*Schilling, M.W., Marriott, N.G., Acton, J.C., Anderson-Cook, C., Duncan S.E., **Alvarado, C.Z.** 2003. Utilization of Response Surface Modeling to Evaluate the Effects of Non-Meat Adjuncts and Combinations of PSE and RFN Pork on the Texture of Boneless Cured Pork. *J. Muscle Foods.* 14:143-161.
11. \*Schilling, M.W., N. G. Marriott, J. C. Acton,, C. Anderson-Cook, **C. Z. Alvarado**, H. Wang, 2003.Utilization of Response Surface Modeling to Evaluate the Effects of Non-Meat Adjuncts and Combinations of PSE and RFN Pork on Water Holding Capacity and Cooked Color in the Production of Boneless Cured Pork. *Meat Sci.* 66(2):371-381.
12. \*Schilling, M.W.,N. G. Marriott, J. C. Acton, C. Anderson-Cook, S. E. Duncan, **and C. Z. Alvarado**, 2003. Utilization of response surface modeling to evaluate the effects of non-meat adjuncts and combinations of PSE and RFN pork on the texture of boneless cured pork *J. Muscle Foods. Meat Sci.* 65:547-553.
13. \*Schilling M. S., L. E. Mink, P. S. Gochenour, N. G. Marriott, and **C. Z. Alvarado**, 2003. Utilization of pork collagen for functionality improvement of boneless cured ham manufactured from pale, soft, and exudative pork. *Meat Sci.* 65/1:547-553.
14. \*Schilling, M.W., S. P. Daigle\*, **C. Z. Alvarado**, N. G. Marriott, and H. Wang. 2004. Effects of collagen addition on the functionality of PSE-Like and normal broiler breast meat in a chunked and formed deli roll. A research note. *J. Muscle Foods.* 16:46-53.
15. \*Schilling, M.W., S. P. Daigle\*, **C. Z. Alvarado**, N. G. Marriott, and H. Wang. 2004. Pale and Normal Turkey Breast Enhancement through the Utilization of Turkey Collagen in a Chunked and Formed Deli Roll. *J. Appl. Poult. Sci.* 13:406-411.
16. **Alvarado, C. Z.** and A. R. Sams, 2004. Turkey carcass chilling and protein denaturation in the development of pale, soft, and exudative meat. *Poultry Science* 83:1039-1046.
17. **Alvarado, C. Z.** and A. R. Sams, 2004. Early postmortem injection and tumble marination effects on broiler breast meat tenderness. *Poultry Science* 83:1035-1038.
18. \*Schilling, M.W., Marriott, N.G., Acton, J.C., Anderson-Cook, C., **Alvarado, C.Z.**, Wang, H. 2004. Utilization of Response Surface Modeling to Evaluate the Effects of Non-Meat Adjuncts and Combinations of PSE and RFN Pork on Water Holding Capacity and Cooked Color in the Production of Boneless Cured Pork. *Meat Sci.* 66(2):371-381.

19. \*Schilling, M.W., **Alvarado, C.Z.**, Marriott N.G. 2004. Particle Size and Non-meat Adjunct Effects on the Protein Functionality of Boneless Cured Pork Formulated with PSE and RFN Raw Material. *J. Muscle Foods*. 15:57-68.
20. Hester, P.Y., **C. Z. Alvarado**, S. F. Bilgili, J. H. Denton, A. M. Donoghue, A. Giesen, B. M. Hargis, J. W. Kessler, F. N. Madison, G. W. Malone, P. Mavrolas, S. L. Noll, A. J. Pescatore, C. A. Ricks, F. E. Robinson, R. B. Shirley, M. Sifri, M. O. Smith, R. H. Stonerock, J. L. Wilson, M. J. Wineland, M. M. Beck, and W. W. Saylor, 2005. Planning our Future: The Poultry Science Association Strategic Plan. *Poultry Sci.* 84 (12):1814. (vol. 12)
21. Hester, Y.P., **C.Z. Alvarado**, S.F. Bilgili, J.H. Denton, A.M. Donoghue, A. Giesen, B.M. Hargis, J.W. Kessler, F.N. Madison, G.W. Malone, P. Mavrolas, S.L. Noll, A.J. Pescatore, C.A. Ricks, F.E. Robinson, R.B. Shirley, M. Sifri, M.O. Smith, R.H. Stonerock, J.L. Wilson, M.J. Wineland, M.M. Beck, W.W. Saylor, 2005. THE 2006-2010 STRATEGIC PLAN FOR THE POULTRY SCIENCE ASSOCIATION. *Poultry Sci.* 85 (13):1-7
22. \*Carroll, C.D, **C. Z. Alvarado**, M. M. Brashears, L. D. Thompson, and J. Boyce, 2007. Marination of Turkey Breast Fillets to Control the Growth of *Listeria monocytogenes* and Improve Meat Quality in Deli Loaves *Poult Sci* 86: 150-155.
23. **Alvarado, C. Z.** and S. R. McKee, 2007. Marination to Improve Functional Properties and Safety of Poultry Meat. *J. Appl. Poult. Res.* 16:113-120
24. **Alvarado, C. Z.**, M. P. Richards, S. F. O'Keefe, and H. Wang, 2007. The Effect of Blood Removal on Oxidation and Shelf Life of Broiler Breast Meat *Poult Sci* 86: 156-161.
25. \*Carroll, C. D., H. Buses, and **C. Z. Alvarado**, 2007. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Broiler Breast Fillets *Poult. Sci.*(Manuscript # 07-00213) In Press
26. \*Lakins, D.G., A. Echeverrey, M. Brashears, **C. Alvarado**, C. Brooks, 2008. Quality And Mold Growth Effects Following Microwave Commercial Sterilization On White Enriched Bread For Military Rations. *J. of Food Sci.* 73(3):99-103.
27. Matak, K., K. Gailunas, R. Boyer , **C. Z. Alvarado**, R. Williams, S. Sumner, 2008. Use of Ultraviolet Light for the Inactivation of *Listeria monocytogenes* and Lactic Acid
28. \*Lakins, D. G., C. Z. Alvarado, L. D. Thompson, M. T. Brashears, J. C. Brooks, and M. M. Brashears, 2008. Reduction of *Salmonella* Enteritidis in Shell Eggs Using Directional Microwave Technology. *Poult. Sci.* 87: 985-991.
29. \*Carroll, C.D. and C. Z. Alvarado, 2008. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Marinated Broiler Breast Fillets. *Poult. Sci.* 87: 368-372.

#### **In Press:**

1. \*Pitchiah, S., **C. Alvarado**, M. Brashears, 2008. Biofilm Formation by *Listeria monocytogenes* on various conveyor belt systems. *Food Protection Trends*. In Press.
2. \*Lakins, D.G., **C.Z. Alvarado**, M.M. Brashears, L.D. Thompson, A. M. Luna, J.B. Boyce, and S.F. O'Keefe, 2008. Comparison of quality attributes of shell eggs subjected to directional microwave technology. *Poult. Sci.* In Press

**Proceedings: total of** 13

## **Refereed**

### **Invited:**

1. McKee, S. R., **C. Zocchi**, G. J. Veeramuthu, A. R. Sams, 1997. The effect of electrical stimulation on rigor development, calpastatin activity, and tenderness in avian red and white muscle fibers. *In Proceedings 50<sup>th</sup> Annual Meat Conference*, Ames, Iowa.
2. **Alvarado, C. Z.**, 2002. Meat Quality: Meeting the Customer's needs. *In Proceedings from the Sel-Plex Physiological Cascade Seminar*, St. Louis, MO.
3. **Alvarado, C. Z.**, 2002. Current issues in the poultry industry: meat quality and moisture retention. *In Proceedings from the 18<sup>th</sup> Annual Feed Industry Symposium*, Lexington, KY.
4. Schilling, M.W., N. G. Marriott, J. C. Acton, and **C. Z. Alvarado**, 2002. Chemical properties of restructured boneless pork produced from PSE and RFN pork utilizing modified food starch, sodium caseinate, and soy protein concentrate. *In Scientific Committee of the 48th International Congress of Meat Science and Technology*, Rome, Italy
5. **Alvarado, C. Z.** and A. R. Sams, 2004. Update of PSE Poultry Meat. *In Proceedings from the 57<sup>th</sup> Annual Reciprocal Meat Conference*, Lexington, KY.
6. J. C. Brooks, **C. Z. Alvarado**, M. M. Brashears, and L. D. Thompson, 2007. Packaging Symposium - Packaging and CO<sub>2</sub>. Poultry Science Association Joint Meeting San Antonio, TX. July 2007. *Poult. Sci.* Vol. 86, Suppl. 1 (199).
7. J. Chance Brooks, **C. Z. Alvarado**, M. M. Brashears and Mark F. Miller, 2007. Characterizing the Safety and Quality of Fresh Beef Cuts Subjected to Deep Muscle Marination *Poult. Sci.* Vol. 86, Suppl. 1 (199).

### **Invited International Proceedings:**

1. **Alvarado, C. Z.** and A. R. Sams, 2001. The relationship of chilling rates and the development of PSE meat in Turkeys. ANECA, Guanajuato, Mexico.
2. **Alvarado, C. Z.**, 2003. Value Added Poultry Products. Quinto Simposium Internacional de Procesamiento de Aves y Calidad de Producto. Leon, Mexico. (February 6-8, 2003)
3. Sams, A. R. and **C. Z. Alvarado**, 2003. Early Postmortem Injection and Tumble Marination Effects on Quality and Sodium Penetration of Broiler Breast Fillets. XVI European Symposium the Quality of Poultry Meat, Saint-Brieuc- France. Vol. II pp 159-164
4. **Alvarado, C. Z.**, 2004. Remedial Marination of Pale, Soft, and Exudative Meat. Simposium Internacional de Procesamiento de Aves y Calidad de Producto. Querretaro, Mexico.
5. **Alvarado, C. Z.**, C. D. Carroll, H. M. Buses, K. D. Paske, and L. D. Thompson, 2004. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Broiler Breast Fillets *In Proceedings from the XXIX Annual ANECA Poultry Convention*.
6. **Alvarado, C. Z.**, E. Wenger, and S. O'Keefe, 2005. Consumer Perceptions of Meat Quality and Shelf-life in Commercially Raised Broilers Compared to Organic Free Range Broilers. *In Proceedings of the XVIIth European Symposium on the Quality of Poultry Meat*. Doorwerth, Holland May 23-26, 2005.

Abstracts: total of 48

1. **Zocchi, C.** and A. R. Sams, 1996. The use of electrical stimulation and extended chilling times to reduce the aging needed to achieve maximum tenderness in broiler breast fillets. Poultry Sci. 75:83 (Suppl. 1) (Abstr.).
2. Owens, C. M., **C. Zocchi**, and A. R. Sams, 1997. Rigor mortis development, calpastatin activity, and tenderness in pectoralis from electrically stimulated broiler chickens and ducks. Poultry Sci. 76:49 (Suppl. 1) (Abstr.).
3. **Alvarado, C. Z.** and A.R. Sams, 1999. Rigor mortis development in turkey breast muscle and the effect of electrical stimulation. Poultry Sci. 78:210 (Suppl 1) (Abstr.).
4. **Alvarado, C. Z.** and A. R. Sams, 2000. Injection marination strategies for remediation of PSE broiler breast meat. Poultry Sci. 79:98 (Supl. 1) (Abstr.).
5. **Alvarado, C. Z.** and A. R. Sams, 2000. A comparison of pre-rigor injection and tumble marination and its effects on broiler breast meat tenderness. Poultry Sci. 79:256 (Supl. 1) (Abstr.).
6. **Alvarado, C. Z.** and A. R. Sams, 2001. The relationship of chilling time and temperature on quality of turkey pectoralis. Poultry Sci. 80:574 (Supl. 1) (Abstr.).
7. \*Gorsuch, V. A. and **C. Z. Alvarado**, 2002. Postrigor tumble marination strategies for improving color and water holding capacity in normal and PSE broiler breast fillets. Institute of Food Technologists, 88:207.
8. \*Greene, D. M., K. M. Waterman, S. F. O'Keefe, **C. Z. Alvarado**, and S. E. Duncan, 2003. Poultry collagen coatings as flavor protection for pet foods made with rendered poultry fat. Poult. Sci. 82:17 (Supl. 1) (Abstr.).
9. \*Daigle, S. P., M. S. Schilling, **C. Z. Alvarado**, and N. G. Marriott, 2003. Improving PSE and Normal Broiler Breast Meat Quality with Poultry Collagen in a Chunked and Formed Deli Roll. Poult. Sci. 82:18 (Supl. 1) (Abstr.).
10. **Alvarado C. Z.** and A. R. Sams, 2003. Slow Chilling of Turkey Carcasses Can Cause Protein Damage and Pale, Soft, Exudative Meat. XVI European Symposium the Quality of Poultry Meat, Saint-Brieuc- France. Vol. II pp 117-122
11. **Alvarado, C. Z.**, C. D. Carroll\*, H. M. Buses, K. D. Paske, and L. D. Thompson. 2004. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Broiler Breast Fillets, International Poultry Scientific Forum, Atlanta.
12. Gailunas, K.M., S. S. Sumner, **C. Z. Alvarado**, and R. C. Williams, Use of Ultraviolet Light for the Inactivation of *Listeria monocytogenes* and Lactic Acid Bacteria in a Model Meat Brine Chiller System .International Association of Food Protection, 2004
13. **Alvarado, C. Z.**, O'Keefe, S. F., Richards, M. P. and H. Wang, 2004. The Effect of Blood Removal, Oxidation and Shelf-life in Broiler Meat. Poult. Sci. 83:113 (Supl. 1) (Abstr.).
14. **Alvarado, C. Z.**, and H. Wang, 2004. Na<sup>+</sup> Migration and Quality Parameters in Turkey Fillets using Different Marination Techniques Poult. Sci. 83:113 (Supl. 1) (Abstr.).
15. **Alvarado, C. Z.**, C. D. Carroll, H. M. Buses, K. D. Paske, and L. D. Thompson, 2004. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Broiler Breast Fillets International Poultry Scientific Forum, Atlanta, GA.
16. Gailunas, K.M., S. S. Sumner, **C.Z. Alvarado**, R.C. Williams. 2004. Use of ultraviolet light for the inactivation of *Listeria monocytogenes* and lactic acid bacteria in a model



- meat brine chiller system. Annu. Mtg. Intl. Assoc. for Food Prot., Phoenix, AZ, August 8-11.
17. \*Carroll, C.D., **C. Alvarado**, M. Brashears, L. Thompson, 2005. Marination of Turkey Breast Fillets with organic acids to Control the Growth of *Listeria monocytogenes* and Improve Meat Quality. Poult. Sci. 84:22. (Suppl 1.) (Abstr)
  18. Bauermeister, L. J., **C. Z. Alvarado**, and S. R. McKee, 2005. Supplementing peanut skins in poultry diets to alleviate meat quality defects associated with heat stress. Poult. Sci. 84:14. (Suppl 1.) (Abstr)
  19. \*Wenger, E., **C. Z. Alvarado**, L. D. Thompson, and S. O'Keefe. 2005. Consumer Perceptions of Meat Quality and Shelf-life in Commercially Raised Broilers Compared to Organic Free Range Broilers. International Poultry Scientific Forum, Atlanta, GA.
  20. \*Wenger, E., **C. Z. Alvarado**, L. D. Thompson, and S. O'Keefe. 2005. Consumer Perceptions of Meat Quality and Shelf-life in Commercially Raised Broilers Compared to Organic Free Range Broilers. International Poultry Scientific Forum, Atlanta, GA.
  21. Quebe, Q., L., M. T. Brashears, **C. Z. Alvarado**, and M. M. Brashears, 2005. Industry Perceptions of the Effectiveness of Microwaves for Post-Harvest Food Safety in Eggs. Southern Agricultural Education Research Conference, February 4-8, Orlando, FL.
  22. \*Pitchiah, S., **C. Z. Alvarado**, and M. M. Brashears, 2006. Comparison of poultry processing conveyor belts for susceptibility to bacterial attachment and biofilm formation. Poult. Sci. 85:97 (Suppl 1.) (Abstr)
  23. Thompson, T. W., J. R. Blanton, J. E. Mann, M. M. Brashears, and **C. Z. Alvarado**, 2006. Reduction of *Campylobacter spp* on poultry carcasses using various interventions under simulated industry conditions. Poult. Sci. 85:98 (Suppl 1.) (Abstr)
  24. \*Lakins, D.G., E. Echeverry, **C. Z. Alvarado**, M.M. Brashears and L.D. Thompson, 2006. Destruction of Salmonella enteritidis and quality of table shell eggs using microwave commercial sterilization Poult. Sci. 85:100 (Suppl 1.) (Abstr), *1<sup>st</sup> place winner PSA graduate student competition*
  25. \*Lakins, D. G., A. Echeverrey, **C.Z. Alvarado**, M.M. Brashears, and J. C. Brooks, 2006. Influence of Microwave Commercial Sterilization on White Enriched Bread for Military Rations. IFT, Orlando, FL.
  26. Thompson, T. W., J. R. Blanton, J. E. Mann, M. M. Brashears, and **C. Z. Alvarado**, 2006. Reduction of *Campylobacter spp* on poultry carcasses using various interventions under simulated industry conditions. Poult. Sci. 85:98 (Suppl 1.) (Abstr)
  27. Kiker, J.K., J.C. Howe, J.H. Holden, **C.Z. Alvarado**, J. Boyce, A.M. Luna, and L.D. Thompson. 2006. Nutritional composition of grilled and raw enhanced and non-enhanced chicken breast fillets. Poult. Sci. 85:105 (Suppl 1.) (Abstr)
  28. Kiker, J.K., J.C. Howe, J.H. Holden, **C.Z. Alvarado**, J. Boyce, A.M. Luna, and L.D. Thompson. 2006. Nutritional composition of grilled and raw enhanced and non-enhanced chicken breast fillets. Fifth Annual Graduate Research Poster Competition, The Graduate School, Texas Tech University. April 6, 2006. Poster Presentation.
  29. Kiker, J.K., J.C. Howe, J.H. Holden, **C.Z. Alvarado**, J. Boyce, A.M. Luna, and L.D. Thompson. 2006. Nutritional composition of grilled and raw enhanced and non-enhanced chicken breast fillets. Bob Albin Competition Graduate Research Competition, Animal and Food Sciences, Texas Tech University. March 2006. Poster Presentation
  30. \*Mueller, S.M., J.C. Howe, J.M. Holden, **C.Z. Alvarado**, L.M. Boylan, A.M. Luna, D.B. Wester, and L.D. Thompson. 2006. Nutritional composition of two flavors of rotisserie

- chicken obtained from four regions of the United States. PSA 85:100 (Suppl 1.) (Abstr). *Certificate of Excellence for presentation in the Processing, Products and Food Safety Section of Poultry Science Association Annual meeting 2006.*
31. \*Mueller, S.M., J.C. Howe, J.M. Holden, **C.Z. Alvarado**, L.M. Boylan, A.M. Luna, D.B. Wester, and L.D. Thompson. 2006. Nutritional composition of a nationally representative survey of ready-to-eat rotisserie chicken purchased from retail establishments. Fifth Annual Graduate Research Poster Competition, The Graduate School, Texas Tech University. April 6, 2006. Poster Presentation. *Second place in Sciences Division.*
  32. \*Mueller, S.M., J.C. Howe, J.M. Holden, **C.Z. Alvarado**, L.M. Boylan, A.M. Luna, D.B. Wester, and L.D. Thompson. 2006. Nutritional composition of two flavors of rotisserie chicken obtained from four regions of the United States. Bob Albin Competition Graduate Research Competition, Animal and Food Sciences, Texas Tech University. March 2006. Poster Presentation. *First place.*
  33. Okeefe, S., D. G. Lakins, **C. Z. Alvarado**, 2007. Collagen films with antioxidant for flavor protection in pet food. Division of Polymer Chemistry, Polymer Design for Foods and Nutrition. 234th ACS National Meeting, Boston, MA, August 19-23,2007.
  34. \*Lopez, A. M., G. Poullier, A. M. Luna, **C. Z. Alvarado**, L. D. Thompson, and M. M. Brashears, 2007. Carbon Monoxide in MAP Chicken Breast Fillets and Drums as a Food Safety Intervention to Reduce Pathogen Loads and Extend Shelf-Life. Poult. Sci. 86:424. (Suppl 1.) (Abstr)
  35. \*Johnson, J., A. E. Dow, **C. Z. Alvarado**, and M. M. Brashears, 2007. Reduction of *Salmonella* in Whole and Ground Turkey Meat at Refrigerated and Elevated Temperatures using Lactic Acid Bacteria. Poult. Sci. 86:444. (Suppl 1.) (Abstr)
  36. Kiker, J., J. Howe, J. Holden, J. Boyce, A. Luna, **C. Alvarado**, D. Wester, and L. Thompson, 2007. Nutritional Composition of Raw and Fried Enhanced or Non-Enhanced Boneless Chicken Breast Fillets. Poult. Sci. 86:492. (Suppl 1.) (Abstr)
  37. Echeverry, A., D.G. Lakins, **C.Z. Alvarado**, J.C. Brooks, and M.M. Brashears. Quality and mold growth effects following microwave commercial sterilization on white enriched bread for military rations. 94<sup>th</sup> Annual Meeting of the International Association for Food Protection, July 8 to 11, Orlando, FL.
  38. \*Johnson, J., **C. Z. Alvarado**, and M.M. Brashears. Reduction of Salmonella in Whole and Ground Turkey Meat at Refrigerated and Elevated Temperatures using Lactic Acid Bacteria. Presented at the Joint Annual Meeting of the Poultry Science Association. July, 2007. San Antonio, TX.
  39. Aggarwal, D., **C. Alvarado**, C. Brooks, D. Wester, A. Tittor, A. M. Luna and L. Thompson, 2007. Quality of Shell Eggs Stored Under Modified Atmosphere Packaging Using Gas Mixtures Containing CO and CO<sub>2</sub>. Poult. Sci. 86:425. (Suppl 1.) (Abstr)
  40. Brooks, J.C., **C. Z. Alvarado**, M. M. Brashears, and L. D. Thompson, 2007. Packaging Symposium - Packaging and CO<sub>2</sub>. Poult. Sci. 86 (Suppl 1.) (Abstr)
  41. S. R. McKee and **C. Z. Alvarado**, 2007. Marination Symposium - Impact of Functional Ingredients on Food Safety. Poult. Sci. 86:247. (Suppl 1.) (Abstr)
  42. Emmert, J. L., C. M. Owens, **C. Z. Alvarado**, S. R. McKee, and S. Bilgili. 2008. Multi-Media Educational Tool for Poultry Meat and Egg Processing Instruction. Poult. Sci. 87:240. (Suppl 1.) (Abstr)

43. **Alvarado, C. Z.**, M. T. Brashears, and K. K. Fritz. 2008. iPod technology in graduate agricultural courses: A comparison of adopters and nonadopters. *Poult. Sci.* 87:244. (Suppl 1.) (Abstr)
44. **Alvarado, C. Z.**, and C. M. Owens, 2008. Research developments in pale, soft, exudative turkey meat in North America. *Poult. Sci.* 87:247. (Suppl 1.) (Abstr)
45. \*Johnson, J., **C. Z. Alvarado**, M. Berrang, S. R. McKee, L. D. Thompson, and M. M. Brashears, 2008. Control of *Listeria monocytogenes* on further processed ,turkey deli loaves using organic acids as postcook dips. *Poult. Sci.* 87:393. (Suppl 1.) (Abstr)
46. \*Lloyd, T., **C. Z. Alvarado**, M. Berrang, S. R. McKee, L. D. Thompson, and M. M. Brashears, 2008. Multihurdle approach to controlling *Listeria monocytogenes* in further processed turkey deli loaves. *Poult. Sci.* 87:394. (Suppl 1.) (Abstr)
47. Alvarado, M., A. Laury, **C. Z. Alvarado**, M.M. Brashears. Evaluation of Spraying a Lactic Acid Based Antimicrobial Product on the Reduction of Salmonella on Broiler Chickens. 95<sup>th</sup> Annual Meeting of the International Association for Food Protection, August 3 to 6, 2008. Columbus, OH
48. \*Dow, A., **C. Z. Alvarado**, M.M. Brashears. Reduction of Salmonella in Ground Turkey Breasts with a Lactobacillus-Based Intervention. 95<sup>th</sup> Annual Meeting of the International Association for Food Protection, August 3 to 6, 2008. Columbus, OH.

**Technical Reports: total of \_\_6\_\_**

1. M. M. Brashears, **C. Z. Alvarado**, and J. Mann. Sensory Perceptions, 2005. Meat Marketing and Technology. August. pp. 47-50
2. S. Daigle, N. G. Marriott, H. Wang, M. S. Schilling, **C. Z. Alvarado**. PSE Poultry Breast Enhancement through the Utilization of Collagen, Soy Protein, and Carrageenan in a Chunked and Formed Deli Roll: A review, 2005. FeedInfo News Service. September 2005
3. **Alvarado, C. Z.**, M. M. Brashears, and J. Mann. Protection vs. Perception, 2005. Poultry Magazine. October/ November.
4. **Alvarado, C. Z.**, 2007. The Belt Way; Food Safety in the Plant. Poultry Magazine. April/May 2007.
5. **Alvarado, C. Z.**, 2007. The Incredible Edible Egg. Prepared Foods Magazine. July 2007.
6. **Alvarado, C. Z.**, 2008. Assessing your cross-contamination risk, both in a slaughter and further processing environments. Poultry Magazine. April/ May 2008.

**PRESENTATIONS AND LECTURES: total of \_\_16\_\_**

1. **Alvarado, C. Z.**, 2003. Value Added Poultry Processing and the Effect of PSE Meat. The Ohio State University. Columbus, Ohio. Department of Animal Science.
2. **Alvarado, C. Z.**, 2002. Meat Quality: Meeting the Customer's needs. *In* Proceedings from the Sel-Plex Physiological Cascade Seminar, St. Louis, MO.
3. **Alvarado, C. Z.**, 2002. Current issues in the poultry industry: meat quality and moisture retention. *In* Proceedings from the 18<sup>th</sup> Annual Feed Industry Symposium, Lexington, KY.

4. **Alvarado, C. Z.** and A. R. Sams, 2004. Update of PSE Poultry Meat. *In Proceedings from the 57<sup>th</sup> Annual Reciprocal Meat Conference*, Lexington, KY.
5. **Zocchi, C.** and A. R. Sams, 1996. The use of electrical stimulation and extended chilling times to reduce the aging needed to achieve maximum tenderness in broiler breast fillets. *Poultry Sci.* 75:83 (Suppl. 1) (Abstr.).
6. **Alvarado, C. Z.** and A.R. Sams, 1999. Rigor mortis development in turkey breast muscle and the effect of electrical stimulation. *Poultry Sci.* 78:210 (Suppl 1) (Abstr.).
7. **Alvarado, C. Z.** and A. R. Sams, 2000. Injection marination strategies for remediation of PSE broiler breast meat. *Poultry Sci.* 79:98 (Supl. 1) (Abstr.).
8. **Alvarado, C. Z.** and A. R. Sams, 2000. A comparison of pre-rigor injection and tumble marination and its effects on broiler breast meat tenderness. *Poultry Sci.* 79:256 (Supl. 1) (Abstr.).
9. **Alvarado, C. Z.** and A. R. Sams, 2001. The relationship of chilling time and temperature on quality of turkey pectoralis. *Poultry Sci.* 80:574 (Supl. 1) (Abstr.).
10. **Alvarado C. Z.** and A. R. Sams, 2003. Slow Chilling of Turkey Carcasses Can Cause Protein Damage and Pale, Soft, Exudative Meat. XVI European Symposium the Quality of Poultry Meat, Saint-Brieuc- France. Vol. II pp 117-122
11. **Alvarado, C. Z.,** C. D. Carroll\*, H. M. Buses, K. D. Paske, and L. D. Thompson. 2004. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Broiler Breast Fillets, International Poultry Scientific Forum, Atlanta.
12. **Alvarado, C. Z.,** O'Keefe, S. F., Richards, M. P. and H. Wang, 2004. The Effect of Blood Removal, Oxidation and Shelf-life in Broiler Meat. *Poult. Sci.* 83:113 (Supl. 1) (Abstr.).
13. **Alvarado, C. Z.,** and H. Wang, 2004. Na<sup>+</sup> Migration and Quality Parameters in Turkey Fillets using Different Marination Techniques *Poult. Sci.* 83:113 (Supl. 1) (Abstr.).
14. **Alvarado, C. Z.,** C. D. Carroll, H. M. Buses, K. D. Paske, and L. D. Thompson, 2004. Comparison of Air and Immersion Chilling on Meat Quality and Shelf Life of Broiler Breast Fillets International Poultry Scientific Forum, Atlanta, GA.
15. **Alvarado, C. Z.,** M. T. Brashears, and K. K. Fritz. 2008. iPod technology in graduate agricultural courses: A comparison of adopters and nonadopters. *Poult. Sci.* 87:244. (Suppl 1.) (Abstr)
16. **Alvarado, C. Z.,** and C. M. Owens, 2008. Research developments in pale, soft, exudative turkey meat in North America. *Poult. Sci.* 87:247. (Suppl 1.) (Abstr)

## **GRADUATE STUDENT COMMITTEES:**

**Completed:**

**Chaired: total of**   8  

**M. S.**

1. Donna Greene (VPI&SU – graduated December 2003) “Use of Poultry Collagen Coating and Antioxidants as Flavor Protection for Cat Foods Made with Rendered Poultry Fat”

2. Valerie Gorsuch (VPI&SU – graduated May 2003). “Tumble Marination Strategies to Improve the pH, Color, and Water Holding Capacity of Pale, Soft, and Exudative (PSE) Broiler Breast Fillets.”
3. Casey Carroll graduated August 2005.
4. Sarah Mueller – co-chair Leslie Thompson. graduated May 2006. “Nutrient composition of a nationally representative survey of ready-to-eat rotisserie chicken purchased from retail establishments”
5. Shankaralingam Pitchiah – co-chair Mindy Brashears –graduated August 2006
6. Jennifer Johnson graduated May 2008. Controlling *Listeria monocytogenes* in Further Processed Meat and Poultry using Organic Acid Marinades as Post-Cook Dips.”
7. Tabitha Lloyd graduated May 2008. “Multi-hurdle approach to controlling *Listeria monocytogenes* in further processed meats.”

**Co-Chaired: total of   2**

**Ph.D.**

1. Donna Greene Lakins. August 2006. “*Salmonella enteritidis* reduction, quality attributes, and nutritional profile in both white and brownshell eggs subjected to an innovative microwave technology”.

**Committee member of: total of   14**

**In Progress:**

**Chaired: total of   4**

**M. S.**

1. Andrea Dow – current. “Control of *Listeria monocytogenes* on Contact and Non-Contact Surfaces by Electrostatic Spraying of Sanitizers
2. Ngan Nyugan – current
3. Thrinadh Yalamanchili -current

**Ph.D.**

1. Sejin Park “Evaluation and Effect of Tryptophan, Arginine, and Glutamine on Growth Performance, Gut Morphology, Metabolic Response, and Meat Quality of Broiler”

**Committee member of: total of   6**

**Undergraduate Research :**

1. Adam Lopez “Carbon Monoxide in MAP Chicken Breast Fillets and Drums as a Food Safety Intervention to Reduce Pathogen Loads and Extend Shelf-Life” won Poultry Science undergraduate competition 2007.

2. Andrea Dow “Reduction of *Salmonella* in Whole and Ground Turkey Meat at Refrigerated and Elevated Temperatures using Lactic Acid Bacteria.” Presented at IAFP.

### **International Exchange Program – M.S. Students**

1. Gaelle Poulier, Department of Animal Production, Ecole Nationale Supérieure Agronomique, Toulouse, France (summer 2006)
2. Melanie Martignon, Department of Animal Production, Ecole Nationale Supérieure Agronomique, Toulouse, France (summer 2006)
3. Elodie Wenger, Department of Animal Production, Ecole Nationale Supérieure Agronomique, Toulouse, France (summer 2005)

### **TEACHING RESPONSIBILITIES:**

Teach undergraduate and graduate Poultry Production and Lab, Poultry Processing and Lab, and Introductory Food Science.

### **FIVE YEAR SUMMARY OF TEACHING EVALUATIONS** **Christine Alvarado**

<b>Term/Class</b>	<b>Number of Students</b>	<b>Instructor Overall (Question #1) Mean</b>	<b>Availability (Question #2) Mean</b>	<b>Treated all Fairly (Question #4) Mean</b>	<b>Presented Clearly (Question #7) Mean</b>
<b>Spring 2004</b>					
ANSC 3404	57	3.89	3.92	4.18	3.71
FDT 5307	5	No evaluations	No evaluations	No evaluations	No evaluations
<b>Fall 2004</b>					
ANSC 3100	22	4.27	4.21	4.45	4.30
ANSC 5100	24	4.67	4.58	4.68	4.53
<b>Spring 2005</b>					
FDT 2300 DE	9	No evaluations	No evaluations	No evaluations	No evaluations
FDT 5307	8	4.50	4.23	4.22	4.37
<b>Fall 2005</b>					
FDT 2300 DE	19	4.36	4.45	4.36	4.55
FDT 5307	8	No evaluations	No evaluations	No evaluations	No evaluations
ANSC 4407	12	4.17	4.5	4.33	3.83
ANSC 4001	1	No evaluations	No evaluations	No evaluations	No evaluations
ANSC 5100	22	4.38	4.45	4.57	4.48
<b>Spring 2006</b>					
FDT 2300 DE	20	4.38	4.75	4.71	4.25
ANSC 4001	1	No evaluations	No evaluations	No evaluations	No evaluations

ANSC 5100	10	No evaluations	No evaluations	No evaluations	No evaluations
<b>Fall 2006</b>					
FDT 2300 DE	34	4.57	4.29	4.64	4.57
ANSC 4407	16	No evaluations	No evaluations	No evaluations	No evaluations
<b>Spring 2007</b>					
FDSC 2300 DE	33	4.0	3.88	4.38	4.25
ANSC 5100	14	4.38	4.45	4.57	4.58
<b>Fall 2007</b>					
FDSC 2300 DE	35	3.15	3.15	4.23	3.23
ANSC 4407	20	4.44	4.56	4.67	4.29
ANSC 5001	1	No evaluations	No evaluations	No evaluations	No evaluations
ANSC 6001	1	No evaluations	No evaluations	No evaluations	No evaluations
ANSC 7000	2	No evaluations	No evaluations	No evaluations	No evaluations
FDSC 6000	3	No evaluations	No evaluations	No evaluations	No evaluations
<b>Spring 2008</b>					
FDSC 2300 DE	32	3.36	3.55	4.45	3.55
FDSC 5307	11	4.56	4.56	4.78	4.67
FDSC 4307	1	4.00	5.00	5.00	5.00
ANSC 4001	1	No evaluations	No evaluations	No evaluations	No evaluations
ANSC 7000	2	No evaluations	No evaluations	No evaluations	No evaluations
FDSC 6000	3	No evaluations	No evaluations	No evaluations	No evaluations

Scale for evaluations : 5=excellent; 4=outstanding; 3=good, 2=fair, 1=poor

Note: Changes were made in the FDSC 2300 course for Fall 2007. The tests are no longer online to stimulate individual test taking. These changes made the course more challenging to the students.

### Other Teaching Responsibilities:

1. ANSC 5100 Seminar – Presented PSE and Value Added Poultry seminar
2. ANSC 2401 Honors Anatomy and Physiology of Domestic Animals – (Poultry Anatomy and Physiology, 1 class)
3. ANSC 3404 Consumer Selection and Utilization of Meat Products - (Poultry meat)
4. ANSC 3403 Selection and Care –(poultry meat)
5. ANSC 1401 General Animal Science – (Poultry Production and Processing)
6. ANSC 5301 Advanced Contemporary Issues in Animal Agriculture – Fall 2003 (Grain for animal use versus grain for human consumption)
7. IS1100 Freshman transition

Advisement Responsibilities

1. 12 Students (2004-2006)
2. Advisor Sigma Alpha (2004-2005)
3. Advisor Freshman Ag Council (2004-2005)
4. Red Raider Roundup committee advisor (2003-2005)

## **VPI&SU**

### **Undergraduate Courses**

1. Poultry Processing and Products – Fall 2001
2. Introduction to Food Science – Spring 2002
3. Meat Science Fall 2002
4. Animal Science Seminar

### **Graduate Courses**

1. Advanced Physiology and Anatomy of Domestic Animals – Fall 2001
  1. (skeletal muscle section)

### **Advisement Responsibilities**

1. Faculty co-advisor Food Science Club
2. Advisement of Graduate Students (3)

### **Chair of Theses, Dissertations, and Undergraduate Honors Research Projects:**

1. Undergraduate Research – 2 students
2. Master of Science – 2 student
3. Ph.D. – 1 student
4. Committee Member - 2

## **GRANTS AND AWARDS: total funded \$ 5,228,301 (1,030,708) to PI**

### **Funded:**

#### *2001- 2002: VPI&SU*

Tumble marination strategies for improving color and water holding capacity in PSE broiler and turkey breast fillets. 2001. C. Z. Alvarado, PI. B.K. Ladenburg \$ 14,200

Economic evaluation, incidence, and heritability of bone breakage and skin tearing in several genetic lines of broilers. 2001. C. Z. Alvarado, PI. Aviagen \$4,740

Use of Poultry Collagen Coating and Antioxidants as Flavor Protection for Cat Foods made with Rendered Poultry Fat. 2002. Alvarado, C. Z., S. Duncan, and S. O'Keefe. U. S. Poultry and Egg – Fats and Proteins Research \$25,724

Increased salvage value of pigs that yield pale, soft, and exudative pork, 2002. P. I. C. Z. Alvarado Virginia Agricultural Council \$2,000



Use of animal protein coatings as flavor protection for pet foods made with rendered poultry fat, 2002. C. Z. Alvarado, P. I. Nestle Purina PetCare. \$ 6,000

#### 2003:

Use of Poultry Collagen Coating and Antioxidants as Flavor Protection for Cat Foods made with Rendered Poultry Fat, 2003. Alvarado, C. Z., S. Duncan, and S. O'Keefe. U. S. Poultry and Egg Association – Fats and Proteins Research \$25,724 – VPI&SU

Improving children's lifestyles through product improvement, skill development in food preparation, nutrition education, and family intervention, 2003. J. B. Boyce and C. Z. Alvarado. College of Human Sciences Seed Grant Proposal \$5,000

Collaborative Development of a multi-media, modular poultry processing, products, and food safety curriculum, 2003. C. M. Owens, J. Emmert, S. R. McKee, and C. Z. Alvarado, USDA-HEC. \$499,000 total; \$249,956 requested (\$59,708 - TTU)

Marination of turkey breast fillets to control the growth of *listeria monocytogenes* and improve meat quality, 2003. C. Z. Alvarado, L. D. Thompson, and M. M. Brashears, US Poultry and Egg Association. \$27,507 (\$13,753.50)

International Center for Food Industry Excellence, 2003. Brashears, M., C. Alvarado, J. Blanton, C. Brooks, J. Boyce, Hoover, L., M. Miller, K. Pond, L. Thompson. USDA- CSREES. \$232,252 (\$82,955.14)

Evaluation of Tenderness of minimally aged breast fillets and bone strength of broilers from five genetic strains, 2003. C. M. Owens, C. Z. Alvarado, and S. R. McKee. Cobb Vantress \$19,753

#### 2004:

International Center for Food Industry Excellence, 2004. Brashears, M., C. Alvarado, J. Blanton, C. Brooks, J. Boyce, Hoover, L., M. Miller, K. Pond, L. Thompson. USDA- CSREES. \$237,000 (\$16,230.40)

Comparison of wire and plastic belts on microbial load and biofilm formation, 2003. Alvarado, C. Z., and M. M. Brashears. Wirebelt Company \$34,100 (\$17,050)

Improving Water Holding Capacity in Poultry Products without the Use of Phosphates. Alvarado, C.Z., J.R. Blanton, Jr., J.C. Brooks, and M.F. Miller. 2004. Marks and Spenser of London. \$8,000

#### 2005:

International Center for Food Industry Excellence, 2005. Brashears, M., C. Alvarado, J. Blanton, C. Brooks, J. Boyce, Hoover, L., M. Miller, K. Pond, L. Thompson. USDA- CSREES. \$811,000 (\$35,000)

Comparison of wire and plastic belts on microbial load and biofilm formation, 2003. Alvarado, C. Z., and M. M. Brashears. Wirebelt Company \$34,100

Controlling *Listeria monocytogenes* in Ready to eat meat, 2005. McKee, R. R., C. Z. Alvarado, and M. Berrang. NAFSS \$250,000 (\$110,000 TTU)

Development of an online HACCP certification and Hazard Analysis Resource List for Shell and Further Processed Eggs, 2005. Alvarado, C. Z., M. M. Brashears, and M. T. Brashears, 2005. USDA – FSIS, \$ 35,000 (\$11,999.62)

Verification of microwave technology for the elimination of food-borne pathogens in whole shell eggs and the development of new applications in the USA food industry, 2005. M. M. Brashears, C. Z. Alvarado, M. T. Brashears. ITACA \$57,000 (\$13,927.75)

Development of a Rapid Test Kit for Yolk Contamination in Egg White using Thin Film Chemistry (Reagent Strip Chemistry), 2005. S. O'Keefe, C. Alvarado. American Egg Board \$32,725 (thru VPI&SU)

#### 2006:

International Center for Food Industry Excellence, 2006. Brashears, M., **C. Alvarado**, J. Blanton, C. Brooks, J. Boyce, Hoover, L., M. Miller, K. Pond, L. Thompson. USDA-CSREES. \$1,266,717 (\$88,670.19)

Controlling *Listeria monocytogenes* in Further Processed Meat, 2006. McKee, R. R., **C. Z. Alvarado**, and M. Berrang. NAFSS \$250,000 (\$80,885.25)

Control of *Listeria monocytogenes* on Contact and Non-Contact Surfaces by Electrostatic Spraying of Sanitizers, 2006. **C. Z. Alvarado**, S. R. McKee, and P. Takhar. US Poultry and Egg Association \$35,000 (\$12,638.82)

Risk Factors and Consequences Associated with Condensation in Fresh and Ready-to-Eat Processing Facilities, 2006. AMIF. M. M. Brashears, **C. Z. Alvarado**, M. F. Miller, and J. C. Brooks. (\$19,089)

Shelf-Life Validation Studies. M. M. Brashears, **C. Z. Alvarado**, J. C. Brooks, L. D. Thompson, \$55,000

#### 2007

International Center for Food Industry Excellence, 2007. TTU- Bridge Funding. \$356,163 (\$24,000) not via sponsored programs – this was from CASNR to replace lost line item funding from ICFIE)

#### 2008:

Food Safety Compliance and Development of Online Training for Hot/Cold Self-serve Bars. 2008. **C. Z. Alvarado**, M. Binkley, L. D. Thompson, S. Burris, G. Loneragan. Integrated Food Safety, 2008. \$599,640 (\$203,945.60).

Multiscale Modeling and Experimental Verification of Transport in Coated Fried Products. 2008. P. Takhar, C. Z. Alvarado, L. D. Thompson. NRI –Food Quality. 350,000 (116,666).

International Center for Food Industry Excellence, 2005. Brashears, M., C. Alvarado, J. Blanton, C. Brooks, J. Boyce, Hoover, L., M. Miller, K. Pond, L. Thompson. USDA- CSREES. \$980,000 (\$28,000)

#### Rejected:

#### 2003:

Improving Water Holding Capacity in Poultry Products Without the use of Phosphates, 2003. C. Z. Alvarado, J. C. Brooks, J. Blanton, and M. F. Miller. \$40,250

Use of Ingredient Intervention Strategies to Control the Growth of *Listeria monocytogenes* in Ready-to-Eat Turkey Loaves, 2003. C. Z. Alvarado, L. D. Thompson, M. M. Brashears. American Meat Institute Foundation. \$75,000

- Determination of factors that influence the color development of cooked dark poultry meat, 2003. S. G. Birkhold, L. D. Thompson, and C. Z. Alvarado. U.S. Poultry and Egg Association. \$64,182
- Marination Impact on *Salmonella* in Vacuum Packaged Breast Fillets, 2003. L. D. Thompson, C. Z. Alvarado, and S. G. Birkhold. U.S. Poultry and Egg Association. \$28,657
- Remediation Applications for Controlling *Listeria monocytogenes* in Further Processed Turkey Deli Loaves, 2003. C. Z. Alvarado, L. D. Thompson, M. M. Brashears and S. R. McKee. USDA-CSREES-IREE-CGP-NIFSI \$404,819
- Validation of Critical Control Points in Meat and Poultry HACCP Systems, 2003. M. Miller, M. Brashears, R. Huffman, C. Z. Alvarado. USDA-CSREES-IREE-CGP-NIFSI. \$250,000
- 2004:
- Development of a Sustainable Small Farm Crop-Livestock System, 2004. J. J. McGlone and C. Z. Alvarado, USDA-CSREES-NRI \$499,478
- Sensory and Meat Quality Evaluation of Organic and Commercial Chicken in a Restaurant Setting, 2004. C. Z. Alvarado, J. Boyce, L. D. Thompson, SARE \$9818
- Evaluation of acids and Cl<sup>-</sup> concentrations in the prevention of cross contamination, pathogen reduction, and meat quality during broiler processing, 2004. M. M. Brashears and C. Z. Alvarado, USP and Egg Association \$25,000
- Impact of Feeding Current Industry Probiotics/Direct Fed Microbials in Combination with Prebiotics and the Impact on Pathogen Loads in Broilers, 2004. M. M. Brashears and C. Z. Alvarado, USP and Egg Association \$31,962
- Comparison of Conventional, Organic, and Free Range Organic Broiler Production on Consumer Acceptance, and Meat Quality, 2004. C. Z. Alvarado and L. D. Thompson, USP and Egg Association \$25,000
- Multi-functional Web-based Pre-Harvest Food Safety Course Development, M. M. Brashears, M. T. Brashears, and C. Z. Alvarado, National Integrated Food Safety Initiative \$263,754
- Remediation Applications for Controlling *Listeria monocytogenes* in Ready to Eat Meat and Poultry Products, National Integrated Food Safety Initiative \$263,754
- The Effect of Modified Atmosphere Packaging on the Quality and Safety of Eggs, 2004. C. Z. Alvarado, J. C. Brooks, L. D. Thompson, USP and Egg Association \$31,962
- Development of a High Protein Collagen Coating to Aid in Adhesion of Batter and Breading and Reduction of Oxidation in Pre-Fried Refrigerated Chicken Breast Tenders, 2004. C. Z. Alvarado, L. D. Thompson, Fats and Proteins Research Foundation \$27,000
- Development of a Sustainable Small Farm Crop-Livestock System in Poultry, 2004. C. Z. Alvarado, J.J. McGlone, J. Johnson, and Mark McGinley Texas Tech University Multidiscipline Grants, \$20,000
- Peanut Skins as Sources of Valuable Nutraceuticals in Broiler Feed to Reduce Stress and Produce Nutritionally Enhanced Broiler Meat, 2004. C. Z. Alvarado and S. F. O'Keefe, TX Peanut Board \$26,060
- Interactive Multimedia Approach to Food Science and Technology Learning, 2004. C. Z. Alvarado, TLTC grant \$6,415
- Consumer acceptance of irradiation in chicken products, 2004. C. Z. Alvarado, M. M. Brashears, T. Brashears, and D. Doerfert, USP and Egg Association \$25,000
- Validation of CCP's in Shell Egg Processing, 2004. C. Z. Alvarado, M. M. Brashears, S. M. McKee, American Egg Board \$50,000

Phosphate Alternatives and Food Safety Efficacy in Marinated Broiler Breast Fillets, 2004. C. Z. Alvarado, L. D. Thompson, J. C. Brooks, USP and Egg Association \$25,000

Development of edible coatings and alternative frying methods to enhance quality of breaded fried poultry products, K. Mallikarjunan, S. E. Duncan, S. F. O'Keefe, and C. Z. Alvarado, USDA-CSREES-NRI \$433,146

Functional Analysis of Turkey Breast Muscle, M. Wick, C. Z. Alvarado, M. Lilburn, and N. St. Pierre, USDA-CSREES-NRI \$395,038

Remediation Applications for Controlling *Listeria monocytogenes* in Ready to Eat Poultry Products, NAFSS \$120,000

Development of a breakfast chicken sausage nutritionally enhanced with fiber and phytochemicals, C. Z. Alvarado, J. Boyce, C. Brooks, L. D. Thompson, and S. F. O'Keefe, USDA-CSREES-NRI \$368,505

2005:

Multiscale Modeling and Experimental Verification of Transport in Coated Fried Products, 2005. C. Alvarado, P. Takhar, L. Thompson, USDA-CSREES-NRI-Food Quality \$410,072

Reduction of Pathogen Loads in Broilers by Feeding Direct Fed Microbials, 2005. C. Alvarado, M. Brashears, L. Thompson, G. Loneragan, USDA-CSREES-NRI-Food Safety \$398,011

Impact of feeding current industry direct fed microbials and the impact on pathogen loads in broilers and turkeys, 2005. C. Alvarado, M. Brashears. NPC \$31,962

Acquisition and Dissemination of Current Italian Agricultural Industry Techniques and Issues to American Agricultural Students, 2005. M. T. Brashears, C. Z. Alvarado, C. Akers. USDA- CSREES- International Science \$74,738

Risk Factors and consequences associated with condensation in fresh and ready-to-eat processing facilities, 2005. M. M. Brashears, M. Miller, C. Brooks, J. Blanton, C. Z. Alvarado, AMIF. \$125,445

Validation of Three Antimicrobial Agents to Control *Escherichia coli* O157:H7 in Needle Tenderized and Injected Beef Strip Loins, 2005. C. Brooks, M. M. Brashears, M. Miller, J. Blanton, C. Z. Alvarado, AMIF. \$87,153

Elimination of *Listeria monocytogenes* in Ready-to-Eat Meat and Poultry Products using Microwave Technology, 2005. M. Brashears, C. Brooks, C. Z. Alvarado, T. Brashears, AMIF. \$84,597

Validation of Trichloromelamine (TCM) as an Effective Hide Wash Technology, 2005. J. Blanton, M. Brashears, L. Thompson. C. Alvarado, C. Brooks, M. Miller, AMIF. \$100,000.

Impact of feeding current industry direct fed microbials and the impact on pathogen loads in broilers, 2005. C. Alvarado, M. Brashears, G. Loneragan, USP and Egg Association. \$35,000

Comparison of Conventional, Organic and Free Range Organic Broiler Production on Consumer Acceptance, and Meat Quality, 2005. C. Alvarado and L. Thompson, USP and Egg Association. \$17,331

Evaluation of acids and CI in the prevention of cross contamination, pathogen reduction, and meat quality during broiler processing, 2005. C. Alvarado, M. Brashears, USP and Egg Association \$31,962

Elimination of Food-borne pathogens in Meat and Poultry Products using Microwave Technology, 2005. M. Brashears, C. Alvarado, C. Brooks. ATP, \$100,000

Development of a Sustainable Small Farm Crop-Livestock System Featuring Poultry, 2005. C. Alvarado, M. Mcglone, J. Johnson, M. McGinley. TTU – Multidiscipline NOI \$20,000

Control of heat resistant *Salmonella* spp. in cooked meat products during thermal processing under reduced humidity conditions, 2005. M. Brashears, J. Mann, P. Takhar, M Miller, C. Brooks, J. Blanton, C. Alvarado. AMIF. \$84,597

Use of Direct Fed Microbials to Reduce Antibiotic Usage and Salmonella in Chickens, 2005. C. Alvarado, M. Brashears, Lindberg Foundation. \$10,000

Remediation Applications for Controlling *Listeria monocytogenes* in Ready to Eat Meat and Poultry Products, 2005. C. Alvarado, M. Brashears, S. McKee. USDA-CSREES-Integrated Food Safety. \$400,000

#### 2006:

Multiscale Modeling and Experimental Verification of Transport in Coated Fried Products. C. Alvarado, P. Takhar, L. Thompson, USDA-CSREES-NRI-Food Quality \$410,072

Reduction of Pathogen Loads in Broilers by Feeding Direct Fed Microbials. C. Alvarado, M. Brashears, L. Thompson, G. Loneragan, USDA-CSREES-NRI-Food Safety \$398,011

Reduction of *Salmonella* and *Campylobacter* Loads in Broilers by Feeding Current Industry Direct Fed Microbials. C. Z. Alvarado, M. M. Brashears, G. Loneragan. US Poultry and Egg, \$34,500

Control of *Listeria monocytogenes* on Contact and Non- Contact Surfaces by Electrostatic Spraying of Sanitizers. C. Z. Alvarado, M. M. Brashears, P. Takhar. AMIF. \$95,000

Impact of feeding current industry direct fed microbials and the impact on pathogen loads in broilers and turkeys. C. Alvarado, M. Brashears. NPC \$31,962

Acquisition and Dissemination of Current Italian Agricultural Industry Techniques and Issues to American Agricultural Students. M. T. Brashears, C. Z. Alvarado, C. Akers. USDA-CSREES- International Science \$74,738

Elimination of *Listeria monocytogenes* in Ready-to-Eat Meat and Poultry Products using Microwave Technology. M. Brashears, C. Brooks, C. Z. Alvarado, T. Brashears, AMIF and NCBA. \$95,381

Impact of feeding current industry direct fed microbials and the impact on pathogen loads in broilers. C. Alvarado, M. Brashears, G. Loneragan, USP and Egg Association. \$37,500

Control of *Salmonella* spp. in large whole-muscle meat products during thermal processing under reduced humidity conditions. M. M. Brashears, C. Z. Alvarado, P. Takhar, and J. Mann. \$95,000

Rapid Validation of Cooking Instructions for Poultry Products Using Computer Simulations and Experiments Pawan S. Takhar, Christine Z. Alvarado and Mindy M. Brashears. AMIF \$95,000

A Multidisciplinary Approach to Nutrition and Obesity. C. Z. Alvarado, M. T. Brashears, J. Boyce, L. D. Thompson. HEC \$125,000

#### 2007

Multiscale Modeling and Experimental Verification of Transport in Coated Fried Products. C. Alvarado, P. Takhar, L. Thompson, USDA-CSREES-NRI-Food Quality. \$500,000 (30% - \$150,000)– resubmission 01/2008

Multiscale Hybrid Mixture Theory Based Approach For Reducing Fat Uptake in Fried Food Products. ARP P. Takhar, C. Z. Alvarado, L. D. Thompson. \$150,000 – submitted 01/200

Impact of Integrated Food Safety Programs and Antimicrobial Interventions on Pathogen Prevalence, Strain Selection and Antibiotic Resistance Profiles in Poultry Processing. USDA-CSREES-Integrated Food Safety. M. Sanchez, C. Alvarado, M. Brashears, L. D. Thompson, \$600,000 (33%, \$198,000). (subcontract with Texas A&M submitted 01/2008

Food Safety Compliance and Development of Online Training for Hot/Cold Self-serve Bars. USDA-CSREES-Integrated Food Safety. C. Alvarado, M. Binkley, L. D. Thompson, S. Burris, J Rupnow, G Loneragan. \$600,000. (25%, \$150,000)– resubmission 01/200

Evaluation of Early Broiler Nutrition During the Initial Posthatch Period and its Effect on Growth Performance, Yield and Meat Quality. C. Z. Alvarado, L. D. Thompson, and S. Kim US Poultry and Egg \$37,000 (80%, \$29,600, submitted 01/2008

2008

Multiscale Hybrid Mixture Theory Based Approach For Reducing Fat Uptake in Fried Food Products. ARP P. Takhar, C. Z. Alvarado, L. D. Thompson. \$150,000

Marination with Organic Acids to Control *Listeria monocytogenes* and Improve Shelf-Life in Further Processed Meat Products. USDA-CSREES-Integrated Food Safety. S. R. McKee and C. Z. Alvarado \$400,000

Impact of Integrated Food Safety Programs and Antimicrobial Interventions on Pathogen Prevalence, Strain Selection and Antibiotic Resistance Profiles in Poultry Processing. USDA-CSREES-Integrated Food Safety. M. Sanchez, C. Alvarado, M. Brashears, L. D. Thompson, \$600,000.

Evaluation of Early Broiler Nutrition During the Initial Posthatch Period and its Effect on Growth Performance, Yield and Meat Quality. C. Z. Alvarado, L. D. Thompson, and S. Kim US Poultry and Egg \$40,000

### **Cash and In-kind Gifts:**

2003

In-kind Support: \$7,500 from BK Giuliani Corp.

2005

In-kind Support: Marketing and Technology \$5,000

2006

In kind support – Marketing and Technology \$12,000

2007

In-kind Support: Marketing and Technology \$12,000

2008

In-kind Support: Marketing and Technology \$12,000

## **SERVICE TO PROFESSIONAL ORGANIZATIONS:**

### **National:**

Poultry Science Association

1. Professional member (1994 – present)
2. Board of Directors elected member
3. Strategic Planning Committee member
4. Chair Long Range Planning Committee
5. Chair of Marination Symposium Program for the 2007 Joint meeting in San Antonio, TX
6. Associate Editor for Processing and Products and Production sections in the Journal of Poultry Science

Institute of Food Technologists

1. Professional member (2000-present)
2. Committee on Divisions and Education member
3. Muscle Foods Division elected member

World Poultry Science Association member (1999-present)

### **Regional:**

1. Multi-state Project S-292: The Poultry Food System: A Farm to Table Model
2. Multi-State Project S-295: Enhancing Food Safety Through Control of Food-borne Disease Agents

### **State:**

1. Texas Poultry Federation

## **CONSULTING ACTIVITIES:**

1. Expert Witness - served as an expert witness in a case involving food spoilage and potential food safety concerns
2. Developing and Implementing HACCP Plans in Food Facilities
3. Review and Auditing of HACCP and SSOPS programs for national poultry and meat companies
4. Provided training materials and presentations for Advanced HACCP, basic HACCP, GMPS and SSOPS

*Educational Industry Courses:*

1. Poultry 101 – 3/year (Texas Tech University, Auburn University, University of Arkansas)
2. Poultry 201 – Marination and Batter and Breeding
3. Poultry 201 – Listeria control
4. HACCP certification

*International Courses:*

1. Serve Safe certification
2. HACCP certification
3. Advanced HACCP certification
4. Food Safety for Dairy, Poultry and Meat plants - United States Department of Agriculture Foreign Agricultural Services (FAS) program – food safety and quality instructor for Poultry and Dairy products– Ramalah, Palestine; Palic, Serbia

*VPI&SU:*

1. Virginia's Poultry Processors Workshop (2001, 2002)
2. 4H Creative Chefs class instructor (March 2001, 2002)
3. 22<sup>nd</sup> Annual Meat Processing Mini Course (March 2001, 2002)
4. HACCP Certification class instructor for meat and poultry industry (May 2001, January 2002, November 2002)
5. Poultry Processing and Products Short Course January 23-24, 2001
6. Virginia's Governor School – developed one week class for Food Science and Technology (July 30- August 2, 2001, July 22-26, 2002)

**SERVICE TO:**

**University:**

1. Faculty Senate Secretary (2006-2007)
2. Commencement Committee (2005-2007)
3. Enrollment Management Council (2006-2007)

**College:**

1. TTU - CASNR Faculty Senate Department Representative (2005-2008)
2. TTU - CASRN Alumni and Friends Association Advisory Board Member
3. TTU - CASNR Recruiting Committee member
4. TTU - CASNR Commencement Program committee member
5. TTU - CASNR Masters at a Distance Task Force committee member
6. Advisor to Sigma Alpha sorority (2005-2006)
7. Advisor to Freshman Ag Council (2005-2006)

**Department:**

1. Food Science and Technology Department Graduate Committee Member
2. Science It's a Girl Thing – (Summer, 2003-present)
3. Shake Hands with your Future- (Summer, 2003-present)
4. Super Saturday - (2003-present)



5. Red Raider Roundup Coordinator (recruitment) – 2005-2006
6. Food Science recruiting; South Plains Chemistry Department - 2003 – present
7. IFT Champion – 2001-2002 (VPI&SU) – recruited in freshman college classes as well as areas high school for degrees in food science

#### **Community:**

1. Hatched Chicks for local schools (2006-present)
2. Developed Food Science Extravaganza (2005) at Science Spectrum
3. Conducted science classes at Northridge Elementary “Bubbles in Food” (2007-present)
4. FFA Food Science Contest judge (2003-present)
5. FFA Poultry Science contest Assistant Superintendent (Lubbock, TX and Canyon, TX)
6. Teach ServSafe to local establishments (bi-monthly)
7. Holy Spirit Catholic Church – CCE (Sunday school teacher) – Pre-K, K and 3<sup>rd</sup> grade (2003-present)
8. Holy Spirit Catholic Church – volunteer/teacher vacation bible school (2005-present)

#### **Industry:**

1. Poultry 101, 201 – Marketing and technology sponsored event
2. HACCP training and implementation
3. Online Egg HACCP distance education course
4. Sanitation Workshops
5. Recall Management
6. Food Security
7. Expert Witness

#### **Virginia Polytechnic University and State University**

1. CALS Committee on Research and Extension Program Policy (2002) – Virginia Tech
2. CALS Academic Program Policies Officer (2001-2003) – Virginia Tech
3. University sponsor for IFT Champions (2002) – Virginia Tech
4. HACCP Certification class instructor for meat and poultry industries (May 2001, September 2001, January 2002)
5. Virginia’s Poultry Processors Workshop (February 2001, April 2001, April 2002)
  - i. 4H Youth Program Creative Chefs instructor in Rockingham County, VA (March 2001, 2002)
6. Annual Meat Processing Mini Course (March 2001, 2002)
7. Poultry Processing and Products Short Course January 23-24, 2001
8. Blue Ridge Highlands Science Fair Judge (March 2001, 2002)
9. Virginia’s Governor School – developed one week class for Food Science and Technology (July 30- August 2, 2001, July 22-26, 2002)
10. FFA contest – judged product development section (October 9, 2001)