# Minutes of the S-1056 Annual Meeting

Held October 6-7, 2015

Narragansett, RI

**Member Reports**

**October 6, 2015-Tuesday**

1. Welcome from Lori Pivarnik,, URI Extension Specialist and Host, and Deborah Sheely, Associate Dean of Extension
   1. Introduction of attendees
2. University of Rhode Island- Lori Pivarnik, Nicole Richard, Sejal Lanterman – app technology to assess food safety practices at farmers markets. Farm to school food safety program development for school gardens. Inhibition of *L. monocytogenes*  in seafood. Defining and overcoming economic factors hindering adoption of food safety practices by small and medium sized farms in the New England region. Growing outreach efforts for GAP compliance amongst produce growers in the state. Entrepreneur workshops for startups, collaborating with Amanda Kinchala. Cottage food production focused on all aspects of a food manufacturing business. Animated video developed in collaboration with NM State to discuss non-thermal processes, soliciting feedback from subject matter experts.
3. University of Tennessee- Doris D’Souza research focuses on improved detection and extraction methods for foodborne pathogens (both viral and bacterial). Antimicrobial effects of polyphenolic compounds (cranberry, hibiscus, blueberry) against viruses. When incorporated into food systems they have shown limited activity. Faith Critzer reported on some extension resources she has developed for small growers to use as training aids and visual reminders for GAPs as well as application of emulsified essential oils as a post-harvest wash alternative antimicrobial that contains OMRI- approved components.
4. New Mexico State- Barbara Chamberlin and Jeanne Gleason- Learning Games Lab Math Snacks and Ninja Kitchen. Evaluating distribution mechanisms ~4 million views for all games. New card game targeting college students focused on food safety. Apps- Navajo plant ID, school gardening, feeding/movement apps for pre-schoolers and parents, chemistry for agricultural sciences. Animations- NoroCore, Purple Triangle Fruit for GAP. Infographics and Virtual Lab. Development studio for collaboration of all of these tools. Traditionally have done a lot of food safety focused games, animations.
5. Louisiana State University- Marlene Janes- studying community acquired *C. difficile* have recovered *C. difficile* from raw oysters (~40%) and from harvesting water (37%) and sewage before and after treatment. Now evaluating the effect of exposure to mice. Also focusing on Norovirus and *Vibrio*. Achyut Adhikari- UV-C light treatment of produce with bacterial foodborne pathogens. UV-C light treatment of irrigation water. Effect of plot management on
6. University of Puerto Rico- Maria Plaza- shelflife of baked pumpkin cakes to develop a low-calorie alternative to traditional fried product. Edible films incorporated with lemon extract to extend shelflife of chicken. Shelflife analysis of PR vacuum packaged beef. Risk assessment of hydroponic production of lettuce. Ochratoxin detection on coffee beans using LCMS. Outreach- GAP training, HACCP, GMPs, Better Process Control School.
7. University of Nebraska- Jeyam Subbiah heat penetration studies and modeling of microwave heating. Help industry design products that heat more uniformly. CAP grant focusing on low-moisture food products using RF processing to facilitate faster heat transfer and decreased come-up times. Egg white powder, wheat powder, spices pasteurization using RF. Validation of extrusion to inactivate foodborne pathogens in low water activity foods. Electrostatic spraying of antimicrobials for more uniform application and decreased antimicrobial application. Monitoring water usage and energy consumption in beef processing to evaluate the impact of alternative processing technologies
8. Auburn University- Luxin Wang- Cow-calf study evaluating the shedding of STEC during rearing. Microflora have an impact on shedding of STEC. High moisture diet (corn silage, corn gluten feed) increased shedding of STEC. Diversified farms with produce and animal production- monitoring of surface water and sediment. Tend to see higher biotype I *E. coli*  in afternoon versus morning. Survival/growth predictive models for *V. parahaemolyticus* in oysters. Reverse transcriptase-PCR yielded higher populations than traditional plate counts.
9. NC State- Ben Chapman- Farmers Market food safety culture, organizational structure and how food safety information is transferred through Extension, to managers then to vendors. Retailer acceptance of unwashed eastern cantaloupes. Food safety knowledge and practices amongst food safety volunteers. Documentation, practices and food safety plans were not formalized and in many cases were non-existent. How does a norovirus outbreak play out in social media- antiquated guidelines are still being distributed. Ecolab “big data” from food processing auditing. Roughly 12 million audits. Inputs are not standardized and they are currently in the process of cleaning-up the data. Evaluating practices such as hand washing compliance, temporally and geographically. Evaluating risk of mechanically tenderized beef processing at independent retail markets. Created a program called Safe Plates as a case study based alternative to ServSafe.
10. Ohio State University- Qiuhong Wang- Research is focused on Norovirus. Objectives are to understand the attachment, uptake and dissemination and persistence of HuNoV in leafy greens. Lectins inhibited binding of HuNoV. HuNoV can persist for up to 14 days, but was not found on inner leaves. SaV may internalize into leafy greens.
11. University of Illinois- Matt Stasiewicz- background in process engineering to virulence response of foodborne pathogens, and development of risk management strategies, deli study evaluating WGS amongst persistent and sporadic *L. monocytogenes* isolates. Would like to relate genotype to WGS. UI, upgrading pilot plant.
12. University of Massachusetts – Amanda Kinchla- leveraging the capabilities within the state to build food processing extension. Product development, BPCS. Trying to provide more resources for entrepreneurs and partnering with food hubs to develop their knowledge of food systems. Enzymatic detection to reduce enrichment times and detection limits. Application of carvacrol nanoemulsions to treat seeds prior to sprouting. National needs fellowship 2 MS and 2 PhD focused on food safety for produce, in the process of recruiting students.
13. North Dakota State University- Teresa Bergholz- genetic and environmental factors on antimicrobial resistance in *L. monocytogenes*. High salt improves resistance to nisin. Five gene stress survival island (SSI-1) observed to contribute to acid resistance, as described by researchers in Ireland. Hypothesized that SSI-1 may also contribute to salt resistance. SSI-1 for lineage I was negatively associated with survival, but increased survival was observed in lineage II. Construct SSI deletion mutants in lineafe I and II strains, and assess impact on nisin resistance.
14. University of Maine- Jason Bolton- several extension courses for established food processors (HACCP, BPCS, etc) as well as for entrepreneurs. Also act as a processing authority for acidified and seafood. Evaluating the risk of mycotoxins in maple syrups, treatment for spices going into cheese. Also does facility design and flow for food manufacturers. Evaluating value-added products from lobster industry. Sous vide project recently funded.
15. University of Arkansas- Kristen Gibson- Crandall collaborating with OK State to conduct whole chain traceability in the beef industry. Conducts a lot of training modules for food workers. Steve Ricke- primary focus on poultry research evaluating the efficacy of oral vaccine for reducing *Salmonella* in poultry. Effect of prebiotics and probiotics on poultry gut microbiome. Kristen has recently gained funding for microbe-microbe interactions with enteric viruses. How do viruses interact with the microbiome of the phyllosphere. Work with local entrepreneurs – recent example working with a dipper well replacement strategy for water conservation. Water quality research evaluating the persistence of pathogens in irrigation water and role of sediments. AFRI-funded grant for farmer’s market food safety focused on engaging consumers.
16. Colorado State University- Jennifer Martin- Center for Meat Quality and Safety- just beginning work of antimicrobial resistance using a metagenomic approach. Microbiome loses diversity (including pathogens) as cattle get closer to slaughter. Collaborating with Elaine Scallan to sequence multi-drug resistance strains of *Salmonella* from human isolates. Looking for resistance genes common amongst human isolates as well as from food. Increasing interventions and validations of interventions for meat products and growing interest in pet food. Lymph nodes as source of *Salmonella* contamination and development of interventions that can be applied during grinding. Transmission of antimicrobial resistance genes in the microbiome to foodborne pathogens. Risk assessment for antimicrobial resistance in the beef industry.

**October 7, 2016- Wednesday**

1. University of Wyoming- Bledar Bisha- Rapid micro detection. Especially the role of wildlife in disseminating foodborne pathogens. Has worked with MALDITO for rapid identification, which is currently more cost effective than WGS. Biotyped roughly 3,000 isolates from which PCA analysis showed clustering amongst species, but are not able to predict antimicrobial resistance. This was supplemented with phenotypic antimicrobial resistance. Also evaluating microfluicis (paper-based spot tests) using substrate-enzyme pairs for detection. Currently testing reagent stability. Sample preparation for microbial detection. Resin-based capture for foodborne pathogen detection in air. Also evaluating the role wildlife in disseminating STEC and *Salmonella* to leafy greens. Coupled this with distance sampling from beef cattle.
2. University of Connecticut- Dennis D’Amico- several faculty focused on food safety research. Sampling microbiome of raw milk cheese with WGS. Runs UCONN creamery in addition to research mission. Enhancing microbial quality and safety of small scale dairy production. Characterize risks and identify control strategies for raw milk and artesian cheeses. Improve processing strategies suitable for implementation and use by small-scale producers. Risk assessment: technical assistance and training for small scale cheese makers for artesian cheeses and enhanced surveillance and control of *L. monocytogenes* and *E. coli* in the dairy industry. Audit being implemented based on UK Small and Local Suppliers Audit (SALSA). Track *L. monocytogenes* and indicators in cheese manufacturers (small) also link source tracking. Risk management- utilization of GRAS compounds as antimicrobial dip for high moisture cheese to control *L. monocytogenes*; use of processing aids to reduce *Campylobacter* in raw milk; acidification aids for raw milk cheese.
3. Penn State University- Luke LaBorde- several faculty focused on food safety in department. Cider safety patulin risk reduction, juice HACCP workshop, GAP extension training, surface water irrigation survey, mushroom food safety. Issues with *L. monocytogenes* contamination with mushrooms. Assisted with first commodity-specific USDA audit Mushroom GAP with 90% of mushroom growers in the US currently being audited.
4. Virginia Tech- Laura Strawn- Five faculty currently part of this multi-state project. Laura is located on the Eastern Shore where a lot of vegetable production occurs. Has started the fresh produce food safety team website, capacity building for agents, FSMA preparedness, farmers market food safety, cucumber safety, water quality, WGS of *Salmonella* Newport as well as other isolates, Delmarva Food Safety Task Force.
5. Cornell University- Randy Worobo- A lot of juice HACCP- focused research. Focusing on UV treatment of juice. Now evaluating nanofabricated surfaces with holes that are 15-100nm in size to evaluate *E. coli, Listeria, Salmonella,* and other pathogens pertinent to public health due to hospital-acquired infections to determine adherence based on nanoparticle size. Irrigation water treatment with UV light and application. Still regularly teaches Juice HACCP for industry and FDA regulators, cGMPs for industry and FDA regulators. Just acquired a 55 liter HPP piece of equipment for validation of juice processes.
6. University of Georgia- Yen Con Hung- Are opening a new facility to assist with production for entrepreneurs. Currently evaluating non-thermal technologies (UV-light) on O157 and big six non-O157 strains. Also evaluating pulsed light (a lot of the light in the UV-C spectrum) but at higher intensity. Also evaluating electrolyzed oxidizing water, which is currently being evaluated as a produce washing step for retail outlets. Evaluating photocatalytic nanocoatings using titanium dioxide. Pesticide removal from produce is another focus.
7. University of Delaware- Kali Kniel- Developed resource to catalog food safety education materials for K-12. Also revamping some of their own materials that are available on this website and fully editable. Evaluating the survival of *Salmonella* from poultry litter incorporated into the soil. When tilled into the plots *Salmonella* prevalence increased. Found pathogens were transferred onto watermelons. Rain events increased prevalence of *E. coli* in the field. Evaluating the efficacy of a *Bacillus* sp. that promotes plant growth and modulates opening and closing of stomata and was found to inhibit *L. monocytogenes.* Hydroponic growth of microgreens has demonstrated efficient update of MuNoV and survival until harvest. Tulane virus evaluating binding patterns and cell culture infectivity.
8. University of Minnesota- Franscisco Diez-Gonzalez- Food Protection and Defense Institute changing funding model to multiple agencies vs DHS-only. Dr. David Baumler systems biology and using genome based metabolic modeling. Healthy turkeys have a previous-VBNC organism and identified culture conditions necessary to get this organism to grow. Francisco has been evaluating plant-pathogen interactions using RNA-seq. Models have been *Salmonella* in peanuts and *E. coli* in spinach. Trying to determine if pathogen can internalize in the plant, which has only been observed when soil populations are higher than 6 log CFU/g. Trnascriptome of *Salmonella* in low water activity (0.11) and thermal inactivation. Trying to determine factors which influence the ability of *Salmonella* to survive.
9. University of Maryland- Bob Buchanan- Projects focused on produce safety, *Toxoplasma gondii* risk assessment, pet food safety. Evaluating cropping systems commonly used with tomatoes and muskmelons to determine risk. Investigating mix-crop and livestock farming 17% *Salmonella* positive. Z-pattern sampling is similar to stratified or random when processing a large number of samples, but this sensitivity goes down when only evaluating 10. Rehydrated dry pet food (common serving method) typically results in reduction to no growth. Parabens aid in thermal inactivation of *C. sakazakii*.
10. Rutgers University- Don Schaffner- fresh citrus QMRA, *Salmonella* growth modeling in tomatoes, cross-contamination in fresh cut produce, *Salmonella* modeling in cucumber cross-contamination, surface to food cross-contamination (five second rule), Norovirus QMRA in future work, sociology student currently studying dynamics of lab, Salmonella in leafy greens QMRA visiting scientist. Effet of surface geometry on disinfection with cold plasma, UV and heat to inactivate *Alicyclobacillus*. Model cooling rates as an interface with restaurant practices and . *Salmonella* QMRA in low water activity powders, risk of contamination with refillable soap.
11. University of Florida- Michelle Danyluk- Tomato GAPs have been mandatory since 2007, requiring expansion of material covered. One example is explaining water testing, methodology, interpreting results, and application of water safety post-harvest. Applied manure at different rates in different areas around the state to determine survival and persistence of pathogens. Evaluating the risk of field flooding, application of biosolids to commercial crops, evaluating buffer distances for fecal contamination, hydrocooling and risk of pathogen internalization, expanding outreach to tree fruit crop growers, leading Southeastern Regional Center that will coordinate produce safety training efforts within the region.

**Business Meeting Minutes**

1. Business meetingwas called to order at 5pm EST October 6, 2015 by Chair Michelle Danyluk.
2. Those in attendance at the business meeting were:

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| **Last Name** | **First Name** | **Organization** |
| Adhikari | Achyut | LSU AgCenter |
| Bergholz | Teresa | North Dakota State University |
| Bisha | Bledar | University of Wyoming |
| Bolton | Jason | Umaine |
| Buchanan | Robert | University of Maryland |
| Chamberlin | Barbara | New Mexico State University |
| Chapman | Ben | North Carolina State University |
| Critzer | Faith | University of Tennesee |
| D'Amico | Dennis | University of Connecticut |
| Danyluk | Michelle | University of Florida |
| Diez-Gonzalez | Francisco | University of Minnesota |
| D'Souza | Doris | University of Tennessee-Knoxville |
| Gibson | Kristen | University of Arkansas |
| Gleason | Jeanne | New Mexico State University |
| Hung | Yen-Con | University of Georgia |
| Janes | Marlene | LSU AgCenter |
| Kinchla | Amanda | Umass Amherst |
| Kniel | Kali | University of Deleware |
| LaBorde | Luke | Penn State University |
| Lanterman | Sejal | University of Rhode Island |
| Martin | Jennifer | Colorado State University |
| Pivarnik | Lori | University of Rhode Island |
| Plaza | Maria | UPR-RUM |
| Richard | Nicole | University of Rhode Island |
| Schaffner | Don | Rutgers University |
| Stasiewicz | Matthew | U. Illinois Urbana-Champaign |
| Strawn | Laura | Virginia Tech |
| Subbiah | Jeyam | University of Nebraska-Lincoln |
| Wang | Qiuhong | The Ohio State University |
| Wang | Luxin | Auburn University |
| Worobo | Randy | Cornell University |

1. Membership voted for new leadership which will begin after the annual meeting, serving a two-year term in each role before ascending to the next position. In addition to secretary, Vice-chair was also elected in order to fill the position vacated by Joy Waite-Cusic. Candidates for the positions were:
   1. Vice-chair: Kristen Gibson, University of Arkansas and Secretary: Achyut Adhikari, Louisiana State University and Sanja Illic, Ohio State University
   2. The membership elected Kristen Gibson as Vice-Chair (2015-2017) ascending to chair (2017-2019) and Achyut Adhikari as Secretary (2015-2017), Vice-Chair (2017-2019), and Chair (2019-2021)
2. Hosts for next year
   1. It was recommended that New Mexico State host the next meeting. Barbara Chamberlin and Jeanne Gleason indicated they would be willing to consider their options and would get back with the executive committee so that plans can be made. Other recommendations included Maine. Faith will follow-up with Barbara and Jeanne in late Oct to early Nov to discuss our options.
3. Additional multi-media training workshop
   1. The risk assessment additional one-day workshop was very well received by the members. It was recommended that leadership discuss the possibility of NMSU hosting a similar workshop focusing on their area of expertise before the 2016 meeting.
4. Meeting adjourned

Respectfully submitted,

Faith Critzer

S-1056 Vice-Chair