**NE1942 Annual Meeting**

**Enhancing Poultry Production systems through Emerging Technologies and Husbandry Practices**

**American Farm School, Thessaloniki, Greece,**

**June 17-18, 2024**

**Officers for 2024**

Sr. Exec – Indu Upadhyaya, UConn

Jr. Exec – Shawna Weimer, UArk

 Secretary – Li Zhang, MS State

**Introduction of Attending NE1942 Participants:**

Tony Pescatore – University of Kentucky

Mike Ford – University of Kentucky

Jackie Jacob – University of Kentucky

Tayo Adedokun - University of Kentucky

Lin Walker - NC State Dept. of Poultry Science

Lingjuan Wang-Li – NC State University

Pratima Adhikari – Mississippi State University

Kelly Wamsley – Mississippi State University

Ken Macklin - Mississippi State University

Michael Persia – Virginia Tech

Todd Applegate – University of Georgia

Tomislav Vukina – North Carolina State University

Dianna Bourassa – Auburn University

Greg Fraley – Purdue University

Rajeash Jha – University of Hawaii

Mary Anne Amalaradjou – University of Connecticut

Indu Upadhyaya – University of Connecticut

Shawna Weimer – University of Arkansas

**Introduction:**

* Jeffrey Landsdale provided an introduction of himself and the American Farm School (AFS). He welcomed spouses and other guests to be involved in the school during the meeting and/or symposium. He discussed the AFS’s pre-K and K programs to introduce youth to agriculture and the college. The AFS used to be vocational high school, expanded to children of all ages and college students. The Farm School has historically been very advanced, and they are trying to keep up with that.
* Jeffrey Landsdale spoke of the beginnings of the farming program and the development of the poultry/farming industry in Thessaloniki. After issues with authorities after complaints from those living nearby, the farm has been allowed to stay for the betterment of students and the community. There was 8 million dollars provided to revitalize the school’s farm. Partial revenue for the school comes from product sales including eggs and milk. Though Greece’s cattle milk production is 8th best in the world per head, demand for cattle dairy product is going down. Because of this, the school may switch to goats. This may reduce environmental impact as well. The school might also use the cattle sediment tank for freshwater fish farming after replacing the cattle with goats.

**Meeting called to order** **–**Dr.Indu Upadhyaya

* Indu Upadhyaya called the meeting to order and commenced with the approval of minutes from the previous meeting. Mike Persia made the motion to approve the minutes, which was seconded by Ken Macklin.

**Administrative Update** – Dr. Kumar Venkitanarayanan

* Dr. Kumar Venkitanarayanan provided a pre-recorded administrative update due to health reasons preventing him from attending the meeting in person. He introduced himself and provided a brief discussion of the project. He thanked the project team for their hard work regarding the grant as well as coordinating and attending the meeting. Afterwards, he announced the unanimous approval of an extension for the project to NE2442. Suggestions were made to include the consideration of artificial intelligence technology and agriculture economics in studies, and to also recruit additional PI’s. Dr. Venkitanarayanan concluded the update by thanking the American Farm School and planning committee as well as extending an invitation to Jeffrey Landsdale to visit the University of Connecticut.
* Discussion on the project extension was furthered by Indu Upadhyaya. There was an invitation for members to enroll in the extended project, which requires PIs to complete Appendix E. Indu Upadhyaya recommended inviting as many people as possible to maximize productivity.

**Proposed Meeting Locations in 2025:** 9:33-10am

* 3rd Precision Livestock Farming (hatch-funded) meeting, recommended that there is a meeting piggybacking off this for next year in Lincoln, Nebraska
	+ Could include tour of university, major projects underway that would be interesting to visit
	+ Members are unsure of the amount of poultry expertise available, but the technology could still be very transferrable. In addition, PLF recently had an industry panel on how to utilize AI in the livestock industry.
* It was suggested that there could be a survey to decide on location.
* Pratima suggested a domestic and international on alternating years to assist with affordability.
* University of Georgia, Iowa State, Hawaii, and Puerto Rico were also mentioned as options. Hawaii has on-campus accommodations that would be relatively cheap
* Iowa State offered to host; a prior in-person meeting was cancelled during COVID-19 epidemic. However, Iowa State has HPAI issues.
* It was mentioned that the schedule for the COE is very predictable and can help with planning to include everyone.

**Coffee break** – 10am

**2024 Station Reports:** until 11:52

* Attendees were asked to list their name and university, and to discuss their objective of research and any new facilities.

University of Georgia

* Dr.Todd Applegate
* The university held a round of interviews for food safety research/teaching positions (55% extension, 40% research) focusing on breeder/hatchery, assistant professor rank only. They have gone through a few years for integrated precision agriculture including 5 universities, mostly plant-related but gaining on livestock/poultry especially in animal well-being. Animal vision and acoustics, nutrition.

Mississippi State University

* Dr. Pratima Adikhari and Dr. Ken Macklin
* The university has 1 open position still for a poultry physiologist.
* There is a new assistant prof, poultry management position, shared animal/poultry position filled.
* They are looking into improving hatching of chicks by manipulating breeder diet and incubation environment.
* Li Zhang (not attending) is working on the development of a vaccine for poultry *E. coli*, studying the chick microbiome, and methods of *Campylobacter/Salmonella* detection.
* Pratima has been studying different approaches in feeding laying hens. She is investigating alternative ingredients (household waste meal, soybean mold prevention), and higher superdoses of vitamin A or phytase. She has been working with Zhang on APEC, comparing healthy versus sick birds, characterization to find virulent genes looking for vaccination candidates, and creating a model for positive isolates. She is also looking for a microbiology post-doc.
* Dr. Kelley Wamsley has been working on enzyme projects (phytase, gut health products, impact on litter quality – moisture, water activity, bacteria, ammonia), feed conversion ratio calculations impact, feed quality projects with USDA-ARS (corn particle size, feed quality, necrotic enteritis), and feed quality with particle sizes on birds.

**University of Kentucky**

* Dr. Tony Pescatore provided the update. The Martin-Gatten College of Agriculture and the Environment was provided a major endowment of funding to improve the college. The university promised to rebuild the dairy and poultry farms lost to urban encroachment. So far, they have rebuilt the poultry farms but not yet the dairy in a nearby county. They have been raising broilers and laying pullets, utilizing an increased capacity, and reutilizing rooms for temperature stress for research. They can also build office/research lab complex to go with the poultry farm. They are also getting new ag buildings due to new a new teaching hospital being built in their place. This includes a teaching building, research building, food processing workforce development center, administrative building, and education center joint venture with cattle unit.
* A position will open soon with a 60% extension and 40% research in the summer.
* They will continue a continuing vet training program (non-poultry).
* They are hoping to do more projects with pasture-raised laying hens, regenerative farming.
* Dr.Tayo Adedokun has been performing studies on amino acids, microminerals, etc.. He has conducted a few studies on corn and soybean for factors on digestion and contamination, studies on effects of feed additives on different poultry strains and their production and welfare, and research on effects of heat stress on broiler chicken utilization of vitamins in corn.
* Dr. Jacquie Jacob has been working with small backyard flocks, and has been hosting educational webinars. She is looking for more experts to answer questions and do webinars on tech transfer for different research on how university research can be applied to small commercial/pasture/food safety/biosecurity. She has also been involved in farmer-to-farmer programming that is currently on hold due to delays in budget passing

**University of Connecticut**

* There are 4 faculty that are part of this multistate group: Dr. Kumar Venkitanarayanan, Dr. Indu Upadhyaya, Dr. Abhinav Upadhyay, and Dr. Mary Anne Amalaradjou.
* Dr. Mary Anne Amalaradjou has been working on a sustainable poultry project that should be finishing soon. She also has a new grant on layer production and food safety. She also is working on 2 more new USDA projects on egg-to-hen production and development (sanitation, on-farm hatching improvement, phytogenics and nanoemulsions, ultrafine ozone bubbles effect, and manipulating the embryonic microbiome). She is also researching how various aspects including transport effect chick hatching quality and microbiome. She is looking for a post-doc in poultry to help with microbiome project
* Dr. Indu Upadhyaya has a new grant on egg safety, the funding of which will support the study of effects of farm aspects on egg safety. She is also in the process of developing an egg HACCP, and is looking to fill a position to assist with this. She has been hosting meat/poultry HACCP workshops for small-scale processors which included grad student presentations on research. She has been working on an industry project with AVANTGARDE (through a USDA- SBIR grant)
* Dr. Abhinav Upadhyay received a food safety production grant in layers, and has been developing an externship program with India.

**North Carolina State University**

* Dr. Lin Walker, Dr. Wang-Li and Dr. Tomislav Vukina presented the update. The University has a position available with 60% extension, 30% research, and 10% teaching.
* Most of the research at the university is applied, part of which is studying the reduction of *Salmonella* and *Campylobacter* at various stages of poultry production and processing. They are also comparing cage and aviary birds on egg quality/functionality and food safety parameters. They are also studying the use of infrared pulse lights to extend shelf life and reduce pathogens in liquid egg products. There is a research looking at conventional broiler systems and agriforestry effects on welfare, food safety, and economic factors. There is also a litter study in progress evaluating pH level, activity level, and *Salmonella* growth. They also have research in progress on protozoans in turkeys.
* The university will have a poultry-related position open soon, and a position regarding poultry health was just filled.
* There is a room in the turkey unit ready for poultry research, and the first trial will begin soon (can peanut skin reduce *Salmonella* in broilers).
* The engineering department head search has begun, and they just hired for a poultry position.
* They can collaborate with the agriculture communication department head position.
* There will be upgrades to food safety research locations, mostly preparing for digital agriculture.
* There has been progress on a broiler heat stress study on net bird health. There has also been progress on a nitrogen deposition study on how ammonia effects the aerosolization of nitrogen.
* Tom Vukina had a PhD student graduate recently.
* There was a brief discussion on criminal cases on litigation for price fixing and collusion within the poultry industry. There is a PhD student looking into signs of possible collusion, and a graduate student wrote a paper on a major merger affecting business market power.
* There was a cooperative agreement looking into regulated tournaments for broiler production efficiency.
* A student investigated Proposition 12 in California and the discrepancy in voting on it versus consumer preference.
* This group is looking for a poultry agriculture economist to collaborate with.

**University of Arkansas**

* Dr. Shawna Weimer provided a report for the University of Arkansas.
* Multiple full professors retired recently, and thus more faculty positions will likely be available soon. A position has also opened for food safety with extension.
* There is a faculty at the university working on net energy and testing products. There is also a faculty researching on histomoniasis.
* There has been research focusing on photo period and wavelength effects on poultry production, welfare, and physiology.
* There was a USDI-APHRI proposal for heat stress.
* They are working with their extension team for more workshops and short courses, and there is a cohost auditor training examination.

**Auburn University**

* Dr. Diana Bourassa provided an update for Auburn University.
* Dr. Wilmer Pacheco was not present, but it was mentioned that he has been continuing feed milling and particle size work.
* They are getting a new department head in July and have hired a new research assistant professor. There is also a post-harvest food safety hiring in progress, and the vet school hired a new faculty member to help with poultry extension.
* There is research focusing on *Salmonella* and *Campylobacter,* tracheal microbiomes, aerotolerant *Campylobacter* genes and colonization, dietary fat sources and effects on birds and disease transmission, antimicrobial interventions, gene expression impact from high intensity high pulse lights, and the effects of bacteriophages and treated water on the quality and functionality of egg laying ducks.
* They are also teaching basic HACCP for meat/poultry.

**Purdue University**

* Greg provided the update for Purdue University.
* There is research ongoing that is focusing on multiple kinds of poultry, parasites in layers, epigenetics of heat stress (f1-f3), how birds perceive environment based on multiple lighting systems, and how to combine behavioral, physiological, other holistic data into a program that can virtually produce optimal cage-free poultry systems.
* There are active grants on poultry quality, meat quality, environmental enrichment for turkeys, and the antibiotic properties of high-carotenoid diets and their effectiveness in relieving stress.
* The university hired new faculty, but no new poultry scientists. They are searching for a new department head.
* They are using facilities for research, hoping to upgrade environmental control systems.
* They are preparing extension programs for shell eggs and other poultry-related topics.

**University of Hawaii**

* Several new individuals have joined the university, including a new dean and multiple personnel specializing in veterinary fields.
* There has been ongoing work on nutrition and gut health, mechanistic factors, prebiotics, microbiology and biology, heat stress management (temperature manipulation), reproductive physiology, aging, and how to increase laying production time.
* Though they are limited by their facility availability for research, international programs are becoming more regular.

**Virginia Tech**

* They will be hiring a new dean soon. There were recent faculty losses and are hoping someone new with a poultry focus will be hired soon as well.
* There are two new buildings, and they are hoping that equipment and people will be available so that they can be properly utilized.
* There is research ongoing that is focusing on aragonite, a bio-renewable calcium source from coral on ocean floor that is denser and more digestible than most available limestone. There are other studies in progress on gut health, antibiotic replacements (alternative ingredients), the effects of litter moisture effect on coccidiosis response, and (for NRC nutrient guides) updated poultry nutrient requirements for cost and environmental savings

**Indu closed station reports**

* A request will be sent to non-represented universities for station reports, and deadlines will be set for the timely sharing of knowledge.

**Lunch break followed by campus tour** – 11:56am

**June 18, 2024 (DAY 2):**

The meeting was called to order by Indu Upadhyaya at 8:57 am.

**Opening remarks and introductions** - Indu Upadhyaya

Guest speakers: Dr Ilias Giannenas, Aristotle University, Dr. Kostas Mountzouris, Agricultural University of Athens.

**Guest speaker presentations** - 9:00am

* Dr Ilias Giannenas gave a presentation introducing himself and his work. It began with his early work and education, and his introduction to the college.
* He discussed his work with insects in poultry feed, including different insect species, their care, and their nutritional content. He also spoke on the low environmental footprint of insects (low requirements, high efficiency, and can utilize waste for production), the different forms of use for insects (fresh, dried, flour), the composition / nutritional value of various insect species, and larvae production methods.
* After this, he presented various research hypotheses and study methods for his work. The results of the studies showed no significant difference in feed intake and feed conversion ratio, though there was mild diarrhea. However, there was a slightly better pododermatitis occurrence and feather score in those birds provided with the additional insects in their feed. He also discussed results of related studies. There were apparently no adverse effects on intestinal tissue, and there was greater villus height and lower crypt depth. There were varied effects on the intestinal microbiome, including greater diversity in species richness and diversity in caecal samples compared to ileal samples. He concluded his presentation on his research by showcasing a few of his publications.
* There was time provided for a few questions before moving on.

**Short Refreshment Break:** 10:10 am

**Second Guest Speaker Presentation:** Dr. Kostas Mountzouris, introduction by Indu Upadhyaya – 10:32

* Dr. Kostas Mountzouris offered a potential meeting in Agricultural University of Athens, Greece before giving a presentation on his work. The main topic for this work is the modeling of critical gut homeostasis indices for their links with dietary inputs and broiler performance. He began by defining gut homeostasis before showing examples and describing processes of critical cellular mechanisms involved in homeostasis modulation (detoxification, cytoprotection, inflammation). He then explained connections between these processes and animal physiology and listed functional gene mRNA transcript indices. He moved on to describe an experimental approach to map performance responses and determine critical gut homeostasis indices under diverse dietary inputs in broilers. The objective of this is to apply Response Surface Methodology (RSM) and Central Compositive Statistical Designs (CCD). He described a case study (modeling RSM empirical modelling of ME, CP, and Phytogenic inclusion, study protocol and data collection methods for various performance responses/values, that detoxification transcripts and inflammatory transcripts decrease and cytoprotection increases as approaching optimal diet, and that dietary PG inclusion increases STI and decreases DTI and IRI, therefore its conclusion could counteract. He also described the formation processes of various case studies. To conclude, he said RSM mathematical models are helpful tools for studying and optimizing multiple reposes. The functional indices provide tools to monitor dietary formulation challenges at cell level, so measurements could be valuable markers for sustainable poultry production.
* There was then time provided at the end for a few questions.

**Unfinished Business** – 11:45

Voting for 3 potential locations for next meeting

* Top 5: Georgia, Iowa, Nebraska, Hawaii, Puerto Rico
* Iowa – 13
* Puerto Rico – 10
* Georgia – 8
* Nebraska - 7
* Hawaii - 4
* **Winners: Iowa, Puerto Rico, Georgia**
* Suggestion of having an estimate of cost within survey for final choice
* Suggestion of dates that would be best to avoid or to visit

Tony Pescatore motioned to accept the choices, which Kelley Wamsley seconded. Motion passed.

Indu moved to the second topic of discussion, which is to nominate a new secretary.

Indu described the position including their responsibilities.

* Nominated candidates: Lin Walker, Mary Anne Amalaradjou
* Both accepted nominations
* Mike Ford was chosen to be the teller, counting the votes
* Lin Walker got 9 votes, while Mary Anne Amalaradjougot 4 votes. Lin Walker received the majority of votes and was given the position.

Motion made by Mike Persia for Shawna to move as the Senior executive and Li Ziang to move as the Junior executive for the 2024-2025 term

* The vote was done verbally, and the motion was accepted.

Tony Pescatore suggested that the leadership present work related to the project (NE 2442) to show progress and adequate use of resources and increase visibility. Mike Persia suggested there be a committee for this.

Kelley made a motion for a committee comprising the following listed people to create a symposium for presentation at the 2025 PSA Annual Meeting: Mike Persia, Ken Macklin, Mary Anne, and Brett Ramirez (or at least 1 Agricultural engineer).

* Seconded by Rajesh Jha. Decided by verbal vote and the motion was approved.

No further unfinished business.

Indu invited Greek collaborators to participate in a discussion. Dr. Kostas was available.

Finally, it was decided that the leadership committee would follow up on inviting more participation to the NE-2442 group and follow up with surveys to plan the next annual meeting 2025.

Motion to adjourn from Mary Anne Amalaradjou, seconded by Rajesh Jha. **Meeting adjourned at 12.20 PM.**