



AGENDA

IALR Board of Trustees APPLIED RESEARCH COMMITTEE

Tuesday, May 5, 2026 - 9:00–10:30 am – IALR Conference Room 203

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|--|--------------------|
| I. Convening of Meeting | Dr. Mario Ferruzzi |
| A. Welcome | |
| B. Call to Order and Confirmation of Quorum | |
| C. Call for Changes to Agenda | |
| II. Attendance of Committee Member(s) by Electronic Communication Means (Vote Required) | Dr. Mario Ferruzzi |
| III. Approval of Minutes (Vote Required) | Dr. Mario Ferruzzi |
| A. February 3, 2026 | |
| IV. Applied Research Report | Dr. Scott Lowman |
| V. Open Discussion of Concerns, Issues, and Observations | Group |
| VI. Adjournment | Dr. Mario Ferruzzi |

Reference material included: “Research-Related Updates”

Future Committee Meetings

Applied Research Committee Members

Dr. Mario Ferruzzi, *Chair*
Mr. Don Gibson, *Ex Officio*
Ms. Emma Kozlowski
Mr. Charles Majors
Ms. Leslie Mantiply
Mr. Don Merricks
Mr. Kunal Patel
Dr. Tom Powell

Future Plenary/BOT Meetings

May 14, 2026

IALR Staff

Mr. Telly Tucker, President
Dr. John Hughes, Executive Vice President, Operations
Dr. Scott Lowman, Director of Applied Research
Ms. Pam Patterson, BOT Secretary & Executive Assistant



**IALR BOARD OF TRUSTEES (BOT)
APPLIED RESEARCH COMMITTEE**

Minutes – Tuesday, February 3, 2026 – 9:00 a.m. – IALR Conference Room 203

<p><u>Members Present</u> Dr. Mario Ferruzzi, <i>Chair, via Zoom</i> Mr. Don Gibson, <i>Ex Officio</i> Ms. Emma Kozlowski, <i>via Zoom, left @ 9:50 a.m., returned at 10:00 a.m.</i> Ms. Leslie Mantipty, <i>left @ 10:00 am</i> Mr. Don Merricks Dr. Tom Powell</p> <p><u>Members unable to attend</u> Mr. Charles Majors Mr. Kunal Patel</p>	<p><u>IALR Staff Present</u> Mr. Telly Tucker, President, IALR Dr. John Hughes, EVP, Operations, <i>via Zoom</i> Dr. Scott Lowman, VP of Applied Research Ms. Pam Patterson, BOT Secretary</p> <p><u>IALR Staff unable to attend</u></p> <p><u>Guests</u> None</p>
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Call to Order / Quorum / Changes to Agenda

Dr. Mario Ferruzzi called the meeting to order at 9:00 a.m. on Tuesday, February 3, 2026. No changes were made to the meeting agenda.

Attendance of Committee Member(s) by Electronic Communication Means

Dr. Ferruzzi and Ms. Kozlowski participated electronically. Dr. Ferruzzi joined remotely due to professional obligations at Virginia Tech. Ms. Kozlowski attended via Zoom due to the distance between her principal residence and the meeting location. The committee voted to approve their participation via Zoom.

Motion: Mr. Don Gibson made a motion to allow Dr. Mario Ferruzzi and Ms. Emma Kozlowski to attend the meeting via Zoom. Mr. Don Merricks seconded the motion, and it passed unanimously.

The results of the vote are shown below.

Committee Members Absent	-	2
Committee Votes For	-	4
Committee Votes Against	-	0
Committee Abstentions	-	0

Approval of Minutes

Motion: Dr. Tom Powell made a motion to accept the minutes for the October 28, 2025, meeting. Ms. Leslie Mantiply seconded the motion. The motion passed unanimously.

Applied Research and Business Development Update

Dr. Scott Lowman presented the report (Exhibit A). The department had received a \$62,000 grant from the Virginia Department of Agriculture and Consumer Services (VDACS) to support the development of new crops for the CEA industry. IALR had also been awarded a \$500,000 grant from the Southern Crescent Regional Commission (SCRC) to support greenhouse expansion, with a focus on entrepreneurial initiatives.

Several articles were published during the reporting period, including a peer-reviewed publication in PLOS, a mission-driven open-science publisher, on beneficial microbes and strawberry production. Partner projects continued with Syngenta, AgroSpheres, and Mosaic.

Dr. Lowman and Dr. Kaylee South planned to attend the Indoor Ag-Con: Indoor/Vertical Farming & CEA Trade Show in Las Vegas, Nevada, where IALR is serving as an event sponsor.

Open Discussion of Concerns, Issues, and Observations

There was no further discussion.

Action Item

- Dr. Scott Lowman agreed to provide a summary of the report titled, “*Co-Locating Data Centers and Greenhouses*” and present it to the committee.

Adjournment

Dr. Ferruzzi asked for a motion to adjourn the meeting.

- **Motion:** _____ made a motion to adjourn the meeting. _____ seconded the motion, and it passed unanimously. The meeting adjourned at _____ a.m.

Signatures and Exhibits are shown on the following page.

Minutes Recorded By:

Minutes Approved By:

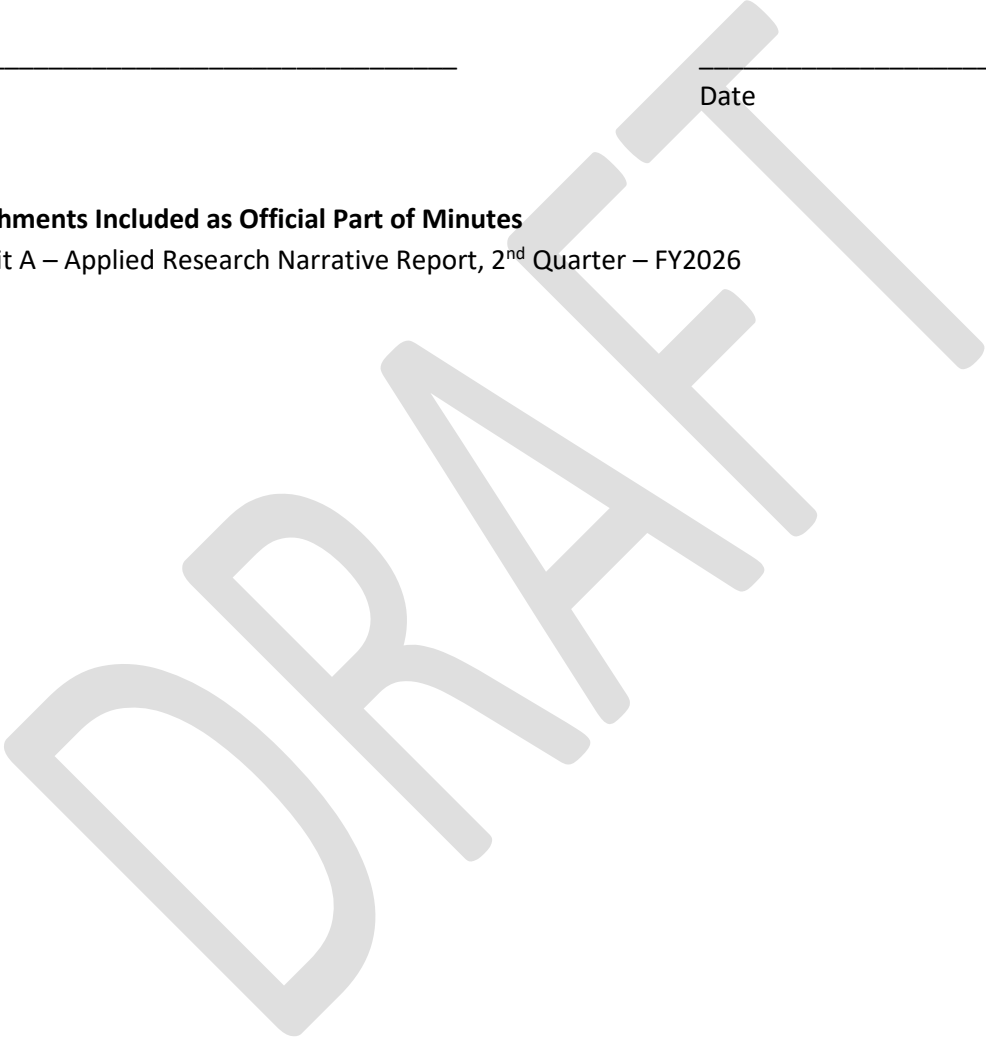
Ms. Pam Patterson
BOT Secretary

Dr. Mario Ferruzzi
Chair, Applied Research Committee

Date

Date

Attachments Included as Official Part of Minutes
Exhibit A – Applied Research Narrative Report, 2nd Quarter – FY2026





Research Committee Report
Dr. Scott Lowman
May 5, 2026

Name of Program or Initiative: Building Virginia’s Controlled Environment Agriculture (CEA) Industry Through Targeted Research, Workforce, and Economic Development Initiatives

(The Virginia Tech / IALR Controlled Environment Agriculture Innovation Center)

1) Background

- a. The Center’s strategic partnership with Virginia Tech’s School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences provides CEA businesses access to a diverse array of globally recognized subject matter experts and leading-edge translational research capabilities.
 - The VT/IALR CEA Innovation Center houses facilities encompassing laboratories, offices, and greenhouse spaces devoted to biology, chemistry, robotics, data science, and hydroponic research in plant science.
 - Partnering companies benefit from a comprehensive suite of services, including IP-friendly and low-cost contract research, ISO chemistry testing, access to bench and greenhouse spaces, and experts for guidance.
 - While the above capabilities and partnerships highlight a competitive industry-focused research capacity, current small-scale internship programs, and entrepreneurship support are presently pilot-scale and have tremendous room for growth.
 - The Virginia Tech Center for Economic and Community Engagement helped develop the CEA Strategy and Roadmap in GO Virginia Region 3, which identified several strategic needs and opportunities.
 - The team has supported numerous VEDP and other economic development initiatives since its inception.

2) CEA Research

- a. The report titled “Co-locating Data Centers and Greenhouses” was published recently. Funded by Go Virginia Region 3, the report was prepared by the Resource Innovation Institute.



- Currently leveraged across the state
 - A working group has been formed with GoVa, REII, and IALR to explore the concept of a farm park for economic development.
 - Multiple groups are contacting the team and wanting to learn more.
- b. Research is interviewing to fill six internships this year. Three will be focused on biotechnology, two will be in CEA, and one will be in robotics.
- c. Dr. Lowman is working with the Governor's school to develop a parallel path to their traditional senior research project focused on the engineering design process. This will enable students to more easily coordinate with and utilize divisions across campus and also give students interested in engineering an option to gain real world experience.
- d. The VT / IALR team published a new peer reviewed article in PLOS One titled "Integrated effects of anaerobic soil disinfestation and beneficial microbes in strawberry production" (Baker D. Aljawasim, Patricia Richardson, Chuansheng Mei, Robert L. Chretien, Scott Lowman, Jayesh B. Samtani).
- e. The VT / IALR team published a new peer reviewed article in HortTech titled "Microtomato Fruit Production Varies among Cultivar and Photosynthetic Photon Flux Density in an Indoor Vertical Production System" (Anna Ekene Tharpe, Kaylee A. South, Scott Lowman, Brandan Shur, and Michael R. Evans)
- f. The IALR team published an article titled "Integrated Transcriptomic and Root Microbiome Responses of Lettuce to Beneficial Endophytic Bacteria in Hydroponic Systems". The article was published in the International Journal of Molecular Sciences.
- g. SMART tables have been upgraded to meet OSHA standards and moved into 236.
- h. New partnership has been established with group who built the Pluck'd greenhouses. Focuses include promoting small to midsized greenhouses for the US, workforce, and K-12 education.
- Company overview - Pluck'd is a U.K.-based company that has established its first U.S. facility in Austinville, Carroll County, Virginia, investing \$104.5 million to build a 65-acre advanced greenhouse for tomato production and distribution. The facility is strategically located within a day's drive of the entire



East Coast, allowing rapid delivery to retailers from Boston to Miami. This proximity ensures fresher produce with a longer shelf life, reducing food waste and enhancing flavor.

a. Tomato Varieties

- Pluck'd focuses on three carefully selected tomato varieties, chosen after extensive taste testing and research:
- Preemos: Mid-size tomato-on-the-vine with balanced flavor and vibrant red color
- Plucculents: Cocktail-sized tomatoes-on-the-vine, juicy and sweet
- Plucklings: Small, snackable tomatoes-on-the-vine with bold flavor and natural sweetness

b. These varieties are grown year-round using climate-smart greenhouse technology, including AI, robotics, smart lighting, waste heat circulation, and pollination optimization.

3) Entrepreneurship support

- a. The RISE Collaborative received funding from TRRC to launch the RISE Accelerator and are in early talks with the folks from RBTC/RAMP about partnering to bring their RAMP accelerator model to SOVA. They are particularly interested in the AgTech sector. Having the CEA Innovation Center be part of this would be essential.

4) Conferences and Events

- a. Drs Lowman, Evans, and South attended IndoorAgCon in Las Vegas.
- Event Summary - Indoor Ag-Con 2026, held February 11–12 at the Westgate Las Vegas Resort & Casino, brought together over 2000 attendees from all 50 U.S. states and more than 30 countries alongside roughly 260 exhibitors, and was widely seen as a turning point toward a more mature, execution-focused phase for the controlled environment agriculture (CEA) industry, with discussions emphasizing operational discipline, realistic scaling, and long-term profitability rather than rapid expansion or hype. Across multiple crop- and sector-specific conference tracks and packed Expo Theater sessions, speakers highlighted that CEA encompasses a spectrum of models—greenhouses, hybrid systems, and vertical farms—each requiring different economics and go-to-market strategies, while repeatedly stressing that sales, demand alignment, and cash flow management are now bigger challenges than simply increasing production. The



expo floor reflected these themes, showcasing automation, robotics, AI-enabled control systems, and energy-efficient climate and lighting technologies aimed at reducing labor costs and improving margins, and networking events and co-located association meetings reinforced Indoor Ag-Con's role as the industry's primary annual convening point focused on building durable, commercially viable indoor farming businesses

- b. Mitchell Doss is leading a workshop focused on regional food system development.

c.

5) Grants

- a. Applying for - AI-Ready America (NSF AI-Ready America) "Virginia Coordination Hub: Growing an AI-Ready Commonwealth Through Sector-Driven Workforce Development and Community Deployment" with a VT team.
- b. Submitted – TRRC, \$350,000 for greenhouse expansion
- c. Submitted - Transforming Hydroponic Leafy Greens Systems Through Integrated, Innovative Pest, Pathogen, and Shelf-Life Management, Program: USDA-NIFA Agriculture and Food Research Initiative (AFRI) – Strengthening Agricultural Systems (SAS)



Lead Institution: University of Arkansas (PI: Dr. Kristen Gibson)

IALR Budget: \$47,250 over 5 years

- Overview: This multi-institutional project aims to develop sustainable, integrated strategies to manage pests and pathogens in hydroponic leafy greens while improving post-harvest shelf life and food safety. The proposal also includes a strong workforce development and outreach component.
 - IALR & Partner Roles: IALR's Amy Turner and Dr. Sajeewa Amaradasa, along with Virginia Tech's Dr. Kaylee South and University of Georgia's Dr. Ruchika Kashyap, will lead the pathogen-management objective. Activities include evaluating disease-control strategies and contributing to training and outreach deliverables.
- d. Submitted - SHIELD-CEA: Systems-based Holistic Integrated Early-warning, Learning, and Disease Management Platform for Gray Mold in CEA, Program: USDA-NIFA Agriculture and Food Research Initiative (AFRI) – Strengthening Agricultural Systems (SAS)

Lead Institution: Virginia Tech (PI: Dr. Kaylee South)

IALR Budget: \$67,640 over 5 years

- Overview: This project focuses on developing an improved, systems-based management framework for gray mold (*Botrytis cinerea*) in controlled-environment agriculture. The work includes evaluating commercial and novel biocontrol agents, UV-based disinfection tools, and cultural practices, and integrating the most effective approaches into a comprehensive disease-management platform. Workforce training and outreach are also major components.
 - IALR & Partner Roles: Dr. Amaradasa (5% effort) and Amy Turner (15% effort) will contribute to pathogen biology, disease-management trials, and integration of biological and physical control tools during the first four years of the project.
- e. In Development - A Novel, Integrated Approach to High Tunnel Farming for Enhanced Nutrient Use Efficiency and Timely Decision-Making, Program: USDA-NIFA Specialty Crop Research Initiative (SCRI)

Lead Institution: University of Florida (PI: Dr. Uttara Samarakoon)

IALR Budget: TBD

- Overview: This proposal aims to improve high-tunnel specialty crop production by integrating nutrient-use efficiency tools, decision-support systems, and disease-reduction strategies. The project will evaluate biostimulants and other biological inputs to enhance fertilizer efficiency and reduce disease pressure.



- IALR & Partner Roles: IALR's Dr. Sajeewa Amaradasa, Dr. Chuansheng Mei, and Rob Chretien, together with Virginia Tech's Dr. Kaylee South, will lead the evaluation of biostimulants for improved nutrient uptake and disease suppression. Budget development is ongoing.
- f. IALR was awarded \$500,000 from the Southern Crescent Regional Commission for Greenhouse expansion and Entrepreneurship support. Next steps will be to secure a Tobacco Commission Grant as a match.
- g. Dr Mei and Lowman received a grant from the Virginia Department of Agriculture and Consumer Services for \$62,000. The grant is focused on developing new crops for the CEA industry.

Name of Program or Objective: AgTech and Life Sciences Manufacturing Support to Grow Industries Through Testing, Contract Research, and Lab Access

Current Activities

1) Background

- a. To support the IALR Strategic Plan Goal of Strategically Expanding Applied Research, the rapidly growing biomanufacturing industry has been a focus.
- b. In 2024, strategic partnerships were established with the following entities:
 - NC Biotechnology Center
 - NC Life Science Corporation
 - Va Bio
 - Virginia Tech Applied Research Corporation
 - George Mason University
 - Capra BioSciences
 - Virginia Tech Biochemistry
- c. To develop a plan statewide, a Biomanufacturing Summit was held in Richmond Va. The conference took place in Richmond, and the Keynote was Senator Mark Warner.

2) Supporting Industry



- a. A new work group has been formed that includes VT Biochemistry, Virginia Western Community College, and IALR. The focus of the group is to support the rapidly growing biomanufacturing industry in the state.
- b. Applied research licensed three endophytes to Leone Bio Ventures, a portfolio company focused on sustainability in agriculture.
- c. A new company as located onsite – FermentSystems
 - About the company – “When biosystems engineer Luis Huezo, Ph.D., launched FermentSystems, he wasn’t looking to build a laboratory from the ground up. Instead, Huezo chose to base his new bioprocess consulting firm on the Institute for Advanced Learning and Research campus, tapping into shared infrastructure, specialized equipment and a collaborative environment designed to help companies move quickly from idea to execution. That approach allowed FermentSystems to begin operating much quicker, offering fermentation and bioprocess development services to clients across Virginia and beyond. “IALR has an infrastructure already in place,” Huezo said. “There’s a chemistry lab, greenhouses, all types of infrastructure already here that make it easier for an entrepreneur to come in and start a business.” FermentSystems now serves as yet another example of how early-stage companies can utilize IALR’s Applied Research division as both an incubator and a technical partner, accessing high-end research tools without the capital burden of building and equipping an independent facility.”
- d. A large new project is underway with Syngenta focused on PCB remediation.
- e. Dr. Lowman, along with partners from VT and VWCC, attended a Virginia Biomanufacturing Workforce Summit at Piedmont Community College. The one day event brought together the Virginia Community College System, along with UVA, to strategize how to support the rapidly expanding industry across the Commonwealth.
- f. Attended a ribbon cutting with our partners at Agrospheres.



- g. The Fermentation workshop was a great success <https://www.ialr.org/2026-industrial-fermentation-workshop-builds-skills-and-industry-connections/>



**FERMENTATION:
SCIENCE, TECHNOLOGY
AND ENGINEERING**

A HANDS-ON, FIVE-DAY WORKSHOP

Focused on technology development and scale-up for the microbiology and engineering of industrial microbial cultures (fermentation), this workshop covers anaerobic systems relevant to the gut microbiome and biofuel industries. Lectures alternate with practical experiments where participants will generate and analyze their own data. Lessons connect to daily fermentation plant operations.

The workshop is ideal for industry professionals and advanced college students/recent graduates. Fee waiver and financial support are available for qualified applicants.

INSTRUCTORS:
Biswarup Mukhopadhyay, Ph.D.
Department of Biochemistry, Virginia Tech

Scott Lowman, Ph.D.
Institute for Advanced Learning and Research

INVITED INDUSTRY LECTURERS

HAMILTON

DiSTEK **xylem**
Lab Solutions

eppendorf **fff**

January 12-16, 2026

**A HANDS-ON,
FIVE-DAY WORKSHOP**

Registration Cost: \$2,000
Your payment is your registration.

How to Pay: ialr.org/pay
(list Fermentation Workshop in the invoice)

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150 Slayton Ave. | Danville, VA

3) Grants/Funding

- A new grant is being applied for with Dr. Matthew Hull, Director of ICTAS Matter Labs, focused on expanding the partnership with the AI-QUANTAM NQNI Site Led by Virginia Tech. IALR Applied Research along with Jason Wells from AM plan to participate in this NSF National Quantum Nanotechnology Infrastructure (NQNI) project aimed at increasing support for regional businesses.
- Received – USDA Specialty Crop Block Grant, \$67,000 to study new crops for CEA production
- Received – Southern Crescent Regional Commission, \$500,000 for construction of a new greenhouse



- d. **Received** – GoVa Region 3 - “The Synergistic Co-location of Data Centers and Controlled Environment Agriculture Greenhouses to Boost Competitiveness”
- e. **Received** – VT College of Agriculture and Life Sciences Internal Seed Grants – Va State Needs Assessment
- f. **Received** – Virginia Cooperative Extension – Controlled Environment Agriculture Certificate Program
- g. **Received** - Tobacco Region Revitalization Commission (TRRC) grant titled “Building a Regional Food System Through the Creation of a Value Chain Coordinator” (\$104,452 request + \$100,000 external match)
- h. **Received** - Tobacco Region Revitalization Commission grant in partnership with Virginia Tech titled “Supporting Controlled Environment Agriculture (CEA) Growth in Southern Virginia”, (\$145,841 request + \$150,000 external match)
- i. **Received** – USDA Specialty Crop Block Grant “Biostimulants to Improve Indoor Strawberry Production” (\$54,000)
- j. **Received** – USDA Specialty Crop Block Grant “Biotechnology to Improve Indoor Strawberry Production and Disease Control”
- k. **Received** - Agrospheres is funding a new employee for 2 years (\$110,000)
- l. **Received** – The applied research team along with Virginia Tech and Cornell University submitted a grant titled “Empowering Greenhouse Resiliency with an Optimized Workforce (E-GROW)” focused on introducing controlled environment agriculture to K-12. (\$149,119 subaward)
- m. **Received** - A grant partnership with Virginia Western Community College focused on AgTech robotics and vegetable production resulted in an NSF grant award to develop an in-depth program for workforce training in community colleges. Dr. Lowman will serve on the advisory board.

Economic / Business Development – Companies Utilizing Space at IALR

- a. **MicroEndo has agreed to locate at IALR later this spring**
- b. **Lester Polymer Insights (added two employees)**
- c. **Scale Holdings**
- d. **PlantSustain**
- e. **Canon**



f. Mosaic

g. Axxor

h. Ferment Systems (New)