

2014-16 Executive Progress Report

Commonwealth of Virginia
Secretary of Education

Institute for Advanced Learning and Research

At A Glance

The Institute for Advanced Learning and Research serves as a regional catalyst for economic transformation. The Mission will be accomplished through applied research, advanced learning and economic development.

Staffing 42 Salaried Employees, 0 Contracted Employees, 0 Authorized, and 3 Wage Employees.

Financials Budget FY 2015, \$5.82 million, 100.00% from the General Fund.

Trends	↑ Applied Research Projects/Contracts	Key Perf Areas	➔ STEM participants
	↑ Advanced Learning Programs & Workforce Development		↑ Projects with known deliverables
	↑ Economic Development Initiatives	Productivity	↑ Ratio of in-kind services
Legend	↑ Increase, ↓ Decrease, ➔ Steady	Legend	↑ Improving, ↓ Worsening, ➔ Maintaining

For more information on administrative key, and productivity measures, go to www.vaperforms.virginia.gov

Background and History

Agency Background Statement

The Institute for Advanced Learning & Research (IALR) is designated by the Code of Virginia as a political subdivision, and further classified as an educational institution as well as a public body. IALR is a multi-functional agency that engages in research and development that contributes to economic development within the region, and delivers high quality educational and outreach opportunities for the residents of the agency's large footprint (Danville City, Franklin County, Halifax County, Henry County, Martinsville City, Patrick County, Pittsylvania County, and Mecklenburg County). This region is comprised of approximately 4,000 square miles with a population of 318,000.

In late winter 2013 IALR's Board of Trustees determined the agency was at a crossroads and a new direction was needed to develop sustainable solutions beyond its' campus. In April 2013 IALR was reorganized under the leadership of a new executive director and leadership team. The reorganized agency was tasked by its Board with fulfilling the responsibilities outlined in the Code of Virginia, § 23-231.19, in order to become the transformer and innovator that it was initially planned to be.

Projects to be undertaken as components of IALR's strategic plan have been developed so they will align with the Commonwealth Enterprise Strategic Priorities, the Commonwealth's Long-term Goals and the Secretariat Priorities (Secretary of Education).

Additionally, the agency is aligning IALR's initiatives with the four target areas identified by the Southern Virginia Regional Alliance (SVRA) and Virginia Economic Development Partnership (VEDP): Aerospace, Food & Beverage Processing, Data Centers and Plastics/Polymers. Focus is also placed on the vital areas of STEM-H education, experiential learning and workforce development.

IALR's research initiatives are, by design, collaborative in nature and focused on the needs of the Commonwealth. As an example, in the areas of Polymers/Chemistry and Aerospace, IALR with Virginia Tech, NASA Langley Research Center, National Institute of Aerospace and private enterprises are building a hub of applied research in boron nitride nano tubes (BNNT) that will stretch from Newport News to Blacksburg, with Danville being in the center of the effort.

IALR's Board of Trustees and Leadership Team are committed to fostering collaborative endeavors that advance the agency's mission and

vision. During fiscal year 2014 IALR was instrumental in strengthening the sustainability of the Southern Virginia Regional Alliance (SVRA) and joined that economic development partnership as an active member of their Board of Directors. IALR supports the Work-Ready Community Certification initiative and the Dan River Region Collaborative. Collaborative efforts with Virginia Tech (VT) have improved and are increasing as the agency works more closely with VT's Institute for Critical Technology and Applied Science (ICTAS). The agency partners with the National Tire Research Center and SoVa Motion to provide technology and educational support to the automotive sector. IALR partners with Virginia Advanced Study Strategies (VASS), Averett University, Danville Community College, New College Institute, Patrick Henry Community College and the Southern Virginia Higher Education Center to provide collaborative support to educational opportunities within the region.

Major Products and Services

Services provided by the agency include:

- Workforce development
- Internships for high school and college students as well as educators
- Scientific research and development
- Researchers' expertise and lab equipment available to small business owners through consultative services and contract research
- Program management services (commercialization, applied research & educational)
- STEM Mobile Lab travels to schools and organizations
- Advanced Learning loaner equipment program for educators
- Summer Camps to increase students' exposure to STEM
- Economic development support provided by competent experienced personnel
- Programs that focus on the adult learner
- Distant learning classrooms
- Conference Center space and services

Anticipated changes to services include:

- Funding limitations will reduce the number of research and advanced learning programs the agency is able to provide and significantly restrict the agency's ability to partner with other institutions to develop and provide new research related initiatives as well as educational and workforce development programs
- Lack of additional space will restrict research and development projects

Customers

Customer Summary

The Institute for Advanced Learning & Research (IALR) develops intergenerational educational programs that provide opportunities for a continuum of learning. The development of lifelong learning programs for older adults is especially important to address the "Age Wave" demographic shift identified in the Council on Aging 2011 annual report. The report stated "the number of Virginians over the age of sixty will increase from 1.4 million (17.8% of population) in 2010 to 2.3 million (23.9%) in 2030."

Science, technology, engineering and mathematics (STEM) interest is increasing regionally as well as on a state and national level. The IALR has upgraded technology in the STEM Mobile Lab and is planning on an expansion of the Mobile Lab to enable a greater number of students in the Lab at any given time. The STEM Mobile Learning Lab allows the agency to reach the service region and beyond, while providing learning opportunities for individuals of all ages.

IALR's efforts with applied research make it necessary for the organization to collaborate with basic research organizations, both public and private. IALR has definitive working applied research relationships with three of the colleges/institutes within Virginia Tech, NASA Langley Research Center, and a number of private enterprises. IALR is working toward similar relationships with departments within the University of Virginia, Virginia State University, George Mason University and other research and commercial organizations.

IALR will continue to intensify outreach to business customers by providing creative and engaging opportunities. IALR's contribution to economic revitalization in the region will remain focused on partnerships, collaborative projects, and intern opportunities with area businesses, colleges, and school systems. The agency is also completing an assessment of area businesses to identify opportunities for providing technical and research resources that may otherwise not be available to smaller companies. Through its economic development activities, IALR will work to recruit prospective industries to the region.

The challenge confronting IALR is encompassing the diversity of customers within our expansive footprint.

Customer Table

Predefined Group	User Defined Group	Number Served Annually	Potential Number of Annual Customers	Projected Customer Trend
Student	K-12 Students	8,083	35,459	Increase
Adult	K-12 Educators	385	3,700	Increase
Business and Finance	Existing & prospective industries served by IALR	29	988	Increase

Higher Education Institutions	Private and For-Profit 4 and 2 year institutions, and other public educational insitutions/regional education centers in Virginia	13	72	Increase
Adult	Adult 18 - 65 years old	1,889	191,648	Increase
Student	High School & College Students	1,329	13,518	Increase
Consumer	External Conference Event Attendees	16,963	20,000	Increase
Consumer	Community Participants	1,730	85,675	Increase
General Assembly	Elected Senators and Delegates	140	140	Stable
Local or Regional Government Authorities	City Councils and County Board of Supervisors wthin the agency's footprint	33	65	Increase

Finance and Performance Management

Finance

Financial Summary

For the fiscal year that concluded June 30, 2014 (FY 2014) the Institute for Advanced Learning and Research's (IALR) primary source of funding was the State appropriation of \$6,123,574. Additional revenues during this fiscal year include allocations from the State Maintenance Reserve Fund and the Higher Education Equipment Trust Fund, rental income, fees for conferencing services, grants from private foundations, and final proceeds of federal and capital grants.

It is important to note that even with improved financial policies and procedures, the agency remains at a crossroads and must develop sustainable solutions beyond its campus. Although a hybrid entity, IALR's goal is to make a difference in the lives of those residing within the region. The challenge, as well as the inhibitor, is obtaining adequate funding to allow IALR to move forward with new and innovative programs and services such as Capstone, the Academy of Engineering and Technology (AET), and the STEM Mobile Lab expansion.

IALR is an innovative organization working to provide economic benefit to the region. The agency's strategic plan emphasizes the creation, development and commercialization of technology critical to Southern Virginia's economic prosperity. The agency is aligning its research programs with the strategic economic plans of the Southern Virginia Region and of the Commonwealth. To reach sustainability in all areas, it is critical that IALR receive an increase in appropriated funding. Even a modest increase to the base budget would make a difference.

Factors that are likely to affect the agency's budget include state revenues, further economic downturn, lack of capital for companies to grow, and ability to collaborate with other agencies on grant applications.

Fund Sources

Fund Code	Fund Name	FY 2015	FY 2016
0100	General Fund	\$5,817,395	\$5,817,395

Revenue Summary

The Institute for Advanced Learning and Research's (IALR) primary source of funding for fiscal year 2014 (FY2014) was from State sources:

- State Appropriations \$6,123,574
- State maintenance reserve allocation of \$50,000
- Higher Education Equipment Trust Fund allocation of \$406,000 (for the biennium 2013-2014)

Federal and Non-Federal grants concluded during FY2014 produced \$687,000 revenue for research programs and \$131,000 for academic programs.

A Non-Federal Capital Grant of \$287,000 was finalized during the year for research laboratories.

Other revenue sources that assisted in defraying operational expenditures for IALR as the agency worked to fulfill its role as a catalyst for regional economic transformation included:

- conferencing services \$200,000
- rental income \$609,000

Diminishing opportunities for federal research grant funding, together with facility space at near capacity, will limit expansion of research program and advanced learning opportunities that are critical for regional economic transformation.

Performance

Performance Highlights

The Institute for Advanced Learning & Research (IALR) is an innovative organization working toward providing economic and social benefit to

our community. We are working to align IALR research programs with the strategic economic plans of our region and of the Commonwealth. Bio-based materials, traditional polymers, newly developed nanomaterials, and composites are all areas of interest in IALR's applied research department. During fiscal year 2014, biopolymer research using plant-derived proteins allowed the casting and production of films with improved plasticity and opacity quality over and beyond the prior year's research efforts.

IALR maintains ISO (International Organization for Standardization) certification for the agency's Analytical Chemistry Lab.

The agency's plant science research enterprise focuses on biotechnology; using the knowledge and experience gained from research to provide tools that will help lead to a stronger economy. Performance highlights in horticulture research include the beneficial microbe inoculation program that has shown enhanced growth and biomass accumulation for tobacco, indicating the potential to enhance regional tobacco crop yields. Tissue culture efforts have produced several school color daylilies, while plant breeding efforts have created several new ornamental lines for Amaryllis, as well as promising mutants with enhanced growth and biomass (Arundo), increased phytonutrient contents (tomato) and increased seed oil yield per acre (pennycress). "Smart Tables" were set up and successfully trialed to bring automated, robotic and remote sensing capabilities to plant growth analysis and environment monitoring for research and contract services

Parallel to IALR's research initiatives are advanced learning programs designed to increase learning opportunities, particularly in the STEM (science, technology, engineering, mathematics) disciplines and targeting "pre-K to gray." In March 2014, IALR hosted the second annual Southern Virginia (SOVA) STEM-H (-health) Summit, an event developed by IALR in partnership with New College Institute and the Southern VA Higher Education Center. The Summit brought together regional K-12 school districts, higher education institutions, businesses and community organizations with a focus on creating the next generation of STEM innovators. Over 140 high school students explored career options in STEM-H fields and over 100 educators and industry members participated in the Educator and Industry Convention. The STEM Summit represents a best-practice of how regional collaborations can develop STEM capacity and this concept has been replicated in other parts of the Commonwealth.

The STEM Mobile Lab serves local K-12 schools, community non-profits and community colleges by traveling throughout the region to provide hands-on experiences. The Mobile Lab serves as a cost-efficient, non-duplicative resource that provides unique equipment and lab activities to students and citizens of all ages. Robots, 3-D printers, and collaborative technology activities engage students in teambuilding and problem solving. There were 11,686 participants who explored the STEM Mobile Lab during fiscal year 2014 including 385 teachers. A total of 32,184 participants benefited from spending time on the STEM Mobile Lab since fiscal year 2011.

The Academy of Engineering and Technology (AET) program began in Fall 2012 as a collaborative partnership between New College Institute, Virginia State University, Martinsville City Schools, and Henry County Public Schools. In Fall 2014, a new collaborative partnership between IALR, New College Institute, Virginia State University, Danville Community College, Danville Public Schools and Pittsylvania County Public Schools will begin with 25 Juniors enrolled in the engineering track on the IALR campus. The summer component of the program, known as Industry Fundamentals, began in June 2014 providing students with the opportunity to participate in a two-week paid experiential learning experience at IALR, New College Institute, and various industries throughout southern Virginia and North Carolina.

IALR's Advanced Learning department has increased the agency's focus on adult learners and is now offering both computer classes for any age adult along with STEM engagement for GED students. IALR also partnered with Danville Community College, Pittsylvania County 4-H Club and Library, Danville Science Center, Reynolds Homestead and the Center for Energy Efficient Design to reintroduce the Southside Summer Adventure (summer camps for K-12 students) which has been a huge success with 208 registered participants and waiting lists for many of the camps.

During IALR's reorganizational efforts the agency evaluated whether to expand its economic development involvement. A strategic partnership with the Southern Virginia Regional Alliance (SVRA) was formed enabling IALR and SVRA to work together to market the region globally to accelerate job growth and increase the tax base within the targeted footprint. Improvements in the economy, both nationally and internationally, have led to an increase in project inquiries into Southern Virginia. Through IALR's economic development outreach efforts, the agency has seen an increase in project inquiries through state, consultant and utility partners during the first half of calendar year 2014. It is anticipated that this trend will continue over the next 12 to 18 months as IALR increases marketing and outreach efforts.

The agency's conference center is an essential element for IALR's mission to drive economic development in Southern Virginia. Our Danville location highlights the surrounding area, accessibility to major expressways while offering exceptional conferencing services. IALR's conferencing services is a technologically advanced setting having options that will satisfy any event needs from executive and professional training to workshops, trade shows, receptions and single and/or multiple day conferences. Fiscal year 2014 saw an increase in space utilization with businesses opting to utilize our conferencing and meeting rooms.

Selected Measures

Measure ID	Measure	Alternative Name	Estimated Trend
M885AG12004	Number of science, technology, engineering and mathematics (STEM) participants	STEM participants	Maintaining
885.0005	Number of known deliverables for active economic development, business development and applied research projects	Projects with known deliverables	Improving
885.0004	Ratio of dollar value of "in-kind" services provided to the region in the advancement of the Institute for Advanced Learning and Research's mission of economic transformation (numerator), over State Appropriations (denominator).	Ratio of in-kind services	Improving

Key Risk Factors

Risk factors that are having a significant impact on the agency and will continue to do so in the near future include:

RESEARCH: Research funding via contract research grants and other sources is becoming more competitive, which impacts IALR's ability to expand the program. Additionally, during the past year IALR engaged in an overall reorganization of the agency to better align the department with regional needs. This led to unavoidable delays in hiring a polymer engineer and a natural products chemist which slowed the progress in some research initiatives such as bio-based film development, plant-derived molecule development as well as the spinning-tube-in-tube (STT) program development.

ADVANCED LEARNING: The 6 county, 2 city region that IALR serves is experiencing high unemployment and a high poverty level, which together have contributed to a declining population. With a declining population comes a reduction in the potential participant target for advanced learning programs. Increased options for online learning reduce the need/demand for face-to-face programming. A risk factor of lesser degree is the fact that IALR is not located on a bus line which hinders growth in community participation.

ECONOMIC DEVELOPMENT: The areas of training and workforce development are impacted by the national economy and global trade. More locally, threats to the region through environmental issues (coal ash spill, for example) are impacting efforts to recruit new businesses to the region. While not at risk at this moment, the success of regional economic development efforts depends heavily on continued support (both financial and organizational) on the part of local partner organizations as well as regional and state funding partners (e.g. Tobacco Indemnification Commission, Mid-Atlantic Broadband).

ADMINISTRATIVE AREAS: Like many agencies, IALR struggles with containment of benefit costs, funding for positions and training/employee development. Difficulty in identifying and attracting competent staff skilled in science, technology, engineering and mathematics (STEM) poses a risk to IALR. IALR is continually assessing demands placed on aging technology equipment due to high-usage and is concerned with the possibility of critical equipment failures. IT upgrades are contingent upon funding and prioritized based on the degree of funding received by the agency.

FACILITIES: The agency's main campus building and building systems are beginning to age, having been completed in 2004. IALR's current buildings are nearing capacity which places limitations on expansion of research and educational endeavors.

Agency Statistics

Statistics Summary

A highly skilled workforce is critical to any area's economic development. IALR is committed to partnering with businesses, colleges, and school systems to provide encouragement and opportunities that foster education, especially in science, technology, engineering and mathematics (STEM) fields. IALR also supports the Certified Work Ready Community program.

IALR has a long term commitment to serve as a catalyst for the region and holds a strong belief that transformation occurs through collaborative projects and partnerships. The agency formed 8 new partnerships during fiscal year 2014 (FY2014) and continued collaborating with existing partnerships.

One new commercialized business was launched during FY2014. Dan River Plants is still in their start-up phase but the business model remains strong. The agency anticipates that this new business will see added employees and increased revenue in FY2015.

Scientists employed at IALR eagerly share their knowledge and expertise when provided the opportunity. Research presentations were provided to area businesses and organizations as well as at national and international conferences.

Statistics Table

Description	Value
Number Research & Development consultations & evaluations provided to industries	22
Number of STEM related courses/workshops provided	480
Number of Research presentations, papers & publications	40
Number Research & Development revenue sources from non-State sources	6
Number of new partnerships formed	8
Number of economic development projects worked	18
Number of economic development site consultants & industry visits	20
Number of new businesses launched	1
Webinars recorded/produced	9

Management Discussion

General Information About Ongoing Status of Agency

The integrated mission of the Institute for Advanced Learning and Research (IALR) includes research, advanced learning and economic development. These components build upon existing regional strengths. The IALR is working on ways in which talent and resources can be used especially through collaborative efforts. These efforts are of special importance as the IALR works toward providing local manufacturers with opportunities that will enable them to compete in a global marketplace.

The agency will utilize the unique resources in our business and research community to optimize its polymer/chemistry and agricultural research venues. IALR's research efforts are geared toward creating opportunities for business and workforce development in these areas. During fiscal year 2014 IALR explored bio-composites (blending our assets in agriculture and polymers/chemistry) and agriculture research that included work with high value horticulture in conjunction with Virginia Tech, one of the agency's founding institutions. Research work continues on energy crops including Miscanthus and Arundo Donax.

Research work is also being performed with plant proteins as a source for polymers and enhanced crop performance to provide natural molecules that can be an alternative for those derived from petroleum. IALR's research labs have expanded from those dedicated to plant science to include those focused on polymer characterization and processing. During fiscal year 2014 IALR labs supported existing grants, internal research and local industry support.

Moving forward, IALR research endeavors will focus on application and commercialization of the products, technologies and processes developed by our scientists and technicians. While serving existing industry is an important aspect of the applied research mission, significant investment is being made in new product development that builds on technology and knowledge created within Virginia's basic research institutions, universities, NASA Langley, and Jefferson Lab to name a few. IALR's applied research organization expects to supplement the state budget allocation via commercial contract research awards, Federal or other institutional grants and business fee-for-service activities.

Advanced learning, where education meets experience, is integrated into every IALR research project through activities such as teacher internships as well as high school and college student internships, Governor's School student projects, researcher development and technical team development. The agency provides educational access via the Piedmont Governor's School, distance learning classrooms used by Virginia Tech and Averett University, and technical equipment made available to Danville Community College, Southern Virginia Higher Education Center and Virginia Tech. New programs initiated during fiscal year 2014 include the Academy of Engineering & Technology in partnership with the New College Institute, a Research-to-Commercialization Learning Agreement with the New College Institute, Workforce Forward with the Southern Virginia Higher Education Center and New College Institute, and public school system focused Aerospace Education with the Virginia Space Grant Consortium, NASA and the National Institute for Aerospace. Additionally, the STEM (science, technology, engineering and mathematics) program, that takes the science mobile lab to classrooms in schools throughout the footprint, continues to be very successful.

IALR's economic development department is responsible for aligning the agency's efforts with the need for economic and community transformation. IALR is committed to assisting local and State economic developers in any way possible as evidenced by the agency's renewed focus through a partnership with the Southern Virginia Regional Alliance (SVRA). The agency's first commercial spin-off, Dan River Plants, was launched July 1, 2013. Nine employees were initially trained around technology developed at IALR. This start-up business is projected to create at least 30 jobs by 2016. Seed funding was provided by the Danville Regional Foundation and IALR's Foundation.

Every initiative undertaken by IALR is evaluated on whether the project/action/activity will have an economic impact in measurable meaningful ways.

Information Technology

Synopsis of current IT state:

Technology enhancements for IALR's instructional and meeting rooms continues to be refreshed using interactive touch screen technology

integrated to standard display equipment of projector or computer, significantly improving the overall meeting, presentation and learning experience. During fiscal year 2014, IALR completed the upgrade to a real-time integrated Financial Accounting System, enabling greater efficiencies in the financial operations.

Other information technology solutions include beta testing cloud technologies using third party service providers for backup/recovery of data storage and intranet file sharing reducing the number of physical servers. IALR continues to research, test and evaluate technology solutions for multiple users' desktop and research lab data capture/retrieval.

The agency's most significant future technology needs include:

- Upgrading classroom and conference space wiring and audio/video equipment to digital format enabling webcasting, interactive distance learning classes and rebroadcasting of instruction using internet protocol
- Evaluation, implementation and training users on a software system that captures metrics in an efficient and productive manner

Workforce Development

A significant number of managers will reach retirement age within the near future at the Institute for Advanced Learning & Research (IALR). 72.7% of managers are age 50 or older; 36% of managers are within 5 years of retirement. The wide disparity with the age of the current workforce (69% age 40 or older; 19% ages 30 to 40, and 12% below 30 years of age) makes it challenging to adequately implement a succession plan. Management is identifying key and hard-to-fill positions, scanning existing workforce for potential, and establishing steps needed to provide professional development. Development, skill and competency needs are incorporated into the performance review process and continuing education is encouraged.

Recruiting/retaining challenges include finding experienced, qualified individuals in the region's available workforce, especially in the science, technology, engineering and mathematics (STEM) fields. Efforts are focused on enhancing knowledge and skills throughout the organization. Through partnerships with the CSIIP (Commonwealth STEM Industry Internship Program) and local organizations, IALR sponsored internship programs working with 8 high school and college level students in STEM-related training as a potential solution to recruitment issues.

The IALR researchers are engaged in a collaborative discussion with corporate businesses (locally, state-wide and nationally) to strengthen the research efforts through expanded research and contractual services, and with presentations at national and international conferences.

Due to IALR's unique structure the state does not appropriate positions for the agency. Because IALR operates with a small, highly skilled, specialized workforce, the primary challenge the agency is facing is providing pathways for upward mobility.

Physical Plant

The Institute for Advanced Learning and Research's (IALR) Main campus building contains administrative offices, research areas and a conference center along with leased space to entities engaged in research related activities. IALR Main is ten years old and is beginning to need increased maintenance.

A modification and expansion of uninterruptible power supply to support disaster recovery and prevent loss of data is required to bring the IALR into full compliance with Virginia's Continuity of Operations Plan (COOP) and disaster recovery standards.

Long term growth needed for the IALR's applied research programs to attract additional high technology enterprises requires extra space to house funded research projects and research services.