Committee Minutes

ACADEMIC, RESEARCH, AND STUDENT AFFAIRS COMMITTEE

June 2, 2025

Committee Members Present: Nancy Dye (chair), Sandy Davis, William Holtzman, Donald Horsley, Letitia Long, J. Pearson, Jeanne Stosser

Board Members Present: Ed Baine (rector), David Calhoun, Anna James, Starlette Johnson, Ryan McCarthy, Jim Miller, John Rocovich

Constituent Representatives Present: Janice Austin (A/P faculty representative), LaTawnya Burleson (staff representative), Rachel Miles (faculty representative), Leslie Orellana (undergraduate student representative), William Poland (graduate and professional student representative).

Guests: Beth Armstrong, Mac Babb, David Baker, Callan Bartel, Richard Bishop, James Bridgeforth, Kristin Caddick, Kirk Cameron, Cyril Clarke, Lance Collins, Catherine Cotrupi, Debbie Day, Katherine Drinkwater, Heather Ducote, Stefan Duma, Jeff Earley, Abbey Erwin, Juan Espinoza, Ron Fricker, Michael Friedlander, Ian Friend, Rachel Gabriele, Bryan Garey, Avery Gendell, Nannette Gordon, Rebekah Gunn, Andrew Gunsch, Leslie Hager-Smith, Chelsea Haines, Rebecca Halsey, Kay Heidbreder, Elizabeth Hooper, Cyndi Hutchison, Frances Keene, Sharon Kurek, Justin Lemkul, Jeff Loeffert, Kimberly Loeffert, Dylan Losey, Hud McClanahan, Larisa McGann, Nancy Meacham, Joe Merola, Mallory Miller, Jeff Mitchell, Justin Noble, Kelly Oaks, Kim O'Rourke, Stephanie Overton, Mark Owczarski, Kevin Pitts, Lauren Pollard, Jonathan Porter, Tanya Rogers, Julie Ross, Karen Sanders, Tim Sands, Saonee Sarker, Brennan Shepard, Oliver Shuey, Rick Sparks, Michael Staples, Michael Stowe, Dan Sui, Aimee Surprenant, Dwyn Taylor, Monecia Taylor, Jon Clark Teglas, Mary Trigiani, Marc Verniel, Peggy Vilardo, Heather Wagoner, Lisa Wilkes, Chris Wise, Andrew Woodall, Chris Yianilos

OPEN SESSION

1. Welcome. N. Dye, chair of the committee, welcomed attendees to the meeting and called the meeting to order at 9:03 am.

2. Review and Approval of Open Session Agenda. The Open Session Agenda and Consent Agenda were presented for approval by the committee. J. Stosser requested that the following items be removed from the Consent Agenda for additional discussion:

- 3b. Resolution to Revise Chapter 7 of the Faculty Handbook
- 3d. Resolution to Clarify Eligibility for Postdoctoral Associate Status
- 3e. Resolution to Amend the Faculty Handbook to Codify Interest- or Discipline-Based Faculty Organizations
- 3f. Resolution to Integrate Chapter 12 into Chapters 2 and 5 of the Faculty Handbook
- 3g. Resolution to Codify the Faculty Reconciliation Process within the Office of Faculty Affairs

3j. Ratification of 2025-26 Faculty Handbook

These items were then discussed immediately following the consideration of the Consent Agenda. A motion to approve Item 3b., the Resolution to Revise Chapter 7 of the Faculty Handbook failed, with 6 committee members voting no and one committee member voting yes. The motion to approve item 3d., the Resolution to Clarify Eligibility for Postdoctoral Associate Status was approved unanimously by the committee. J. Stosser proposed an amendment to item 3e., the Resolution to Amend the Faculty Handbook to Codify Interest- or Discipline-Based Faculty Organizations, to add the following sentence to the proposed language, indicated in red as follows:

1.1.12 Faculty Organizations
Faculty organizations may be established by faculty for the purposes of building communities of practice and networking for professional development. These organizations may be comprised of faculty around certain disciplinary interests, experiences, or towards specific goals. These faculty organizations have constitutions that designate their purposes, membership, officers, election procedures, standing committees and their duties, and other organizational and procedural matters. These faculty organizations do not have a formal role in university governance but are recognized by and supported in their activities, as appropriate, by the office of the Vice Provost for Faculty Affairs. The Vice Provost for Faculty Affairs will provide an annual report to the Board of Visitors on the registered faculty organizations and their activities.

This item was approved as amended with 6 committee members voting yes and one committee member voting no. Item 3f., the Resolution to Integrate Chapter 12 into Chapters 2 and 5 of the Faculty Handbook was approved unanimously by the committee. Item 3g., the Resolution to Codify the Faculty Reconciliation Process within the Office of Faculty Affairs was approved unanimously by the committee. J. Stosser proposed an amendment to Item 3j., Ratification of 2025-26 Faculty Handbook, to add additional reference to Title VI and Title IX. This change is reflected in Section 2.4.1 as follows (highlighted in grey):

2.4.1 ~~Equitable~~ Searches
It is the policy of Virginia Tech to provide equal opportunity for all qualified individuals while rejecting all forms of prejudice and discrimination. Virginia Tech does not discriminate against employees, students, or applicants on the basis of age, color, disability, sex (including pregnancy), gender, gender identity, gender expression, genetic information, national origin, political affiliation, race, religion, sexual orientation, or military status; or otherwise discriminate against employees or applicants who inquire about, discuss, or disclose their compensation or the compensation of other employees or applicants; or any other basis protected by law. For inquiries regarding non-discrimination policies, contact the Office for Civil Rights Compliance and Prevention Education~~Office for Equity and Accessibility.~~

Virginia Tech is committed to ensuring that all qualified individuals with disabilities can take part in educational and employment programs and services on an equal basis. The aim is to provide this opportunity in an integrated setting that fosters independence and meets the guidelines of the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973. Reasonable accommodations are made on an individual ~~and flexible~~ basis.

Virginia Tech does not discriminate against employees, students, or applicants ~~is committed to increasing the number of women and underrepresented faculty and administrators. This commitment is~~as stated and elaborated in the ~~affirmative action program~~university's nondiscrimination statement, Title VI of the Civil Rights Act of 1964 , Title IX of the Education

Amendments Act of 1972, Executive Order ~~11246~~14173, and other documents filed with federal and state officials. All recruitment and search processes and procedures are designed to ensure that searches are conducted ~~affirmatively resulting in greater faculty diversity~~in a fair and unbiased manner.

This item was approved unanimously as amended.

3. Consent Agenda Items. Approval of March 24, 2025 Committee Meeting Minutes; Resolution to Rename the Department of Biomedical Engineering and Mechanics; Resolution to Approve 2025-26 Student Code of Conduct; Resolution to Revise Graduate Honor System Constitution; and Report of the 2025-26 Faculty Compensation Plan.

The committee voted unanimously to approve the Open Session Agenda and remaining Consent Agenda items.

4. Provost's Update.

Recruitment of Senior Leaders

C. Clarke, executive vice president and provost, provided updates to the committee on several senior searches. The search for the new dean of the Honors College is complete and Dr. Becky Bott-Knutson will be joining Virginia Tech on July 1. Dr. Bott-Knutson is an animal scientist and academic leader, currently serving as Dean of the Honors College at South Dakota State University. Dr. Saskia van de Gevel will be joining Virginia Tech on July 1 as the new dean of the College of Natural Resources and Environment. Dr. van de Gevel was previously chair of Geography and Planning at Appalachian State University. Dr. Jill Sible, the Associate Vice Provost for Undergraduate Education and Professor of Biological Sciences has been appointed as the Vice Provost for Undergraduate Academic Affairs, taking over from Rachel Holloway who is retiring. Clarke expressed deep appreciation for Rachel Holloway, Paul Winistorfer, and Paul Knox on their many years of service.

Academic Resource Alignment

C. Clarke provided the committee with an update on the Academic Resource Alignment project; this project was discussed at length during the BOV retreat in August 2024 and a more comprehensive report was provided in the Provost's update in March. The goal of the project is to assure that programs remain relevant to student interest, career opportunities and strategic interest of the university. The committee has completed its quantitative and qualitative review of programs and several departments, representing a cross-section of disciplinary emphases across the arts, humanities and STEM areas have been identified for further review by an administrative support team. Possible outcomes include discontinuation, redirection, and administrative reorganization. In addition to subject relevancy, particular attention is being focused on cost-effectiveness of program delivery. Although an opportunity for reinvestment is anticipated it will take time to be realized because:

- university curriculum is not substantively deficient, due to ongoing updates;
- discontinued programs are subject to a teach-out requirement; and
- employment contracts of instructional personnel have to be honored.

Final recommendations are anticipated this summer, with consequent actions to be

submitted to governance in the fall.

Artificial Intelligence (AI)

Multiple efforts are underway across the university to understand and utilize this technology as well as mitigate potential challenges posed. Included among these is the AI Working Group charged by the Chief Operating Officer and the Provost to develop guidance for AI use at Virginia Tech. This working group is being co-chaired by the Associate Vice Provost for Technology-Enhanced Learning and the Associate Vice President for Security Identity. A report is expected by July 1 addressing: responsible and ethical AI framework; options for AI governance; analysis of Virginia Tech policies to identify those that might need revision due to AI; and recommendations for tools and platforms; and a prioritized task list for next steps.

Results of a recent survey regarding the use of AI at Virginia Tech include the following items of note:

- 52 % of Virginia Tech faculty already use AI in their teaching. Creating teaching materials is the dominant use-case.
- Main barriers to adoption are “lack of time/resources to explore AI” and “concern about negative impacts”.
- 54% of VT respondents believe student evaluation methods need significant change or a complete revamp; half anticipate redesigning assignments to be more “AI-resistant.”

Fraternities and Sororities

C. Clarke concluded his remarks with an update on fraternities and sororities at Virginia Tech. The mission of fraternities and sororities is to coach and educate the members by cultivating leadership, encouraging personal growth, fostering health & safety, and facilitating community while embracing *Ut Prosim* as a way of life.

In Spring 2025 semester, the fraternity and sorority community had 5,639 full-time enrolled students (approximately 19% of the undergraduate student population) organized in 61 chapters. For the Spring 2025 semester, the all fraternity and sorority GPA (3.4349) was higher than the all-undergraduate GPA (3.38) for the 36th consecutive semester since the Fall 2007 semester. 3,318 active and new members of the fraternity and sorority community (59%) achieved Dean’s List academic honors or made a 4.0 term GPA.

5. Overview of Institute for Advanced Computing. C. Clarke provided an overview of a new institute being established at Virginia Tech. There are two types of institutes at Virginia Tech, investment institutes and thematic institutes. Investment institutes are university-level organizations that convene researchers from across campus to focus on high-potential, interdisciplinary projects, with resources provided that include funding, space, and core equipment. In these institutes faculty retain as their primary homes their respective academic units. Thematic institutes are university-level organizations committed to advancing a particular thematic area of emphasis, such as transportation, national security, biomedical research and advanced computing. In thematic institutes

faculty retain tenure in their respective academic units, but their primary membership is in the institute community. Thematic institutes have deep relationships with sponsors and receive substantial extramural research grants and/or contract funding.

Of the two types of institutes at Virginia Tech, the Institute for Advanced Computing (IAC) will be a thematic institute, with a focus on computing technology. The IAC's mission is to catalyze a culture of innovation that unlocks the power of its faculty and students to solve the world's most pressing problems through computing technology. The institute will seek to unite top innovators in computing technologies to integrate faculty and students into the science and technology ecosystem of our nation's capital and beyond. Through research leadership, experiential learning, and strategic partnerships, real-world and human-centered challenges from industry and government will be addressed.

The foundations of this institute will be in artificial intelligence and machine learning, Next G wireless, quantum architecture and software development, and intelligent interfaces. There will also be opportunities to develop close connection with areas such as business analytics, sports, art, and entertainment, and health sciences. The IAC will have a director who will report to a senior administrator in the Greater Washington DC Metro area, and ultimately up to the Provost. It will also be supported by an internal stakeholder committee and external advisory board.

Areas of potential impact for the IAC include innovative research in the foundational areas, innovative project-based graduate education in Computer Science and Electrical and Computer Engineering at both the master's and Ph.D. levels, close collaboration with non-university partners, and visibility, branding, and communication in the Washington DC region.

The creation of the IAC has involved a number of steps in compliance with Virgia Tech policy. The institute's charter was developed in fall of 2024, and an interim director was appointed in May of 2025. The charter was approved, and a public announcement was made about the institute in May of 2025. After the Board of Visitors meeting, next steps for the IAC include the appointment of the senior administrator in the Greater Washington DC Metro area and the launch of a national search for the inaugural institute director.

6. Undergraduate Enrollment Plan. C. Clarke and Juan Espinoza, Vice Provost for Enrollment Management, provided the committee with information regarding undergraduate enrollment planning. This topic differs from admissions policy, which will be addressed at the November meeting. A number of recent topics addressed by the BOV, including the Student Life Village and on-campus residential housing are dependent on having a clear understanding of enrollment growth. The case for growth, at least over the intermediate- to longer-term is strong. Two foundational considerations in enrollment planning are Virginia Tech's land grant mission, and VT's role in advancing economic development through the graduation of a skilled workforce. Enrollment plays a pivotal role in the university budget, as tuition and Education and General (E&G) fees account for 68% of the university's revenues. J. Espinoza presented a plan for 1% enrollment growth over the next 5 years as a point of introduction for discussion of this topic. Neither a

proposal nor a scenario, it is a plan designed to stimulate a constructive conversation about whether the BOV supports growth in enrollment and, if so, at what rate.

There are a wide variety of opinions about university growth across local communities that support the university, citizens of Virginia who want access to the education provided, and those who believe that the university must scale to achieve its global distinction goal. The situation is complicated because even within local supportive communities there are differences of opinion. It is important that there is an understanding that the 1% plan is not an immutable one, but one that has been selected at neither extreme of current opinion. Though for several years the university has maintained the same First-Time-In-College (FTIC) and transfer goals for new students, total enrollment has still grown because of improvements in student retention. However, the projection is that total enrollments will plateau because ongoing improvements in retention are mathematically not sustainable.

7. Update on the Expand Appalachia CORE-CM project. Richard Bishop, professor of practice in the Department of Mining and Minerals Engineering, shared an update with the committee on the work of the Expand Appalachia CORE-CM project, a grant-funded program that is researching approaches to the domestic development of critical minerals and rare earth elements. The project is based out of the Virginia Center for Coal & Energy Research and includes partnership with a number of other universities including Penn State, Bluefield State, University of Kentucky, and West Virginia University, in addition to industry and governmental partners. The current phase of the project includes expanding the geographic focus, continuing to evolve the project objectives for mineral location, and focusing on a wider set of resources under consideration, both coal and non-coal. This phase of the project has $7.5M in funding from the Department of Energy, as well as an additional $2.1M from other sources.

8. Closing Remarks and Adjourn. N. Dye offered brief remarks. The meeting concluded at 10:52 am.

Open Session Agenda

ACADEMIC, RESEARCH AND STUDENT AFFAIRS COMMITTEE

June 2, 2025

	Agenda Item	Reporting Responsibility
1.	**Welcome**	N. Dye
2.	**Review and Approve Open Session Agenda**	N. Dye
3.	**Consent Agenda**	N. Dye
	a. Approval of March 24, 2025 Committee Meeting Minutes	
*	b. Resolution to Revise Chapter 7 of the Faculty Handbook	
*	c. Resolution to Rename the Department of Biomedical Engineering and Mechanics	
*	d. Resolution to Clarify Eligibility for Postdoctoral Associate Status	
*	e. Resolution to Amend the Faculty Handbook to Codify Interest- or Discipline-Based Faculty Organizations	
*	f. Resolution to Integrate Chapter 12 into Chapters 2 and 5 of the Faculty Handbook	
*	g. Resolution to Codify the Faculty Reconciliation Process within the Office of Faculty Affairs	
*	h. Resolution to Approve 2025-26 Student Code of Conduct	
*	i. Resolution to Revise Graduate Honor System Constitution	
*	j. Ratification of 2025-26 Faculty Handbook	
	k. Report of the 2025-26 Faculty Compensation Plan *(shared for information purposes by Finance and Resource Management Committee)*	
4.	**Provost's Update and Discussion**	C. Clarke
5.	**Overview of Institute for Advanced Computing**	C. Clarke
# **6.**	**Undergraduate Enrollment Plan**	C. Clarke, J. Espinoza
7.	**Update on the Expand Appalachia CORE-CM project**	R. Bishop
8.	**Closing Remarks and Adjourn**	N. Dye

* Requires Full Board Approval
# Discusses Enterprise Risk Management topic(s)

Joint Closed Session Agenda

ACADEMIC, RESEARCH, AND STUDENT AFFAIRS COMMITTEE
and
FINANCE AND RESOURCE MANAGEMENT COMMITTEE

10:30 a.m., Room 260, New Classroom Building

June 2, 2025

		Agenda Item	Reporting Responsibility
	1.	Motion to Begin Joint Closed Session	N. Dye
*	2.	Ratification of Personnel Changes Report *(voted on by Finance and Resource Management Committee only)*	S. Allen
*	3.	Resolution to Approve 2024-25 Promotions, Tenure, and Continued Appointments	R. Fricker
	4.	Update on Compliance with March 25, 2025 BOV Resolution	C. Clarke
	5.	Motion to Begin Open Session	N. Dye

*Requires Full Board Approval

Closed Session Agenda

ACADEMIC, RESEARCH, AND STUDENT AFFAIRS COMMITTEE

June 2, 2025

		Agenda Item	Reporting Responsibility
	1.	Motion to Begin Closed Session	N. Dye
*	2.	Resolution to Approve Appointments to Emeritus/a Status (8)	R. Fricker
*	3.	Resolution to Approve Appointments to Endowed Chairs, Professorships, or Fellowships (4)	R. Fricker
*	4.	Resolution to Approve Reappointments to Endowed Chairs, Professorships, or Fellowships (11)	R. Fricker
*	5.	Resolution to Approve Appointments with Tenure (3)	R. Fricker
*	6.	Resolution to Approve Faculty Research Leaves (7)	R. Fricker
	7.	Motion to End Closed Session	N. Dye
	8.	Report of Closed Session Action Items	N. Dye

*Requires Full Board Approval

INSTITUTE FOR ADVANCED COMPUTING

VIRGINIA TECH™

Dr. Cyril Clarke

Executive Vice President and Provost

Institutes at Virginia Tech

Investment Institutes:

University-level organizations that convene researchers from across campus to focus on high-potential, interdisciplinary projects. Resources provided include funding, space, and core equipment. Faculty retain as their primary homes their respective academic units.

Thematic Institutes:

University-level organizations committed to advancing a particular thematic area of emphasis, such as transportation, national security, biomedical research and advanced computing. Faculty retain tenure in their respective academic units, but their primary membership is in the institute community. Thematic institutes have deep relationships with sponsors and receive substantial extramural research grants and/or contract funding.

IAC Mission and Vision

As a thematic institute, the **Institute for Advanced Computing** (IAC) will catalyze a culture of innovation that unlocks the power of its faculty and students to solve the world's most pressing problems through computing technology.

- IAC will unite top innovators in computing technologies to integrate faculty and students into the science and technology ecosystem of our nation's capital and beyond.
- Through research leadership, experiential learning, and strategic partnerships, real-world and human-centered challenges from industry and government will be addressed.

Attachment D

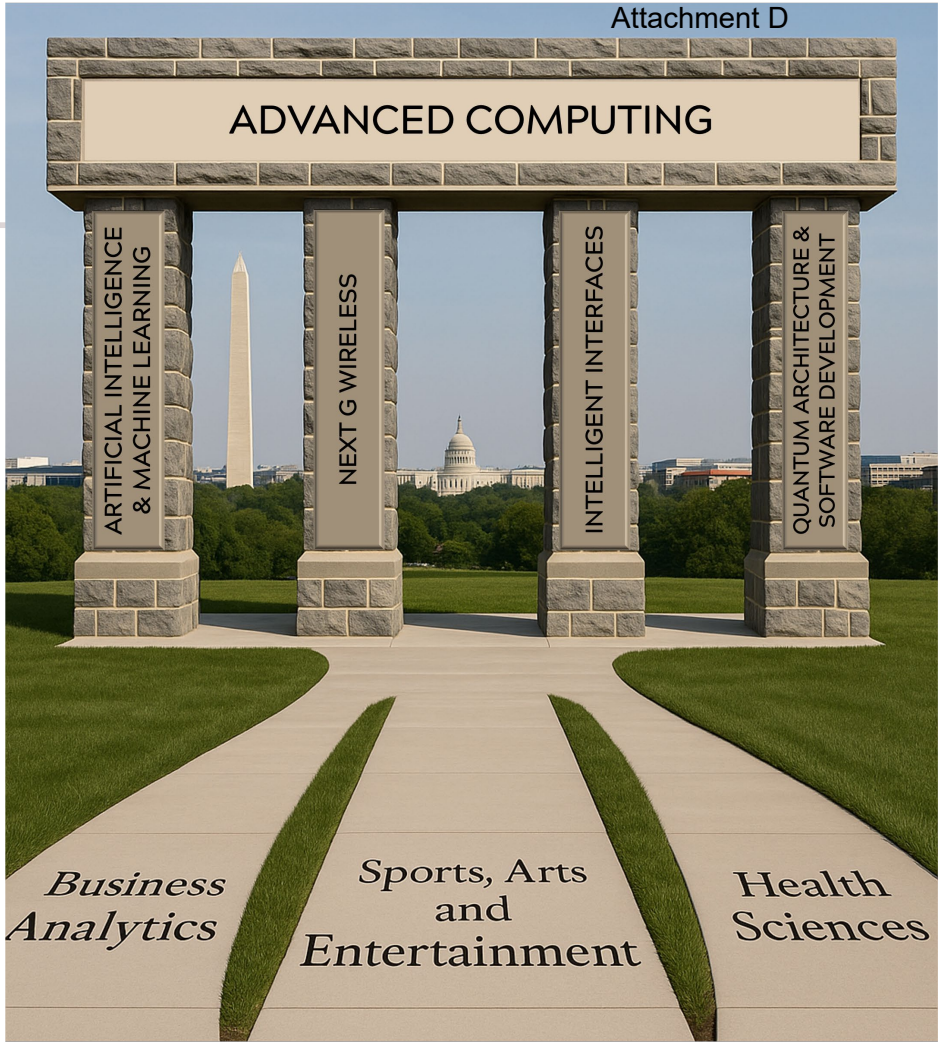
Thematic Emphasis

Core Computer Science and Computer Engineering:

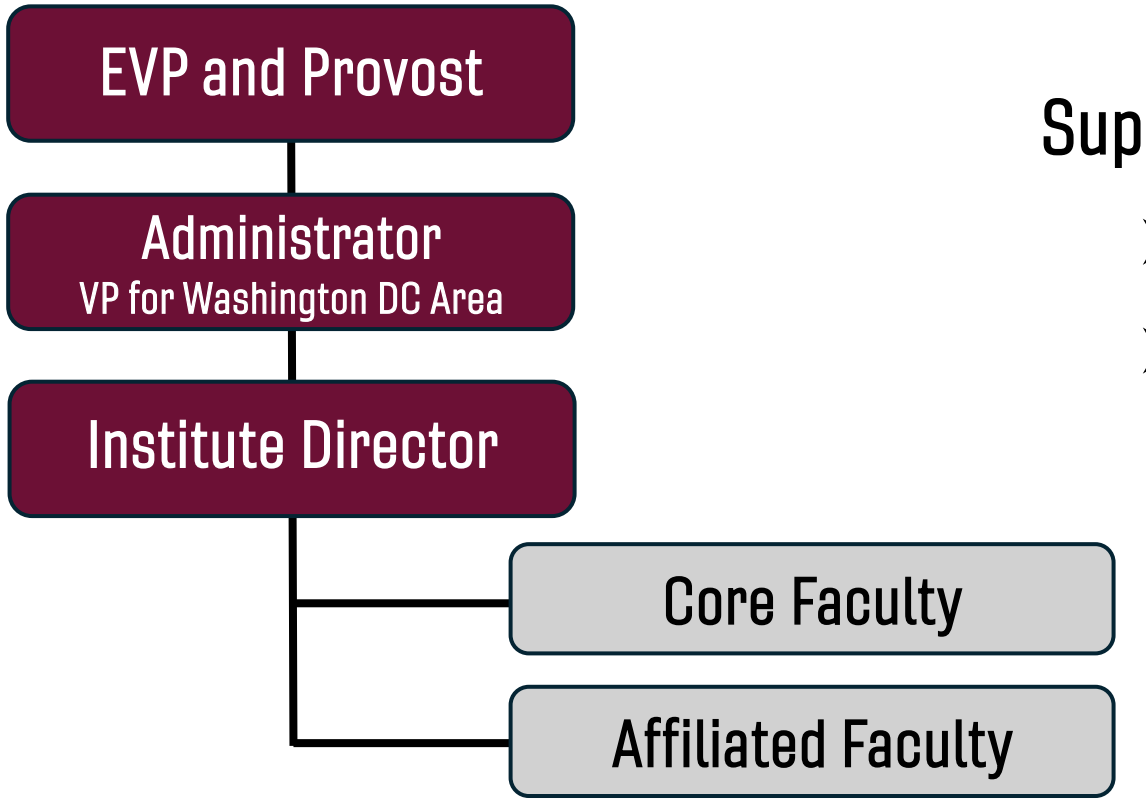
- Artificial Intelligence & machine learning
- Next G wireless
- Quantum architecture and software development
- Intelligent interfaces

Possible areas of closely-connected applications:

- Business analytics
- Sports, arts and entertainment
- Health sciences



Organizational Structure and Governance



Supported by:

- Internal stakeholder committee
- External advisory board

Potential for Impact

- Innovative research:
  - *Artificial Intelligence & machine learning*
  - *Next G wireless*
  - *Quantum architecture and software development*
  - *Intelligent interfaces*
- Innovative, project-based graduate education:
  - *MEng in CS and ECE; PhD*
- Close collaboration with non-university partners
- Visibility, branding and communication in Washington DC Region

Process and Approval

Addresses requirements of Virginia Tech Policy 13005 - Centers and Institutes: Establishment, Governance and Programmatic Oversight, encompassing approval of the following items:

- Rationale for the Institute
- Vision and mission
- Description (including overviews of strategic objectives, impacts, strategic approach, faculty and student involvement, and clientele.)
- Governance
- Financial plan
- Metrics and goals
- Letters of endorsement
- Final approval by Provost

Timeline and Next Steps

- Development and drafting of IAC charter (Fall 2024)
- Appointment of interim director (May 2025)
- Approval of IAC charter and public announcement (May 2025)
- Update and overview for Virginia Tech Board of Visitors (June 2025)
- Appointment of administrator (June 2025)

- Launch national search for inaugural IAC director (TBD)

Questions or Comments

VIRGINIA TECH™

INSTITUTE FOR ADVANCED COMPUTING

VIRGINIA TECH

Undergraduate Enrollment Plan

Dr. Cyril Clarke, Executive Vice President and Provost

Dr. Juan Espinoza, Vice Provost for Enrollment Management

Academic, Research, and Student Affairs Committee

Board of Visitors

June 2, 2025

LAND GRANT MISSION

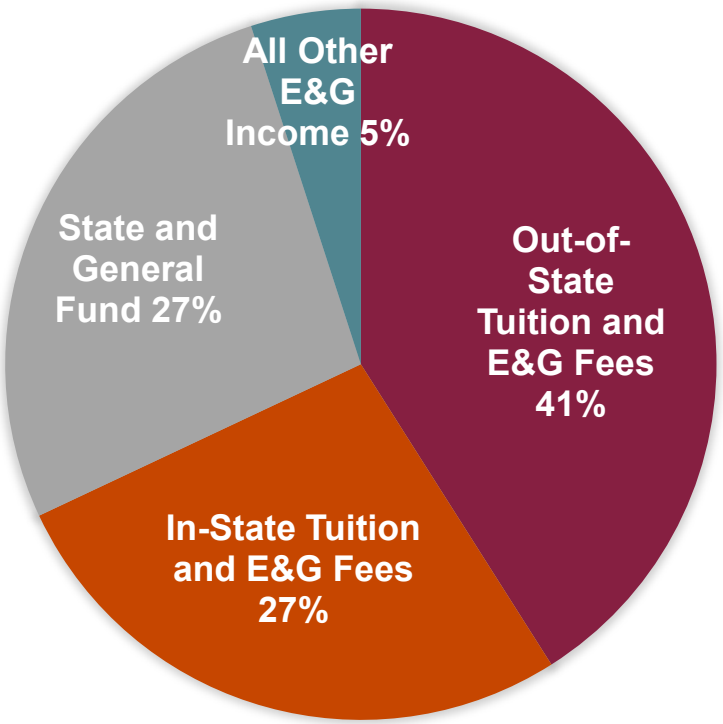
The importance of access to higher education is a major driver in meeting the needs of the Commonwealth.

ECONOMIC DEVELOPMENT

The role of Virginia Tech in advancing economic development through graduation of a skilled workforce.

RESOURCING THE MISSION

FY26 E&G Revenue by Major Source



Enrollment plays a pivotal role in our budget as Tuition and E&G Fees contribute 68% to overall E&G Revenue

UNDERGRADUATE ENROLLMENT PLAN

	2025	2026	2027	2028	2029
Projected Fall Enrollment	31,661	32,135	32,519	32,845	33,211
# of New Students Over Prior Fall	+626	+474	+384	+326	+366
Growth Rate Over Prior Fall	2.0%	1.5%	1.2%	1.0%	1.1%
FTIC Cohort Class Size	7,085	7,251	7,290	7,388	7,431
Transfer Cohort Class Size	1,025	1,175	1,175	1,175	1,175

- Assume 1,175 transfer each in fall and 50 First-Time in College (FTIC) + 300 transfer in each spring.
- Assumes continuation rate is steadily improved for Out-of-State (OOS) students.

VIRGINIA TECH®

Attachment D

EXPANDING THE SEARCH FOR CRITICAL MINERALS IN APPALACHIA

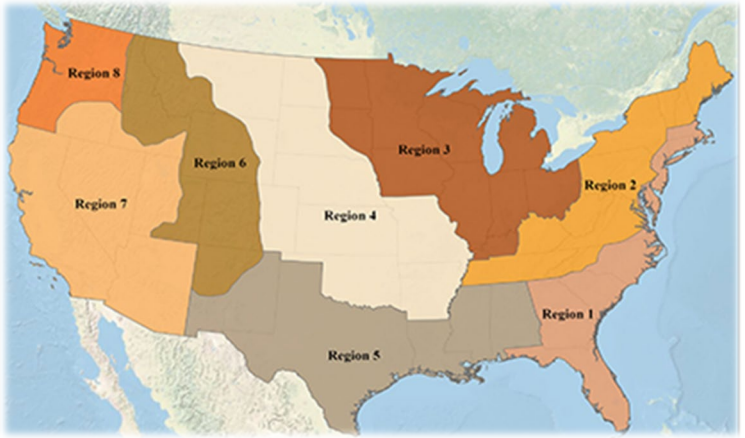
EXPAND APPALACHIA CORE-CM

Richard Bishop
Professor of Practice, Virginia Tech

Academic, Research, and Student Affairs Committee
Board of Visitors
June 2, 2025

EXPAND APP RESEARCH TEAM

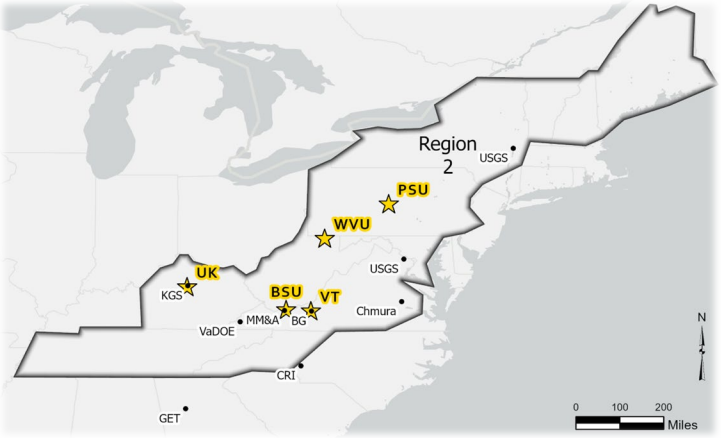
VT-led consortium including academia, labs, government and consultancies



Virginia Center for Coal & Energy Research

Virginia Tech

Mining & Minerals Engineering



Penn State Mining Engineering

Bluefield State Univ. Mining Engineering

University of Kentucky Mining Engineering

West Virginia University Mining Engineering

Marshall Miller & Associates

Chmura Economics & Analytics

Coalfield Strategies

Crescent Resource Innovation

U.S. Geological Survey

Kentucky Geological Survey

Virginia Department of Energy

Bandy Geological

LEADERSHIP
Principal Investigators

Richard E. Bishop, PhD

Professor of Practice, Mining & Minerals Engineering

- PI, Expand APP Project
- BSc, MSc, PhD – Virginia Tech
- 20+ years of mining industry experience
- Former Precious Metals Analyst, Royal Bank of Canada
- Former CEO of exploration companies in Mongolia & South Africa
- 10-year VT Mining Industry Advisory Board Member
- 2013 VT COE Outstanding Young Alumnus Award Recipient

Aaron Noble, PE, PhD

Professor & Dept Head, Mining & Minerals Engineering

- Co-PI, Expand APP Project
- BSc, MSc, PhD – Virginia Tech
- 15 years of experience in academia
- 50+ research contracts and grants in critical minerals
- 3 patents (4 additional pending) in mineral processing
- Top 10 highly ranked global scholar in Rare Earth Elements (ScholarGPS)

CRITICAL MINERALS

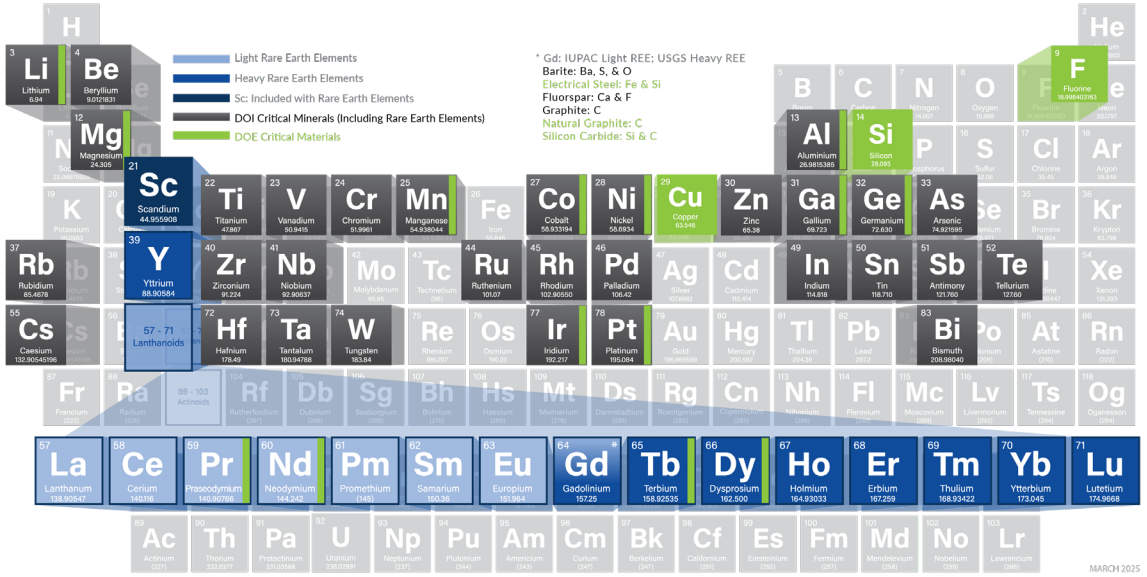
Definition and relevance

50 **Critical Minerals**

are vital to the economy and national security for manufacturing and technology, and yet they have no easy substitute

17 **Rare Earth Elements**

are a subset that occurs at low concentrations in the earth's crust and can also be found in coal-based resources



Key building blocks for current high-demand and next—gen industries

MAGNETICS
Computer Hard Drives
Disk Drive Motors
Anti-Lock Brakes
Automotive Parts
Frictionless Bearings
Magnetic Refrigeration
Microwave Power Tubes
Power Generation
Microphones & Speakers
Communication Systems
MRI
Nd Tb Dy Pr

DEFENSE
Satellite Communications
Guidance Systems
Aircarft Structures
Fly-by-Wire
Smart Missiles
Nd Eu Tb Dy Y Lu Sm Pr La

CERAMICS
Capacitors
Sensors
Colorants
Scintillators
Refractories
Nd Y Eu Dy Lu Gd La Ce Pr

CATALYSTS
Petroleum Refining
Catalytic Converter
Fuel Additives
Chemical Processing
Air Pollution Controls
Nd La Ce Pr

METAL ALLOYS
NiMH Batteries
Fuel Cells
Steel
Super Alloys
Aluminum/Magnesium
Nd Y La Ce Pr

PHOSPHORS
Display phosphors-
CRT,LPD,LCD
Fluorescents
Medical Imaging
Lasers
Fiber Optics
Nd Eu Tb Y Er Gd Ce Pr

GLASS & POLISHING
Polishing Compounds
Pigments & Coatings
UV Resistant Glass
Photo-Optical Glass
X-Ray Imaging
Nd Gd Er Ho La Ce Pr

Source: https://www.netl.doe.gov/resource-sustainability/critical-minerals-and-materials/rare-earth-elements

CHALLENGE FOR THE US

Economic and national security concerns

CURRENT SITUATION

Dependency on imports
+80% from foreign sources, led by China

Accelerating demand for scarce resources

Uncertain political and trade policies

Immature development of domestic economic infrastructure
(industry, tech, workforce, regulations, standards, incentives, tariffs, R&D funding, etc.)

RISKS FACED

Supply Chain disruption

Reduced industry competitiveness

Foreign economic leverage

National security threats

Environmental damage

ADDRESSING THE CHALLENGE

Initial steps to advance domestic growth

U.S. path to secure, reliable, and sustainable domestic supplies of strategic mineral resources

Collection and analysis to understand mineral structure and concentration levels

Source identification & characterization

Economic infrastructure

Assessing existing assets and new industry growth needs for end-to-end capabilities from extraction, processing technologies, manufacturing and distribution

Stakeholder engagement across industry, government and communities

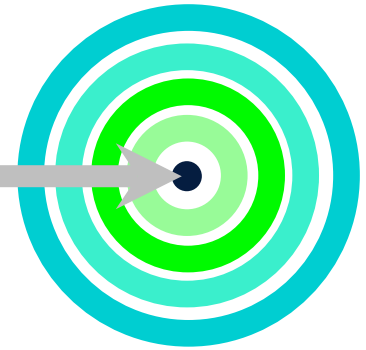
Awareness & buy-in

Workforce development

Plans for training future technicians, skilled workers and STEM

Plans to develop regional technology innovation centers

Innovation



Future phases along the journey

Virginia Tech has the expertise, infrastructure & structural advantages to lead the nation in these initiatives.

EXPAND APP PROJECT

Next phase of CORE-CM work facilitating a domestic critical minerals future

U.S. Department of Energy – CORE-CM Program

Project Phase	Evolve Central Appalachia *"Evolve CAPP"*	**Expand Appalachia CORE-CM** *"Expand APP"*	***Phase 3*** ***TBD***
Geography	Central Appalachian coal basin (parts of VA, WV, TN, KY)	Expands geographic focus to Appalachian Mountain region (Region 2) – including 11 states from TN, NC & VA up to Maine	
Scope	• Collect data on CORE-CM (carbon ore, rare earth and critical materials) resource distribution • Develop strategies on coal mine waste reuse and CM industry building • Assess technology solutions • Assess workforce education and training needs	• Continues overall Evolve CAPP objectives for mineral location/concentration and building a more secure domestic supply chain • Focuses on a wider set of resources under consideration – both coal and non-coal, as well as power generation facilities and other unconventional critical mineral sources	
Duration	3 years (10/2021 – 9/2024)	3 years from start date	
Funding	$2.7M total (2.1M DOE grant, $0.6M other)	$9.6M total ($7.5M DOE grant, $2.1M other)	

FIELDWORK AND LABWORK

Focus on understanding mineral structure and concentration levels

Field Sampling

- Surface & underground mines
- Rock cores
- Fly ash
- Acid mine drainage
- Oil & gas well-produced water

Field Screening

- Geologic logging
- X-ray fluorescence (XRF)
- Drone-based gamma sensing
- Spectral Gamma downhole geophysics
- Laser induced breakdown spectroscopy (LIBS)

Lab Analysis

- Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
- SEM-EDX / Mineralogical analysis (TESCAN TIMA)

VIRGINIA TECH MINING AND MINERALS ENGINEERING

A Leader in Critical Minerals Research

$32M
REE/CM research over 10-years

64
REE/CM projects over 10-years

$28M
in pending new proposals

Virginia Tech heads Appalachia coalition on critical minerals

March 4, 2025 NAM Staff

CARDINAL NEWS
SERVING SOUTHWEST AND SOUTHSIDE VIRGINIA

ECONOMY

Virginia Tech-led team expands hunt for critical minerals

Researchers say that sources such as coal waste, fly ash from power plants and slag dumps from iron mines contain critical minerals and rare earth elements, potentially providing a key domestic source for these vital resources.

by **Matt Busse**
March 3, 2025

"Critical minerals are essential for many of today's technologies, especially those related to clean energy. I'm glad Virginia Tech is receiving federal funding I helped secure to research critical mineral extraction and processing in the Appalachian region. This will provide opportunities for new industries to develop, which will grow the local economy."

- U.S. Sen. Tim Kaine

"It is crucial to our national and economic security that the U.S. identify secure sources of critical minerals. I am proud to see Virginia Tech playing a leading role in critical minerals research, leveraging natural resources found right here in the commonwealth."

- U.S. Sen. Mark Warner

"The work at the Virginia Center for Coal and Energy Research has led to exciting breakthroughs in tapping from coal beds sources of the rare earth minerals so integral to modern technology, used in everything from advanced batteries to smartphones. DOE's award advances research that could support jobs in Appalachia and shore up supply chains vital to our country's security and economic growth."

- U.S. Rep. Morgan Griffith

Expanding the search for critical minerals in Appalachia

EXPAND APPALACHIA CORE-CM

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