Virginia Tech Board of Visitors Retreat

Agenda

Sunday, August 27, 2023
9:30 a.m. – 5:00 p.m.

W. E. Skelton 4-H Center
775 Hermitage Road
Smith Mountain Lake, Wirtz, Virginia 24184

- Orientation – Legal and Regulatory Responsibilities of the Board
- Opening Remarks by Rector Baine and President Sands
- Discussion of Generative Artificial Intelligence and Implications for Higher Education and Virginia Tech
- Session I – Top 100 Global Research University
- Session II – The Virginia Tech Advantage (Access, Affordability, and Student Success)
Board Basics

KAY HEIDBREDER
UNIVERSITY LEGAL COUNSEL
Legal Framework for Public Institutions

- Article VII of the Virginia Constitution
- Enabling legislation (Va. Code § 23.1-2600 et seq.)
- Title 23.1 of the Code of Virginia
  - Statutorily assigned powers and duties
  - Coordination by State Council of Higher Education (SCHEV)
- Restructuring Act/Management Agreement
External Regulation

- Federal Government
  - U.S. DOE laws and regulations (Title IX, Clery, FERPA)
  - Financial Aid Participation Agreement
  - Grants Administrations (NSF, NEA)

- Accreditation by SACSCOC
Board Directives

The Board exercises its authority through collective action:

- Majority vote
- Open Session- Freedom of Information Act requirement
- Quorum Present
Freedom of Information Act

Government in the Sunshine
Board Meetings

FOIA Requirements:
- All meetings open to the public
- 3 members discussing institutional business constitutes a meeting
- Do not hit reply all on emails
- 3 day public notice must be provided
- Minutes must be taken
- Closed sessions allowed under very limited circumstances
- Public streaming of official meeting of full board
Board Records

- Default is that all records created by Board members in the transaction of public business are accessible under FOIA.
- Application of exemptions determined at the institutional level
  - Virginia Tech has a statutorily required FOIA officer
- Members are not required to create records, but once created, records must be maintained according to the Public Records Act
- Caution smartphone, texts, meeting notes, etc. are board records
Conflict of Interests Act

- Prevent accrual of personal financial interest of $5,000 or more
  - Members are prohibited from contracting with Virginia Tech
- Avoid appearance of impropriety
- Opportunity for opinion from Ethics Advisory Council or Attorney General
Conflict of Interests Act

Compliance Requirements

- Training to be completed within 2 months of assuming office and every 2 years thereafter

- Filing of disclosure forms upon assuming office and every February 1 thereafter
Relationship with the Virginia Tech Foundation

- VTF is an independent 501C Foundation
- Mission of VTF is to support the University, but no University control
- VTF is governed by an independent Board of Directors
- While Virginia Tech has ex officio members on the Board of Directors, no other Virginia Tech control
- *Transparent GMU v. George Mason University*
  Virginia Supreme Court upheld the ability of George Mason University to operate outside the bounds of FOIA
Attorney-Client Relationship

- The primary role is to advise the Board and University President on legal issues and the management of legal risk

- Reports provided under privilege in conjunction with regular meetings
Discussion on Generative AI

• Introduction
  • What is Generative AI?
  • What is VT doing in this space?
• What are the implications for universities and the design of their programs?
  • A Thought Scenario
  • “Full Stack Human”
• Superpowers of the future
  • Why range and breadth are superpowers in the AI era
  • Institute for Leadership in Technology
The implications of Generative AI on Virginia Tech’s research, education and civic missions are real - and so we are proud to be leading and innovating in and around this field in a manner true to our mission.
Generative AI

• Methods to automatically generate content
  • Large Language Models (ChatGPT), MidJourney, DALLE-2

• Examples of a human acting like an LLM
  • “For breakfast this morning, I had a ____.”
  • “I arrived in Tokyo last night. For breakfast this morning, I had a ____.”
  • “My jaw accident has made it difficult to chew food. I arrived in Tokyo last night. For breakfast this morning, I had a ____.”
What happens when you make a spelling mistake on Google?

Showing results for **smith mountain lake**
Search instead for **smith montana lake**

Virginia Department of Conservation and Recreation (gov)
https://www.dcr.virginia.gov › state-parks › smith-mo...

**Smith Mountain Lake State Park**
Aug 2, 2023 — On the second largest freshwater lake in the state, this picturesque park is the water enthusiast's paradise. There are numerous water ...
Ways to think of LLMs

- LLM is an auto-completor
- LLM is a noisy compressor
- LLM is Wilson
- LLM is a stochastic parrot (courtesy Emily Bender)
- LLM is a bluffer
Generative AI projects at VT

1. Report generation to support analysts decision making (DARPA)

(a) Screenshot of the CAUSEWORKS system.
Generative AI can be used to:

- Address instances when real data is scarce about patients with particular criteria/conditions
- Capture a diversity of patient abnormalities, imaging conditions, geography
Generative AI projects at VT

3. Synthetic Data for Cybersecurity analysis (Collaboration between NSI, CCI, and Sanghani Center)
CURRENT PARTNERSHIP EXAMPLE

Virginia Tech and Amazon are partnering to advance research and innovation in artificial intelligence and machine learning. The Amazon - Virginia Tech Initiative for Efficient and Robust Machine Learning will include machine learning-focused research projects, doctoral student fellowships, community outreach, and an establishment of a shared advisory board.

“We are delighted to collaborate with Virginia Tech in launching this new initiative which brings together the top talent in our two organizations in a joint mission to achieve ground-breaking advances in robust machine learning.”

- Prem Natarajan, Vice President of Alexa AI - Natural Understanding, Amazon

Key Components of the Partnership:

- Shared advisory board (4 + 4)
- Doctoral student fellowships (with summer internships available)
- Deep, embedded ML research projects
  - Paired research groups
  - Lead to joint IP/startups
- Community Outreach
Generative AI projects at VT

4. Conversational AI (Amazon-VT Initiative in Efficient and Robust ML)
Generative AI Risks

- To data consumers
  - Output fictionality, information pollution
  - Information obsolescence

- To data owners
  - Leakage of sensitive/classified information
  - Lack of credit and compensation

- To organizations
  - Gateway to security risks
  - Value inconsistency with company policy, objectives
  - Lack of V&V processes
Generative AI in the classroom

Concerns

• What uses are admissible?
• “Watermarking” AI outputs

Opportunities

• Scaling up personalized delivery
• Rethink educational objectives in light of available tools
• Innovate new paradigms of knowledge workers
The long arm of the law is still playing catchup

**WHO IS GETTING SUED BY WHOM & FOR (c)?**

- **Stability AI for (c) infringement & 1202 violations**
  - Getty: Stable Diffusion’s model was trained on 12 million Getty images
  - Sarah Anderson (on behalf of a class of visual artists whose works were used as training data) claims training data = illegal copying + all outputs = infringing DWs
    - Midjourney & Deviant Art also defendants in *Anderson*

- **OpenAI for (c) infringement & 1202 violations**
  - Silverman & Tremblay class action lawsuits on behalf of all authors whose works were used as training data focus on ChatGPT (claims are same as Anderson’s)

- **Meta for (c) infringement & 1202 violations**
  - Kadrey class action on behalf of all authors whose works were used as training data focus on LLaMA (claims are same as Anderson’s)

- **Alphabet for (c) infringement & privacy violations**
  - J.L. class action lawsuit on behalf of all persons whose data was used as training data focus on Bard

(slide presented by Pamuela Samelson, UC Berkeley)
Courses @ the Sanghani Center

In addition to the usual fare

- Artificial Intelligence
- Deep Learning
- Natural Language Processing
- Language Models

we emphasize

- Human-AI Collaboration and Teaming
- Ethics and Professionalism in AI/Data Science
Unpacking a GenAI application

Technology is not a monolith

Example: AI Avatar Generation
- Permissioning of private data/photos (social contract theory)
- Use of public LLMs / Privacy issues
- Data sovereignty (international law)
- Intellectual Property (likeness of image, reuse)
- Bias in image generation (moral philosophy)

This is a fairly innocuous example. Now imagine DNA, SCADA systems for critical infrastructure, Internet of Things, connected medical devices, predictive policing with historic crime data, cyber security.
A memorable scenario

- On board the USS Blue Ridge in the South China Sea
  - US Navy’s Seventh Fleet command, responsible for fleet of 80 vessels
  - Andres Xenachis on “watch floor,” C4I, responsible
  - HYSY 981 deep-sea drilling rig into Vietnamese EEZ
- Navy War College
  - War Games, “red teaming,” or “force on force”
  - Multi-day, in-person, Jungian, experience creating consciousness
  - Finding Unknown Unknowns, human error
- Special Operations Command (SOCOM):
  - “Humans are more important than hardware. People – not equipment – make the critical difference. The right people, highly trained and working as a team, will accomplish the mission with the equipment available. On the other hand, the best equipment in the world cannot compensate for a lack of the right people.”
Harvard president Drew Faust to 800 Cadets:
- The Humanities “...teach us how to scrutinize the thing at hand, even in the thick dust of danger or drama or disorienting strangeness. It imparts skills that slow us down –the habit of deliberation, the critical eye, skills that give us capacity to interpret and judge human problems; the concentration that yields meaning in a world that is noisy with information, confusion, and change. The humanities teach us many things, not least of which is empathy– how we see ourselves inside another person’s experience.”

- Internalize this reflection today
  - We are the stewards of our own conversations and internal debates, and how we choose to guide them toward hope, rather than fear, a the future we create
Anthropology, not Tech
Ballet, not Robotics
"Studying philosophy taught me two things... I learned how to write really clearly. I learned how to follow an argument all the way down, which is invaluable in running meetings."

- Stewart Butterfield, CEO Slack
Becoming Socratic with Machines

DATA < KNOWLEDGE < WISDOM

- PLATO
Intelligence Amplification (IA)

I.A. NOT A.I.
Already True in Silicon Valley

CEO YouTube = **History & Literature**
COO Facebook = **Economics**
CEO Pinterest = **Political Science**
Founder Airbnb = **Art & Design**
Founder LinkedIn = **Philosophy**
Founder Paypal = **Philosophy**
CEO Slack = **Philosophy**
Founder AOL = **History**
Founder Reddit = **History**
CEO Palantir = **Social Theory**
CEO Alibaba = **English**
Founder Salesforce = **English**
# Full Stack Human

## Liberal Arts “Stack”

<table>
<thead>
<tr>
<th>Timely (Dynamic)</th>
<th>Privacy &amp; Data</th>
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<tbody>
<tr>
<td></td>
<td>AI Bias</td>
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<td>Workplace Automation</td>
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<td>Biometric Surveillance</td>
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## Infrastructure

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<tr>
<th>Sciences</th>
<th>Social Sciences</th>
<th>Psychology</th>
<th>History</th>
<th>Literature</th>
<th>Philosophy</th>
<th>Music / Art</th>
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</table>
What’s the superpower of the future?

And how might Virginia Tech ensure this notion of a “Full Stack Human” is within the reach of all?
In a world in which computing-and-commercial skills are increasingly within reach, human sensibilities are breakthrough - and build longevity for people, products and policy.
THE END OF THE ENGLISH MAJOR

Enrollment in the humanities is in free fall at colleges around the country. What happened?

By Nathan Heller
February 21, 2023
“There are people in their thirties and forties who have been stay-at-home parents, or they work. And they are committed to the humanities - they have an idea about the value of liberal-arts education…it’s a matter of life experience.

What someone who has been in the grind of life wants to learn more isn’t necessarily linear algebra.

Career studies have shown that humanities majors, with their communication and analytical skills, often end up in leadership jobs. To that extent, the value of the educated human touch is likely to hold in a storm of technological and cultural change.”

_The New Yorker_, March 6, 2023
What the world’s hottest MBA courses reveal about 21st-century business

Students seek hardheadedness, self-awareness and tact
“Management education involves wading through case studies, poring over financial statements and building sophisticated spreadsheets.

And, like any MBA curriculum worth its salt, the GSB’s has compulsory classes in accounting, finance and computer modelling, to be completed within the first two terms of instructions, out of a total of six.

Look at the school’s three most popular facultative courses, though, and a more interesting picture emerges of the 21st-century manager. All three require virtually no number-crunching.

Instead they aim to cultivate in students a capacity for hardheadedness, introspection and diplomacy, respectively. It is these attributes, the students appear to be saying, rather than any technical expertises, that will determine success.”

The Economist, April 8th, 2023
INSTITUTE FOR LEADERSHIP IN TECHNOLOGY

VIRGINIA TECH.

ADVANCING A NEW KIND OF LEADERSHIP LITERACY
WHAT'S THE SUPERPOWER OF THE FUTURE? OUR ANSWER: THE HUMANITIES

Welcome to the Virginia Tech Institute for Leadership in Technology, where we offer a one-year, low-residency fellowship to a select group of rising leaders from around the world each year. The experience, geared for mid-career professionals from across sectors and around the world, culminates in an Executive Leadership Certificate from Virginia Tech – a credential grounded in the liberal arts and humanities. Welcome to a new kind of leadership literacy for entrepreneurs, executives and evangelists in and around the technology landscape.

READY TO LEARN MORE?
WHY VIRGINIA TECH?
Why the Liberal Arts Will Rule the Digital World

SCOTT HARTLEY
Hokies Have Undisputed Technical Heritage

Hokies Are Local Souls with Global Goals

Hokies Believe *That We May Serve* Humanity

Hokies Can Move Fast and Entrepreneurially

Hokies Live In a Fuzzy & Techie Commonwealth

**Virginia Tech Is** A Pioneering *Global* Land Grant
WHY TECHNOLOGY?
ATTACHMENT D

The most-regretted college majors

Those who wish they'd chosen a different field of study, as a share of all who majored in each subject, 2021

- Humanities and arts
- Social and behavioral sciences
- Occupational and technical training
- Education
- Business and management
- Law
- Life sciences
- Health
- Physical sciences and math
- Computer and information sciences
- Engineering

Note: Includes those who attended college but aren't currently employed.

WHY LEADERSHIP?
MPA / MBA

A Master of Public Administration and a Master of Business Administration often appeal to a very similar audience. Understanding the unique skills and career paths associated with each can help you make the most of your graduate education.

MPA
For those seeking leadership roles in the public and nonprofit sectors

MBA
For those seeking to develop skills required for careers in business and management
EXECUTIVE EDUCATION AT PAMPLIN

The speed of business is the speed of change. Changing technologies, evolving competition, dynamic market demands, and other external factors force organizations to stay smart.
IT’S THE PEOPLE, SILLY 😊
AND WHY THE HUMANITIES?
Want to thrive in an AI world? Major in the humanities.

nytimes.com
Opinion | In the Age of A.I., Major in Being Human
How to acquire the skills no machine can have.
MISSION
To realize a world in which emerging and established leaders in technology draw on the power of the humanities in service of a higher stewardship.

In so doing, Virginia Tech will bring to life a new approach to higher learning that will inspire innovation across higher education.
FELLOWSHIP
CURRICULUM AND COMMUNITY
Religion and Development: The role of faith-based institutions in socioeconomic development

Philosophy and Code: A review of global philosophy and its role in shaping what we code

The Economics of Small Things: Shining a surprising, economic light on our daily lives

Introspective Fiction: A journey with the most memorable characters in American fictional history

Environmental Morality: An examination of the most difficult moral dilemmas in climate advocacy

The Far (Eastern) Reaches of Western Civilization: An inclusive, and global, examination of classics

Additional VT Strengths: Military/CW History, Electrical, Computer, Civil Engineering, Arts/Architecture
October Seminar
“The Humanities and a Higher Leadership”

Instructor: Professor Rishi Jaitly

How has society’s sense of what makes a good leader evolved over time and place? What role have the liberal arts played in shaping leaders we admire across contexts and communities? And what role might the humanities play in advancing a higher form of leadership in our era’s technology landscape? This seminar will consist of a review of leadership as it has been understood, cultivated and practiced over time - and will feature contemporary case studies and guest speakers from the technology industry.

November Seminar
“Ancient Texts and Tales”

Instructor: Professor Sylvester Johnson

In what ways, both seen and unseen, does the expanding Western canon shape our society today? What are its limits? And at the level of faith, values and culture, what classical works from the East undergird today’s leading societies of the non-Western world? This seminar entails a review of Western philosophy, an examination of the interplay between Judeo-Christian and Eastern Civilizations and a reflection on the ensuing role religion and culture have long played in social and economic development.

December Independent Paper

Prompt:
Drawing on the history we studied in our first semester together, select an episode - whether it occurred millennia or months ago - that particularly enthralled you with awe and wonder. Reflect on the nature of human leadership that manifested in this chosen context. And using the skills and sensibilities that emanate from the humanities as a guidepost, analyze and assess the leadership that surfaced in this historic moment and make an inspired argument for what an even higher kind of human stewardship might have looked like.
February Seminar
“Stories Make the World Go Round”

Instructor: Jonathan Harley

What is it about stories that have captivated the human spirit across time and place? What are the hallmarks of a compelling narrative across media types - written, oral and digital? And what is the relationship between storytelling and leadership? This module is a study - but also a skill-building seminar - centered on examining the power of storytelling in a range of human contexts: from mythmaking and movement building to motion pictures and moral debates.

March Seminar
High Humanities, High Technology

Instructor: Scott Hartley

Who are the people - the founders, the executives, the humans - that have shaped the inescapable technology landscape we live in today? What skills, sensibilities - and, indeed, superpowers - have they accumulated in their lives that have allowed them to imagine and innovate? And, looking ahead, are poets or programmers more likely to be best equipped to thrive in the world’s high-technology ecosystems? Inspired by Hartley’s book “The Fuzzy and the Techie,” this seminar entails a review of the essential role the liberal arts have long played in shaping our technology landscape in Silicon Valley and beyond - and the “full-stack” superpower role they’re poised to play looking ahead.

April Creative Work

Prompt:
Drawing on what we’ve learned - and practiced - together during this second semester together relating to the skills of storytelling and the superpower of being a “full-stack” humanist, produce a significant creative work that makes you proud. Whether poetry or prose, a play or portrait, be sure to work with faculty to lean into the very best of what the humanities do to us: that is, they compel us, and help us confront, all kinds of human others with awe and wonder. In so doing, they produce in us a higher power of sensitivity, storytelling and stewardship. Work independently or with your classmates as you see fit.
2023 - 2024
April 26: VT LIT Public Announcement

August 15: Finalized Initial Class of Fellows

September 19-21: Blacksburg Ignition Experience

January 23-25: Off Campus Immersion Trip

April 23-25: Northern VA Capstone and Conferral
#ThatIMayServe

@rsjaitly

jaitly@vt.edu

#VTLIT
Times Higher Education (THE) Top 100 World Rankings Goal

Cyril R. Clarke

August 2023
Rankings used as Proxy for Assessing Strategic Progress

**THE World University Rankings**

#251-300 out of 1,799 ranked institutions

#16 (tied) among land-grants

**THE Impact Rankings**

#92 out of 1,591 ranked institutions

<table>
<thead>
<tr>
<th>Rank</th>
<th>2023 THE WUR</th>
<th>University</th>
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<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>University of California-Berkeley</td>
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<tr>
<td>2</td>
<td>48</td>
<td>University of Illinois at Urbana-Champaign</td>
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<tr>
<td>3</td>
<td>63</td>
<td>University of California-Davis</td>
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<td>4</td>
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<td>University of Wisconsin-Madison</td>
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<td>5</td>
<td>101</td>
<td>University of Minnesota-Twin Cities</td>
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<td>6</td>
<td>104</td>
<td>University of Maryland-College Park</td>
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<td>7</td>
<td>106</td>
<td>Michigan State University</td>
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<td>Purdue University-Main Campus</td>
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<td>Penn State</td>
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<td>University of Florida</td>
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<td>191</td>
<td>University of Massachusetts-Amherst</td>
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<td>15</td>
<td>201-250</td>
<td>Rutgers University-New Brunswick</td>
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<td>16t</td>
<td>251-300</td>
<td>University of Hawaii at Manoa</td>
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<td>251-300</td>
<td>Virginia Tech</td>
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<td>16t</td>
<td>251-300</td>
<td>University of California-Riverside</td>
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<tr>
<td>19</td>
<td>301-350</td>
<td>The University of Tennessee-Knoxville</td>
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</table>
THE Impact Rankings Metrics

Sustainable Development Goals

1. No Poverty
2. Zero Hunger
3. Good Health and Well-Being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals
Correlation between THE WUR Metrics and AAU Membership Indicators

THE WUR Metrics
- Teaching Reputation
- Internationalization
- Research Productivity
- Income
- Student-to-Faculty Ratio

AAU Membership Indicators
- Research Expenditures
- Citations
- PhDs Awarded
- Research Reputation
- Book Publications
- Post Doctoral Appoints
- Social Mobility
Role of PIBB in Incentivizing Strategic Progress

Instructional Support
- All Student Credit Hours (SCH’s) by Course Level
- Interdisciplinary SCH’s
- Lab Course SCH’s

Enrollment-Based Support
- All Majors

Research & Scholarship Support
- Sponsored Expenditures
- Faculty Awards, Fellowships, & Memberships
- Book Publications
- Citations
- Doctoral Degrees Awards
- Postdoctoral Appoints

AAU Membership Indicators
THE 2023 Impact Rankings
Selected SDGs for Submission

- 2. Zero Hunger
- 5. Gender Equality
- 6. Clean Water and Sanitation
- 7. Affordable and Clean Energy
- 8. Decent Work and Economic Growth
- 10. Reduced Inequalities
- 11. Sustainable Cities and Communities
- 12. Responsible Consumption and Production
- 13. Climate Action
- 15. Life on Land
- 17. Partnerships for the Goals
## Correlation between THE WUR Metrics and AAU Membership Indicators (Full Chart)

<table>
<thead>
<tr>
<th>Weight/Phase</th>
<th>Metrics</th>
<th>Category</th>
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<tbody>
<tr>
<td>AAU P1&amp;P2</td>
<td>Research Expenditures</td>
<td>Research</td>
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<td></td>
<td><em>P1 Faculty awards/National Academy Members</em></td>
<td>Research/Reputation</td>
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<td></td>
<td>P1 Citations</td>
<td>Research</td>
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<td></td>
<td>P1 Books</td>
<td>Research</td>
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<td></td>
<td>P2 PhDs Awarded</td>
<td>Teaching</td>
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<td>P2 Post Doc Appointments</td>
<td>Research</td>
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<td>Info</td>
<td>Pell Enrollment</td>
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<td>Pell Grant Grad Rate</td>
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<td>Info</td>
<td>Grad Rate Gap</td>
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<tr>
<td>THE WUR</td>
<td>30% Citations</td>
<td>Research</td>
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<td><em>18% Research Reputation Survey</em></td>
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<td>15% Teaching Reputation Survey</td>
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<td>6% PhD:Faculty</td>
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<td></td>
<td>6% Research Income</td>
<td>Research</td>
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<td></td>
<td>6% Research Productivity (# of publications)</td>
<td>Research</td>
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<td></td>
<td>5% Staff:Student</td>
<td>Teaching</td>
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<td></td>
<td>3% Proportion international students</td>
<td>International Outlook</td>
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<td>3% Proportion international faculty</td>
<td>International Outlook</td>
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<td></td>
<td>3% International Collaborations</td>
<td>Research</td>
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<td></td>
<td>3% Industry Income</td>
<td>Research</td>
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<td></td>
<td>2% PhD:Bach Awarded</td>
<td>Teaching</td>
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<td></td>
<td>2% Institutional Income</td>
<td>Teaching</td>
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Note: The percentages represent the weight assigned to each metric in the correlation analysis.
Higher Education Rankings

BOV Retreat

Dan Sui
Senior Vice President,
Office of Research and Innovation

August 2023
AAU Membership Metrics

- Phase I
  - Competitive Federal Research Expenditures
  - Highly Prestigious Awards and National Academy Memberships
  - Citations
  - Books

Metrics are indicators of volume and quality of sponsored research and scholarship
AAU Membership Metrics

- Phase 2
  - Non-competitive Sponsored Research Expenditures
  - PhDs awarded
  - Postdocs

Metrics are correlated with volume of sponsored research and scholarship, training
AAU Membership Metrics

- Informational
  - Pell-eligible
  - Graduation Rate
  - Pell-eligible Graduation Rate
  - Graduation Gap

Metrics are correlated with quality and accessibility of undergraduate education
Tabletop Exercise

Selecting the next AAU Member
# University of Alpha

Private university 934 faculty

## Phase 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Expenditures</th>
<th>per faculty</th>
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<tbody>
<tr>
<td>Competitive Federal</td>
<td>$209M</td>
<td>$216k</td>
</tr>
<tr>
<td>Awards</td>
<td>150</td>
<td>0.16</td>
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<td>Books</td>
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## Phase 2

<table>
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<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Other Research Expenditures</td>
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<tr>
<td>PhDs</td>
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<tr>
<td>Postdocs</td>
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## Informational

<table>
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<tbody>
<tr>
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<tr>
<td>Graduation Rate</td>
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<tr>
<td>Pell Graduation Rate</td>
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<td>Graduation Gap</td>
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## Beta State

### Public university

2111 faculty

<table>
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<td>Awards</td>
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<td>Citations</td>
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<td>Books</td>
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### Informational

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<thead>
<tr>
<th></th>
<th>Pell Enrollment</th>
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<tbody>
<tr>
<td>Graduation Rate</td>
<td>66%</td>
<td></td>
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<tr>
<td>Pell Graduation Rate</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Graduation Gap</td>
<td>6%</td>
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</table>
## University of Delta at Omega

**Public university**

1280 faculty

### Phase 1

| Competitive Federal Expenditures | $209M | $163k |
| Awards                        | 307 | 0.24 |
| Citations                     | 203k | 159 |
| Books                         | 538 | 0.42 |

### Phase 2

| Other Research Expenditures | $21M | $16k |
| PhDs                         | 1425 |
| Postdocs                     | 247 |

### Informational

<p>| Pell Enrollment          | 54% |
| Graduation Rate          | 62% |
| Pell Graduation Rate     | 61% |
| Graduation Gap           | 1%  |</p>
<table>
<thead>
<tr>
<th>Phase</th>
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<th>$160k</th>
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<td></td>
<td>Citations</td>
<td>203k</td>
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<td>Books</td>
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<td></td>
<td>Postdocs</td>
<td>193</td>
<td></td>
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<tr>
<td>Information</td>
<td>Pell Enrollment</td>
<td></td>
<td>13%</td>
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<tr>
<td></td>
<td>Graduation Rate</td>
<td></td>
<td>91%</td>
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<tr>
<td></td>
<td>Pell Graduation Rate</td>
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<td>90%</td>
</tr>
<tr>
<td></td>
<td>Graduation Gap</td>
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<td>1%</td>
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</table>
## Omicron State

**Public university**

1589 faculty

<table>
<thead>
<tr>
<th>Phase 1</th>
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<th>$188M</th>
<th>$118k</th>
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<td></td>
<td>Awards</td>
<td>381</td>
<td>0.24</td>
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<tr>
<td></td>
<td>Citations</td>
<td>230k</td>
<td>145</td>
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<td></td>
<td>Books</td>
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<td>0.40</td>
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<table>
<thead>
<tr>
<th>Phase 2</th>
<th>Other Research Expenditures</th>
<th>$118M</th>
<th>$76k</th>
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<tr>
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<td>655</td>
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<td></td>
<td>Postdocs</td>
<td>234</td>
<td></td>
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### Informational

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Pell Enrollment</td>
<td>16%</td>
</tr>
<tr>
<td>Graduation Rate</td>
<td>87%</td>
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<tr>
<td>Pell Graduation Rate</td>
<td>83%</td>
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<tr>
<td>Graduation Gap</td>
<td>4%</td>
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</table>
Strategies and Next Steps
GOAL
- TOP 100 GLOBAL

OBJECTIVES
- INCREASE RESEARCH EXPENDITURES
- AMPLIFY IMPACT

PRIORITIES
- FACULTY
- INFRASTRUCTURE
- CULTURE

RESEARCH FRONTIERS
- HEALTH
- SECURITY
- QUANTUM
- ARTIFICIAL INTELLIGENCE
Strategies:
Phase 1

- Alignment of university budget model
- Increase research volume and impact generally
  - Research Frontiers
  - Destination Area 2.0
  - Research Development Support
- Increase awards and recognition
  - Dedicated resources, in partnership between Faculty Affairs and Research and Innovation
  - Improve university-level recognition and celebration of excellence
Strategies:
Phase 2

- Strengthen LINK, the industrial engagement team
- Improve support for postdocs
- Improve support for graduate students
Strategies: Informational Metrics

- Virginia Tech Advantage
Current Status

(Backup Slides)
Phase 1: Competitive Federal Expenditure
Phase 1: Prestigious Awards

Prestigious and Highly Prestigious Awards

![Box plot showing distribution of prestigious awards by institution type]

Prestigious and Highly Prestigious Awards per Faculty

![Box plot showing distribution of prestigious awards per faculty by institution type]
Phase 1: National Academies Memberships

Robert J. Bodnar
C. C. Garvin Professor of Geochemistry and University Distinguished Professor
National Academy of Sciences

Linsey C. Marr
Charles P. Lunsford Professor and University Distinguished Professor
National Academy of Engineering

Shuhai Xiao
Professor of Geobiology
National Academy of Sciences
Phase 1: Citations
Phase 1: Books
Phase 2: Other Sponsored Research

3 Year Average Other Research Expenditure (Dollars in Thousands)

Analysis Year: 2019-21

3 Year Average Other Research Expenditure per Faculty (Dollars in Thousands)

Analysis Year: 2019-21
Phase 2: Postdocs and PhDs
Informational:

6yr Graduation Rate: Overall, Pell Recipients, and Graduation Gap

- Bachelor’s 6yr Graduation Rate
- Pell Recipients 6yr Graduation Rate
- Graduation Gap

<table>
<thead>
<tr>
<th>Year</th>
<th>Institution Type</th>
<th>2022</th>
<th>2022</th>
<th>2022</th>
<th>2022</th>
<th>2022</th>
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<tbody>
<tr>
<td></td>
<td>VT</td>
<td></td>
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<td></td>
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<td></td>
<td>Public-LG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public-NLG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Informational:

Full Time First Time UG Pell Awarded by Institution Type

<table>
<thead>
<tr>
<th>Institution Type</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT</td>
<td>2022</td>
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<tr>
<td>Public-LG</td>
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<td>Public-NLG</td>
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<tr>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>New</td>
<td></td>
</tr>
</tbody>
</table>
What drives research success?

- Faculty talent
  - Recruitment/retention
  - Postdoctoral fellows
  - Graduate assistants

- Research infrastructure
  - Facilities
  - Equipment
  - Pre-/post-award expertise

- Support infrastructure
  - Human resources
  - Information technology
  - Compliance

- Partnerships
  - Universities
  - Industry
  - Governmental agencies
What are the university’s strategic investment priorities?

**Destination for Talent**
Virginia Tech Advantage
Employee Recruitment and Retention

**Academic Excellence**
Tech Talent Investment-Innovation Campus
Health and Biomedical Sciences
Integrated Security
Destination Areas 2.0

**Enabling Infrastructure and Capacity**
Advancement
IT Transformation/Technology Infrastructure
Facilities Renewal

**Academic Quality and Critical Needs**
Academic Incentive-Based Funding (PIBB Model)
Annual Critical Needs Requests

Multiple fund sources will contribute to the achievement of these strategic initiatives

*March 2023 Projections*
How are our investment strategies and research goals linked?

**Destination for Talent**  
Virginia Tech Advantage  
Employee Recruitment and Retention

**Academic Excellence**  
Tech Talent Investment-Innovation Campus  
Health and Biomedical Sciences  
Integrated Security  
Destination Areas 2.0

**Enabling Infrastructure and Capacity**  
Advancement  
IT Transformation/Technology Infrastructure  
Facilities Renewal

**Academic Quality and Critical Needs**  
Academic Incentive-Based Funding (PIBB Model)  
Annual Critical Needs Requests
How is research funded?
Fralin Biomedical Research Institute (FBRI) example

Research programs are funded by multiple sources

• University investments
  - Grants and contracts
  - Indirect cost recoveries
  - Philanthropy
  - Nongeneral funds

• State investment
  - General fund support
  - Equipment trust fund

• Self-generated revenue (e.g., service centers)

FBRI FY23 Actuals ($ in millions)

- Federal G&C, $27.7, 54%
- Non-Federal G&C, $2.4, 5%
- Indirect Cost Recoveries, $4.5, 9%
- Equipment Trust Fund, $0.5, 1%
- Other Self-Generated Revenue, $0.6, 1%
- General Fund Research, $5.6, 11%
- University E&G, $9.9, 19%
- Total expenditures: $51.2 million
FBRI expansion goals will require incremental funding

<table>
<thead>
<tr>
<th>30 faculty pre-expansion</th>
<th>FY24</th>
<th>FY25</th>
<th>FY26(1)</th>
<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Research Faculty</td>
<td>12</td>
<td>16</td>
<td>19</td>
<td>23</td>
<td>27</td>
<td>31</td>
<td>35</td>
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### Resources

<table>
<thead>
<tr>
<th>University E&amp;G Support</th>
<th>FY24</th>
<th>FY25</th>
<th>FY26(1)</th>
<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>$3.9</td>
<td>$4.3</td>
<td>$5.6</td>
<td>$6.0</td>
<td>$6.4</td>
<td>$6.8</td>
<td>$6.8</td>
</tr>
<tr>
<td>One-time</td>
<td>3.4</td>
<td>2.8</td>
<td>11.3</td>
<td>1.7</td>
<td>2.3</td>
<td>2.0</td>
<td>1.6</td>
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Subtotal University Support = 7.3 7.0 17.0 7.7 8.7 8.8 8.4

<table>
<thead>
<tr>
<th>Salary Support from Grants &amp; Contracts</th>
<th>FY24</th>
<th>FY25</th>
<th>FY26(1)</th>
<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
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<tbody>
<tr>
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<td>0.4</td>
<td>0.8</td>
<td>1.3</td>
<td>2.2</td>
<td>2.6</td>
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<th>Returned Overhead</th>
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<th>FY30</th>
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<tbody>
<tr>
<td></td>
<td>0.3</td>
<td>0.7</td>
<td>0.8</td>
<td>1.3</td>
<td>1.8</td>
<td>2.0</td>
<td>2.9</td>
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<th>Philanthropy</th>
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<th>FY27</th>
<th>FY28</th>
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<th>FY30</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4.0</td>
<td>5.7</td>
<td>5.6</td>
<td>8.3</td>
<td>6.4</td>
<td>4.8</td>
<td>1.8</td>
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</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>FY24</th>
<th>FY25</th>
<th>FY26(1)</th>
<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4.6</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.1</td>
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</table>

Total Resources = 16.6 15.2 25.7 20.4 20.5 19.5 17.2

### Expenses

<table>
<thead>
<tr>
<th>Personnel and Operating</th>
<th>FY24</th>
<th>FY25</th>
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<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4.3</td>
<td>5.5</td>
<td>6.8</td>
<td>8.2</td>
<td>9.3</td>
<td>10.6</td>
<td>11.9</td>
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<thead>
<tr>
<th>Startup</th>
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<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
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<tr>
<td></td>
<td>8.0</td>
<td>6.5</td>
<td>7.1</td>
<td>8.6</td>
<td>5.2</td>
<td>7.3</td>
<td>7.6</td>
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<table>
<thead>
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<th>Space and Equipment</th>
<th>FY24</th>
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<th>FY26(1)</th>
<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>6.4</td>
<td>4.5</td>
<td>14.7</td>
<td>5.3</td>
<td>5.5</td>
<td>5.5</td>
<td>5.5</td>
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</table>

Total Expenses = 18.7 16.5 28.5 22.1 20.1 23.4 25.0

### Surplus/(Shortfall)(2)

<table>
<thead>
<tr>
<th>FY24</th>
<th>FY25</th>
<th>FY26(1)</th>
<th>FY27</th>
<th>FY28</th>
<th>FY29</th>
<th>FY30</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ (2.1)</td>
<td>$ (1.3)</td>
<td>$ (2.8)</td>
<td>$ (1.7)</td>
<td>$ 0.4</td>
<td>$ (3.9)</td>
<td>$ (7.8)</td>
</tr>
</tbody>
</table>

(1) Includes proposed $8.8M one-time capital expenditure for expansion of space at the Children’s National Research and Innovation Campus.

(2) Shortfall largely due to additional faculty startup commitments. Additional resources will need to be identified, or expansion timeline will be adjusted.
VIRGINIA TECH ADVANTAGE:

Dr. Menah Pratt and Dr. Matt Holt

BOV PRESENTATION | August 2023
The Virginia Tech Advantage is a university wide, multiyear commitment to offer the broad educational experience to admitted undergraduate students from Virginia.

It reflects the university's commitment to serve the Commonwealth of Virginia.
At scale, the program will remove barriers for more than 5,500 undergraduate students from the Commonwealth with unmet financial need.

It will provide a strong foundation for academic success through enhanced resources, a community of peers and mentors, and scholarships and emergency funds.

It will help students enhance the value of their Virginia Tech degrees by providing opportunities for research, experiential learning, and discovery inside and outside of the classroom or lab.
Looking ahead, Virginia Tech Advantage will begin to shift from planning to implementation.

Three key implementation components include:

- **Philanthropy** and fundraising efforts.
- **Government affairs** and external stakeholder alignment and coordination.
- **Internal policy** and process alignment.

In the long run, we plan for each component to contribute 1/3 of the resources.
• A new $500M component of the Boundless Impact Campaign

• Will officially kickoff Fall 2023.

• Target is $425 million in new endowment over ten years:
  ➢ $400 million in endowed scholarships.
  ➢ $25 million to support student success.

• Plus $75 million in current use funds, also over ten years:
  ➢ $50 million to support scholarships.
  ➢ $25 million to support student success.
PHILANTHROPIC CAMPAIGN: Student Success Priorities

• **Basic Needs Support:**
  - Increased scholarships
  - Additional Student emergency funds
  - Added resources for The Market

• **Career Preparation:**
  - Added support for **internships**.
  - Coordinated **project-based learning**.

• **Transformative Experiences:**
  - **Study abroad** opportunities.
  - On- and off-campus **research experiences**
Senior campus leaders and staff in the Office of Government and Community Relations will:

• **Work at the state level** to expand resources for underserved students in the commonwealth.

• **Coordinate efforts** at the federal level **to expand** Pell resources.

**Virginia’s Appropriation Act includes $5.5M of new state general funds** for Virginia Tech students in FY 2023-24.
As noted in the June meeting, we will pursue strategies to ensure internal alignment with overall objectives:

• Complete a **full policy audit** (financial and academic) to identify and remove institutional barriers to undergraduate student success.

• Pursue **curricular alignment** to support four-year graduation across all degrees.

• **Review** existing **scholarship usage** and, where possible, modify language to expand award criteria in existing fund agreements.
VIRGINIA TECH ADVANTAGE

Dr. Rachel Holloway
on behalf of Student Experience Working Group
Co-Chairs Dr. Frances Keene and Dr. Ellington Graves
Americans' Confidence in Higher Education Down Sharply

% Great Deal of Confidence

2015: 28
2018: 23
2023: 17
Americans Are Losing Faith in College Education, WSJ-NORC Poll Finds

Confidence in value of a degree plummeted among women and senior citizens during pandemic

Wall Street Journal, March 31, 2023

% COLLEGE ISN'T WORTH THE COST

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>40</td>
</tr>
<tr>
<td>2017</td>
<td>47</td>
</tr>
<tr>
<td>2023</td>
<td>56</td>
</tr>
</tbody>
</table>
“At the core of our findings was a fascinating insight that alumni who reported strong skill development were earning more money and had more positive assessments of the value of their education, including feeling the education helped them achieve their goals, was worth the cost, and had a positive impact on their career and life.

There was another very important thread to our findings: Equity gaps persist.”
Essential Skills

Critical thinking/problem solving, Writing, Creativity, Verbal communication, Ability to learn new things
Alums who rated their skill development as “high” were more likely than those who rated skill development as “low” to rate their post-completion outcomes as high.
What’s the “secret sauce” in undergraduate education?
Holistic, Experiential Education

An integrated, intentional, and inclusive educational environment, both curricular and co-curricular, designed to promote a student’s intellectual and personal development around critical competencies needed to flourish in work and life.
“Structured Flexibility”

“Inescapable Opportunity”
Student Experience Working Group Findings

• Personal and financial reasons lead to breaks in enrollment.
• Financial challenges increase student stress.
• Financial shortfalls and emergencies disrupt academic performance.
• Costs associated with transformational experiences create barriers for low-income students.
• Additional cost shapes co-curricular participation.
• University structures and practices may increase the cost of education.
“Money is time.”
168 hours in 7 days

<table>
<thead>
<tr>
<th>Activity</th>
<th>Allocation</th>
<th>Your Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Eating</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Life Maintenance (e.g., Personal Hygiene; Laundry)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Travel to/from campus and between classes</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Class time</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Study/Prep</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Recreation/Socializing/Engagement</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Down Time</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>202</td>
<td></td>
</tr>
</tbody>
</table>
Scholarship Basics

• Remain continuously enrolled.
• Maintain a cumulative GPA of 3.0 or higher. (GPAs are checked at the end of the spring semester.)
• Enroll full time (12 hours) during Fall and Spring terms.
• Earn at least 30 credits hours each academic year. Credits earned during fall, winter, spring and upcoming summer sessions count toward the 30 hours.
• Grades of “W” do NOT count as earned hours.
First Semester

A new first year student was awarded a scholarship that covers about 50% of cost of attendance.

- The student has an on-campus job for 10 hours per week.
- She travels home most weekends to continue working at a well-paying job she held through high school.
- The student is just meeting expenses with this work plan.

A week before the deadline to drop classes, the student is feeling overwhelmed and struggling in at least two classes.

- She knows she must remain full-time.
- She must earn 15 credit hours to stay on track for her scholarship.
- Some courses are prerequisites for courses she needs to take in the next semester.
- She’s worried about the GPA requirement.
What would you advise?

• Stay in the classes. “W” grade option is available.
• Drop one class to focus on the second. W grade option is available.
• Stay in the classes. Find other financial resources for the end of the semester to stay focused on academics after Thanksgiving.
• Others?
# Outcomes and Impact

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1225</td>
<td>4</td>
<td>W</td>
</tr>
<tr>
<td>CHEM 1035</td>
<td>3</td>
<td>D-</td>
</tr>
<tr>
<td>CS 1114</td>
<td>3</td>
<td>W</td>
</tr>
<tr>
<td>ENGL1105</td>
<td>3</td>
<td>A-</td>
</tr>
<tr>
<td>ENGE 1215</td>
<td>2</td>
<td>A-</td>
</tr>
</tbody>
</table>

**Attempted Hours**: 15  
**Earned Hours**: 8  
**CUM GPA**: 2.57

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1225</td>
<td>4</td>
<td>C+</td>
</tr>
<tr>
<td>CHEM 1035</td>
<td>3</td>
<td>D-</td>
</tr>
<tr>
<td>CS 1114</td>
<td>3</td>
<td>Drop</td>
</tr>
<tr>
<td>ENGL1105</td>
<td>3</td>
<td>A-</td>
</tr>
<tr>
<td>ENGE 1215</td>
<td>2</td>
<td>A-</td>
</tr>
</tbody>
</table>

**Attempted Hours**: 15  
**Earned Hours**: 12  
**CUM GPA**: 2.24

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1225</td>
<td>4</td>
<td>C+</td>
</tr>
<tr>
<td>CHEM 1035</td>
<td>3</td>
<td>D-</td>
</tr>
<tr>
<td>CS 1114</td>
<td>3</td>
<td>D</td>
</tr>
<tr>
<td>ENGL1105</td>
<td>3</td>
<td>A-</td>
</tr>
<tr>
<td>ENGE 1215</td>
<td>2</td>
<td>A-</td>
</tr>
</tbody>
</table>

**Attempted Hours**: 15  
**Earned Hours**: 15  
**CUM GPA**: 2.18
Outcomes and Impact

Fall semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1225</td>
<td>4</td>
<td>W</td>
</tr>
<tr>
<td>CHEM 1035</td>
<td>3</td>
<td>D-</td>
</tr>
<tr>
<td>CS 1114</td>
<td>3</td>
<td>W</td>
</tr>
<tr>
<td>ENGL1105</td>
<td>3</td>
<td>A-</td>
</tr>
<tr>
<td>ENGE 1215</td>
<td>2</td>
<td>A-</td>
</tr>
</tbody>
</table>

Attempted Hours 15
Earned Hours 8
Term GPA 2.57
CUM GPA 2.57

Spring Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 1004</td>
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<td>C+</td>
</tr>
<tr>
<td>PHYS 2305</td>
<td>4</td>
<td>C+</td>
</tr>
<tr>
<td>MUS 1104</td>
<td>3</td>
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<tr>
<td>ENGL1106</td>
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<td>A</td>
</tr>
<tr>
<td>ENGE 1216</td>
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<td>A-</td>
</tr>
</tbody>
</table>

Attempted Hours 15
Earned Hours 15
Term GPA 3.16
CUM GPA 2.96

23 earned hours
2.96 overall GPA
What to do?

- Needs 9 additional hours to exceed 30 credit hours and move forward in degree.
- Needs 3.1 Term GPA in 9 VT credit hours to reach 3.0 CUM GPA

<table>
<thead>
<tr>
<th>9 hours for In-State</th>
<th>VCCS at home</th>
<th>VT courses; on-campus housing and dining</th>
<th>VT courses, off-campus housing and dining</th>
<th>VT tuition and fees, virtual campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition and fees</td>
<td>$1500</td>
<td>$5,070</td>
<td>$5,070</td>
<td>$4,630</td>
</tr>
<tr>
<td>Housing and Food</td>
<td>Free</td>
<td>@ $6,000</td>
<td>@ $6,000</td>
<td>Free</td>
</tr>
<tr>
<td>Work</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>$1,500</td>
<td>$11,000</td>
<td>$11,000</td>
<td>$4,630</td>
</tr>
</tbody>
</table>
## Is it Worth It?

<table>
<thead>
<tr>
<th>Extending time to degree by one year</th>
<th>In-state</th>
<th>Out-of-State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of attendance, continuing student, off-campus residence</td>
<td>$33,422</td>
<td>$54,940</td>
</tr>
<tr>
<td>Lost earning for one year (Computer Engineer)</td>
<td>$72,000</td>
<td>$72,000</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$105,422</td>
<td>$126,940</td>
</tr>
</tbody>
</table>