APPENDIX C:

RESEARCH
STRATEGIC PLANNING,
COMMONWEALTH
CYBER INITIATIVE,
AND
DIVERSITY
STRATEGIC PLANNING

RESEARCH STRATEGIC PLANNING PROCESS

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Over the course of 2018 and early 2019, the Office of the Vice President of Research and Innovation led a series of strategic discussions with hundreds of members of Virginia Tech's research community, peer benchmarking, and discussions with external stakeholders to establish priorities for advancing Virginia Tech's research enterprise. These conversations included everything from one-on-one conversations to half-day community engagements, from faculty surveys to literature reviews, and from blue-sky, open-ended innovation sessions to focused brainstorming on specific topics.

Throughout the engagements, several themes and priorities emerged. Several high-level priorities are reflected in the strategic plan. More in-depth, granular strategies and initiatives will be described in forthcoming implementation and strategic plans for the research enterprise.

CAMPUS ENGAGEMENT

Innovation Session

To begin framing the research strategic plan, faculty members and administrators, nominated by their Colleges and Departments, attended an innovation session in June 2018. This engagement asked participants to approach three prompts through the lens of where Virginia Tech is strong, where Virginia Tech has gaps, where Virginia Tech's structure isn't working, and where there may be risk. The three prompts were based on the components of the Beyond Boundaries vision that overlap with research:

1. Virginia Tech strives to become a top 100 global university
2. Externally-funded transdisciplinary research is key to growing Virginia Tech's research enterprise
3. Virginia Tech's research infrastructure is critical to supporting research and innovation

Through small group brainstorming, full group discussion, and voting, several major themes emerged. Attendees highlighted the need for resources and support to pursue and capture major opportunities, including federal business development support, shared instrumentation and facilities, and seed grants. They expressed support for existing mechanisms for transdisciplinary research and advocated for decreasing barriers and counterproductive incentives to collaborative projects. Attendees emphasized the need for raising Virginia Tech's national and international profile, for example, through improved storytelling and liaisons with key partners. They asked for improved mechanisms for identifying, protecting, and commercializing intellectual property. Finally, there were several aspects of research administration, processes, and support that warranted attention.

Gallery-Style Community Connection

To build on the framework developed during the innovation session, and to gather input from research enterprise stakeholders across campus, the Office of the Vice President of Research and Innovation held a gallery-style community connection. The session was designed to provide both independent and reactive thinking and communication and engage the participants with both visual and verbal cues that encouraged input, including building on the commentary of previous participants. More than 65 members of the Virginia Tech faculty, staff, and leadership attended the session, and engaged with facilitators, reviewed the opinions of prior attendees, and transcribed their own thoughts on several prompts within five principal categories:

1. How might Virginia Tech identify and pursue opportunities, both thematically and geographically?
2. How might Virginia Tech build a shared focus to create critical mass in strategic areas?
3. How might Virginia Tech highlight and leverage Virginia Tech's research strengths and capabilities with partners and the community at large?
4. How might Virginia Tech optimize research administration, processes, and support?
5. How might Virginia Tech better translate research discoveries into commercial products and global impact?

These all suggest an opportunity to reaffirm and refine a sense of identity, purpose, and community for Virginia Tech's research enterprise. They reflected a need to better clarify, communicate, strengthen and broaden Virginia Tech's core and cross-disciplinary research areas. The resounding message was to build community and find ways to change processes relating to department budgeting, governance, and promotion/tenure to encourage cross-disciplinary collaboration. Faculty want leadership to drive efforts to remove barriers and creating incentives but a faculty-led approach to finding and creating cross-disciplinary research.

To build larger teams and projects, participants supported approaches to foster and build faculty connections and community, as well as for more investment in faculty and facilities. Participants requested an improved cadence, coordination, and level of support, including efforts related to capturing research opportunities. This aligns with the recurring call for a more comprehensive and diverse view of Virginia Tech's research strengths, including the perspective that research should include humanities, social science, medicine, and strive to become a more cross-disciplinary and comprehensive university.

Leadership Discussions

To understand the priorities of leadership across the university's colleges, departments, and institutes, the Office of the Vice President of Research and Innovation held focused discussions with many leaders across Virginia Tech. The Vice President for Research and Innovation held small-group discussions with the Directors of all university-level research institutes and centers, with the Associate Deans for Research of each College, as well as focused discussions with colleges and large departments. These discussions framed the structure and priorities of the Office of Research and Innovation – including recent reorganization and new leadership – and explored the participants' priorities in advancing the research enterprise. Recurring themes included the desire for better coordination and investment in shared research facilities and instrumentation; increased support for the development of large, complex sponsored research programs; and improving structures for technology transfer and entrepreneurship.

LANDSCAPE ANALYSIS AND PARTNERS

EAB Strategic Plan Framing
Virginia Tech partnered with EAB to provide guidance and structure to the research strategic planning process. At a strategic planning framework attended by leadership in the Office of Research and Innovation as well as the Virginia Tech Office for Strategic Affairs, EAB provided a common framework of challenges and changes facing higher education in the United States, as well as some common approaches to strategic planning in the higher education environment.

RTI Strategic Planning Support
Throughout the fall, the Office of the Vice President of Research and Innovation engaged RTI International to facilitate strategic discussions, community engagement, and landscape analysis. This partnership helped explore and benchmark common approaches to research strategic plans, facilitated brainstorming to develop potential frameworks for community engagement, supported community events, and provided critical data analysis to synthesize feedback into major themes.

IAT / TEConomy
In parallel with the strategic planning efforts at Virginia Tech, the Vice President of Research and Innovation was engaged with state-wide research strategic planning through engagement with the Virginia Research Investment Committee. This strategic framework was charged through the Virginia Research Investment Committee's enabling legislation, to "Develop a cohesive and comprehensive framework through which to encourage collaboration between the commonwealth's institutions of higher education, private sector industries and economic development entities in order to focus on the complete life cycle of research, development and commercialization."

As described on the Virginia Research Investment Committee's website, "The State Council of Higher Education for Virginia, on behalf of the Virginia Research Investment Committee, launched a comprehensive study to assess the commonwealth's research assets, including those at its public and private universities, federal research facilities and private sector companies. SCHEV retained TEConomy Partners, LLC, to conduct the study, which was completed in January 2018."

Subsequent to the TEConomy study, the Vice President of Research and Innovation participated on the Implementation Advisory Team for the Virginia Research Investment Committee, which sought to inform the priorities and guide the approach to aligning strategic directions and actions for implementation. The Implementation Advisory Team specifically focused on high-impact approaches to improving technology transfer, entrepreneurship, and economic development fueled by university research and discovery.

SPECIFIC AREA FOCUS

IP Survey

Technology commercialization and transfer is critical to ensuring Virginia Tech delivers on its land-grant mission to disseminate knowledge and discoveries for public impact and economic development. Given the criticality of this to Virginia Tech's land-grant mission and research enterprise, the Office of the Vice President of Research and Innovation took extensive measures to evaluate our technology commercialization operations. Along with consulting partners, the Office of the Vice President of Research and Innovation assessed a full range of past performance indicators, as well as benchmarked staffing, investment, and ancillary activities. In June 2018, the Office of the Vice President of Research and Innovation launched a climate survey to take stock of the needs and opportunities as expressed by our own community.

Shared Research Capabilities

During the strategic planning process, the need for access to state-of-the-art research instrumentation and facilities was a recurring theme. In fact, in 2017, the Commission on Research surveyed researchers across campus, and this topic was the third most often cited barrier to advancing the research enterprise. "Space within state-of-the-art facilities with well-maintained equipment and adequate staff was indicated as essential for successful quality research programs. Faculty with older space and resources expressed greater concerns for the impact on quality research. All faculty seem to face lack of funding for adequate staff, new equipment, maintenance agreements and repairs, and items that cannot be charged to sponsored programs." Based on this consistent feedback, the Office of the Vice President of Research and Innovation initiated a landscape analysis for shared research laboratories. This included focused discussions with stakeholders across the research enterprise to understand the highest-priority areas for investment, assessment of capabilities and access models of peers, and analysis of landscape studies on core facilities. Based on this feedback and findings, the Office of the Vice President of Research and Innovation is initiating a thoughtful and comprehensive approach to improving its shared research laboratories.

COMMONWEALTH CYBER INITIATIVE

COMMONWEALTH CYBER INITIATIVE

The Commonwealth Cyber Initiative will create a commonwealth-wide ecosystem of innovation excellence in cyberphysical systems with an emphasis on trust and security. The Commonwealth Cyber Initiative will ensure Virginia is recognized as a global leader in secure cyberphysical systems and in the digital economy more broadly for decades to come by supporting world-class research at the intersection of data, autonomy, and security; promoting technology commercialization and entrepreneurship; and preparing future generations of innovators and research leaders. The Commonwealth Cyber Initiative will build on Virginia's strong base of research excellence, its innovative and diverse higher education system, vibrant ecosystem of venture capital investment and high-growth firms, and unparalleled density of cybersecurity talent.

The Commonwealth Cyber Initiative must address two challenges: today's workforce gap, and tomorrow's new economy. They are different facets of the same problem and opportunity. To focus only on today's workforce challenge is to miss an opportunity to diversify the economy. Today's assessment is a look in the rear-view mirror. Conversely, to focus only on the future economy is to ignore the fact that the basis for that economy is threatened by the workforce gap.

The Commonwealth Cyber Initiative is a highly-connected Network that engages institutions of higher education, industry, and government, along with non-governmental and economic development organizations. It will connect Regional Nodes across the commonwealth, each led by an institution of higher education. Regional Nodes will be vibrant centers of research, learning, and innovation tailored to their local ecosystem. To ensure success, Commonwealth Cyber Initiative Regional Nodes will be certified by the Virginia Research Investment Committee consistent with the commitment of Regional Node partners to the goals of the initiative.

The Hub, anchored by Virginia Tech and located in the greater Washington, D.C., area, will enable world-class research focused on cybersecurity. By hosting faculty from Commonwealth Cyber Initiative Network institutions, industry partners, and entrepreneurship programs, the Commonwealth Cyber Initiative Hub will provide a center of mass for the cybersecurity innovation ecosystem across the Network, acting as a beacon to draw talent and partners to the commonwealth.

The Hub will also coordinate the Network, strengthening connectivity and programs to build and align assets across Virginia, amplifying the efforts already underway and providing a one-stop access point to Commonwealth Cyber Initiative resources for all stakeholders, current and future. To achieve its goals, the Commonwealth Cyber Initiative will both develop new programs and promote, amplify, align, and grow existing efforts across Virginia. The Commonwealth Cyber Initiative's success relies on the active collaboration of institutions of higher education across the commonwealth, contributing their experience, ideas, and expertise. The Commonwealth Cyber Initiative Network will create an ecosystem that is greater than the sum of its parts.

The Commonwealth Cyber Initiative will build a research alliance across the Network to build a commonwealth-wide cyber innovation ecosystem, support curriculum alignment for more seamless credit transfers across the commonwealth, cultivate holistic relationships with industry and government partners to support research, education, and experiential learning across the commonwealth; and collect market research and performance data, supporting strategic decision-making and continuous performance improvement.

Key activities include:

- *CYBERPHYSICAL SYSTEM SECURITY RESEARCH:* Cyberphysical systems and the internet of things promise to enhance the quality of life in many ways but require advances in security and trust to ensure robust, safe, and widespread adoption and impact. This includes world-class research teams at the Hub and across the Network focused on the next-generation communication technologies that will support the internet of things, as well as machine learning and artificial intelligence for cybersecurity. Through a Network-wide research alliance, the team will partner with and host Commonwealth Cyber Initiative-aligned researchers from institutions across the commonwealth, bolstering Commonwealth Cyber Initiative Network ties and enhancing synergies across the Nodes.

- *ENTREPRENEURIAL ECOSYSTEM:* The Commonwealth Cyber Initiative Network is committed to ensuring that research outcomes make their way to market quickly and effectively. Commonwealth Cyber Initiative investments will grow and diversify the Virginia cyber economy by promoting the commercialization of cyberphysical system security products and launching cyber-focused startups. The Commonwealth Cyber Initiative Hub will support entrepreneurship across the Network by providing access to venture capital and supporting startups. The Commonwealth Cyber Initiative will support technology de-risking through approaches like proof-of-concept grants. In addition, Nodes will promote cyberphysical system security research and entrepreneurship in their regional ecosystems.

- *CO-OP 2.0 PORTAL:* To ensure that Virginia students are fully prepared to enter the innovation workforce upon graduation, the Commonwealth Cyber Initiative Network will promote and support opportunities for long-term and year-round experiential learning in ways that do not prolong student time-to-degree. These longer-term relationships increase value for both stakeholder groups. The Commonwealth Cyber Initiative will support the distance learning, flexible educational schedules, and industry partnerships required to establish and scale these experiences across the commonwealth. Commonwealth Cyber Initiative funding will be made available for matching industry investment in student stipends.

The Virginia State Budget invests $5 million in one-time capital expenditures for renovations, space enhancements, and equipment and $20 million in annual funds for the Commonwealth Cyber Initiative. The annual appropriation includes $10 million to scale the initiative and recruit faculty at both the Hub and Node sites. An additional $10 million is provided to establish the Hub, including research faculty, entrepreneurship programs, and student internships.

The Commonwealth Cyber Initiative will be measured by well-defined indicators like faculty participation, scholarly publications, and competitive research expenditures. It also aims to produce real outcomes for the commonwealth, such as student employment in cyber fields in Virginia industry, patent licensing, and venture capital invested in spin-outs.

INCLUSION AND DIVERSITY STRATEGIC PLANNING GUIDE

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This template was used by every college and administrative unit to create their own unit-specific strategic plan. The plans were required to address the four goals of InclusiveVT – the institutional and individual commitment to *Ut Prosim* (That I May Serve) in the spirit of community, diversity, and excellence. The four goals are sustainable institutional transformation; representational diversity; campus climate; and academic mission.

Unit Name: _____

Person(s) responsible for completing form: _____

PART I: OVERVIEW

- Does your department have a diversity statement? If so, please share. How is this statement publicized and communicated to faculty, students, and staff?

- Please describe any model/signature inclusion and diversity programs within the unit that significantly advance or advanced (if the program was discontinued) diversity and inclusion (ideally there would be measurable outcomes/evaluation, evidence of effectiveness).

- Please describe the structure for implementation, oversight, and accountability for diversity in your unit, (*i.e, Dean and Associate Deans; Diversity committee(s); AdvanceVT/InclusiveVT representatives; InclusiveVT Senior representatives; student organizations in the disciplines*).

PART II: REPRESENTATIONAL DIVERSITY

Please share your current department's compositional diversity for gender and traditionally underrepresented racial/ethnic populations:

	Undergraduate	Graduate	Faculty	Staff
American Indian/Alaska Native				
Asian				
Black/African American				
Hispanic/Latino				
Native Hawaiian/Pacific Islander				
Two or more races*				

	Undergraduate	Graduate	Faculty	Staff
Female				
Male				
Non-binary				

- How does your unit compare in terms of representational diversity with its peers for faculty and student diversity? What is the average diversity by race/gender in the field for undergraduate students, graduate students, and faculty? Who are our aspirational peers/programs and why? (ie. "Our pre-assessment reveals that the percentage of female faculty within the unit is underrepresented in comparison to the national population at universities and Virginia Tech. We are at comparable status with our peer units and other universities.")

- Do your disciplinary associations have committees on women/minority concerns? If so, please list the association(s) and website(s)? What is the unit's relationship with these associations?

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* Include those from traditionally underrepresented groups.

PART III: CLIMATE AND INCLUSION

How does your unit promote an inclusive, welcoming, affirming, safe, and accessible climate for all?

- What issues impact the climate in your unit, and how are you addressing them? Are there unique concerns for particular identity groups/populations (race, ethnicity, gender, veterans, LGBTQ, disability, and other groups reflected in the Principles of Community)?

- How does the department/unit track, promote and encourage participation and engagement in programs, mentoring, training, etc. that promote an inclusive climate? How are these addressed in performance evaluations?

- Describe your unit's collaborations/partnerships with programs that support the above groups (ie. faculty/staff caucuses, student cultural centers, student organizations – including those associated with academic disciplines, alumni chapters, community-based organizations).

PART IV: ADVANCING THE ACADEMIC MISSION OF VIRGINIA TECH THROUGH INCLUSION AND DIVERSITY

In what ways are inclusion and diversity integrated in teaching, research, and service in your unit?

- *TEACHING* (*Pathways General Education Curriculum, upper level and graduate courses*)

- *RESEARCH* (*sponsored research, Equity and Social Disparity in the Human Condition Strategic Growth Area)*

- *SERVICE* (*student/faculty/staff disciplinary associations, community outreach/partnerships*)

PART V: GOALS AND TIMELINE

What are your 1, 2, and 5-year inclusion and diversity goals? Explain how they connect to and integrate with the InclusiveVT strategic goals above.

Part V: For each of the goals above, articulate 3-5 action steps/resources/and evaluations needed to achieve the goal.				
Departmental goal (*What do we want to accomplish?*)	Action steps (*What key steps will be taken to achieve success?*)	Resources available and needed (*What funding, personnel, or other resources will be committed and/or sought to support this action item?*)	Measures of success / accountability (*Describe the methods you will use to measure the success of the action item. Use both qualitative and quantitative measures.*)	Timeline/Sustainable transformation (*How will your department support progress on this action item in the long term? Where do you want to be in 2-3 years?*)
Goal 1:				
Goal 2:				
Goal 3:				
Goal 4:				
Goal 5:				