

COMMISSION ON OUTREACH AND INTERNATIONAL AFFAIRS

Minutes

November 12, 2015; 3:30-4:30 p.m.

Gateway Center; 902 Prices Fork Road; Suite 120

Attendance: Bonnie Alberts, Kathy Alexander, Jan Helge Bøhn, Andrea Brunais, Howard Chung, David Clubb (for Nicole Sanderlin), Ed Jones, Reed Kennedy, Channing Mitchell, Gerhardt Schurig, Michael Schwarz (via phone), Eric Vance, Heather Evans (guest), James Harder (guest), Katherine Keeney (guest), Judy Ridinger (guest), Robert Stephens (guest)

Absent: Montasir Abbas, Dave Close, Guru Ghosh, Brian Hairston, Jenn Mackay, Karl Markgraf, Djordje Minic, Nicole Sanderlin, Susan Short, Elizabeth Spiller

1. **Welcome and Introductions**

Jan Helge Bøhn welcomed the group; self-introductions were made.

2. **Agenda Approval**

Jan Helge made the call for approval of the agenda; motion to approve was made; was seconded and approved.

3. **Beyond Boundaries-Creating a Vision for 2047 Virginia Tech as a Global Landgrant University**

Robert Stephens lead the discussion outlining the living laboratories model. Overview included 1) Experiments involving both teaching and research; 2) Extension Model; 3) Family; 4) Disaster Scenario which includes adaptable and resilient situations as they relate to the university. The different scenarios were presented from the Global land-grant committee working document (**see attached**). Scenarios included Bill Hopkins' *Living Laboratory Scaled for the World*; Tyler Walters' *Developing Countries, Developing Infrastructures*; and Anisa Zvonkovic's *Preparing Students for Jobs/Life We Don't Even Know Exist*.

Discussion included a look at the website: <http://www.beyondboundaries.vt.edu/about.html>; and how Virginia Tech can advance as a global land-grant institution.

The global land-grant white paper; *Envisioning Virginia Tech Beyond Boundaries* was also discussed with the group (**see attached**).

Discussion included how can we uplift Virginia Tech so people will want to be a part and how can we prioritize issues that are global and have become our issues.

Katherine Keener indicated that future conversations could occur over email; COIA is invited to send additional comments to her.

4. **Announcements**

The meeting concluded after item #3.

5. **Approval of Minutes, September 17, 2015**

See item #4 above (The minutes from the September 17, 2015 meeting were sent out electronically for approval and will be posted to the University Governance website upon approval by University Council. Minutes can be found at: <http://www.governance.vt.edu/>.)

6. Chairman's Report

See item #4 above.

7. Vice-Chairman's Report

See item #4 above.

8. Reports

a. Virginia Cooperative Extension (VCE)

See item #4 above.

b. University Council on International Affairs (UCIA) Meeting

See item #4 above. (Minutes located at:

https://www.outreach.vt.edu/UCIA/minutes_index.html)

9. Discussion of COIA Projects for 2015-2016.

See item #4 above.

10. Commission Board Member Comments

See item #4 above.

Members left gradually after 4:35 p.m.

Respectfully submitted,

Kimberly Rhodes
Recording Secretary

TENTATIVE MEETING DATES FOR 2015-2016

(All meetings will be from **3:30-4:30 p.m.** and will take place at the Gateway Center-902 Prices Fork)

December 10, 2015

NO JANUARY MEETING

February 18, 2016

March 17, 2016

April 14, 2016

May 5, 2016

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ENVISIONING VIRGINIA TECH BEYOND BOUNDARIES

GLOBAL LAND-GRANT WHITE PAPER



PREPARED BY:

JAMES HARDER

SEPTEMBER 2015

“Envisioning Virginia Tech – Beyond Boundaries” (Beyond Boundaries) sets out to advance the university as a global land-grant and address the shifting landscape of higher education (Sands, 2015). To achieve this goal, the leaders of Beyond Boundaries must grapple with a number of tradeoffs. How does the university strike a balance between local and global commitments? How does the university remain accessible as a public institution while continuing to increase in international prestige?

Additionally, external shifts in the field of higher education challenge Virginia Tech to think of new operating models that will allow us to compete with other institutions around the world. The Beyond Boundaries process will allow us to think deeply about how Virginia Tech will respond to a myriad of factors. How does the university leverage increased global interdependence and technology to strengthen its research, teaching and engagement? How does Virginia Tech garner the required distinction, in its scholarship and teaching, it needs to attract the highest quality faculty, students, and partnerships? How can the university prepare students to be global citizens that personify *Ut Prosim* throughout the world?

These questions require the university community to think critically about its long-term direction. Where are the gaps in higher education, and within your own discipline, that Virginia Tech can fill? To answer the President’s charge, the members of Beyond Boundaries need to serve as a catalyst for developing game-changing directions that complement the university’s strengths, context and history.

What is Global Higher Education?

The meaning of global higher education is multi-faceted and variable (Altbach & Knight, 2007; Knight, 2015). Most rankings boil it down to international student and faculty ratios, though more nuanced rankings have begun to emerge. Altbach & Knight (2007) contend that university administrators have a manifold definition of what an international university means:

Even though international is a term used by a large majority of higher education institutions, it means very different things. Most institutions would apply it to their collaboration with partners in other countries and participation in regional or global networks. Many would point to the international and intercultural make-up of their student body and faculty/staff. Others would refer to their off-campus research and teaching centers in different parts of the world. Some would refer to the international and intercultural dimension of their institution’s mission and goals, whereas others would specifically describe their efforts to internationalize academic programs and research initiatives. And there are those who would use international to describe their perception of the “world class” nature of their institution. More recently, educators suggest that the term has come to represent internationally co-founded and co-partnered new independent institutions (108).

In this paper I use the word “international” primarily as an adjective to identify an aspect of a university as having international focus. Often, international characteristics of a university are surface-level and transactional in nature (e.g. how many foreign born students are enrolled). In contrast, I use the term “global” as a holistic, in-depth term. The evidence of the global

university is in the minutiae. It focuses on creating intensity and second-level experiences for learners and researchers. A global university provides exposure to transformational, even transcendent, international opportunities.

In many ways this contrast between the application of the words “international” and “global” exemplifies the difficulty in becoming a global university. An example can help to illustrate this point. Many universities provide students with opportunities to study internationally; however, a select few offer study abroad scholarships, provide for buildings with living and classroom space in foreign countries, create forums for students to discuss their international experience with the broader university community, and develop partnerships that address the typical barriers for students to undertake study abroad (e.g. guaranteed course transfer, tuition swaps, on-time graduation). In short, there are schools that have surface-level international programs and there are schools that make global higher education part of their DNA. This white paper sets out to explore the upper-echelon of higher-education programs operating in a global context and the ways that they have transitioned from international into global experiences.

A secondary aim is to glean ideas about how Virginia Tech can globalize while maintaining its land-grant, public focus (e.g. access, engagement). This is a careful balance to strike. Other land-grant, public universities that have begun to define what a global-land grant looks like can serve as a useful blueprint:

Michigan State University aims to be a Global Land Grant University of international distinction and a 21st century influence as a local, national, and international resource for knowledge creation and knowledge dissemination. We aim to promote problem solving to address society’s needs locally and globally, to advance diversity within community by encouraging greater understanding of a multi-cultural and global society...MSU embraces an over-arching vision of an internationally engaged university that will provide broad opportunities for all students, faculty, staff, and other constituents to become globally aware, capable of collaborating with colleagues and clients at home and abroad, and able to operate effectively in a global environment (MSU, 2004).

A central focus of the work conducted throughout the “Envisioning Virginia Tech – Beyond Boundaries” process will be an articulation of how Virginia Tech finds its own equilibrium between global and local missions as means to advance both in tandem.

Virginia Tech in 2015¹

Virginia Tech has a broad array of international programs, assets, and people. Two international locations – the [Steger Center for International Scholarship at Virginia Tech](#) and (under construction) [VT, India](#) – provide the Virginia Tech community with opportunities for research and learning abroad. Virginia Tech also has a [language institute](#), [international center](#), and [global education office](#). Many other Virginia Tech assets create indirect benefits to global education.

¹ This is not an exhaustive listing of Virginia Tech’s international offerings.

For example, the work at the Institute for Critical Technology and Applied Science addresses solutions to global problems and attracts top-tier international faculty to the university. The Virginia Tech Corporate Research Center also provides international scholars with opportunities for developing patents, research, and business models that engage global issues. Further, the Office of International Research, Education and Development manages international projects that offer public engagement on a global scale (e.g. [Integrated Pest Management Innovation Lab](#)).

In comparison to other universities Virginia Tech struggles in the international categories of world university rankings. In the Times Higher Education World University Rankings for 2014-15 Virginia Tech is ranked 275-300 overall,² yet scores only 28.9/100 on the “International Outlook” category (ranking the university #372 nearly 100 slots behind its overall position).³ The recently released 2015 *U.S. News and World Reports* global rankings placed Virginia Tech 248th, far below the university’s national ranking (70th). Comparatively SCHEV+4 schools averaged a USNWR global ranking of 76th. Table 1 shows each SCHEV+4 schools’ performance on the national and global rankings, as well as a comparative of their performance called “Relative Score,” which looks at the difference between their national and global ranking.

In the Fall of 2014, Virginia Tech had an international undergraduate population of 1,121 (4.62%) and an international graduate population of 1,890 (29.02%) (Virginia Tech Office of Institutional Research and Effectiveness, 2015abc). Virginia Tech’s study abroad figures also lag behind typical global university standards. According to the Virginia Tech Global Education Office, 1,221 Virginia Tech students studied abroad in 2014-15. Fifty-nine percent of these participants studied in shorter time frame programs (e.g. week, month) (Rachel Fitzgerald, personal communication, August 26, 2015).

² The Times Higher Education World University Rankings for 2014-15 – establish three metrics for determining a schools ranking: (1) the ratio of international to domestic students, (2) the ratio of international to domestic faculty, and (3) the proportion of peer-reviewed publications that include an international co-author. Carrying equal weight (2.5% of total THE score) these metrics offer surface-level depth in understanding the international quality of a university, but are a useful benchmark of where the university stands in international higher-education. For an in-depth analysis of Virginia Tech’s rankings and the implications of its ranking see Sharif (this volume).

³ Similarly, the QS World University Rankings weights international student and faculty ratios at 5% (each) of their total score. Virginia Tech ranks #401 and #391 respectfully on these ratios, which also trail the university’s overall ranking of #355. It should be noted that most international rankings have been heavily critiqued for being poor indicators, if not simply unfairly biased determinants, of university quality. There was recently an “admission by QS that, in reputation surveys, universities can occasionally be nominated as excellent in subjects in which they neither offer programmes nor conduct research” (EU Report, in favorites tab, 19).

Table 1: Virginia Tech benchmark institutions: USNWR national and global rankings

Benchmark Institutions	USNWR National	USNWR Global	Relative Score
University of Arizona	121	64	57
University of Minnesota	69	29	40
University of Washington	52	14	38
University of Colorado Boulder	89	58	31
University of Pittsburgh	66	42	24
University of Texas at Austin	52	30	22
The Ohio State University	52	34	18
University of California, Berkeley	20	3	17
Rutgers, The State University of New Jersey	72	55	17
University of Michigan	29	14	15
University of Wisconsin-Madison	41	27	14
University of Illinois at Urbana Champaign	41	35	6
University of Maryland, College Park	57	51	6
Massachusetts Institute of Technology	7	2	5
University of California, Davis	41	37	4
Michigan State University	75	75	0
University of North Carolina at Chapel Hill	30	32	-2
Pennsylvania State University	47	52	-5
University of Florida	47	53	-6
Cornell University	15	23	-8
Purdue University	61	69	-8
Texas A&M University	70	86	-16
Georgia Institute of Technology	36	61	-25
University of Southern California	23	50	-27
Stony Brook	89	131	-42
Iowa State University	108	155	-47
North Carolina State University	89	213	-124
Virginia Tech	70	248	-178
University of Missouri	103	288	-185
University at Buffalo	99	420	-321

What can be gleaned?

Interviews for this research produced several takeaways. First, Virginia Tech’s existing international programs are loosely coupled and could benefit from increased integration and uniformity. Interviewees felt that it was important to find a way to bring all international programs and support under one roof. This would allow for increased interaction between international offices – currently the University Council for International Affairs relies on monthly meetings – and provide infrastructure to house globally-focused teaching, research, and engagement. This was a similar conclusion to the University of North Carolina – Chapel Hill’s

“Strategic Roadmap for Globalizing,” which created a [Global Education Center](#) to house its Carolina Global programs.

Second, Virginia Tech needs to think critically about how it employs assets abroad. The Steger Center’s current curriculum mirrors course offerings at the Pamplin Business School, which helps keep undergraduates on a 4-year graduation path. Many globally focused universities find ways to differentiate the learning experience abroad through location-specific coursework and distinctive offerings that typically count as electives for students, without disrupting the four-year graduation path. Additionally, many universities offer course articulation agreements that allow common courses to be transferred between universities without the need for authorization. To this end, it may make sense for Virginia Tech to abandon resource intensive international assets and focus on smoothing partnerships in critical disciplines and geographic locations.

Expanding International Research and Education

Attracting the best – students, scholars, and research partners – from anywhere they can be found has become the modus operandi of the world’s best institutions. As borders become softer, the competition for the best has become more intense.

– Jamil Salmi (2009, 64)

Many universities use targeted hiring to bolster global academics and scholarship, including the creation of endowed professorships and research faculty. The University of North Carolina Chapel Hill’s “Strategic Roadmap for Globalizing” allocates \$65 million of the projects total \$67 million designated endowment to faculty and research investments. For example, the “Roadmap” plans to develop a Global Research Institute and Internationally-Oriented Faculty disbursing \$35 million for:

- Five Asia-oriented professorships (including one Eminent Distinguished Professorship).
- Two Africa-oriented Professorships.
- Seven additional internationally-oriented professorships (through private and state support).
- Four Eminent Distinguished Visiting Scholars.
- Eight UNC faculty fellowships.
- Five graduate dissertation fellowships.
- Eight undergraduate research assistants.
- Fourteen travel awards for UNC faculty and visiting scholars.

Of special interest is the fact that UNC’s “Roadmap” includes funding for both mid-career professors and undergraduate researchers, as well as funding for visiting professors. High-quality global education should serve as an incubator of ideas that brings together a spectrum of differing generations, perspectives, and methods. UNC used the “Roadmap” as a means to “build on our faculty strengths in key areas where we have comparative advantage and distinguish UNC as the place for acquiring new knowledge in areas not already being explored by our competitors” (Strategic Roadmap, 2009). UNC’s “Roadmap” is about differentiation and bolstering existing assets, not breadth.

Most experts believe that the most important factor in attracting international students is a university's ability to produce cutting edge research and high-quality academic reputation (Salmi, 2009). Mihaly Csikszentmihalyi contends there is an exponential effect in high-quality scholarship:

In the sciences, being at the right university – the one where the most state of the art research is being done in the best equipped labs by the most visible scientists – is extremely important. George Stigler describes this as a snowballing process, where an outstanding scientist gets funded to do exciting research, attracts other faculty, then the best students – until a *critical mass* is formed that has an irresistible appeal to any young person entering the field [emphasis added] (as cited in Salmi, 2009, 20).

The 2015 CGS International Graduate Admissions Survey confirms this argument. It shows that institutions with the Carnegie Foundations' "Very High Research Activity" are experiencing growth in international applications but all other types of research universities are experiencing contraction (Redden, 2015). For example, institutions with "Very High Research Activity" account for 80% of the 676,484 total international graduate applications in 2014. STEM fields are also a driver of international students whom apply to American universities, comprising 50% of all graduate international applicants. The report shows "International applications in engineering -- the most popular field of study for non-American students -- increased by 4 percent [in 2014]" (Redden, 2015). If these statistics continue, it is likely that the horizon of academia is about distinction and specialization, especially in STEM fields.

Michigan State University's ongoing "Bolder By Design" (BBD) visioning process explicitly targets increased international faculty and research. BBD calls for the university to "Expand MSU's global reach through themes or areas of expertise in which MSU has significant capacity to effectively engage abroad in research, instruction, international development and problem solving" (5). Of note, Michigan State's land-grant mission seems to extend into the international context calling for the university to "Establish partnerships which benefit MSU and our partner institutions and which produce societal benefits here and abroad" (5). Michigan State even incorporates international publications into its tenure process to codify the importance of international collaboration in promotions.

What can be gleaned?

International students prioritize STEM fields, especially engineering. Virginia Tech is currently ranked 21st in Engineering by the U.S. News and World Report and has other high performing STEM subjects. Many higher-education scholars believe that the comprehensive university model of producing breadth is failing (Salmi, 2009). Salmi argues "A crucial element of [a university's strategic] vision is the selection of a niche market toward which the institution will seek to build and maximize its comparative advantage...Part of the vision setting will therefore consist of delineating the main areas where the institution wishes and has the potential to operate at the forefront" (54).

As education online surges and broader globalization trends continue to decrease the costs of information and skills acquisition (e.g. ease of travel and communication), the highest quality students and researchers desire universities with Csikszentmihalyi's critical mass. Virginia Tech has an opportunity to use targeted hires or a new global research center as a way to create a new area of differentiation in engineering, agriculture, or another core strength. Further, finding ways to develop new lines of endowed fellowships in areas relevant to Virginia Tech's global-land grant mission can serve as a way to stimulate high-quality research and education, as well as contribute to the university's reputation.

International research also benefits from the other aspects of a global university. Sharif (this volume) contends: "As the university builds relationships with institutions abroad and focuses its resources on simplifying access to international partners, global collaboration is more likely to occur. These broader, structural changes will ease the way for individual faculty and departments to initiate the type of collaboration that leads to multinational coauthored work" (19). The simple act of placing a greater emphasis on global research, education, and engagement, in of itself, creates momentum for other aspects of the global university.

Locations

Today, 41 percent of [Carnegie Mellon University]'s 13,300 students come from outside the United States. Some of those international students earn their CMU degrees without ever traveling to Pittsburgh; others start their studies in one country and finish in another."

(Sabo, 2015, 24)

A global education is about providing distinctive and transformative opportunities to students. Although many students can gain global skills in a [domestic setting](#), providing students with international experience – through campuses or study abroad – can be the cornerstone to a global education.

Branch Campuses

Geographic expansion through the creation of international branch campuses has been a major trend at many top American universities. The Cross-Border Education Research Team at SUNY-Albany estimates that 229 international branch campuses operate in seventy-two host countries. NYU has arguably built the strongest network of global campus locations. Their [Global Academic Centers](#) system includes locations in Abu Dhabi, UAE; Accra, Ghana; Berlin, Germany; Buenos Aires, Argentina; Florence, Italy; London, UK; Madrid, Spain; New York, USA; Paris, France; Prague, Czech Republic; Shanghai, China; Sydney, Australia; Tel Aviv, Israel; and Washington, DC. NYU even offers degree-granting programs in Shanghai and Abu Dhabi.

NYU prides itself on providing students with the infrastructure they need to study abroad, while keeping tuition and fees consistent with normal study on the anchor campus (Global, 2015). Further, NYU's global network includes assets and personnel that deepen the experience in study abroad locations. For example, NYU Prague includes housing for around 200 students through

university-leased apartments and residence halls, as well as 40 dedicated faculty and 10 administrative staff (Global, 2015).

NYU's global offerings also include purposive features that help students deepen their study abroad experience. First, they offer a Global Ambassadors program that "allows returning study away students to share their experiences with the NYU community." Second, NYU provides merit-based scholarships and grants that don't require separate application. Instead all applicants are considered for financial support. Third, NYU created freshman year abroad programs in Florence, London, Paris or Washington, DC. These programs allow incoming students the ability to gain experience abroad before putting down roots in New York (Global, 2015).

Many of Virginia Tech's SCHEV peers have developed branch campuses abroad – including Georgia Tech (France), Texas A&M (Qatar), Cornell (Qatar), Michigan State (Dubai). Many Virginia schools have also expanded their international reach with branch campuses and offices – including Virginia Commonwealth (Qatar), George Mason (Qatar) and Virginia (China).

Virginia universities' branch campuses have produced a range of outcomes. On a positive note, VCU Qatar operates a school of art and design located in Doha that includes 58 faculty from 17 nationalities, 300 students from 42 nationalities, and 538 alumni hailing from 33 nationalities. The degrees offered at VCU Qatar are fully accredited in the United States and Qatar. Conversely, in 2005 George Mason abandoned the branch campus it opened in Ras-al-Khaymah, UAE. Tamar Lewin (2009) summarized the barriers that George Mason faced in the Middle East:

George Mason has struggled since it opened its branch in Ras al Khaymah, an emirate with neither the dazzle of Dubai nor the oil wealth of Abu Dhabi. It never attracted many students, with about 120 in degree programs and 60 in its English-language program. None of the faculty members came from the home campus, there was constant turnover in the leadership, and the branch had not completed the lengthy process of gaining local accreditation.

International presence isn't limited to classrooms and dormitories. In 2014, the University of Virginia opened an [East Asia Center](#) in Shanghai, which aims to "strengthen its academic programs, research, internships, alumni engagement and recruitment of students" (Celebration, 2015). A physical international presence can provide a powerful recruitment tool and outreach opportunity. However, as the George Mason experience illustrates branch campuses can be hard to manage and sustain. More broadly, branch campuses have also been criticized for [human rights violations](#), [having a negative influence on local culture](#), and [concerns about academic freedom](#).

Study Abroad Partnerships

Many universities enter into study abroad partnerships that help alleviate the barriers to student participation (e.g. course transfer, cost). For example the Global Engineering Education Exchange (Global E3) gives member institutions uniformity in study abroad offerings through tuition swap, pre-approved coursework, and opportunities to extend study abroad through

“supplemental internships after their study abroad experience...[which] help provide students with industrial placements near the university, co-op internships within the university, and more” (About, 2015). Participants in the E3 program include SCHEV peers like Michigan, Florida, SUNY-Buffalo and Pittsburgh. E3 international partners provide the opportunity to study engineering coursework in [23 countries](#).

What Can Be Gleaned?

Institutional partnerships that address the primary obstacles to study abroad (e.g. finances, academic fit) may be an attractive way to advance global offerings for students without significant outlays (due to seed funding from the NSF, AT&T Foundation, and U.S. Department of Education participation in Global E3 is just \$2,500 per year for member institutions (About, 2015). Further, the ability to study specialized content at a foreign university promotes the depth of learning and experience that the global student need to be prepared for a global career.

A global campus can be an important facet of advancing global opportunities. Beyond Boundaries committee members need to consider the appropriate balance of assets, partnerships, and spending to achieve the university’s global vision. In his installation speech President Sands declared “it is impossible to view our mission in anything less than a comprehensive global context. Our students are global citizens. They expect to be prepared to compete globally, and we need to do everything we can to provide those opportunities.” It is the task of the Beyond Boundaries process to color in what that means in practice.

Joint Ventures

No other institution can claim both an expansive mountain campus and a campus in the “Capital of the Free World,” all in the same state. We must find ways to exploit this “Binary Star” by building our National Capital Region presence into a Global Innovation District that serves all three functional mission areas of discovery, learning and engagement. A Virginia Tech faculty member, staff member or student will see the Blacksburg campus and the National Capital Region as one, and we must focus on reducing the physical, social, bureaucratic, and financial barriers to becoming, effectively, one distributed campus.

President Sands (2014)

One of the emerging alternatives to the international branch campus is the development of a joint research and education campus (referred to henceforth as a joint venture). Joint ventures are typically located in metropolitan area. They use their urban location as a global platform for students and researchers to fuse their work with real world problems. This provides an attractive opportunity to increase a university’s international profile and grow its geographic footprint without leaving the U.S.

Three joint ventures – Cornell Tech, Global Innovation Exchange, and The Berkeley Global Campus – are reviewed here to illustrate the aspects of a typical collaboration. Each of these joint ventures are still in the budding stages of development and have simply announced the project as well as their plans for construction (none are complete at this writing). These three institutions were selected because they are the first universities to create joint ventures of this

nature. Further, they were selected because each of the U.S. universities in the joint venture is a SCHEV peer, two are public (Washington and Cal-Berkeley) and two are land-grant universities (Cornell and Cal-Berkeley). Two ventures incorporate international university partners, which attempt to benefit from the reputation of innovation fostered by the foreign schools (e.g. [Technion](#)) and as a way to broaden the joint ventures global impact. International partnerships of this nature are important to contemplate as we consider alternatives to advancing globally.

In many ways the point of a joint ventures is to create a symbiotic relationship with community and private-sector businesses to serve as employers, mentors and formal partners with the university. Each venture incorporates aspects that are relevant to other task force groups in Virginia Tech's 2047 initiative:

- **Campus Setting** – Each joint venture broadens the participating universities' geographic location. For the international schools, it is attractive to secure an American location; for the American universities, it extends the reach of the physical campus into vibrant urban regions. The joint ventures are also founded on creating a deeper link between the university and the larger community (e.g. Cornell Tech specifically addresses NYC's limitations in the technology sector), which is particularly attractive to a land-grant, public university's mission. Further, each of the projects' campuses are at the cutting edge of modern architecture and academic design.
- **Funding Models** – Each of the joint ventures develop new resource streams for partner institutions. Joint ventures are intentionally structured to create new parties that are interested in the university's success (e.g. companies, location specific individuals or organizations). Further, each joint venture serves as a microcosm of the broader university's capacity to think forward and attract the highest quality students and researchers.
- **Preparing Students** – Each of the joint ventures offer students new degree options (e.g. health technology, startup postdocs) and partnerships (Microsoft, Google, Verizon) that link the learning experience to practical experience. For the universities, each joint venture establishes a new area of inquiry that falls outside of its traditional education and research specializations.

Cornell Tech

Cornell Tech is an alliance between Cornell University, Technion Israel Institute of Technology, and New York City. From the perspective of Cornell, the endeavor bolsters its international reputation through initiating partnerships with NYC and an acclaimed international university. Further, the academic structure of Cornell Tech, which uses a loose coupling of disciplines and appointments (including guest professorships alongside faculty from Cornell and Technion), provides a platform for scholarly collaboration and applied research. Cornell Tech also differentiates the degree offerings of Cornell, including distinctive graduate degrees in three hub areas – connective media, health tech and built environment – which it calls “Areas of Impact” as well as a Cornell Tech specific MBA and startup postdoc.

The joint venture currently operates out of Google's New York office in Chelsea and is set to open the first phase of the new campus on Roosevelt Island (between Manhattan and Queens) in 2017. The Roosevelt Island campus is itself a [visionary design](#) and is taking several construction

risks (notably Cornell Tech chose not to build a data center of servers and instead relies solely on cloud services). Descriptions of the project call attention to its open-ended design:

There is, in that sense, a sort of Zen to the planning process. Committing to flexibility means committing to nothing. Embracing technology means not buying too much of it (Wolfman-Arent, 2014).

The structures include a “net zero” building, designed by Pritzker Prize-winner Morphosis, that will generate as much energy as it consumes; a 24-story Handel Architects-designed dorm that would reach nearly as high as the neighboring Queensboro Bridge; and a Weiss/Manfredi-designed giant staircase that runs through the space to encourage collaboration across the campus (Chaban, 2015).

Cornell Tech emerged from a competitive bidding process initiated by New York City that offered to provide \$100 million and the Roosevelt Island parcel to the winning university. The campus provide benefits to each of its constituencies:

For New York City, the campus has the potential to develop a high-tech industry that many say is underrepresented in the city’s economy. For Technion, the campus gives the Israeli institute, widely credited with transforming the country from an agrarian economy to a high-tech capital, a chance to demonstrate show its quality on the international scene. Finally, victory in the competition and the potential success at the new campus could likely help cement Cornell as one of the major players in the high-tech industry, along with Stanford University and the Massachusetts Institute of Technology (Kiley, 2011).

Since each participant garners distinct benefits, they are willing to each provide financial resources and support to the project. Diversified revenue and ideas has increased the quality of the final product, which is set to cost over \$2 billion.

When it is fully built out Cornell Tech plans to encompass two million square feet, 2,000 students, 280 professors and will cost over \$2 billion. According to new Virginia Tech VP for Advancement Charlie Phlegar (who was a member of Cornell Tech’s steering committee) a condition of the Cornell Tech project was that it would not divert monies from the Ithaca campus or the university’s annual budget. Since the project requires a projected \$2 billion in spending, diversification in resource streams was important to the project’s success. A unique venture of this scale redefines the financial donors that the university can solicit for contributions. For instance, funders to the Cornell Tech venture included New Yorkers and tech industry donors who would not previously have considered Cornell in the sphere of their philanthropy. The planned Executive Education Center received a \$50 million naming gift from Verizon and the academic building received a \$100 million naming gift from Mike Bloomberg and the Bloomberg Philanthropies.

Lastly, Cornell Tech is in a reflexive relationship with its community. As stated above, the \$2 billion partnership was initiated by an RFP by New York City’s Mayor Bloomberg. The Mayor perceived a deficiency in the city’s technology sector and sought a means to increase that industry through academic inspiration.

Global Innovation Exchange (GIX)

The GIX joint venture is comprised of the University of Washington (UW), Tsinghua University (China), and Microsoft. The institutions are partnering together to “pioneer new models of global teaching and learning by directly connecting students and faculty through equal collaborations with research-led companies and non-profits in a holistic, project-based environment that will prepare students to help solve a range of global challenges.” The exchange is also designed to facilitate integration of new partner universities, companies and research institutions that emerge through time.

GIX will be located ten miles from the UW campus in Bellevue, WA and will include a 100,000 square foot building that can accommodate nearly 3,000 expected students. Similar to Cornell Tech, it uses local designers, [Wright Runstad & Co.](#), to create an innovative and community centered campus. It will be in the Spring District of Bellevue that will incorporate two office buildings (aimed at attracting commercial tenants), retail space, access to light rail, and a brewpub. Since GIX will be built in a burgeoning part of Bellevue, that hopes to expand the existing technology corridors of Seattle, it mirrors university extension.

GIX’s original corporate partnership is with Microsoft and seeks to extend the GIX classroom into real world using project-based learning. For example, Microsoft will become a consistent source for student development through “ideas for research projects as well as to offer mentors and internships for students” (Redden, 2015). Microsoft’s contribution of applied education experience is supplemented by a \$40 million dollar gift that is set to grow alongside the partnership.

The first cohort of degree seeking students will attend GIX in 2016 (offering one master’s degree in Technology Innovation) but the campus expects 3,000 students within a decade. Innovation is one of the motivating factors in establishing the venture. University of Washington interim President Ana Mari Cauce called Tsinghua “the pacesetter for innovation in China.” Tsinghua University is often called the MIT of China (Redden, 2015) and will bolster teacher and student quality within GIX.

The Berkeley Global Campus at Richmond Bay (BGC)

The BGC is still in the formative stages and has not announced partner universities and companies. Although BGC is still in its formative stages it is presented here because of its overtly global focus and the lessons that can be gleaned from understanding the preliminary stages of the venture process. The impetus for BGC is a rebuttal by Cal’s Chancellor Dirks to the current trend of global education:

Until now American universities seeking to expand their global profile have used a single model: establish a physical presence overseas through the construction of a foreign campus or the opening of small, consular-style offices. When I was at Columbia I helped to develop eight consular offices across the world, and at some point we may still pursue that path. But we have now determined a way to launch a new kind of global engagement by staying right here at home. We have the opportunity to become the first American university to establish an international campus in the United States, right here in the East Bay, in Richmond, California (The Berkeley, 2014).

In many ways Cal is trying to attract global offerings from international universities by providing space and infrastructure. This model attempts to replicate the success of [Education City in Qatar](#) in a domestic setting.

A globally oriented U.S. campus is a response to many of the concerns inherent to education abroad – which include human rights violations, negative influence on local culture, and concerns about academic freedom. Chancellor Dirks believes “At home we are on much more solid ground when it comes to protecting and supporting academic freedom, transparency, different forms of advocacy and political engagement, and protection of intellectual property” (The Berkeley, 2014).

At this point BGC’s lone partner is the Richmond Bay community, where it could have a drastic impact on the future of the shoreline. Projections show that the BGC has the potential to include “5.4 million square feet with a potential employment of up to 10,000 people” (Bergman, 2014). Richmond City Manager Bill Lindsey believes “that the Berkeley Global Campus, in connection with planning for the southern shoreline, is the biggest economic development event since the shipyards in Richmond... And we want to make sure that it takes us literally through the next hundred years of good, positive growth for our community” (Bergman, 2014).

What Can Be Gleaned?

A joint venture of this nature would be a game changer for Virginia Tech. While the Presidential commitment required for a project of this nature is already in place, Virginia Tech does not currently have the international reputation of these cases (USNWR ranks Virginia Tech #248 in its global rankings; Cal #3, Washington #14, and Cornell #23). However, that does not mean that Virginia Tech shouldn’t/couldn’t pursue a joint venture. It raises questions for the university to think critically about: How does Virginia Tech demonstrate its benefit to a municipality in the NCR? Who might the university partner with? What assets can be leveraged to make Virginia Tech more attractive for a joint venture? For example, Cornell’s bid to New York City was enhanced by a \$350 million promised donation to the project (Perez-Pena, 2011).

The joint ventures listed here weave together community and academic benefits. This model could offer Virginia Tech a potential vehicle to establish an extension-like offering to new or broader audience. It could also help the university diversify its resource base, which would be necessary to the creation of a joint venture, through location/sector specific donors. Additionally, local and state governments could be brought on to provide financial resources, land, tax credits or administrative support.

Cornell Tech, and to a lesser extent BGC and GIX, expand the geographic footprint of their universities. A new joint venture could offer Virginia Tech the potential to deepen its roots in the NCR or another locality. Access to the NCR is particularly attractive to the global vision of the university since it is a influential international city. The Washington region is filled with offerings for students (domestic and foreign) and faculty. For example, securing classroom research, and living space, as well as developing relationships with private, non-profit, and public sector organizations could deepen the student experience and help existing Virginia students afford to study/intern in the NCR.

International Students

“Higher education has the potential to reduce or increase inequalities depending on the form of policies institutions, governments, inter-government organizations and transnational associations implement.”

(Unterhalter & Carpentier, 2010, 2)

International students are an important element of globalizing a university. Salmi (2009) argues, “An influx of top students can be instrumental in upgrading the academic level of the student population and enriching the quality of the learning experience” (60). International students present opportunities for universities to grow, diversify and increase in academic excellence; however, to strengthen the university’s global approach administrators and faculty must remain conscious of how to integrate international students cultures, ideas and experiences into the broader university’s ethos. This section considers the ways that other high-performing global universities attract, integrate, and sustain relationships with potential, current and former international students.

Attract

Targeted recruiting is the first step toward encouraging higher-quality and -quantity of international students. In the age of social media and online communication international recruitment provides an opportunity for personal interaction and customized outreach. The University of Sheffield won the 2014 Times Higher Education award for International Student Strategy for its production of [YouTube videos](#) that prepare students to study in the UK and how to complete/process country specific visa application procedures in countries like China and India.

Basic outreach and recruitment is a deficiency for many American schools. The “2015 World’s Top Universities Through Student Eyes” report found that many universities neglect to undertake basic communication seriously: “20 percent of US and Canadian universities fail to reply to student inquiries, and universities that do reply still fail to follow up with students interested in their programs (4 out of 5 times).” Providing high-quality materials and following through with requests for information provide a potential area for recruitment distinction.

It is also important to evaluate the broader trends of international students studying in the U.S. Year to year numbers show that Chinese (-2%) and European (-1%) applicants are declining; whereas Indian (12%) and Brazilian (4%) applicants are growing, though these countries growth is cooling in a relative sense – Brazilian applicants increased 25% in 2012 and 61% in 2013. A 2011 study by UNESCO showed the vast majority of students still come from China and India. It showed that 723,000 Chinese and 223,000 Indian students accounted for about 45% of all students carrying out tertiary education worldwide (Gopinath, 2015).

Integrate

Students, regardless of their nationality, want more than a lecture and course-based education. As instruction and learning undertaken in the classroom becomes widely available through books,

MOOCs, websites, and other resources the value students derive from coursework functions decreases. To this end it is likely that the university's role outside the lecture hall will intensify:

Elite universities will need to ensure that they personalise students' development to prepare them for leadership and influence. They will also need a *robust ecosystem* of extra-curricular and incubated real-world experiences where students can learn and demonstrate leadership. To maintain their elite status, they will need to ensure top-quality peer networking for their students by attracting the world's best and brightest candidates. And, as Gillian Tett, the notable Financial Times columnist reminded us, the matchmaking function of universities, particularly for the elite, will remain important even with the proliferation of online options. Mentorship for students will also be critical as students will increasingly expect these highly personalised interactions to form part of their education. This will mean a large commitment of resources, but is absolutely necessary if these universities are to produce world-class graduates, maintain their relevancy and remain elite [emphasis added] (Barber, Donnelly, & Rizvi, 2013, 56).

Depth in the student experience is likely to become the defining metric in student choice, especially international students who face significant costs to study in the U.S.

Sustain

As international students matriculate, the best universities find ways to develop strong ties with alumni, even in cases where graduates return to their home countries. Sustaining these relationships is critical for universities that hope to produce Barber, Donnelly and Rizvi's (2013) "robust ecosystem." At top universities international alumni organizations cultivate resources and develop lasting connections. UVa has eighteen international alumni organizations, MIT has 42 international clubs (internationals comprise 14% of MIT's entire alumni organization). Alumni relations also can lead to opportunities for mentors and internship placements. This is especially important in international locations where internships, partnerships, and networks (for students and the broader university) can be difficult to secure/enter.

One of the motivating rationales of creating the joint venture is to replicate the connection created between [Stanford and Silicon Valley](#):

At Stanford more than elsewhere, the university and business forge a borderless community in which making money is considered virtuous and where participants profess a sometimes inflated belief that their work is changing the world for the better. Faculty members commonly invest in start-ups launched by their students or colleagues (Auletta, 2012).

Encouraging more graduates to take on mentor roles in international locations could be a way for Virginia Tech to distinguish its offerings for students and alumni networks.

What can be Gleaned?

Virginia Tech's founding as a land-grant university grounds the university in a public service ethos that is responsible for developing opportunities for student and community advancement. As the world flattens and becomes more transient, the university's capacity for advancement expands in scope. To do so, Virginia Tech must think critically about how its broadened international lens transforms its mission and audience. It is likely that the university needs to re-envision its recruitment, campus setting, curriculum, outreach, and international development organization to increase its appeal and ability to educate global students, whether domestic or foreign born. Virginia Tech does not currently have an international student recruitment strategy. How could the university begin to target and increase its attractiveness to high-quality international students?

In the future, the university cannot solely concentrate on American funding agencies and alumni support. Virginia Tech does not currently have an international alumni branch. Current Virginia Tech VP for Outreach and International Affairs Guru Ghosh calls international giving the "frontier of funding" and argues that moving forward the university needs to more nimble in our financial approach.

As Virginia Tech deepens its global ties, it is imperative that it think about how the local and state influences shift alongside. Hopefully, global and local interests can remain a reciprocal relationship. For example, Texas A&M's degree offering branch campus in Qatar prioritizes the parent university's existing strengths through the two locations' geographic similarities – petroleum engineering is highly relevant to both places. Texas A&M is ranked 1st (undergraduate) 2nd (graduate) in the subfield by the *U.S. News and World Report* (Fact Sheet, 2014). Virginia Tech should begin to cultivate opportunities that use its own existing strengths as a means to provide global service that is steeped in its agricultural and mechanical roots.

References

- “About.” Global E3. Retrieved from <http://www.iie.org/Programs/GlobalE3/About>
- Altbach, Philip G. & Jane Knight. 2007. “The Internationalization of Higher Education: Motivations and Realities.” *Journal of Studies in International Education*, 11(3/4): 290-305.
- Auletta, Ken. “Get Rich U.” *The New Yorker*. April 30, 2012.
- Barber, Michael, Katelyn Donnelly, & Saad Rizvi. 2013. “An Avalanche is Coming: Higher Education and the Revolution Ahead.” Institute for Public Policy Research.
- Bergman, Barry. “Dirks, Richmonders get down to business on global campus.” Berkeley News. December 15, 2014. Retrieved from <http://news.berkeley.edu/2014/12/15/berkeley-global-campus-ommunity-meet/>
- “Celebration of the University of Virginia’s China Office Opening in Shanghai, March 6 and 7, 2015.” UVA Global. Retrieved from <http://global.virginia.edu/UVACHinaOfficeOpening>
- Chaban, Matt. “Cornell NYC Tech campus to include top architecture and no fences.” *New York Daily News*. December 19, 2013. Retrieved from <http://www.nydailynews.com/life-style/real-estate/cornell-tech-campus-takes-shape-article-1.1552890>
- Cross-Border Education Research Team. Retrieved from <http://www.globalhighered.org/index.php>
- “Facts & Figures.” Harold Vance Department of Petroleum Engineering Texas A&M University. Retrieved from <http://engineering.tamu.edu/petroleum/about/facts>
- “Global.” New York University. Retrieved from <http://www.nyu.edu/global.html>
- Kiley, Kevin. 2011. “The Lure of the City.” *Inside Higher Ed*. December 20, 2011. Accessed online at: <https://www.insidehighered.com/news/2011/12/20/cornell-and-technions-win-new-york-competition-reflects-desire-grow-urban-ties>
- Knight, Jane. 2015. International Universities: Misunderstandings and Emerging Models? *Journal of Studies in International Education*, 19(2): 107-121.
- Lewin, Tamar. “George Mason university, among first with an emirates branch, is pulling out.” *New York Times*. March 2, 2009. Retrieved from http://www.nytimes.com/2009/03/02/world/americas/02iht-01campus.20518896.html?_r=0
- MSU: A Leading Global Land Grant University. 2004. Michigan State University. <http://www.accreditation2006.msu.edu/internationalization/documents/Globalization.pdf>
- Perez-Pena, Richard. “Cornell’s Bid for City Campus Gains and Stanford Bows Out.” *New York Times*. December 16, 2011.
- Recommendations of the Boldness by Design Internationalization Taskforce. Michigan State University. http://boldnessbydesign.msu.edu/documents/BbdImperative3_000.pdf

Redden, Elizabeth. 2015. "From Beijing to Puget Sound." *Inside Higher Ed*. June 19, 2015. Accessed online at: <https://www.insidehighered.com/news/2015/06/19/university-washington-and-chinas-tsinghua-u-launch-institute-microsoft-millions>

Sabo, Sandra R. 2015. "Complexity Made Simple." *Business Officer*. June, 2015.

Salmi, Jamil. 2009. *The Challenge of Establishing World-Class Universities*. The World Bank: Washington, DC.

Sands, Timothy D. "Installation Speech." October 17, 2014. Retrieved from <http://www.president.vt.edu/about-the-office/statements/101714-installation-speech.html>

Sands, Timothy D. "The Challenge." Retrieved from <http://www.beyondboundaries.vt.edu/challenge.html>

Sharif, Fatima Sparger. "Characteristics of Highly Ranked Universities in the Times Higher Education World University Rankings." Office of the Senior Fellow for Resource Development. July, 2015.

"Strategic Roadmap for Globalizing UNC-Chapel Hill." *UNC Global*. March, 2009.

"The Berkeley Global Campus at Richmond Bay." Retrieved from <http://news.berkeley.edu/wp-content/uploads/2014/10/BGC-Senate-Final.pdf>

Unterhalter, Elaine & Vincent Carpentier. 2010. *Whose Interests Are We Serving? Global Inequalities and Higher Education*.

Virginia Tech. Office of Institutional Research and Effectiveness. (2015a). Headcount summary by student level. Retrieved from <https://irweb.ag.w2k.vt.edu/webtest/EnrollmentSummary.aspx>

Virginia Tech. Office of Institutional Research and Effectiveness. (2015b). Student data, demographics, student residency. Retrieved from http://www.ir.vt.edu/work_we_do/demo_enroll/demographics/studentDemographics.html

Virginia Tech. Office of Institutional Research and Effectiveness. (2015c). University-wide enrollment, classification by ethnicity. Retrieved from <https://irweb.ag.w2k.vt.edu/webtest/Ethenrl.aspx>

Wolfman-Arent, Avi. "How Do You Plan the Campus of the Future? Try Not To." *Chronicle of Higher Education*. July 18, 2014. Retrieved from <http://chronicle.com/article/How-Do-You-Plan-the-Campus-of/147803/>

Bill Hopkins

Living Laboratory Scaled for the World

The effects of climate change, pollution, invasive species, and emerging diseases have become issues that impact the daily lives of all Virginians. For example, coastal VA is subjected to such frequent flooding that more than 1.6 million citizens are expected to relocate from the coastal region by 2070, creating unprecedented planning challenges across inland urban areas. The water quality of the Chesapeake Bay and coastal regions has plummeted due to the combined influence of acidification from CO₂ emissions and nutrient/pollution loading from agriculture/urbanization, and important fisheries are now depleted. Likewise, droughts, increased surface temperatures, and invasive insects have decimated plant, invertebrate, and vertebrate biodiversity across Appalachia, altering these unique Mountain communities and compromising the ecosystem services that they provide to society. Increased frequency and intensity of drought caused by climate change, coupled with diminished soil quality across much of VA, have reduced crop yields to a fraction of what they were in 2015. To make matters worse, a fungus introduced from Asia has eliminated soybeans from the Commonwealth's once diverse agricultural portfolio and the poultry industry in VA has been severely compromised by a newly introduced, highly contagious strain of bird flu that also infects people and challenges our healthcare system.

These cumulative issues have put the Commonwealth's economy in a precarious position with limited federal assistance available, and government funding for education and medical care in rural communities has plummeted due to increased demands in densely populated urban areas. Rapid technological innovation is required to solve these issues, and the dynamic interplay amongst them, yet these new technologies raise their own set of problems, risks, and ethical considerations. Virginia Tech now relies almost entirely on tuition, philanthropy, and corporate and federal partnerships to fund its operations. Global competition for philanthropic and private sources of funding, as well as for the best students and faculty, is now intense among new global actors pursuing these critical resources.

The problems facing the Commonwealth of Virginia and Virginia Tech are not unique. Instead, they are becoming the global norm. Coupled with famine, inter-state conflicts, terrorism, fiscal crises, and rising energy prices, the complex global scenario reveals that robust global partnerships are required to find solutions. Yet, with increased population growth and a growing global economy, the political landscape has become increasingly complex at state, federal, and international levels.

Tyler Walters

Developing Countries, Developing Infrastructures

By 2047 the developing countries and continents of 2010s are rapidly building their infrastructures and addressing societal problems. For instance, some of the developing world regions have growing economies that require new infrastructures, e.g. improved roads, electrical grids and other energy plants, new facilities, reliable clean water supply to cities, modern sewer systems, and the latest in fiber optic networks. Many of the world's leading companies are present in these regions and building the new infrastructures. On a global level, clean water sources that were thought to be nearly inexhaustible are

being depleted by human consumption and industries. Petroleum as a leading energy source is growing in scarcity as well and is becoming increasingly difficult to extract from the Earth. Basic technologies exist to broadly commercialize renewable energy sources at affordable levels. Among these are solar, wind, plant-based, and other bio- and geo-chemical energy sources. However, these technologies still have not been commercialized and deployed globally.

In response to these conditions, there is a rise in regionally-based, multi-national research coordinating organizations that prioritize and commission research at a large scale to solve these challenges of infrastructure and energy, as well as other global problems. Once commissioned, these research coordinating organizations aid in assembling multi-national groups comprised of faculty, students, and other researchers from universities, governments, corporations, and private research organizations worldwide. For the students involved, participating in these research initiatives adds a layer of experiential learning from the field that they would otherwise not gain. This gives them a leg up when competing in the job market globally upon graduation and makes them more attuned to working with people from a wide variety of cultures.

The participating U.S. land-grant institutions leverage their Federal partnership in the Cooperative Extension Service (CES) to work directly with the people living in some of these world regions and apply the research findings as they are generated. Specifically, they help people in learning more about how to use and conserve clean water and energy in their homes and businesses. There are emerging practices coming from the initial research being conducted by the regional research group. The CES takes the lead on addressing clean water and energy supply issues not only as technical problems, but as problems of a socio-economic, political, and ethical nature as well. The CES begins by holding meetings and workshops regarding the choices governments are making about which businesses and people will be supplied with new water and energy resources first, as they emerge. The emphasized message is that these decisions are intended to be made in a transparent and ethical manner; one that improves the regional people's' general welfare as well as their economies. As the new research, local practices, and governmental processes are being tested and implemented, the CES begins testing these in back in Virginia, as the Commonwealth attempts to reduce pressures on its own clean water supply. Despite the support and enthusiasm for the regional research-coordinating organizations, there remain deep impediments confronting their research groups. Most notable are the significant differences in legal systems and research-related policies across the participating nations, particularly with regard to the regulation of biological hazardous materials.

Leading universities involved in the regional research groups come not only from the U.S. and Europe, but also from countries such as Australia, Brazil, China, India, Japan, Russia, and South Africa. Virginia Tech is a participating research university and initially leverages its research portfolios in clean water and in biofuels to be utilized by the regional research group in which it participates. Virginia Tech and the other institutions and organizations in the research group will proceed together as a consortium with commercializing technologies in these two areas, once they are perfected enough for broad use.

Anisa Zvonkovic

Preparing Students for Jobs/Life We Don't Even Know Exist

In 2047, Virginia Tech has capitalized on its position as the land grant university of Virginia and its connections to other land-grant universities in order to focus on how individuals and families in the Commonwealth can flourish economically and personally in the new global world.

Global forces - including climate change, political and religious extremism, unrest and migration, and other conditions - have affected the way Virginians live. As a result, the needs of Virginians in terms of daily life (including how they live in households and how they earn income) have changed, with changes in ecosystems and infrastructure including but not limited to agriculture. Global industries have affected quality of life for Virginians. Vocational and practical skills training for children, youth, and families, as well as aging adults needing to earn income throughout their lives, have resulted in the land-grant university providing training for micro-industries and entrepreneurship in the global economy, post-information economies, and caregiving. Similarly, the research generated by scientists at Virginia Tech related to the environment, economies, and well-being of individuals has broad impact around the world as individuals, families, and communities are confronted with social and environmental problems. Virginia Tech has had to develop strong presences across the state as the ways large-scale circumstances have affected Virginians has varied.

From a global perspective, Virginia Tech now serves a culturally diverse population. Degree seeking students will increasingly come from other regions of the world, with increases in students from Latin America and Africa most notable. A deep understanding of cultural history and current global politics is essential for instructing these students. Graduate education will continue to be interdisciplinary and bifurcated between scholarship in the academy and industry. Physical face-to-face interactions, while still important, have been significantly replaced with realistic and engaging virtual interactions, lessening the need for specific, dedicated physical spaces. Because much of the daily tasks of life have been shifted to autonomous systems, and people can engage in deep and meaningful ways from anywhere, more people are taking advantage of continual learning through universities and other institutions beyond the traditional four-year model.

Tensions To Keep In Mind for All Scenarios:

What are the effects of losing public funding on scholars' ability to conduct exploratory research? Public funding provides the capacity for scholarship to act as a knowledge center and a beacon of discovery. As the university moves toward increased reliance on funding models that are attached to external audiences objectives and motives, even market forces, how will the university maintain its presence as an independent advocate of ideas?

How does disruptive technology influence the university? Increasingly powerful (and cheap) computers, automated systems, social media, flipped classrooms, online forms of learning, online peer-reviewed journals, the unknown drastically change the world that we live in. Moving toward 2047, disruptive

technologies will present boundaries for the university to cope with and overcome. For example, the virtual classroom and other advances in technology could increase the ease of access to upper-echelon universities. Because of this change, Virginia Tech may be engaged in a battle for students and research dollars with elite universities. How will Virginia Tech maintain its relevance under these conditions and exploit disruptive technology vis-a-vis other higher education institutions?

How does the university become more adaptable and less risk averse? Some groups in the beyond boundaries project have discussed the idea of moving away from disciplinary degrees, or even the colleges system, toward more open-minded approaches for organization (perhaps under the university's institute model). If higher education undergoes drastic realignment, the university must be positioned to quickly react to shifting market forces. Yet universities are renown for their ability to calcify "how things are done" and resist change. How will Virginia Tech bolster its capacity to respond and transform?

How does the university navigate political forces that can drain financial resources, create regulatory systems, and inhibit the university's ability to react? It is easy to imagine that the state legislature will drive down its financial contribution to the university (just about every presentation and group I've attended has discussed this). Similarly, it's likely that the university will receive additional unfunded mandates and regulatory obligations. It's not even hard to imagine political leaders prohibiting the university from achieving an innovative presence in the NCR (e.g. gatekeeper, sluggish process, financial obstruction). How does the university articulate its needs to state and federal political leaders in a way that leads to expedient, efficient and effective outcomes?

Partnerships can have as many costs as they have benefits. Partnerships, alliances, consortiums offer clear benefits; however, these benefits are in tension with several downsides and vulnerabilities. Over the long-run partnerships can be difficult to sustain interest within members (especially across sectors). Global unrest (e.g. new cold war, financial turmoil) could also complicate foreign partners, who often serve as the primary funders of partnerships. Further, valid criticisms underlie the model of providing Western solutions to global and/or third world problems (e.g. neo-colonialism, advancing American companies' interests, drain on local economies/cultures). Before entering a partnership, or breaking ground on a Virginia Tech-led project on foreign soil, the university needs address these concerns with long-term time horizon in mind.

How does the university cope with current financial limitations? The university's current endowment - ranked 116th at \$796,437¹ - is a major constraint to the university's capacity moving forward. Many of the university's competitors are better positioned in this area. Disruptions - due to global unrest, financial markets, or technology - could create a consolidation in higher education that could drastically realign the industry. Virginia Tech's current financial limitations could constrain its capacity to respond under extreme conditions.

1

http://www.nacubo.org/Documents/EndowmentFiles/2014_Endowment_Market_Values_Revised2.27.15.pdf