**Summary:**
This current quarter’s institutional priorities report and the accompanying spreadsheet and Schools’ Priorities report provide information on topics which are of current institutional priority to UVA; it also lists emerging priorities. This information has been jointly developed by the VPR and Associate Research Deans of the Schools.

The spreadsheet breaks institutional research priorities into two groups: current (8 topics), indicated in yellow, and emerging topics (18), indicated in green. The emerging topics are ones to watch, especially over the next quarter or two, and are candidates to move up to institutional priorities in the future; they enjoy interest across several Schools, but have not yet reached the level of broad-based research activity and investment characterizing the top priority topics. Note in the last column that there is significant activity in Advancement on almost all current institutional priorities, and on a large number of emerging institutional priorities.

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**Key activities across the areas of institutional priority and emerging priorities which require support in the short term:**

- ResearchNET support for determining externally supported grant opportunities and development of major proposals. ResearchNET, in conjunction with the respective leaders of the identified priorities, will triage their efforts to focus on high probability, early win opportunities.

- Joint focus on philanthropic and foundation support opportunities between leaders of institutional priority areas and central Advancement team.

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**Current Institutional Research Priorities**

1. **Cyber-Physical Systems**

   **Faculty Leader:** Kamin Whitehouse, Computer Science

   **Schools:** SEAS, Medicine, A&S, Batten, Law and Continuing & Professional Studies.

   Cyber-physical systems (cyber systems that link the human and physical environment – aka “the internet of things” – IoT) is a major focus of the Link Lab, a cross-disciplinary research lab where students and faculty from five different engineering disciplines will work and learn together. Eight new faculty members are joining more than a dozen faculty and staff in the lab. A key example is Commonwealth Professor Ben Calhoun, winner of the 2015 Edlich-Henderson
Innovator of the Year Award and co-founder of Charlottesville start-up PsiKick. Professor Calhoun has developed ultra-low-power wireless biomedical sensors that sense and send biometric data to physicians via the internet to provide direct feedback on patients, leading to more effective healthcare.

**Status and Outlook:**

**Institutional investments:**
- Strategic Investment Fund - the Link Lab project.
- Cluster and TOPS Hiring for Cyber-Physical Systems: 8 faculty hires approved for searches in SEAS. Two of these are in the area of risk and safety. One is in the area of Cyber-Physical Security. 5 faculty hires were made in ’16/’17.
- CIT Eminent Researcher Recruitment Program – matching funds from UVa and NGC

**Near term sponsored research opportunities:**
Cyber-Physical Systems is a national funding priority, with over $250M in funding available through multiple agencies, including:
- NSF - over $100M through multiple programs (CPS, S&CC, CRISP, INFEWS)
- DOT - $90M for smart vehicles technology
- DHS - $50M for emergency response technologies
- DOE - $10M for smart, energy-efficient, and low-emission cities

**Impact if successful:**
- If successful, this effort will make U. Virginia among the top schools in the world in the area of Cyber-Physical Systems. This area is widely expected to have high impact on many new industries, from smart cities to autonomous vehicles.

**Issues/needs required to be addressed:**
The Link Lab is still seeking sources for about $9M in funds to run several strategic initiatives, including:
- The creation of a new Masters degree in CPS
- Space renovation for a new robotics laboratory
- The launch of an Industrial Affiliate Program
- Hiring of three research scientists and two lab technicians
- Hiring of administrative staff for lab projects
- The launch of a city-scale testbed, in cooperation with the City of Charlottesville

**Future Actions, and timing:**
- The Link Lab is currently searching for 3 more faculty hires
- The Link Lab has contributed to two Pan-University Institute proposals, currently under review
- Construction of the actual lab facility will begin in March, completion in Dec

**Data Science Institute (DSI)**
**Faculty Leader:** Don Brown (term ending 5/21/2017); Phil Bourne (term beginning 5/22/2017)
**Pan University Institute** involving all 11 schools at the University.
What is Data Science? Three major transformations are impacting almost all of
The continued, unabated acquisition of unprecedented amounts and types of data;

The development and deployment of all the components of an integrated, scalable, and sustainable cyberinfrastructure; and

The emergence of powerful mathematical and analytical frameworks that in combination with the cyberinfrastructure can effectively find patterns and new knowledge in the ever expanding data frontiers.

The new field of data science addresses these transformations by employing a research paradigm centered on the analysis of huge datasets, as opposed to the study of individual systems. Essentially data become the raw material for the creation of new knowledge. Data when effectively processed and analyzed also become the foundation for addressing the grand challenge questions in science and technology as well as for actionable decision making across all sectors of the economy and society.

At the University of Virginia our vision is to prepare the next generation of leaders to address the broadly identified interdisciplinary challenge of data science. Our programs for doing this necessarily lie outside the existing traditional curricular structure, but we believe they will be the blueprint for the future in which data science will play an ever-increasing role.

**Status and Outlook:**

**Institutional investments:**

- Major philanthropic gift—An endowment allows for ongoing funds that can be drawn for supporting strategic initiatives.

- Cluster Hires—Last year (2015-2016) the Data Science Institute was a part of two cluster hires that resulted in the hiring of three new faculty members. Two in the area of biomedical data science in collaboration with Engineering and Medicine; and one in the area of cloud scale data analytics in collaboration with Engineering, Darden, McIntire, Batten, and Arts & Sciences. This year we have continued our involvement with the biomedical data science cluster, which may result in as many as five new hires. We are also participating with Curry and Batten in the search for faculty members in simulation.

- Presidential Funds for Excellence—In collaboration with the Office of Graduate Studies, the Data Science Institute has used research development funds provided by the President as a part of Don Brown’s appointment as Director of the Data Science Institute to fund six graduate fellowships in interdisciplinary data science work. This is the fourth year of this successful graduate fellowship program that was started with funds from the Jefferson Trust. The collaborative projects for 2016-2017 are:
  - Predicting Community-Level Criminal Behaviors by Estimating Human Attitudes from Social Media: Mohammad Al Boni, Systems and Information Engineering, Jordan Axt, Psychology, and Lin Gong, Computer Science
- Computational Law: Faraz Dadgostari, Systems and Information Engineering, and Mauricio Guim, School of Law
- Evaluating the Effects of Social Relationships on Brain Activities via High-Dimensional Differential Graphical Models: Sara Medina-DeVilliers, Clinical Psychology, and Pan Xu, Systems and Information Engineering
- Loneliness in an Age of Unprecedented Social Connection: Using Data Analytics to Explore the Role of Social Media in Bolstering or Impairing Well-Being: Yu Huang, Systems and Information Engineering, Brandon W. Ng, Psychology, and Adi Shakhed, Psychology
- The Role of Emotions in Political Discourse: David Reinhard, Psychology, and B. Kal Munis, Politics
- Responsive Landscapes: translating environmental data into land management and design: Stephanie Roe, Environmental Science, and Bonnie-Kate Walker, School of Architecture

**Near term sponsored research opportunities:**

**Awarded:**
- National Science Foundation (NSF) Industry/University Cooperative Research Center, “Visual and Decision Informatics,” $500k.
- UVA Strategic Investment Fund Award, “Precision Individualized Medicine for Diabetes – the Virginia PrIMeD Project,” $16.9M.
- National Science Foundation (NSF). CC*Networking Infrastructure: Scalable Secure Science DMZ for Academic and Clinical Research at the University of Virginia. $432,383, Awarded.
- Department of Defense (DOD)/Army Research Laboratory (ARL). Culturally Aware Asymmetric Threat Tracking. $1,396,000, Awarded.
- DOD/ARL. Text Mining Implemented in a Graphics Processing Unit (GPU) for Accelerated Extraction of Culturally Relevant Features. $50,000, Awarded.
- TSC. Simulation-Optimization Methods for Improved Water Transport. $100,000, Awarded.
- MITRE Corporation. Data Science for Cultural Mapping. $15,000, Awarded.
- MITRE Corporation. Data Science for Intelligent Processing of Requests for Information. $15,000, Awarded.
- LMI. Logistical Pathways To Critical Diversity in Organizational Leadership. $47,000, Awarded.
- National Institute of Justice (NIJ). “The Creation Of Muhajirat In America: Social Media As A Platform For Crafting Gender-Specific Interventions For The Domestic Radicalization Of Women.” $781,000, Awarded.

**Pending:**
- NSF. MRI: Development of The Virginia ACCORD: “A Cyberinstrument Supporting Diverse Scientific Workflows with Data Protection Assurance.” $4,000,000, Pending.
Impact if successful:
• Fundamentally new and game changing approaches to address treatment and prevention of diseases such as Type I diabetes.
• Increased visibility for UVA in the data science space.
• Close collaborations with industry partners to explore new paradigms for data science and new applications.
• Additional outside funding that facilitates further research in these areas.
• Increased collaborations across Grounds and involvement of faculty members in new research opportunities.
• Opportunities for humanities, and social science scholarship to collaborate more with quantitative fields to advance all sides of the research questions and abilities.

Issues/needs required to be addressed:
• Data and systems to streamline the research process for investigators and enable collaboration across Grounds and with outside institutions.
• Central support for maintenance of systems, storage, and computing infrastructure.
• Incentive startup packages for new faculty that have data and projects to do data-driven research.
• Ongoing collaboration with schools to develop new proposals, institute projects, and ideas. SIF funding has enabled this kind of collaboration across Grounds already.

Future Actions, and timing:
• New Director, Phil Bourne begins on May 22, 2017.
• Continued cluster hires and support of new faculty being hired in a number of schools.
• Continued support of events and opportunities that the DSI supports to highlight Charlottesville and UVA as a center for data science research.
• New data science programs in Northern VA to start in AY 2018.

Environmental Resilience
Faculty Leader: Professor Karen McGlathery, Department of Environmental Science and Associate VP Research for Environmental Resilience
Schools: Arts & Sciences, Engineering, Architecture, McIntire, Law, Public Policy, Darden, Nursing, Medicine, Curry

Priorities in Environmental Resilience are organized around the following themes:
- **Global environmental challenges and societal consequences and responses.**
- **Understanding of the pace and dimensions of change in the environment.**
- **Potential effects of policy implications from an economic and political perspective.**
- **Environmental humanities, which seeks to understand the meaning of environmental change through the lens of cultural practices.**

Key research areas include:

**1. Building Resilient Systems** - Place-based research provides a geographic focus that integrates cultural, ecological, and structural determinants of resilience in
natural and human-dominated environments. Coastal Resilience and Resilient Cities are critical foci.

2. **Water and Food Security** - Understanding competing needs and enabling resilience of global water and food resources require integration of science, economics, policy, technology, infrastructure, public health and ethics. The global water effort focuses on water use by agriculture, cities and environments in light of increasing water scarcity due to population growth, economic development, and climate change.

3. **Energy and Climate** - Innovations in energy technology and feedbacks between the biosphere and socio-political choices affect the resilience of the earth’s climate system. History and cultural attitudes toward the 'commons' affect decisions and ways in which individuals and societies perceive planetary change. The Energy-Climate Futures effort focuses on nexus of land use, climate, energy and culture.

**Status and Outlook:**

**Institutional investments:**

- Mellon Foundation support for 5-faculty cluster hire in Environmental Humanities (Religious Studies, History, Anthropology, English)
- Jefferson Trust funding for Graduate/Undergraduate Resilience Fellowships

**Near term sponsored research opportunities:**

**Awarded:**

- EPA. Integrated Nitrogen and Phosphorus Footprints. $700,000. Awarded. A&S (Environmental Sciences) Collaborative with the Chesapeake Bay Foundation.
- National Oceanic & Atmospheric Administration (NOAA), Community Resilience Environmental Literacy Grant: Preparing Norfolk Area Students for America’s Second Highest Sea Level Rise, $500,000. Awarded. SARC Collaborative with ODU.
- Jefferson Trust. Graduate Resilience Fellowship Program. $75,000. Awarded.
- MATS UTC / US DOT. Estimating Road Inundation Levels Due to Recurrent Flooding from Image Data, $150,000. Awarded. SEAS Collaborative with ODU.
• MATS UTC / US DOT. Vulnerability Assessment of the Transportation Infrastructure in Hampton Roads to Extreme Weather Events and Climate Change, $150,000. Awarded. SEAS Collaborative with ODU and VT.
• Van Alen Institute and West Palm Beach Development Agency. Happier by Design – Public Health Benefits of Green Infrastructure. $40,000. Awarded. SARC.

Pending:
• NSF. CRISP (Critical Resilient Interdependent Infrastructure Systems and Processes) Program, Data-driven Management for Interdependent Stormwater and Transportation Systems, $2.5M. Pending. SEAS.
• NSF. Coupled Human Natural Systems Program, Co-Creating Resilient Futures: Building Social and Natural Capitals in Coastal Communities, $1.8M. Pending. SEAS, A&S, SARC, Batten.
• NSF. National Research Training Program, Team Science Training for Coastal Ocean and Estuarine STEM Graduate Students, $42,000. Pending. A&S (Environmental Sciences) Subcontract to W&M.

Planned Submission:

Impact if successful:
• Increased capacity for transdisciplinary research on coupled human-environmental systems will put UVA ahead of the curve and increase success in large collaborative team proposals which are becoming increasingly the priority at major Federal funding agencies.
• Strategies to reduce risk to infrastructure and people (economic prosperity, public health) to rapid environmental change. Examples include new technologies and systems for early warning of flooding, systems design to reduce risk and increase resilience, policy and economic tools for assisting decision-making and jurisdiction.
• Coastal region is initial priority of proposed institute

Issues/needs required to be addressed:
• Support from Central Development

UVA BRAIN Pan University Institute – Neuroscience
Faculty Leader: Jaideep Kapur, MD, PhD, UVA-BRAIN Director, Professor of Neurology and leader of the Health System Neuroscience Center of Excellence.
Schools: Medicine, Arts & Sciences, Engineering, Curry
The UVA BRAIN Institute provides a framework of enabling infrastructure and connectivity between clinical, basic and translational scientists and data analytics to address important problems in neuroscience research. In order to providing such infrastructure and collaborative capability, this effort draws on expertise from over 80 faculty in at least 4 schools (SOM, CLAS, SEAS and Curry), the Data Science Institute; and will leverage ongoing efforts in 4 different cluster hires, including neurosciences, biomedical data sciences, traumatic brain injury, and autism.

Specific scientific questions that UVA-BRAIN is addressing build on extant and distinguishing research areas at UVA and include:

- How does the immune system influence the brain to modify learning, injury response, and neurological disease?
- How do connections in the brain drive behavior and disease?
- How does injury result in long-term neurological effects?
- How can human subject data direct discoveries of disease process and therapies?

Key areas of research focus: UVA has a significant national profile in several brain disorder areas, such as autism, epilepsy, and Traumatic Brain Injury (TBI), spanning basic mechanistic studies to clinical studies, with clinical trials in epilepsy, stroke and TBI and a total annual funding portfolio of approximately $33M across schools. UVA researchers have also made new discoveries that are changing the way brain disorders are viewed. For example, the recent identification of physical links between the immune system and the brain by UVA investigators is rewriting textbooks, and underlies functional links between the immune system and several neurological diseases, including neurodegenerative disorders, response to injury, MS, CNS infections and autism. Researchers in this area are proposing a paradigm shift for these diseases – targeting the immune system for the benefit of the brain. In this area of Neuro-immunology, UVA has defined and currently leads the field.

**Sensory Biology/Circuitry:** The ability to map communicating neurons and manipulate function in specific pathways has allowed development of definitive cause and effect theories regarding brain cell activity and brain function, with strong links to neurodevelopment and neurodegeneration. New experimental tools are being developed that combine genes that sense cellular stretch with another that functions as a nanomagnet, allowing cell activation in the presence of a magnetic field to control neuronal activity in the brain.

**Integrative neurosciences:** Linking activity at the molecular and cellular level with network and whole brain function, and ultimately with behavioral and clinical outcomes, is a prerequisite to understand the complex connectivity within the healthy brain and the alterations that underlie various neurological and mental disorders. Novel genetic and imaging approaches provide the means to meet the extraordinary challenge involved in connecting individual molecular and cellular pathways through clinical, biological and outcomes studies, as well as developing biochemical and imaging biomarkers of function. Notably, world-class epilepsy research at UVA has spawned a new theory of the origin of epilepsy, and along with that, a new national clinical therapeutic trial. UVA collaborations with federal defense laboratories, schools, and sports organizations are leading the way in understanding Traumatic Brain Injury, its prevention and consequences.
Status and Outlook:

Institutional investments: $1M seed fund to launch Institute.

- 3 T Prizma MRI on order, to be installed by summer of 2017
- Animal PET CT scan installed.
- Neuroscience Graduate Program expansion: from a class of 6 students each year to a class of 12 students.
- Cross grounds collaborative projects funded by the $1M seed fund:
  1) **Understanding the contribution of the oligodendrocyte lineage to depression.** Investigators: Sarah Kucenas, Department of Biology, Dr. Christopher Overall, Department of Neuroscience, Dr. Alban Gaultier, Department of Neuroscience.
  2) **Remote Suppression of Epileptic Seizures.** Ali D. Guler, Department of Biology, Manoj K. Patel, Department of Anesthesiology.
  3) **Automating Glia Neuroimaging.** Daniel Weller, Electrical and Computer Engineering, Christopher Overall, Neuroscience, Tajie Harris, Neuroscience
  4) **A Phase I Study Targeting Newly Diagnosed Glioblastoma with anti-CD3 x anti-EGFR Bispecific Antibody Armed T-cells in Combination with Radiation and Temozolomide.** Camilo E. Fadul, Neurology, Lawrence G. Lum, Departments of Medicine, Immunology & Microbiology.
  5) **SysNimDB: a public resource for characterizing neuroimmunological cell types and disease states in heterogeneous transcriptomic datasets.** Chris Overall, Department of Neuroscience, Quanquan Gu, Department of Systems and Information Engineering, Yanjun Qi, Department of Computer Science, Abigail Flower, Department of Systems and Information Engineering and Data Science Institute.
  6) **Multiscale Imaging of Cerebrovascular Dysfunction in Traumatic Brain Injury.** Song Hu, Biomedical Engineering, Craig Meyer, Biomedical Engineering and Radiology, Wilson Miller, Radiology.
  7) **Cellular and Molecular Basis of Acoustic Nociception.** Jung-Bum Shin, Department of Neuroscience, Ali Guler, Department of Biology.

**Notable Hire:** JC Cang, whose research interest is in understanding the neural basis of the visual system — its organization, function and development. Specifically, his research team has made discoveries concerning the interaction between the sensory experience and visual functions in the cortex during a critical period in early life.

Near term sponsored research opportunities:

It is expected that many of the seed grants listed above will convert into federally funded grants.

- We have been invited to submit a collaborative mild TBI grant by the Allen Foundation.
- Active and on going fundraising effort.
Impact if successful:
- Increased extramural research funding; increased visibility of UVA BRAIN.

Issues/needs required to be addressed:
- Provide continued support for collaborative research across grounds.
- Support recruitment of faculty: sufficient sized start up packages.

Future Actions, and timing:
- Build research support infrastructure.
- Need for research space.
- Continued cluster hires in autism, neurodegeneration, integrative neuroscience, focused ultrasound, translational neuroscience.

Cancer Center  [https://cancer.uvahealth.com](https://cancer.uvahealth.com)
Faculty Leader: Thomas P. Loughran, Director
Schools: SOM, CLAS, SEAS, SON

At UVA Cancer Center, we deliver advanced patient care combined with the latest research-based treatment options to improve the quality of life for cancer patients in and surrounding Virginia. With state-of-the-art clinics in multiple locations around Virginia and telemedicine programs for rural communities, UVA Cancer Center is one of the most widely-accessible cancer centers in the region.

We’re expanding our capabilities to develop new therapies and more effective ways to detect and prevent cancer in order to achieve the National Cancer Institute’s (NCI) highest designation, an NCI Comprehensive Cancer Center, by 2021. With this designation, UVA will be able to treat more types of cancer with targeted therapies that wouldn’t be widely available and have the resources to perform more research and clinical trials, resulting in new and innovative treatments for our patients.

Expansion efforts currently in the works include recruitment of new researchers and doctors in a variety of fields, growth of existing facilities and more. “By having input from as many scientists as possible, in engineering, biology, organic chemistry, physics and medicine, we can come up with new ways of treating cancer.”

Status and Outlook:
Institutional investments: The institution has made significant investments in the Cancer Center. With the recruitment of the new director in August 2013, substantial funds were committed to support faculty recruitment and infrastructure. Since then, additional support has been provided in the form of:
- Recruitment and retention packages totaling over $13M
- $6M for recruitment of cancer control and population health faculty and program building
- Funds to establish a stem cell transplant program that includes faculty and staff support
- $9.4M to construct and equip a cGMP facility as well as annual operating/staffing support

Additional institutional investments will be needed for recruitment of more faculty in the area of population health, basic science, and clinical research.

Near term sponsored research opportunities:
• National Cancer Institute – Cancer Center Support Grant - new 5 year award started 2/1/17, budget of $2.15M
• Opportunities for supplements to the CCSG – are released regularly by the National Cancer Institute – budgets in the $250K per year for 1-3 years range.
• Moonshot – opportunities for funding from the federal Cancer Moonshot program

Impact if successful:
• Renewal of Cancer Center support grant for another 5 years
• Designation at the highest level of NCI cancer centers - Comprehensive. Increase in status and funding.

Issues/needs required to be addressed:
• developing/reorganizing scientific programs
• Integration with cancer research activities at Inova
• Continued faculty recruitment – particularly in population health and phase I clinical trial development
• Seed money for pilot and transdisciplinary projects
• Expansion of clinical trials infrastructure.

Future Actions, and timing:
• Develop strategic plan for CCSG programs – reorganization and development – Spring 2017
• Seek guidance from external advisory board and leadership at the Centers Branch of the National Cancer Institute – Fall 2017
• Recruit faculty, increase clinical research activity, and launch new research projects – present to January 2021
• Submit renewal proposal seeking Comprehensive Designation – January 2021
• Site Visit review of renewal proposal – late spring 2021.

Positive Youth Development (Youth as a Societal Asset)
Faculty Leaders: Prof. Pat Tolan, Curry, Prof. Catherine Bradshaw, Prof. Nancy Deutsch, A&S Prof Noel Hurd, Prof Joseph Allen Curry, Prof. Linda Bullock, Nursing Schools: Curry, Nursing, A&S, Medicine
The Center to Promote Effective Youth Development (Youth-Nex, Curry) is a cross-university trans-disciplinary center devoted to promoting healthy youth development through focused research, training and service. The cross-University center’s work encompasses a wide range of areas including health promotion and management, civic engagement, education, and social responsibility. Youth-Nex also aims to prevent youth problems such as violence; physical and mental health issues; substance abuse and school failure.
Research on Opportunities for Success, include work in A&S and Curry on how parents and peers can facilitate healthy development and how resilience, grit, and hope occur and can be trained.
Research in Nursing on Intimate Partner Violence involves both senior and junior faculty engaged in research on an in-home app for visitors to screen intimate partner violence, and a means for collecting forensic evidence in dark-skinned women.

**Status and Outlook:**

**Institutional investments:** Philanthropic Gift/Grant and Cluster and TOPS Hiring - 2 faculty, in Curry, Nursing.

**Near term sponsored research opportunities:**
- Robert Wood Johnson Foundation, 2016-? $1,000,000 in first year (Compassionate Schools Project, potential for $3,000,000 in next three years. Additional applications for approximately $1,000,000 under consideration
- National Institute of Health- approximately $4,500,000 in current funding with multiple applications under consideration
- Institute for Education Sciences- approximately $7,500,000 in current funding with multiple applications under consideration
- WT Grant Foundation: Two Distinguished Fellow awards ($375,000 each) and multiple grants equaling about $1.2 million per year.
- Grants are bringing scientific method to specify the contributors to effective, healthy, contributing outcomes for developing youth and improving the settings and systems that affect their health

**Issues/needs required to be addressed:**
- Increasing opportunities and engagement with school and community systems for sustained collaborations in research and translation to practice
- Sustained core support for center operations
- Mechanisms and support for engaging more faculty across grounds
- Agreements and procedures for addressing how fund flow for center and other units can occur to be mutually promotive and crediting

**Future Actions, and timing:**
- Seek core funding that is leveraged to bring in 7-8 times that investment in grants and philanthropic support (2017-18)
- Seek greater visibility and opportunities for collaboration of faculty on grounds to focus on “how children succeed, prosper, and thrive” as a scientific and translational focus (2017-19); seek SIF Funds for project basis for this work (2017-18)
- Connect work to promoting positive development opportunities for UVA undergraduates (2017-20)
- Cluster hires to promote cross disciplinary work and rapid advances in knowledge and use of knowledge (and to integrate into training)

**Contemplative Sciences Center**

**Leader:** Prof. David Germano, Religious Studies, Arts & Sciences

**Schools:** A&S, Medicine, Nursing, Education, Architecture, McIntire, Darden, Batten, Law, and Engineering.

CSC is dedicated to fostering partnerships among humanities scholars, scientists, medical and nursing practitioners, clinical researchers, education researchers, and
contemplative practitioners, among others. The center is contributing to a series of central collaborations especially among the College and Graduate School of Arts & Sciences, School of Medicine, School of Nursing, Curry School of Education, and the McIntire School of Commerce.

The center fosters exploration of the practices, ideas, and modern applications of contemplation, building on existing strands of related research and activity around the University, including:

- The Mindfulness Center (Medicine and Intramural-Recreational Sports)
- The Integrative Medicine Clinic (Medicine)
- The Virginia Affective Neuroscience (VAN) Laboratory (Psychology)
- The Center for the Study of Teaching & Learning in Higher Education (Education)
- The Compassionate Care Initiative (Nursing)
- The Division of Student Affairs
- The Student Health Center
- The Division of Perceptual Studies (Psychiatry and Neurobehavioral Sciences)
- And many others academic and research units...

**Status and Outlook:**

**Institutional investments:** our funding comes exclusively from major philanthropic gifts, foundation awards, and government grants we secure ourselves; we have no other state or university funding.

**Near term sponsored research opportunities:** The following are just select projects, not a comprehensive list.

- **Contemplative Universities Alliance:** Collaborative research effort between UVA, Penn State University and University of Wisconsin-Madison. Currently developing curriculum for a first-year course focusing on Resilience & Flourishing to be piloted in Fall 2017 concurrently at three institutions; six-year research project planned with a target sample size of 10,000 to examine proximal and distal outcomes of the course. The course goal is to provide students with a transformative first-year college experience, providing deep and sustained engagement with contemplative concepts and practices that will be vital for academic and personal flourishing. Each week, two plenary sessions focus on humanities and science-based background of specified topic, coupled with a contemplative lab for participatory learning of practices. At scale, the course will be delivered in a flipped classroom pedagogical model with a sophisticated app to access course and collect data.
  - Anticipated budget for six year project, including course development and administration and research component is $5-10 million.
  - Development administrators from all three institutions are collaborating on a comprehensive strategic plan to approach several foundations. Our initial list of prospects includes Einhorn, Robert Wood Johnson, Novo, Templeton, Spencer, Gates, Hemera, Osher, and Bloomberg.
• **Compassionate Schools Project:** Partnership between CSC, Youth-Nex Center for Positive Youth Development and Curry School of Education at UVA along with Jefferson County Public Schools (Louisville, KY.) The Compassionate Schools Project is the most comprehensive study ever undertaken of a 21st century health and wellness curriculum in an elementary or secondary school setting. Facilitating the integrated development of mind and body, the curriculum being evaluated interweaves support in academic achievement, mental fitness, health, and compassionate character. Extraordinary scale of 50 schools and 20,000+ children over the project’s seven years.
  - Budget of $11.75 million with $7.25 million being spent for instruction and implementation in the schools and $4.5 million for evaluation.
  - To date, a number of individuals and foundations have made generous gifts and pledges to the Compassionate Schools Project totaling $7.5 million. The Project is additionally supported by staff and resources from the University of Virginia and Jefferson County Public Schools System.
  - We have pending or planned proposals totalling $3.33-5.33 million over the next 6 months to the Hemera Foundation, Robert Wood Johnson, Humana Foundation, Gheens Foundation and Arnold Foundation.

• **Lupus:** Presently underway is a pilot study to investigate a Contemplation-Based Intervention on health outcomes in Systemic Lupus Erythematosus (SLE) patients, also known as a Mindfulness-based intervention (MBI). Collaborators on the project include UVA and U. Toronto. The research in this pilot phase involves 22 lupus patients participating in a 6-week MBI. The goal of this pilot study is to determine the feasibility of the intervention and its possible impact in preparation for a planned larger double-blind multicenter study. Power analyses suggest a sample of this size should be sufficient (>0.85) to determine whether an impact of our intervention on cognitive, affective, and other biological correlates and manifestations if SLE is likely. As an initial feasibility study prior to the implementation of a larger randomized control trial, this sample should be sufficient to enable refinement of the intervention and measurement regime so as to maximize ability to detect psychosocial and biological effects while minimizing patient burden.
  - Timeline of Pilot Study: February--March 2017 will involve participant recruitment; April--July 2017 will involve participant enrollment and implementation.
  - Budget of Pilot Study: $700k total budget ($600k UVA, $100k U.Toronto)

• **Flourishing Nurses, Compassionate Care:** Neural and bio-behavioral correlates of an innovative contemplative training program: The proposed project, to be conducted at the University of Virginia, will pool nationally recognized interdisciplinary talent, institutional resources, and
bio-behavioral data in order to rigorously evaluate an innovative compassion-based contemplative training program for registered nurses. This would be the first such project that thoughtfully addresses both practical and scientifically salient issues aimed to positively transform clinical care throughout this country, while elucidating the impact of contemplative practices and community on the neurobiology of compassion, empathy, and social support.

- **Budget**: The project will take place over two years for which we are seeking funding support of $658,761.
- We have submitted a proposal for this project to the Hemera Foundation

**Impact if successful:**

- **Contemplative Universities Alliance**: Impact on students and families include putative developmental and civic social benefits of self-reflection, self-regulation, self-clarification; empathy and perspective taking, social responsibility, compassion, stress management and well-being enhancement strategies. As a university and broader alliance, this project will help reinvigorate higher ed approaches to interdisciplinarity and embodiment in educational culture. The research component of the CUA creates interdisciplinary research approaches and measures focused on assessment of early adult education. Additionally, the widespread impetus for change in higher education will be apparent by designing courses that (a) address student preferences around teaching and learning among today’s generations (e.g., the social media generation), and (b) demonstrating the value of bridging the two cultures in education - the sciences and the humanities in a single course.

- **Compassionate Schools Project**: The research aims to have a major impact on children’s education Nationwide in terms of academic performance, physical education, character development, and child health policies with wide-spread adoption of the curriculum as gold standard for health and wellness educations in America’s public elementary schools and beyond.

- **Lupus**: Primary study objective for both the pilot and the large-scale study is to determine whether the MBI has an impact on gene expression and biomarkers in patients with active SLE. Secondary study objectives include:
  - To determine whether MBI has an impact on disease activity in SLE
  - To determine whether MBI has an effect on CNS activity detected by fMRI
  - To determine whether MBI has an impact on patient health related quality of life and other patient reported outcomes in SLE
  - To determine whether MBI has an impact on neurocognitive function by assessment of neuropsychological testing
  - To determine patient compliance with the MBI program
  - Exploratory objective: To determine the association between the response to MBI detected by biomarker analysis, clinical evaluation, fMRI, PROs and neurocognitive testing.
• It potentially has great impact on how such auto-immune disorders are treated in relationship to patient participation in mind-body practices in relationship not only to palliative alleviation of symptoms, but also positive impact on the biology of the disease.

• **Flourishing Nurses, Compassionate Care: Neural and bio-behavioral correlates of an innovative contemplative training program:** Although social support has been empirically linked to health and well-being for decades (if not millennia), the mechanisms of this link remain speculative. Knowledge of these mechanisms is urgently needed for a full understanding of the receipt and provision of care, especially among professional caregivers (nurses) working in high stress environments and at risk for burnout. The proposed research will elucidate 1) the basic mechanisms of care received, care given, and empathy, 2) the role these mechanisms play in caregiving behavior, 3) the role these mechanisms may play in caregiver stress and burnout, and 4) the impact of a targeted compassion-based contemplative practice on all of the above. Specifically, we will evaluate the impact of Sustainable Compassion Training (SCT) using a pre-post, waitlist randomized control design. We will monitor brain activity using a robust and well replicated elicitation of threat, social support, and empathy, across three occasions of measurement among a normative sample of 100 adult nurses (ages 25 to 55), whose social behaviors, parental and peer social experiences, and personality characteristics will also be assessed.

**Issues/needs required to be addressed:**

• **Contemplative Universities Alliance:** Project requires additional $2.4 million to be fully funded for pilot; currently formulating alternate scenarios for scaled-down pilot if necessary.

• **Compassionate Schools Project:** The project requires an additional $4.25 million to be fully funded.

• **Lupus:** Currently negotiating contracts with University of Toronto to expand research there due to inadequate patient population in Charlottesville and surrounding areas.

• **Flourishing Nurses, Compassionate Care:** we are actively cultivating one foundation and one private individual for financial support of this project.

**Future Actions, and timing:**

• **Contemplative Universities Alliance -** Proposed timeline benchmarks:
  • Ongoing - fundraising efforts
    o Fall 2017 (Year 1 of project): pilot of course curriculum; continued development of research measures and app
    o Spring 2018: review and revision of curriculum and development of research pilot; begin approval process of offering course as gen ed at all 3 institutions
Fall 2018-Spring 2019 (Year 2): Complete revisions to course curriculum and pilot research measures
Fall 2019-Spring 2023 (Years 3-5): Full-scale implementation of course and research as general education.
2023-2024 (Year 6): complete research analysis

**Compassionate Schools Project:**
- Current Year: (2016-2017)
- 2nd year of implementation in 3 pilot schools
- Full implementation in 14 schools
- 26 school evaluation (12 school control group)
- Year 4: (2017-2018)
- Full implementation in 25 schools
- 50 school evaluation (25 school control group)
- Year 5: (2018-2019)
- Implementation in 11 schools 24 school evaluation (14 school control group)
- Continuing evaluation of students
- Research analysis and synthesis
- Evaluation and Analysis
- Years 6-7: (2019-2020) & (2020-2021)
- Continuing evaluation of students and schools
- Data analysis and synthesis

**Lupus:** The goal of the present pilot study is to determine the feasibility of the intervention and its possible impact in preparation for a planned larger double-blind multicenter study.
Intended Timeline of Larger-scale Study (randomized controlled trial of 50 SLE patients in which 50% of subjects receive either a 6-week MBI treatment and 50% receive a 6-week psycho-education treatment): January--May 2018, recruitment of participants; June 2018--February 2019, enrollment and implementation; March--December 2019, data reduction, analysis, manuscript preparation.
Budget: Full project budget will be $1.1m ($510k UVA, $590k U. Toronto)

**Flourishing Nurses, Compassionate Care:** this project needs to secure funding, at which point implementation will begin shortly after.

**Education Policy/Workforce**
**Faculty Leaders:** Prof. James Wykoff, Batten and Curry, Prof. Ben Castleman, Curry Schools: Education (Curry), Batten, A&S
The Center on Education Policy and Workforce Competitiveness is a joint collaboration between the Curry School of Education and the Frank Batten School of Leadership and Public Policy which seeks to bring together researchers from across the University of Virginia and the State to focus on important questions of educational policy and the competitiveness of labor in an era of globalization.
The mission of the Center is fourfold:

- to provide rigorous and timely research to inform the design of education policy targeted to improving educational outcomes and the economic competitiveness of American workers in an increasingly globalized world;
- to promote the exchange of ideas that inform policy decisions regarding educational policy and workforce competitiveness;
- to foster the development of data related to these efforts;
- to provide a setting where faculty and students transcend disciplinary boundaries to engage in collaborative, evidence-based inquiry.

Key research thrusts are the Center for Advanced Study of Teaching and Learning (CASTL) in Curry advancing science on policy and practice in pk-12 teaching, and the Center on Education Policy and Workforce Competitiveness (EdPolicyWorks), joint between Curry and Batten, conducting research to improve educational outcomes and economic competitiveness of American labor.

**Status and Outlook:**

**Institutional investments:** Major philanthropic gift. Cluster and TOPS hiring – 3 faculty – Curry, Batten, A&S.

**Impact if successful:** The EdPolicyWorks initiative seeks to bring together researchers from across the University of Virginia and the State to focus on important questions of educational policy and the competitiveness of labor in an era of globalization. It aims to:

- Provide rigorous and timely research to inform the design of education policy targeted to improving educational outcomes and the economic competitiveness of American workers in an increasingly globalized world
- Promote the exchange of ideas that inform policy decisions regarding educational policy and workforce competitiveness

**Issues/needs required to be addressed:**

- Successful recruitment of key faculty
- Continuing development of sponsored research, and associated seed support.

**Future Actions, and timing:**

- Faculty recruitment, continuing through 2017.
Emerging Areas of Potential Research Priority (highlighted in green in the spreadsheet)

The topics which are emerging as areas of potential research priority are as follows. The last column denotes those which are ongoing efforts by the Advancement group. Note that the ones towards the top of the green shaded area are mostly very recently emergent, and do not yet have major Advancement coverage, while those at the bottom enjoy efforts by the Advancement group. Those at the top are, by and large, topics which have emerged in the past 6 months – they are mainly being pursued by the lead school’s advancement group.

The 18 emerging areas are described in the lead school’s section of the attached Schools Priority report, and are:

- Genomics/Precision Medicine (Medicine)
- Cyber Social Learning Systems (SEAS)
- Cybersecurity (SEAS)
- Energy (SEAS and College)
- Materials and Manufacturing for Biological Applications (SEAS)
- Engineering for Medicine (SEAS and Medicine)
- Systems Biology (Medicine and SEAS)
- Cardiometabolomics (Medicine)
- Regenerative Medicine (Medicine)
- Design Thinking (VPR, Architecture, Darden)
- Global Policy (Batten)
- Health Policy (Batten)
- Synthetic Biology (College)
- Behavioral Research (College)
- Democracy and Ethics (College)
- Future Cities (Architecture)
- Health Wellness and Prevention (Medicine)
- Global Health Policy (Medicine)