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**VIRGINIA RESEARCH INVESTMENT COMMITTEE (VRIC) MEETING
OCTOBER 12, 2016**

DRAFT MINUTES

Mr. Blake (chair) called the meeting to order at 12:40 p.m. in the SCHEV Boardroom, 9th Floor, James Monroe Building, Richmond, Virginia.

Committee members present: Peter Blake, Ric Brown, James Dyke, Karen Jackson, Robert Vaughn, John O. “Dubby” Wynne

Committee members absent: Betsey Daley, Heywood Fralin, Charles W. “Wick” Moorman

WELCOME AND INTRODUCTIONS

Mr. Blake introduced himself as the director of the State Council of Higher Education for Virginia (SCHEV), whom the Committee’s enabling statute designates as the VRIC chair. He noted that the meeting agenda and all materials and handouts are located on the Committee webpage of the SCHEV website (www.schev.edu/VRIC). Mr. Blake invited Committee members to introduce themselves. He then introduced members who were not present, as well as staff to the Committee from his agency, Dr. Alan Edwards and Ms. Lynn Seuffert.

He then invited all attendees in the audience to introduce themselves.

DISCUSSION OF ENABLING LEGISLATION AND BUDGET ALLOCATIONS

Mr. Blake asked Mr. Brown and Mr. Vaughn to provide executive-branch and legislative-branch perspective on the Committee’s enabling legislation. Secretary Brown stated that the Governor had an interest in diversifying the economy. He said the Governor envisioned new processes and products to create high-paying jobs. The executive branch especially valued peer review of projects in the form of VRIC and also saw collaboration as an important aspect of the legislation.

Mr. Vaughn provided the legislative perspective of the House Appropriations Committee (HAC). He said the HAC had been concerned with protecting the investments already made in research. The members wanted a rigorous process and tie-in back to GO Virginia (Growth and Opportunity for Virginia). Mr. Vaughn conveyed the perspective of HAC chair Del. Chris Jones that collaboration is key to the initiative and mentioned the potential for Virginia’s two National Cancer Institute (NCI) designated cancer centers to collaborate.

He described the Center for Innovative Technology’s (CIT’s) Research and Technology Strategic Roadmap as “silos of opportunity” and emphasized again the importance of tying projects funded by the Virginia Research Investment Fund (VRIF) back to the Roadmap. He also mentioned his personal interest in the potential of VRIC to prioritize a research agenda for the state, rather than issuing generic solicitations for research.

Mr. Blake invited Mr. Jason Powell and Ms. April Kees to provide perspectives from the Senate Finance Committee (SFC) on behalf of Ms. Daley. Mr. Powell said that the SFC discussed the need to “string” together the Virginia Biosciences Health Research Corporation (VBHRC, aka the Catalyst), the Commonwealth Health Research Board (CHRB), and the Commonwealth Research Commercialization Fund (CRCF) administered by CIT on behalf of the Innovation and Entrepreneurship Investment Authority (IEIA). Mr. Powell mentioned budget requests received by the General Assembly for research projects, but noted that the Senate doesn’t have scientific expertise to vet those proposals. Thus, the SFC sought a more rigorous review process in the

form of the VRIC. They also recognized that it costs money to effectuate that process, which is why they added the proceeds of the sale of CIT property to the corpus of funding available.

In follow-on discussion, Secretary Jackson said that she was pleased that the VRIF is not just incremental investments, but an opportunity to craft the future of technology. The future of the Commonwealth is banking on these investments, she said.

Mr. Wynne, who had been elected chairman of the GO Virginia board earlier that morning, provided the GO Virginia perspective by emphasizing collaboration. He said that there is not enough funding to go around; entities have to collaborate. He reiterated GO Virginia's sole purpose: to create high-paying jobs by working through the regions.

He mentioned the need to prioritize and leverage these dollars against existing university resources, locality resources, etc. He mentioned past successes of incentivizing change through new money to pull people together.

Mr. Wynne reviewed GO Virginia's goals and potential project categories, highlighting the "start-up, then scale up" aspect. He would like proposed projects to leverage \$3 or \$4 for every \$1 invested. He believes regional economic development entities aspire to bring bioscience and related projects to their regions.

Mr. Dyke reviewed the history of CIT and his role as Secretary of Education under Governor Wilder in transferring it out of the Education secretariat and into the Economic Development secretariat in order to fund research with commercial potential. He said he is excited about VRIF. He sees lots of potential, with several areas ripe for development.

Mr. Blake then stepped through the legislation, highlighting criteria for award. He mentioned that the budget language amplifies the legislation. He stated that \$4 million per year is tied to the sale of the CIT building, in addition to general fund and bond appropriations.

In response, Mr. Dyke questioned whether impediments exist to faculty commercializing research and asked whether opportunities exist for VRIC to make it easier. Mr. Blake responded that this issue would need deeper discussion in the future.

A concern was raised about the use of bond funds when private entities are partnering with public institutions. Mr. Vaughn mentioned the roles of taxable vs. tax-exempt debt.

Mr. Vaughn stated that Del. Jones needs to have confidence in the process in order to sustain this effort and continue budget appropriations.

DISCUSSION OF DRAFT BYLAWS

(This discussion was initially moved at the chair's discretion to the end of the agenda; ultimately and in the interest of time, it was tabled without discussion until the next meeting.)

DISCUSSION OF RESEARCH UNIVERSITIES' PRIORITIES

Mr. Blake introduced Dr. Deborah Crawford, Vice President for Research at George Mason University (GMU). She explained that the chief research officers of the seven research universities had spent the prior four months deliberating over the GO Virginia and VRIC legislation. All seven institutions are members of the Virginia Research Alliance, formed in 2015.

Dr. Crawford introduced a presentation that prioritized two main research areas: Cyber security (“Internet of Things”) and bioscience (neuroscience, which also includes big data and data analytics).

Dr. Theresa Mayer, Vice President for Research and Innovation at Virginia Tech, presented the cyber section, and Dr. Phil Parrish, Interim Vice President for Research at the University of Virginia, presented the neuroscience section.

General discussion occurred throughout and following the presentation.

Mr. Vaughn questioned whether investing in more faculty makes institutions compete against each other. He wants to see universities share faculty instead of competing for faculty. Dr. Mayer responded that a base foundation should exist across institutions, but with sector-specific expertise at each university.

Dr. Crawford stated her belief that Virginia should compete with other states, not institution against institution within the state. She cited as an example the Cyber Range, which shares faculty expertise across the Commonwealth.

Mr. Wynne requested that institutions create faculty slots for the future, rather than where the state of the research has been, and suggested looking ahead 20 to 30 years.

Sec. Brown stated that the legislation allows faculty recruitment. Institutions should figure out the current resources and where the gaps are, then use this funding to fill those expertise gaps.

Mr. Vaughn reminded everyone of the strategies in institutions’ six-year operating plans to re-deploy assets to areas with greater interest and stop offering programs that are waning.

Sec. Jackson suggested that new faculty recruits were not the traditional professors of yesteryear – but instead, they are multi-disciplinary.

Dr. Parrish mentioned institutions’ interest in hiring in clusters.

DISCUSSION WITH POTENTIAL REVIEW ENTITIES

Mr. Blake introduced Mr. Mike Grisham, President and CEO of the VBHRC; Mr. Ed Albrigo, President and CEO of CIT; Mr. Andrew Densmore, Executive Director of the Virginia Academy of Science, Engineering and Medicine (VASEM) and Dr. Patricia Dove, VASEM President; and Ms. Anne Pace, Administrator of the CHRB.

Mr. Blake asked, “What value can these organizations bring to VRIC? How can we all collaborate?”

Mr. Grisham said that he has seen culture change in Virginia higher education over the past five years; when he was in Silicon Valley, the word was that Virginia universities were fiercely independent.

He talked about VBHRC, also known as the Catalyst. The mission, goals, governance, and metrics were created before his arrival; his expertise is operations. The Catalyst creates competitive critical mass through collaboration. It focuses on economic development through translational research and aggregating capital from multiple sources.

The creation of VBHRC's governance structure and grant award process took 18 months. It strives to be open and transparent, with clear, measureable objectives and accountability.

Mr. Grisham echoed earlier comments from Mr. Wynne when he said that the VBHRC focuses on "where the puck is going." It picks research areas in which Virginia can be better than other regions of the country and where Virginia can be a leader. Universities contribute their own money for the Catalyst. The College of William and Mary has just asked to join, for a total of seven partner institutions.

Mr. Wynne asked whether and how these entities can collaborate? Mr. Grisham responded that he is willing to do whatever VRIC requests. Mr. Vaughn reminded everyone that the legislation calls for applicants to declare other state funding they are receiving.

Mr. Albrigo distributed a handout detailing the characteristics of the subject-matter experts employed by CIT to review proposals for CRCF funds.

He said that the R&T Strategic Roadmap identifies opportunities; it does not identify priorities. CIT supports young, early stage companies. He suggested that VRIC can set priorities and revisit how the sectors in the Roadmap are prioritized, not only by-region but also multi-region priorities.

He suggested the possibility that a pipeline could be created whereby an individual project could progress through multiple or all of the state-funded research funds and competitions.

He concluded by stating CIT's goal to take the lessons learned from start-ups of cyber companies and get that information back to universities.

Dr. Dove then offered an overview of VASEM, which started in 2013 and includes members of the three national academies who live and work in Virginia. VASEM is a non-partisan resource for the Commonwealth. Members' expertise has been nationally recognized. She said she looks forward to working with VRIC.

DISCUSSION OF INOVA BUDGET ITEM

Mr. Blake asked for feedback on Budget Item 478.20 regarding public university partnerships with INOVA on genomics and bioinformatics and the Committee's role in reviewing applications for funds appropriated for such purposes. He stated that, beyond the criteria in the budget item, VRIC was not ready to provide guidance to the universities or INOVA at the meeting. Mr. Vaughn suggested that INOVA present its plan at the next VRIC meeting.

DISCUSSION OF PRIORITIES FOR NEXT STEPS

Mr. Blake invited each VRIC member to provide closing remarks.

Mr. Wynne said he is keenly interested in coordination and was encouraged by what he heard from the institutions.

Mr. Dyke stated that this meeting was a good first step. He echoed the need for concrete coordination of steps and asked for follow-up from universities on obstacles. He asked institutions to consider the pipeline of talent to high-demand jobs, including any opportunity for coordination with K-12 and community colleges.

Mr. Vaughn again raised his concern that the state's two NCI-designated cancer centers are competing and asked: What are the synergies in research and therapies?

Sec. Jackson said that she is excited that institutions chose cyber as a priority, especially the linkage between cyber and bioscience. She reminded attendees that Virginia is already building an ecosystem in cyber, like Mr. Dyke suggested, but needs key investments to take it to the next level.

Sec. Brown thanked all the entities who are participating. He expressed appreciation that common goals had been highlighted. He said this meeting opened up avenues to work together. Virginia is doing what we need to diversify its economy.

ADJOURNMENT

On motion by Mr. Wynne and second by Mr. Blake, the meeting adjourned at 2:40 p.m.

Peter Blake
Chair, Virginia Research Investment Committee

Lynn Seuffert
SC HEV Associate for Research Investment

**VIRGINIA RESEARCH INVESTMENT COMMITTEE
MEETING
DECEMBER 5, 2016**

DRAFT MINUTES

Mr. Blake (chair) called the meeting to order at 10:00 a.m. in the SCHEV Boardroom, 9th Floor, James Monroe Building, Richmond, Virginia.

Committee members present: Peter Blake, Ric Brown, Betsey Daley, Jim Dyke, Heywood Fralin, Karen Jackson, Robert Vaughn, John O “Dubby” Wynne

Committee member absent: Wick Moorman

WELCOME AND INTRODUCTIONS

Mr. Blake welcomed VRIC members and attendees. He introduced Al Wilson, Senior Assistant Attorney General, as counsel to the Committee.

APPROVAL OF MINUTES

No action was taken on the draft minutes of the October 12 meeting because some members had not yet been sworn in.

DISCUSSION OF DRAFT BYLAWS

Mr. Blake introduced the first reading of a set of draft bylaws, with the understanding that the bylaws could be moved for approval upon the second reading at the next meeting.

At the request of Mr. Blake, Dr. Edwards highlighted the salient points in each section of the draft bylaws.

Asked for clarification on the provisions regarding election of a Vice Chair, Dr. Edwards explained the terms and procedures, which include nomination and, at least two weeks in advance of the election, public notice of the nominee as well as the date, time, and place of the Committee meeting during which the vote is scheduled to occur.

Dr. Edwards concluded that if the desire of the Committee was to approve bylaws and elect a Vice Chair at the same meeting, then both a nomination and public notice would have to occur at least two weeks prior to that meeting; and at said meeting, the election of a Vice Chair could be held only subsequent to an action to approve the bylaws.

DISCUSSION OF PROPOSED ORGANIZING PRINCIPLES, CONCEPTUAL FRAMEWORKS, AND TIMELINE

Mr. Blake introduced staff's proposals regarding organizing principles, conceptual frameworks, and a timeline for developing and initiating a grant program and award process for the Virginia Research Investment Fund (VRIF). Mr. Wynne spoke in favor of a broader-scale approach to the Committee's work.

Mr. Wynne said that he would like to see a situational analysis on research opportunities and strengths. He said he would like VRIC to provide more coordination and more focus to research at public universities. Toward those ends, he would prefer to begin by gaining a better understanding of the “tectonic plates” involved, and then to focus on the mechanics of a research grant program.

Mr. Blake asked those Committee members with knowledge of the legislative intent of the VRIC and the VRIF to provide some insight on the scope and limits of the enacting statutes.

Sec. Brown stated that, from the perspective of the McAuliffe administration, commercialization is the overriding goal; collaboration and diversification of the Virginia economy are also priorities.

Ms. Daley stated that, in the wake of the recent JLARC report on the Virginia Economic Development Partnership (VEDP), she is concerned that the Commonwealth possesses no single focal point for the research efforts of its public universities. While many agencies and entities are involved in research, she said she believes that VRIC should be that focal point.

Mr. Vaughn expressed agreement with Mr. Wynne regarding a broad scale for the Committee’s work. He said he wishes to see better collaboration between and among universities and believes that the VRIF should not be a vehicle to recruit faculty unless they are very high-profile researchers.

Mr. Fralin stated that the VRIC goal should be to create good jobs for Virginia. He said he seeks to understand the best methods and the most likely research topics for getting innovations from the lab to the marketplace.

Sec. Jackson mentioned the Georgia Research Alliance (GRA) as one model that has been highly successful, particularly in terms of recruiting eminent scholars. She stated that the GRA has broadened the industries in which it invests, because its initial two were too few/restrictive. She highlighted the head-to-head nature of the competition for GRA funding.

Mr. Dyke agreed that VRIC could learn from other states and lead the research agenda more broadly.

Mr. Dyke asked whether the next Committee meeting should include presentations about programs/initiatives in other states. Sec. Brown suggested the agenda also include best practices from the literature. Committee members also said that they would like to have a better understanding about what the research universities would recommend.

Ms. Seuffert suggested that an additional method of determining what the universities would prefer would be to solicit proposals broadly and then look closely at the types and foci of requests received. She added that the process would not have to require that any proposals be funded.

Mr. Dyke described his attendance at the SCHEV General Professional Advisory Committee meeting of public institution chief executives and reported that community college presidents are interested in VRIF and the work of VRIC because, as the regional research ecosystem develops, opportunities will manifest for community colleges to contribute to the supply chain or pipeline of talent.

Sec. Jackson noted some projects' long timespan between the lab and commercialization. She emphasized the need for VRIC to recognize that timeframe. She asked where VRIF best fits and who then is responsible for funding a project through the remainder of the often-lengthy commercialization timeline to the ultimate launch of the product.

Mr. Wynne noted the high rate of failure for start-up companies and offered that investigators need the skill sets of entrepreneurs.

At the request of Mr. Blake, Ms. Seuffert then discussed staff's two graphics illustrating the research and innovation continuum in academic research and state grant funding thereof.

PRESENTATION ON CIT'S RESEARCH AND TECHNOLOGY STRATEGIC ROADMAP

Mr. Blake introduced the next topic and welcomed Ed Albrigo, President and Chief Executive Officer of the Center for Innovative Technology (CIT).

Mr. Albrigo offered that his presentation would describe the Roadmap, including what it is and where it is going in terms of CIT's work to update it.

In describing the input sources for updates to the Roadmap, Mr. Albrigo noted the existence of over 100 venture capital firms known to CIT through the GAP Funds program, and that CIT receives input from these firms regarding where they are investing their dollars.

Mr. Albrigo also highlighted the tri-annual frequency of CIT's updates to the Roadmap and postulated that three years may be too infrequent, given the fast-changing innovation cycle in some fields, e.g., cybersecurity.

Mr. Vaughn asked for information about cybersecurity. Mr. Albrigo said that organizations traditionally have focused their strategy on end-point security solutions, but now university research demonstrates that hackers are already past end-point security and are inside the systems and networks of organizations.

Mr. Albrigo pointed out that one way CIT learns about these transitions in technology is by companies coming forward with proposals requesting funding to develop solutions. He also invited comments from Nancy Vorona, CIT Vice President for Research Investment, who stated that proposals from universities for the Commonwealth Research Commercialization Fund and other CIT grant programs span the gamut.

In response to Mr. Vaughan's question about the role that universities can and do have in the data security marketplace, Mr. Albrigo replied that many of the products sold by data security companies originated with university research. Sec. Jackson noted universities' growing roles in developing cybersecurity embedded in medical devices, which can be vulnerable to hacking.

Asked by Ms. Daley for his insights into the next wave of research opportunities, Mr. Albrigo answered that CIT receives qualitative input on the subject. For the Roadmap, CIT staff are discussing how to project into the future rather than only reflecting where Virginia is now. He added that CIT uses seven focus areas for grants and that, as was found by the Georgia Research Alliance, perhaps one or two focus areas is too few.

Reflecting on the Committee's earlier discussion of its approaches and starting points, Mr. Albrigo closed by conjecturing as to whether the Roadmap should lead or follow the foci of the VRIF and whether it should originate from CIT or elsewhere.

**PRESENTATION ON INOVA'S GENOMICS INSTITUTE AND UNIVERSITY PARTNERSHIPS
(BUDGET ITEM 478.20)**

Mr. Blake welcomed the Inova representatives and their university partners: J. Knox Singleton, CEO of Inova; Todd Stottlemeyer, CEO of the Inova Center for Personalized Health; Richard P. Shannon, Executive Vice President for Health Affairs at the University of Virginia; and Deborah Crawford, Vice President for Research at George Mason University.

In introductory comments, Mr. Singleton described Inova's Global Genomics and Bioinformatics Research Institute as a seminal step into a new realm with long-term potential. He called the partnerships between Inova and the research universities "a long-term play," with both short and intermediate impacts. Mr. Singleton highlighted three principles: (i) collaboration rather than competition ("the strength of a wolf is in the pack"); (ii) alignment of business, government and the research community; and (iii) a Commonwealth network, through which the assemblage of a statewide team brings together the differential strengths and competencies of the partners.

Kicking off Inova's formal presentation, Mr. Stottlemeyer emphasized that the institute is a private-public partnership that leverages partners' strengths and improves their collective ability to compete nationally for research dollars. He described the effort as the constructing of a new research ecosystem.

Dr. Shannon stated that UVa would move some 3rd- and 4th-year medical students to the Inova campus, along with the Darden i.Lab, an initiative that creates a nexus for entrepreneurship and innovation education. Dr. Shannon said that the problems in this space are so large that no single entity can solve them alone. He described what is being created as a "research rectangle" and noted that UVa is looking forward to other Virginia universities bringing their areas of expertise, including proteomics from GMU. He believes that the institute is the right mechanism for universities to come together.

Mr. Stottlemeyer introduced Inova's partnership with George Mason University on the Joint Center for Proteomics, for which the policy and ethics issues are still under development. Dr. Crawford from GMU then highlighted the multiplier effect in the creation of this new ecosystem.

Mr. Stottlemeyer then introduced Inova's pending partnership with Virginia Tech on bringing a foundational data piece to the ecosystem. Dr. Theresa Mayer, Vice President for Research and Innovation at Virginia Tech, discussed her enthusiasm for leveraging 20 years of investment and taking it in a new direction: the merger of social analytics and health care analytics.

Dr. Shannon suggested that population genomics might be an example of a potential gap at the institute, with UVa's strength being functional genomics. He also suggested that VCU could collaborate on pharmacogenomics.

Referencing Budget Item 478.20, Mr. Blake asked when the university partners would be ready to present the information needed to access the \$8 million in general funds and \$20 million in debt authorization. Mr. Stottlemeyer said he anticipates being able to present a detailed request in early 2017.

Mr. Vaughn raised the subject of the issuance of bonds to support the institute and expressed a desire to align the square footage to be used by each university with the allocation of bond funds to each partnership. He asked for information about space utilization by each institution. Mr. Stottlemeyer responded that the plan for space utilization is still under development.

Sec. Brown stated that a representative of the Treasury Department was in the room and was taking notes about the timing of the bond issuances. Treasury borrows for cash needs periodically, rather than by individual project. He expressed belief that the bonds involved would be taxable bonds. Sec. Brown said that the mechanics are in place, the only issue is final approval from VRIC.

DISCUSSION OF NEXT STEPS

Mr. Blake asked VRIC members to comment on the process each would like to follow to obtain the input they need to make the best decisions. He offered examples of options such as meeting in smaller groups, scheduling more meetings and/or holding one-on-one consultations with experts.

Mr. Vaughn asked Sec. Jackson whether her early 2016 visit to the Georgia Research Alliance had been worthwhile. She answered that a Virginia contingent had made a field trip to the labs funded by the GRA, in addition to meeting with GRA board members who explained their role and how they designed the program; she found the visit and the information valuable. Mr. Wynne expressed belief that the GRA is funded by private dollars and reiterated his interest in examining other examples.

Sec. Jackson stated that, if members believe that the Committee is more than what is specified in the Code of Virginia, then they need to decide what it is. She suggested that good tools and good staff can lay out a broader scope for the Committee, pointing out that much exists that they, individually and collectively, do not know.

Sec. Brown stated his interest in hearing from individual institutions, particularly about their patents. He too wants to get a handle on what VRIC is doing and what Virginia's strengths are. He believes that VRIC should incent collaboration.

Mr. Wynne suggested formation of a subcommittee that would work with universities and other state agencies, as well as subject matter experts and full-time staff. He said the subcommittee could drive the work, with content and results presented at VRIC meetings.

Ms. Daley agreed with Mr. Wynne on the need to meet, but preferred that all VRIC members participate in discussing the scope of VRIF.

Mr. Blake observed that while the next meeting had been scheduled tentatively for March 14 to coincide with the next meeting of the Growth and Opportunity for Virginia Board, it was clear to him that an earlier meeting was needed. Calendar availability for VRIC members in early January was discussed, but no date was chosen.

ADJOURNMENT

Mr. Blake adjourned the meeting at 12:15 p.m.

Peter Blake
Chair, Virginia Research Investment Committee

Lynn Seuffert
Associate for Research Investment

VIRGINIA RESEARCH INVESTMENT COMMITTEE

VRIC Bylaws

Effective: _____

Adopted: _____

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SECTION ONE

Bylaws of the Committee

These bylaws of the Virginia Research Investment Committee, adopted on [DATE], are designed to adhere to and avoid conflict with existing law and regulation and are at all times superseded by relevant language in the Code of Virginia and the Appropriations Act.

SECTION TWO

Responsibilities of the Committee

- A. The responsibilities of the Virginia Research Investment Committee shall be those specified in the Code of Virginia and in the Appropriations Act and as assigned by the Governor and General Assembly.
 - i) The Committee shall review and select applications for grants and loans from the Virginia Research Investment Fund and other designated appropriations and shall request in writing that the State Comptroller disburse such awards. In its selection of an application, the Committee shall set the terms and conditions of that award.
 - ii) The Committee also shall consult with the State Council of Higher Education for Virginia on the establishment of guidelines, procedures and objective criteria for the application for and award of grants and loans from the Fund, as well as on the selection or creation of one or more scientific and technological advisory and review entities to evaluate applications to the Fund.
 - iii) Annually and no later than November 1, the Committee shall report details of its prior-fiscal-year awarding of grants and loans from the Fund and updates on the results of these and earlier awards to the Governor and the Chairmen of the House Appropriations Committee and the Senate Committee on Finance.

- B. Each member of the Committee shall comply with statutory prohibitions related to contracts as enumerated in the State and Local Government Conflict of Interests Act; shall make any disclosures as required to conform with the Act; shall disclose any real or potential conflict of interest vis-à-vis any grant or loan application; and shall take such actions as are necessary to avoid even the appearance of impropriety with respect to any business conducted by the Committee.

SECTION THREE

Membership of the Committee

Code of Virginia § 23.1-3132.B specifies the membership of the Virginia Research Investment Committee; § 23.1-3132.C sets the lengths of service of the Committee members. (For reference, the authorizing statutes of the Committee and the Fund appear in the Appendix).

SECTION FOUR

Officers of the Committee

- A. Code of Virginia § 23.1-3132.D designates the director of the State Council of Higher Education for Virginia as the chairman of the Virginia Research Investment Committee.

The Committee chairman shall perform duties that include:

- i) Preside at all meetings of the Committee.
- ii) Represent the Committee at official occasions.
- iii) Serve as the official spokesperson of the Committee.
- iv) Submit, with formal authorization of the Committee, written requests to the State Comptroller for disbursement of grant and loan funds.
- v) Submit, with formal authorization of the Committee, annual reports to the Governor and Chairmen of the legislative money committees.
- vi) Supervise staff assigned to the Committee.
- vii) Delegate these duties in whole or in part to other members of the Committee.

A Council director whose title is acting director or interim director shall serve as chairman of the Committee until such time as the Council hires a director.

- B. The vice chairmanship of the Committee shall be an elected office. Eligible nominees shall be the four non-legislative citizen members. Any member of the Committee may nominate a non-legislative citizen member for election to the office of vice chairman. At least two weeks in advance of said election, the public shall be notified of the nominee(s) and the date, time and place of the Committee meeting at which the vote will occur. Voting for the office of vice chairman shall occur by voice vote, paper ballot or show of hands from among the Committee members in attendance. The nominee receiving the majority of votes cast by attending members shall be elected vice chairman.

The vice chairman of the Committee shall perform duties that include:

- i) Perform those duties delegated by the chairman.
- ii) Serve as acting chairman in the chairman's absence.

The vice chairman shall serve for one year, or until a successor is duly elected, and shall be eligible for re-election for an additional one-year term.

A vacancy in the office of vice chairman shall be filled by appointment by the chairman until such time as an election can be duly conducted.

- C. At its discretion, the Committee may establish other offices to be filled from its membership. The selection processes, terms of office and duties of such other officers shall be determined by the Committee as it deems appropriate.

SECTION FIVE

Staff of the Committee

- A. By virtue of the director of the State Council of Higher Education for Virginia being the chairman of the Committee, the staff of the Council shall provide primary staff support to the Committee under the supervision of the Council director.
- B. The staffs of the ex officio members of the Committee, as determined by each ex officio member, shall serve as secondary staff to the Committee.

SECTION SIX

Meetings of the Committee

- A. The Committee shall meet at least twice per year or on the call of the chairman. A majority of the Committee may also call a meeting.
- B. Meetings of the Committee shall be open to the public and held in accordance with the Virginia Freedom of Information Act. In accordance with the Act, the Committee may withhold from public disclosure certain records containing proprietary information and may meet in closed session to discuss such records as long as all relevant statutory processes and procedures are followed.
- C. Notification of meetings of the Committee shall be provided to each member and to the public at least three days prior to the meeting date.
 - i) On behalf of the Committee and because more than two Committee members are members of the GO Virginia board, notification of meetings of the GO Virginia board also shall be provided to the public three or more days before those meetings.
 - ii) Notifications of meetings of the Committee shall acknowledge that more than two members of the GO Virginia board may be present, but that no actions will be taken on behalf of the GO Virginia board.
- D. A written agenda shall be distributed to Committee members prior to each meeting and shall be made readily available to the public. Each agenda shall include a designated opportunity for public comment.
- E. A majority of the members of the Committee serving at any one time shall constitute a quorum for the transaction of business.
- F. Voting on motions considered by the Committee shall occur by voice vote or show of hands. No proxy voting shall be allowed.

- G. Except for Committee members, only persons who make prior arrangements with the chairman and are recognized by the chairman shall be entitled to make presentations or offer public comments at meetings of the Committee. The chairman may waive this requirement at his discretion.
- H. The minutes of each meeting of the Committee shall be posted in a timely manner to the website of the Committee and/or the Council and distributed to the members prior to the next meeting.
- I. Except as prescribed in these Bylaws, all Committee meetings shall be conducted in accordance with the rules and procedures set forth in the most recent edition of Robert's Rules of Order. For interpretation of Robert's Rules of Order, a Committee meeting shall be considered a meeting of a "large" body, while any meeting of a subcommittee or other subgroup of the Committee shall be considered a meeting of a "small" body. The chair shall be the presiding officer at Committee meetings and shall enforce fairly and impartially the rules of procedure of the Committee.

SECTION SEVEN

Subcommittees of the Committee

The chairman of the Committee may appoint such standing or ad hoc subcommittees as deemed appropriate or to ensure the efficient disposition of the work of the Committee. The chairman may authorize a standing or ad hoc subcommittee to seek advice and counsel from one or more persons external to the Committee; any such person shall not be considered a member of the subcommittee for purposes of a quorum and shall be ineligible to vote on matters before the subcommittee.

- A. The chairman shall specify the purpose and duration of any subcommittee.
- B. The term of office of members of any subcommittee shall be at the pleasure of the chairman.
- C. The presence of fifty percent of subcommittee members shall constitute a quorum. For purposes of constituting a quorum of any subcommittee, the Committee chairman and/or vice chairman, when present, shall be considered members of that subcommittee, entitled to take action within that subcommittee.
- D. The act of the majority of the subcommittee members present at a subcommittee meeting at which a quorum exists shall constitute the act of the subcommittee.
- E. No subcommittee shall have authority to take binding action on behalf of the Committee except where authorized specifically by the Committee.

SECTION EIGHT

Review of Bylaws of the Committee

These Bylaws shall be reviewed and revised, as necessary, at least every four years. Any member may propose amendments to the Bylaws at any time. Proposed amendments must be presented in writing and for discussion at the meeting of the Committee prior to the one at which the amendments are to be voted upon. A majority vote of the total membership of the Committee shall be required to adopt any amendments to these Bylaws.

The attached appendix is not a formal component of the VRIC Bylaws; the information is included as reference material only.

APPENDIX

Enacting Statutes

§ 23.1-3132. Virginia Research Investment Committee established; report.

- A. There is hereby established the Virginia Research Investment Committee to evaluate and award grants and loans from the Fund pursuant to the provisions of this article.
- B. The Committee shall consist of the following members: the Director of the Council, the Secretary of Technology, the Secretary of Finance, the staff directors of the House Committee on Appropriations and the Senate Committee on Finance, one nonlegislative citizen member appointed by the Speaker of the House, one nonlegislative citizen member appointed by the Senate Committee on Rules, and two nonlegislative citizen members appointed by the Governor. If the Board exists, the nonlegislative citizen members appointed by the Speaker of the House, the Senate Committee on Rules, and the Governor shall be nonlegislative citizen members of the Board.
- C. Ex officio members shall serve terms coincident with their terms of office. If the Board does not exist, nonlegislative citizen members shall be appointed to a term of four years, and no nonlegislative citizen member shall serve more than two consecutive four-year terms. If the Board exists, nonlegislative citizen members shall serve terms coincident with their terms on the Board.
- D. The Director of the Council shall serve as the chairman of the Committee.
- E. The Committee shall report to the Governor and the Chairmen of the House Committee on Appropriations and the Senate Committee on Finance no later than November 1 of each year. The report shall include details about awards made from the Fund in the immediately preceding fiscal year and updates on the research, development, and commercialization efforts resulting from such awards.

§ 23.1-3131. Virginia Research Investment Fund.

- A. There is hereby created in the state treasury a special nonreverting revolving fund to be known as the Virginia Research Investment Fund. The Fund shall be established on the books of the Comptroller. All moneys appropriated by the General Assembly for the Fund, and from any other sources public or private, shall be paid into the state treasury and credited to the Fund. Interest and other income earned on the Fund shall be credited to the Fund. Any moneys remaining in the Fund, including interest and other income thereon, at the end of each fiscal year shall not revert to the general fund but shall remain in the Fund.

- B.1. Notwithstanding any other provision of law, the General Assembly may specifically designate that certain moneys appropriated to the Fund be invested, reinvested, and managed by the Board of the Virginia Retirement System as provided in § 51.1-124.38. The State Treasurer shall not be held liable for losses suffered by the Virginia Retirement System on investments made under the authority of this subsection.
- B.2. No more than \$4 million of moneys so invested, net of any administrative fee assessed pursuant to subsection E of § 51.1-124.38, may be awarded through grants or loans in a fiscal year for any purpose permitted by this article. At the direction of the Committee, the State Comptroller may annually request a disbursement of \$4 million from the moneys invested by the Board of the Virginia Retirement System, to be held with other moneys in the Fund not subject to such investment. At the end of each fiscal year, if less than \$4 million of such annual allocation is awarded as grants or loans in a calendar year, the Comptroller shall return the remainder of the annual \$4 million allocation to the Board of the Virginia Retirement System for reinvestment pursuant to § 51.1-124.38.
- B.3. Any loans awarded pursuant to this article shall be paid by the Comptroller from the \$4 million annual allocation set forth in subdivision 2. The recipient of a loan shall repay the loan pursuant to the terms set forth by the Committee. At the end of each fiscal year, the Comptroller shall return any repayments received from loan recipients to the Board of the Virginia Retirement System for reinvestment pursuant to § 51.1-124.38.
- C. Moneys in the Fund shall be used solely for grants and loans to (i) promote research and development excellence in the Commonwealth; (ii) foster innovative and collaborative research, development, and commercialization efforts in the Commonwealth in projects and programs with a high potential for economic development and job creation opportunities; (iii) position the Commonwealth as a national leader in science-based and technology-based research, development, and commercialization; (iv) attract and effectively recruit and retain eminent researchers to enhance research superiority at public institutions of higher education; and (v) encourage cooperation and collaboration among higher education research institutions, and with the private sector, in areas and with activities that foster economic development and job creation in the Commonwealth. Areas of focus for awards shall be those areas identified in the Commonwealth Research and Technology Strategic Roadmap, and shall include but not be limited to the biosciences, personalized medicine, cybersecurity, data analytics, and other areas designated in the general appropriation act.
- D. The disbursement of grants and loans from the Fund shall be made by the State Comptroller at the written request of the Committee.

§ 23.1-3133. Award from Virginia Research Investment Fund.

- A. The Council, in consultation with the Committee, shall establish guidelines, procedures, and objective criteria for the application for and award of grants and loans from the Fund. Such guidelines, procedures, and criteria, and any updates thereto, shall be submitted to the House Committee on Appropriations and the Senate Committee on Finance. The criteria for the award of grants and loans shall consider other grants, awards, loans, or funds awarded to the proposed program or project by the Commonwealth and shall require an applicant to indicate other applications for state grants, awards, loans, or funds currently pending at the time of the application for an award from the Fund. The criteria shall consider the potential of the program or project for which a grant or loan is sought to (i) culminate in the commercialization of research; (ii) culminate in the formation or spin-off of viable bioscience, biotechnology, cybersecurity, genomics, or similar companies; (iii) promote the build-out of scientific areas of expertise in science and technology; (iv) promote applied research and development; (v) provide modern facilities or infrastructure for research and development; (vi) result in significant capital investment and job creation; or (vii) promote collaboration among the public institutions of higher education in the Commonwealth. Such criteria shall also require that the program or project for which a grant or loan is sought be related to an area identified in the Commonwealth Research Technology Strategic Roadmap.
- B. Grants and loans may be awarded to public institutions of higher education in the Commonwealth or collaborations between public institutions of higher education in the Commonwealth and private entities. Any award from the Fund shall require a match of funds at least equal to the amount of the award.
- C. Applications for grants and loans from the Fund shall be received by the Council in accordance with the procedures developed pursuant to subsection A. Upon confirmation that an application is complete, the Council shall forward the application to an entity with recognized science and technology expertise for a review and certification of the scientific merits of the proposal, including a scoring or prioritization of applicant programs and projects deemed viable by the reviewing entity. Such entities include, but are not limited to, the Virginia Biosciences Health Research Corporation, the Innovation and Entrepreneurship Investment Authority, the Virginia Academy of Science, Engineering and Medicine, or any other entity deemed appropriate by the Council, including a scientific advisory committee created by the Council for the sole purpose of reviewing one or more applications received pursuant to this article.
- D. Any proposal receiving a favorable evaluation pursuant to subsection C shall be forwarded, along with the scoring or prioritization, to the Committee for further review and a decision whether to award the proposal a grant or loan from the Fund. The award of a grant or loan from the Fund shall be subject to any terms and conditions set forth by the Committee for the award. All decisions by the Committee shall be final and not subject to further review or appeal. The Governor may announce any award approved by the Committee.

§ 23.1-3130. Definitions.

As used in this article, unless the context requires a different meaning:

"Board" means a policy board in the executive branch of government that (i) was created by the 2016 Session of the General Assembly, (ii) has a legislatively stated purpose of promoting collaborative regional economic and workforce development opportunities and activities, and (iii) has membership consisting of members of the House of Delegates, members of the Senate, members of the Governor's Cabinet, and nonlegislative citizen appointees.

"Committee" means the Virginia Research Investment Committee established pursuant to § 23.1-3132.

"Council" means the State Council of Higher Education for Virginia.

"Fund" means the Virginia Research Investment Fund established in § 23.1-3131.

State-Funded Research-Related Programs in Other States

- Georgia Research Alliance
- Florida Institute for Commercialization of Public Research
- Kentucky Applied Research Endowment Match Program (Bucks for Brains)
- Kentucky Science and Technology Corporation (includes Kentucky Science and Engineering Foundation)
- Maryland Technology Development Corporation (TEDCO)
- Invest Michigan
- North Carolina Biotechnology Center
- Texas Governor's University Research Initiative

Georgia Research Alliance

- Established 1990
- Not-for-profit 501(c)(3) organization
- Tax Year 2014 information from Form 990:
 - Total assets: \$9,957,459
 - Salaries & benefits: \$995,831
 - Other expenses: \$3,126,646 (includes fees for services of non-employees of about \$1 million, outreach expenses of \$1.5 million, travel expenses of \$111,492, and misc. expenses)
 - Grant funds awarded: \$5,181,649 (Scholars: \$2,347,020; Ventures: \$2,709,629; Seed grants: \$125,000)
 - Contributions received: \$8,923,106 (Gov't: \$7,614,171; Other: \$1,308,935)
- Governed by a 41-member Board of Trustees comprised of 8 university presidents, the Chancellor of the University System of Georgia, 28 representatives from businesses throughout Georgia, a GRA Eminent Scholar, the Commissioner of the Georgia Department of Economic Development, a representative from a grantmaking foundation, and a representative from a public policy foundation.
- \$30 million average annual investment 2007 through 2012
- \$595 million in state investment total (sources include the state lottery and the state's tobacco settlement fund)
- Private and public support
 - Private funding — from individuals, companies, foundations and partner universities — supports 100% of GRA's operations and management.
 - Public funding, through State of Georgia appropriations, is invested directly into core programs, such as GRA Eminent Scholars® and GRA Ventures.
- Invests in:
 - Eminent Scholar Endowment Program (since 1992)
 - ✓ \$750,000 from GRA and \$750,000 from the university (sometimes from a private donation)
 - ✓ The Eminent Scholar can use the income generated by the Endowment as he or she wishes
 - ✓ In addition, GRA commits additional funds for start-up money or a commitment to build and equip a state-of-the art laboratory
 - GRA Ventures (funds to companies that are commercializing university research)
- Strategic focus encompasses nine intersections of science and industry
 - Agricultural Science and Genomics
 - Biomedical Engineering and Regenerative Medicine
 - Cancer and Human Genomics
 - Computing and Networks
 - Electronics and Optics
 - Energy and Environmental Engineering
 - Immunology and Vaccines
 - Informatics and Systems Biology
- Since the organization's 1990 founding, GRA has driven a total of \$3.8 billion in direct federal and private investment in Georgia. GRA's capacity-building efforts at research universities have also helped:
 - Launch more than 150 active companies
 - Create more than 6,000 highly skilled science and technology jobs in Georgia

Criteria for Selection of Eminent Scholars:

- Eligible at the rank of professor
- Grant productivity – faculty recruited as eminent scholars should be expected to generate \$1 million or more in R&D awards over a couple of years or be able to bring in a major grant for a center or other major effort
- Well respected in their field and broadly cited in the literature over a sustained period
- Working in a field in which there is general consensus that the field will be strong for the next several years
- Demonstrate potential for developing a large-scale, comprehensive, well-funded interdisciplinary center
- Have a track record of building teams and mentoring others rather than acting primarily in the capacity of an individual investigator
- Exhibit characteristics that suggest they can interact at a high level with not only academics but with industry and government as well
- Have an interest in entrepreneurship, which can mean being entrepreneurial in terms of creating his or her own company or willing to work with entrepreneurs

Sources: GRA website (<http://gra.org/>) and 2006 U.S. Department of Commerce, Economic Development Administration report, A Resource Guide for Technology-Based Economic Development: Positioning Universities as Drivers, Fostering Entrepreneurship, Increasing Access to Capital. Available here: <http://ssti.org/reports>

Florida Institute for the Commercialization of Public Research

The Institute facilitates the commercialization of new discoveries generated through publicly-funded research by working closely with technology licensing officers across Florida to leverage research and create and fund new companies. The Institute delivers value-added support services and seed funds that help minimize risk and position companies for success.

- Non-profit organization
- Tax Year 2014 information from Form 990:
 - Total assets: \$17,307,780
 - Salaries & benefits: \$1,346,342
 - Salaries detailed on Form 990 include 3 entrepreneurs in residence who are paid between \$118,000 and \$128,000 per year from the Foundation (there might be more; not all positions are individually listed on 990s)
 - Other expenses: \$1,822,131 (includes \$325,856 for non-salary costs of entrepreneur in residence program; \$37,000 for travel)
 - Grant funds awarded: \$0 (seed fund awards are apparently included on the Form 990 as program-related investments and so are included in the total assets shown above; appears to be \$11.8 million)
 - Contributions received: \$5,622,135 (\$5,500,000 from state funds)
 - Related organization, the Florida Technology Seed Capital Fund, is shown as having \$4 million in income and \$8.7 million as end-of-year assets.
- Board of Directors, 5 members
- Investor Advisory Board, comprised of 31 distinguished experts, evaluates companies for funding consideration and advises entrepreneurs on matters relating to fundraising and business development
- Executive Council – essential to the development of successful startup companies; comprised of experienced executives and entrepreneurs with expertise across a broad range of industries; members of the Council provide coaching and contacts to support company growth. Objectives and activities of Council members include:
 - Leverage industry, business and technical expertise to evaluate company plans and determine resource needs and success milestones;
 - Provide one-on-one executive mentoring and facilitate key introductions to support strategic and fundraising goals;
 - Participate in Institute and partner events in areas such as business plan judging and public speaking;
 - Advocate for a globally competitive knowledge-based economy in Florida.
- Through its subsidiary, the Florida Technology Seed Capital Fund, the Institute provides between \$50,000 - \$300,000 in first-round funding to qualified companies, either as debt or equity; requires 1:1 private investment match
- Companies that achieve significant milestones after funding may qualify for up to \$200,000 in follow-on round funding from the Institute; requires 2:1 private sector match
- Criteria for funding:
 - Core product developed through the research and development activities of universities and colleges, research institutes, and publicly supported organizations within the state, and the intellectual property rights to the core product must be held by such institutions
 - Recommended by the technology licensing office of the host institution, and accepted by the Institute

- Located in Florida with a majority of the current and future employees based in Florida

Outcomes

Companies that were funded through June 30, 2015 exceeded the 1:1 match requirement, raising in excess of \$60 million. The program has enabled entrepreneurs to raise \$37 million in matching funds from high net worth individuals and groups within the State of Florida and, between FY-2011 and FY-2015, companies funded by the Institute attracted more than \$23 million from capital sources outside of Florida.

Over the five-year period (FY-2011 through FY-2015), an estimated 2,473 jobs were supported. The annual number of jobs supported by the Institute and its funded companies grew from 91 in FY-2011 to 1,144 jobs in FY-2015. A significant 80% of the five-year total of 2,473 jobs generated are in Knowledge-Based Services industries and in the Manufacturing sectors.

The average annual earnings per job supported in FY-2015 are \$57,960, however the average earnings per *direct* job are \$76,628, reflecting higher earnings for the high-skill jobs at the funded companies themselves.

GDP impacts have also grown steadily since FY-2011 from \$8 million to \$88 million in FY-2015, contributing a total of \$206 million over the five-year period.

The Economic Return on Investment (ROI) to the State of Florida is 14 times current funding in FY-2015.

Sources: <http://www.florida-institute.com/> and The Comprehensive Economic Development Impacts of the Florida Institute for the Commercialization of Public Research with Projected Economic Impacts Based on Defined Funding Scenarios, The Washington Economic Group, Inc., Oct. 16, 2015. Available here: <http://www.florida-institute.com/sites/default/files/ES-Florida%20Institute%20Economic%20Impact%20Study%2010-16-15.pdf>

Kentucky Applied Research Endowment Match Program (Bucks for Brains)

Purpose: Encourages private investment in public postsecondary education research activities to stimulate business development, generate increases in externally sponsored research, create better jobs and a higher standard of living, and facilitate Kentucky's transition to a knowledge-based economy.

- Enacted in 1997 as one component of a larger reform of higher education
- Administered by the Kentucky Council on Postsecondary Education (CPE)
- State funds are appropriated to the Research Challenge Trust Fund (RCTF) for the two research institutions and to the Comprehensive University Excellence Trust Fund (CUETF) for the six comprehensive institutions
- Funds, both state and private, are endowed (only the investment earnings are eligible for expenditure, not the principal)
- 1998-1999: \$110 million in general fund appropriations
- 2000-2001: \$120 million
- 2003-2004: \$120 million
- 2008: Created the Research Capital Match Program (RCMP)
- 2008-2009: \$50 million in General Fund-supported bonds for RCTF & RCMP and \$10 million for CUETF and capital projects at comprehensive institutions
- RCTF funds are allocated two-thirds to the University of Kentucky and one-third to the University of Louisville
- Endowment proceeds are used to fund endowed chairs, professorships, research scholars, research staff, graduate fellowships, undergraduate scholarships, research infrastructure, and mission support
- RCTF requires 1:1 match from newly generated (after 2001) gifts and pledges from external sources (businesses, non-governmental foundations, hospitals, corporations, alumni, or other individuals); funds received from federal, state, and local government sources are not eligible for state match, nor are general fund appropriations and student-derived revenues
- Capital Match Program requires 1:1 cash match (i.e., agency funds, private funds, federal or state grants, or other nonstate General Funds)
- Areas of concentration or research focus are determined by the Council on Postsecondary Education
- At research universities, funds should support five new-economy clusters that are of strategic benefit to Kentucky and are core components of the knowledge-based economy:
 - human health and development
 - biosciences
 - materials science and advanced manufacturing
 - information technologies and communications, and
 - environmental and energy technologies
- State and private matching funds should be directed toward supporting research that leads to the creation, preservation, or attraction of businesses that will increase the number of good jobs in Kentucky. For these purposes, "good jobs" are defined as jobs that yield income at or above the national per capita income.
- Strong research programs are clustered around related academic disciplines and CPE encourages campus officials to create a critical mass of scholars who can influence the nation's research and academic agenda.

Agenda Item 5: State-Funded Research-Related Programs in Other States

- CPE encourages the use of endowment funds for interdisciplinary, problem solving, or applied research activities
- At research institutions, at least 70% of program funds that an institution's board has designated for use under the traditional Bucks for Brains program must be endowed for the purpose of supporting chairs, professorships, research scholars, staff, infrastructure, or fellowships that are directly linked to the research activities of an endowed chair or professor. No more than 30% of program funds may be endowed for the purpose of supporting mission support activities or fellowships that are not directly linked to the research activities of an endowed chair or professor.

Source: <http://cpe.ky.gov/research/endowment/> ; At University of Louisville
<http://louisville.edu/bucksforbrains>

Kentucky Science and Technology Corporation

The Kentucky Science and Technology Corporation (KSTC) is a private nonprofit enterprise founded in 1987 dedicated to enhancing the capacity of people, companies, and organizations to develop and apply science and technology and compete responsibly in the global marketplace. The Kentucky Science and Engineering Foundation (KSEF) is now part of KSTC, managed in partnership with the Kentucky Council on Postsecondary Education (CPE).

- Established in 1987 as the Kentucky Science and Technology Council, Inc.
- 501(c)(3)
- Tax Form 990 for Tax Year 2013
 - 23 voting members of governing body
 - 48 employees
 - Total assets: \$19,021,479
 - Salaries & benefits: \$3,379,936
 - Other expenses: \$3,188,785 (includes \$324,561 for travel)
 - Grant funds awarded: \$10,175,467
 - Contributions received: \$15,182,649 (Gov't: \$14,478,320; Other: \$704,329)
 - Funds invested in organizations as part of the tax-exempt mission: \$24,818,904 (not included on the Foundation accounts)

Programs (grant programs are described further below) Source: <http://www.kstc.com/>

Talent Development: Help Schools, Teachers and Students in Advancing Math, Science and Entrepreneurship Education

- AdvanceKentucky (K-12 students)
- NMSI Laying the Foundation (LTF) (middle and high school teachers)
- Code.org Regional Partner Program
- Kentucky Idea State U Business Plan Competition (Idea State U) (college students)

Innovation and Entrepreneurship: Fund Programs for R&D, New Product Development and Commercialization

- Kentucky Experimental Program to Stimulate Competitive Research (EPSCoR)
- Kentucky Science and Engineering Foundation (KSEF)
- Kentucky SBIR-STTR Resource Center and Matching Funds Program

Enterprise Development and Capitalization: Assist Early-Stage, High-Growth Oriented Technology Companies with Capital and Resources for Growth

- Kentucky Innovation Network (KyIN): Since 2001; network of mentors; 12 offices located across Kentucky; managed in partnership with the Kentucky Cabinet for Economic Development and KSTC. More info here: <http://kyinnovation.com/>
- Kentucky Enterprise Fund (KEF)
- Kentucky New Energy Ventures Fund (KNEV)
- Kentucky Procurement Technical Assistance Center (KyPTAC)

Space Innovation: Provide R&D, Education and Entrepreneurial Space Solutions

- Exomedicine™ Institute (space medicine)
- Kentucky Space
- Space Tango™ (business accelerator for space enterprises and entrepreneurs)

World-Class Events: Explore Imagination and Cutting-Edge Ideas with Global Innovators and Thinkers

- IdeaFestival®

Kentucky Science and Engineering Foundation (KSEF) is now part of the Kentucky Science and Technology Corporation, managed in partnership with the Kentucky Council on Postsecondary Education. Invests in research and development activity to promote innovation, new product development and commercialization, to advance new ideas and technologies that could add value to scientific and economic growth in Kentucky. The KSEF Advisory Board is appointed by the Kentucky Science and Technology Corporation Board of Directors; 12 members, includes 3 VPs of research (KY, Louisville, & Western KY), 4 senior academic leaders from other states, 4 corporate members, and the KSEF Exec Dir. who is also a Sr. VP of KSTC. More info here: <http://ksef.kstc.com/>

KSEF manages the following programs:

- **Research and Development Excellence Program (RDE)** targets achieving excellence in science and engineering in Kentucky, through innovation and technology development in existing and emerging areas of research, by making proactive investments through a peer-reviewed competitive selection process. The maximum award size for RDE-020 is \$50,000, the period of the grant request will not exceed 12 months, and projects must be R&D hypothesis-driven. Info here: <http://ksef.kstc.com/index.php/funding-programs/rde-program>
- **Kentucky Commercialization Fund (COMM)** supports efforts made by faculty in Kentucky to commercialize a technology, product, or process that they have developed but not yet licensed. Beginning Fall 2016, the intent of the Kentucky Commercialization Fund (COMM) will be fulfilled under KSEF's RDE Awards (i.e., there will not be separate commercialization solicitations).
- **Kentucky SBIR/STTR Phase Zero and Phase Double Zero Program (PZ/DZ)** provides funding for Kentucky-based Small Business Innovation Research (SBIR) and Small Business Technology Transfer Research (STTR), specifically for the development of Federal Phase I and Phase II proposals. More info here: <http://ksef.kstc.com/index.php/funding-programs/pddz-program>
- **Kentucky SBIR/STTR Matching Funds Program** funded by the Cabinet for Economic Development (CED), Office of Entrepreneurship. The Kentucky Science and Technology Corporation (KSTC) administers the KY SBIR/STTR Matching Funds Program under a contract with the CED. This Program provides matching funds up to \$150,000 for Phase I and up to \$500,000 for Phase II (not to exceed two years). These matching funds are to be used for new and additional work tasks that are complementary to an existing Federal SBIR/STTR award. KY SBIR/STTR Matching Funds grants are awarded by a competitive selection process. More info: <http://ksef.kstc.com/index.php/funding-programs/ky-sbirsttr-matching>

Kentucky Enterprise Fund (KEF) and Kentucky New Energy Venture Fund: "We fund Kentucky Startups!" Startups@KSTC provides pre-seed and seed stage funding and other resources to Kentucky-based companies. Our goal is to build successful technology-related companies in Kentucky. More info here: <http://startups.kstc.com/>

Funds companies that:

- Are building a solution to address a specific problem.
- Are working with customers to understand the value of their product or solution.

- Have a team that can uniquely serve the company's customers and build a business.

They fund companies by providing \$20,000 pre-seed investments or \$50,000-\$250,000 seed stage equity investments. On average, they make 2-5 new seed stage investments and 8-12 new pre-seed stage investments in companies each year. They support companies in their portfolio to help them grow. Support includes strategic advising, operational support, and networking services. They work with other investors, organizations, and individuals with complementary skill sets to help the companies grow.

About 10% of companies that apply receive funding. Areas of focus of companies that receive funding: 57% are in the life sciences, 32% in IT, 10% in materials / manufacturing, 1% in environmental / energy.

Kentucky Statewide Experimental Program to Stimulate Competitive Research (EPSCoR).

EPSCoR is an initiative of the National Science Foundation designed to build research infrastructure and stimulate competitive research in regions of the country that are less able to compete successfully for federal research funds. The mission of NSF's EPSCoR is to advance excellence in science and engineering research and education in order to achieve sustainable increases in research, education, and training capacity and competitiveness that will enable EPSCoR jurisdictions to have increased engagement in areas supported by the NSF. EPSCoR currently supports 25 states. Kentucky is using their EPSCoR project to form partnerships that help to balance the distribution of federal research dollars and use state or local control in the delivery of program goals. Since 1985, this Kentucky program works with and has received funding from a range of federal science and technology agencies including NSF, NASA, DOD, NIH, DOE, and EPA. Overview and more info:

<http://cpe.ky.gov/policies/economic/EPSCoR.htm> ; <http://www.kyepscor.org/>
<https://www.nsf.gov/od/oia/programs/epscor/index.jsp>

Maryland Technology Development Corporation (TEDCO)

TEDCO was created by the Maryland State Legislature in 1998 to facilitate the transfer and commercialization of technology from Maryland's research universities and federal labs into the marketplace and to assist in the creation and growth of technology based businesses.

TEDCO provides a framework of knowledge, funding, and networking to support an innovation eco-system that nurtures researchers, entrepreneurs, start-ups, and early stage companies engaged in bringing innovative ideas to market. The corporation's role was expanded in FY 2016 with the transfer of the operation of the Maryland Venture Fund (MVF) and the biotechnology grant program from the Department of Commerce.

TEDCO Facts

- Corporation with a 15-member board
- Board includes the Secretary of the Department of Business and Economic Development
- Remaining 14 board members are appointed by the Governor with the advice and consent of the Maryland Senate
- 21 full-time and 6 part-time positions (employees are not State employees)
- State appropriation for FY 2017 = \$26,812,000 (a general fund grant of \$19.5 million and an additional \$7,345,000 in special funds)
- Salaries and wages: \$2,052,000
- Programs: \$17,294,000
- FY 2014 expenses, funded primarily with State general funds, were \$22.5 million, including \$603,000 in administrative expenses
- General fund allowance includes funds for the (former) Technology Commercialization Fund, the Maryland Industrial Partnership Program, the Rural Business Initiative, the Cyber Security Investment Fund (CIF), the BioMaryland Grant program, the Maryland Innovation Initiative, and the Maryland Stem Cell Research Program
- Special funds are included in the corporation's budget for the first time in fiscal 2016 due to the transfer of the MVF
- Although not reported through the State budget system, the corporation also has nonbudgeted funds that include investment earnings, event income, and grants

Programs (each bullet is also a link)

Idea: Centered on the advancement of technology transferred from research labs to commercial business entities

- [Maryland Innovation Initiative \(MII\)](#)
- [Maryland Stem Cell Research \(MSCRF\)](#)
- [Technology Validation Program](#)
- [mdPACE](#)

Start-Up: Provide startups and early stage ventures knowledge, funding, and resources necessary to launch a new business

- [Incubator Business Assistance Fund](#)
- [Former Cyber Security Fund](#)
- [Maryland Entrepreneur Resource List \(MERL\)](#)
- [Maryland Innovation Initiative \(MII\)](#)
- [N-STEP](#)
- [Rural Business Innovative Initiative \(RBI2\)](#)

- Former Technology Commercialization Fund (TCF)
- Technology Validation Program
- Life Science Investment Fund
- Seed Investment Fund

Expansion: Available to assist existing companies that are in position to advance to the next stage of commercial viability but need outside capital investment and guidance to move forward

- Former Cyber Security Fund
- Maryland Entrepreneur Resource List (MERL)
- Rural Business Innovation Initiative (RBI2)
- Former Technology Commercialization Fund (TCF)
- Life Science Investment Fund
- Seed Investment Fund

In February 2013, TEDCO created a for-profit limited liability corporation, TEDCO Capital Partners (TCP), to manage four planned targeted investment funds. The goal of these investment funds was to raise capital from private sources to provide venture capital for specific recipients. However, in 2015, the TEDCO Board of Directors decided to not move forward with this initiative and to concentrate instead on its expanded responsibilities.

Outcomes

The 2015 Annual Report states:

- TEDCO received more than 410 applications for funding support
- TEDCO provided grants or investments to 108 companies and technologies
- These same awardees attracted more than \$129 million of additional grant and/or investment capital subsequent to TEDCO's support
- TEDCO awarded \$16.5 million in grants
- An updated study by the Battelle Technology Partnership Practice found TEDCO's economic contribution to the Maryland economy totaled almost \$1 billion in 2015, generating a total of 4,358 jobs with average labor income per job estimated at \$74,700.

Source: <http://tedco.md/> and the 2015 Annual Report: <http://tedco.md/wp-content/uploads/2016/03/TEDCO-2015-Annual-Report.pdf> and an audit by the Maryland Office of Legislative Audits here: http://dlslibrary.state.md.us/publications/OLA/TEDCO_2015.pdf and FY2015 annual report here: [http://dlslibrary.state.md.us/publications/TEDCO/EC10-415\(a\)_2015.pdf](http://dlslibrary.state.md.us/publications/TEDCO/EC10-415(a)_2015.pdf) and FY 2017 info here: <http://mgaleg.maryland.gov/Pubs/BudgetFiscal/2017fy-budget-docs-operating-T50T01-Maryland-Technology-Development-Corporation.pdf>

Invest Michigan

Invest Michigan is a non-profit funded by the Michigan Strategic Fund (administered by the Michigan Economic Development Corporation). As fund manager for both the Michigan Pre-Seed Fund 2.0 and the University Commercialization Fund, Invest Michigan invests in early-stage high tech businesses located in Michigan.

- 501(c)(3)
- Started in 2014
- Tax Form 990 for Tax Year 2014
 - 5 voting members of governing body
 - 3 employees
 - Total assets: \$2,466,512 (\$1.3 million are program-related investments)
 - Salaries & benefits: \$265,801
 - Other expenses: \$134,712 (travel ~ \$8,000)
 - Grant funds awarded: \$20,000 (\$5,000 each to four organizations)
 - Contributions received: \$420,513 (all from gov't sources)
- Focus areas
 - Advanced manufacturing and materials
 - Life sciences
 - Information technology
 - Other innovative technology
- **Michigan Pre-Seed Fund 2.0** supports pre-seed and seed stage technology companies located in Michigan. The MPSF 2.0 offers equity or convertible debt initial investments ranging from \$50,000 – \$150,000 with the goal of supporting companies with additional follow-on investments.
- **The University Commercialization Fund** provides funding of up to \$100,000 for the commercialization of technologies originating from any of the 15 Michigan public universities. A signed option or license agreement from the Technology Transfer Offices is required. Companies may apply at any time.
- Press release from April 2015: Invest Michigan, which manages the Michigan Pre-Seed Fund 2.0 of \$10.5 million from the MEDC, has completed 33 investments in 26 companies across the State of Michigan. An additional \$1 million is dedicated to the University Commercialization Fund to help universities transfer technology to the marketplace.

Source: <http://investmichigan.org/>

North Carolina Biotechnology Center (NCBiotech)

NCBiotech connects the company and university researchers; the funders and the small companies; the job seekers and job providers; provides funding when few others do; keeps an eye on emerging biotech sectors; makes sure North Carolina leads the way.

A private, non-profit with headquarters in Research Triangle Park and offices in Asheville, Charlotte, Winston-Salem, Greenville and Wilmington. The General Assembly funds NCBiotech to grow this industry statewide.

Tax Form 990 for Tax Year 2014

- 34 voting members of governing body (17 members are elected by other members)
- 84 employees
- Total assets: \$38,028,399
- Salaries & benefits: \$6,148,682
- Other expenses: \$2,293,193 (travel ~ \$358,000)
- Grant funds awarded: \$6,310,940
- Contributions received: \$14,216,203 (Gov't: \$13,600,338; Other: \$615,865)
- Program Service Revenue: \$652,199
- Related Organization, NC Bioscience Ventures LLC, had end-of-year assets of \$1,660,379.
- Mission on Form 990: The North Carolina Biotechnology Center aids the biotechnology-related efforts of researchers, businesses, state and federal governments, and other agencies primarily through awards of grants and loans related to specific programs.

Programs

- **Business Loans:** Three low-interest NCBiotech loan options bring \$50,000 to \$500,000 to emerging NC life science companies.
- **Research Grants:** Three NCBiotech grant programs help NC scientists move great ideas from concept to commerce. NCBiotech research grant programs are designed to encourage innovation, support university infrastructure and help move technology toward commercialization. In addition, grants fill in some critical funding gaps, stages where it is typically difficult to find funding.
 - **Biotechnology Innovation Grant:** Max. \$100,000. Supports studies at North Carolina research institutions that enable commercialization of early-stage university life science inventions.
 - **Collaborative Funding Grant:** Max. \$50,000/year. Supports a university-company partnership by providing funding for a post-doctoral fellow or technician in a university laboratory who will conduct research on a project of commercial interest.
 - **Institutional Development Grant:** Max. \$200,000. Provides core equipment that will be used by multiple faculty members.
 - **Technology Enhancement Grant:** Max. \$75,000. For university technology transfer offices to support research and other commercially important activities that will make a technology licensable.
- **Event & Meeting Grants:** NCBiotech provides grants of up to \$10,000 to help North Carolina's life science non-profit organizations bring major meetings to the state.
- **Centers of Innovation:** NCBiotech's COI grant program helps bootstrap select life science sectors like marine biotechnology and nanobiotechnology. Staff at the Biotechnology Center work with university researchers, technology transfer officers,

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industrial partners, nonprofit stakeholders as well as regional and statewide policymakers to shepherd the COIs into existence. Potential COIs will need to form a cohesive academic-industry consortium led by strong inter-university and industrial partners. Once a consortium has formed, it must be recognized by the Biotechnology Center as an inclusive and cohesive consortium that is intent on building a state-wide initiative – only then will the Center invite the consortium to submit a Phase I proposal (12-month \$100,000 planning grant). The Phase II award is funding for the implementation of the business plan. Phase II awardees will receive up to \$2.5 million awarded over four years, contingent upon completion of targeted milestones.

Source: <http://www.ncbiotech.org/>

Texas Governor's University Research Initiative (GURI)

- Enacted in June 2015
- Funds the recruitment of Nobel laureates and national academy members only
- Priority is given to the recruitment of distinguished researchers in the fields of science, technology, engineering, mathematics, and medicine; priority is given to proposals that demonstrate a reasonable likelihood of contributing substantially to the state's national and global economic competitiveness
- Administered by the Texas Economic Development and Tourism Office within the office of the governor
- The GURI advisory board reviews and evaluates the applications and makes recommendations to the Texas Economic Development and Tourism Office for approval or disapproval of those applications
- The advisory board must be composed of at least nine members appointed by the governor: one-third with a finance background, one-third with an academic background in science, technology, engineering, or mathematics, and one-third public members
- Biennial budget appropriated \$40 million in FY2016; \$0 in FY2017 (but unexpended balance, if any, remains available)
- Budget appropriation can be used for necessary expenses incurred in the administration of the fund
- Maximum request \$5 million
- 1:1 match required (universities cannot use "appropriated general revenue" as a match)
- Applications must document the support of the institution's president and governing board, the chair of the institution's governing board, or the chancellor of the university system, if the institution is a component of a university system
- Applicants cannot propose to recruit a candidate from another eligible institution or from a private or independent institution of higher education in Texas
- Proposal should identify a specific distinguished researcher being recruited
- Candidate should be distinguished in, or to be engaged in, basic, translational, or applied research
- Information about the Candidate remains confidential until the date, if any, on which the researcher enters into an employment relationship with the recruiting institution
- First awards were announced in July 2016
- \$35 million was awarded to recruit 9 national academy members

Criteria for Selection

Priority is given to proposals that:

1. demonstrate a reasonable probability of enhancing Texas' national and global economic competitiveness;
2. demonstrate a reasonable probability of creating a nationally or internationally recognized locus of research superiority or a unique locus of research;
3. are matched with a significant amount of funding from a federal or private source that may be transferred to the eligible institution;
4. are interdisciplinary and collaborative; or
5. include a strategic plan for intellectual property development and commercialization of technology.

Other factors that may also be considered:

1. the likelihood that the researcher being recruited will not accept a research position with the applicant institution without the institution's receipt of a matching grant;

2. the extent to which the subject matter of the researcher's research offers the opportunity for interdisciplinary and collaborative research at the applicant eligible institution and with other eligible institutions; and
3. any commercialization track record of the researcher being recruited.

GURI replaces former governor Perry's technology fund, started a decade ago in order to encourage high-tech startups; a 2011 report from the state auditor revealed that program had flaws. The initiative, which included a \$400 million allocation to universities and companies, was not transparent and had not been properly tracked.

In addition to Governor Abbott's new initiative, the Legislature budgeted over \$400 million for research at public universities so that all schools will receive increased formula funding. Abbott said that in total, the state's colleges and universities would have access to \$4 billion more than was available in the previous session.

Sources: <http://gov.texas.gov/ecodev/guri/home> ; the statute and administrative rules available here: http://gov.texas.gov/ecodev/guri/useful_links ; June 2015 article: <http://www.educationnews.org/higher-education/in-tx-abbott-launches-governors-university-research-initiative/>

Virginia's State-Funded Research Programs

COMMONWEALTH HEALTH RESEARCH FUND AND BOARD (CHRB)

Statutory Purpose: To support research efforts deemed to have the potential to maximize human health benefits for the citizens of the Commonwealth. Research efforts eligible for support by the Board may include traditional medical and biomedical research relating to the causes and cures of diseases, as well as research related to health services and the delivery of health care.

- Created: 1997
- Va. Code §23-278
- Source of Funds: Proceeds following Trigon's evolution from a non-profit organization
- Endowment: \$35.8 million (June 30, 2015)
- Grant Activity
 - FY2014-2015: 6 new awards plus 5 continuations (year 2) = \$1,017,500
 - FY2013-2014: 5 new awards plus 3 continuations (year 2) = \$746,688
 - FY2012-2013: 6 new awards plus 2 continuations (year 2) = \$799,746
 - Since its inception, the CHRB has made 168 grant awards totaling almost \$13.3 million (as of June 30, 2015)

VIRGINIA BIOSCIENCES HEALTH RESEARCH CORPORATION (VBHRC)

Statutory Purpose: Not created by statute; 2013 Appropriation Item 105 states: The consortium will contract with private entities, foundations and other governmental sources to capture and perform research in the biosciences. Initial exclusive focus will be around the Virginia core strength areas of Bio-Informatics and Medical Informatics, Point of Care Diagnostics and Drug Discovery and Delivery.

- Created: 2013
- Va. Code: created by the Virginia General Assembly in 2013 in Chapter 806, Item 105:M
- Source of Funds: Appropriations and Universities
- Since inception, VBHRC has funded five rounds of competition, with awards for the sixth round to be announced shortly.
- Round five focused on neuroscience and winners were awarded a total of \$687,000.
- As of Nov. 2015, VBHRC had awarded \$6.7 million in grants.

Form 990 from Tax Year 2014

- 12 voting members of governing body
- Total assets: \$3,047,983
- Grant funds awarded: \$2,118,927
- Contributions received: \$0 (prior year \$5.5 million; Gov't: \$5 million; Other: \$550,000)

CENTER FOR INNOVATIVE TECHNOLOGY (CIT) AND INNOVATION & ENTREPRENEURSHIP INVESTMENT AUTHORITY (IEIA)

Statutory Purpose: To (i) promote economic development by attracting and retaining high tech jobs; (ii) increase industry competitiveness by supporting innovative technologies; (iii) mobilize support for high tech industries to commercialize new products and processes; (iv) enhance and expand R&D capabilities of the institutions of higher education and coordinate such capabilities with the R&D activities and requirements of the public and private sectors, including transferring technological advances to the private sector; (v) expand knowledge pertaining to R&D among public and private entities; (vi) attract R&D facilities and contracts from the federal government and private sector; and (vii) facilitate and coordinate the marketing, organization, utilization and development of R&D.

- Created: 1985
- Va. Code: §2.2-2218 et seq.
- Source of Funds: Appropriations
- The Commonwealth Research Commercialization Fund (CRCF) in FY2016 issued one solicitation for proposals for five programs: Commercialization, Eminent Researcher Recruitment, Matching Funds, SBIR Matching Funds, and STTR Matching Funds. As a result, \$3.4 million was recommended for award in 48 projects. The \$3.4 million in awards comprised of a \$2.8 million FY2016 General Fund appropriation plus carryover monies.
- Since the inception of the CRCF program in FY2012, 616 applications were submitted from all of the Commonwealth's ten technology regions and, from these submissions, 232 awarded projects were announced. These announced awards total nearly \$20 million.

Form 990 from Tax Year 2014

- 14 voting members of governing body
- Total assets: \$5,721,624
- Grant funds awarded: \$0 (CIT issued two FY2014 CRCF solicitations resulting in \$4.2 million invested in 52 projects; funds were issued directly by the Department of Treasury)
- Contributions received: \$5,747,960 (Gov't: \$ 5,746,460; Other: \$1,500)
- Program service revenue includes \$6,452,205 in "federal and state awards"

Programs

CIT Broadband (rural and underserved areas)

CIT Connect (consulting service)

CIT GAP Funds (seed- and early-stage investment funds placing near-equity and equity investments in Virginia-based technology, life science, and cleantech companies)

CIT Entrepreneur

Commonwealth Support Programs (R&T Roadmap and Innovation Index)

CIT R&D – Commonwealth Research Commercialization Fund (5 programs)

- Private Sector: Commercialization, SBIR Matching Funds, STTR Matching Funds
- Public & Non-Profit Sector: Matching Funds and Eminent Researcher Recruitment

VIRGINIA TOBACCO REGION REVITALIZATION COMMISSION (VTRRC)

Statutory Purpose: The Commission is established for the purposes of determining the appropriate recipients of moneys in the Tobacco Indemnification and Community Revitalization Fund and causing distribution of such moneys to: (i) provide payments to tobacco farmers as compensation for the adverse economic effects resulting from loss of investment in specialized tobacco equipment and barns and lost tobacco production opportunities associated with a decline in quota; and (ii) revitalize tobacco dependent communities.

- Created: 1998
- Va. Code §3.2-3100 et seq.
- Grant Awards: year ending June 30, 2015, the Commission's 8 grant programs awarded 95 grants, totaling \$71 million (\$14 million of that for R&D)
- Assets: \$500 million +
- Community revitalization: \$75.5 million

R&D Grant Program funds applied research with significant commercialization potential, with accompanying job creation and private sector capital investment in the tobacco-dependent region.

Areas of Research Focus

- Energy (of primary interest to the Commission)
- Biomedical and Health Care
- Information Technology
- Chemical and Materials
- Environmental

VIRGINIA HIGHER EDUCATION EQUIPMENT TRUST FUND (HEETF)

Statutory Purpose: To provide funding to upgrade equipment needed for instruction and research at public institutions of higher education.

- Created: 1986
- Va. Code: Senate Bill 45, 1986 General Assembly
- Source of Funds: Bonds
- The \$168 million allocation in the current budget cycle is the largest in the HEETF's 30-year history.
- The current budget includes \$30,950,000 allocated specifically for research (\$15,950,000 in FY2017 and \$15 million in FY2018).
- Since inception, including the current budget cycle, HEETF funding totals \$1,476,789,456.
- Between FY2009 and FY2018, the separate allocation of HEETF for research has totaled \$155,249,008. (Universities also spend some of the "traditional" HEETF allocation for research purposes.) Institutions eligible for the separate HEETF allocation for research equipment are CWM, GMU, ODU, UVa, VCU, VIMS, and VT.
- The State Council of Higher Education for Virginia (SCHEV) shares administrative responsibility for the program with the Virginia College Building Authority (VCBA) and the Department of Treasury.
- SCHEV recommends how the funds are to be distributed among institutions based on identified equipment needs. The Council's recommendation is then communicated to the Governor and the General Assembly for consideration in the budget process. The General Assembly makes the final decision on dollar allocations.
- The sum of HEETF research-equipment funding to the University of Virginia and Virginia Tech generally has been about two-thirds of the total annual HEETF allocation for research.
- The institutions purchase equipment using their operating funds and are reimbursed by the Trust Fund.

Since 1996, the Trust Fund has been used to accomplish the following goals:

- Significantly reduce the amount of obsolete technology and equipment
- Provide every student with access to an appropriate level of information and technology
- Establish a statewide network that supports and encourages sharing and cooperation
- Provide every faculty member with appropriate equipment and training to use technology in support of teaching and learning
- Support faculty in the introduction of new ways of instruction and learning, provide courses customized to student needs, and take advantage of distance-learning opportunities
- Install high quality, easy-access, network-deliverable student support services, such as transcripts, grades, class scheduling, and account balance and payment information
- Install management information systems that are flexible and directly accessible to users to help support administrative restructuring and cost-containment

	Commonwealth Health Research Fund	Virginia Biosciences Health Research Corp.	Center for Innovative Technology Commonwealth Research Commercialization Fund (2 public/non-profit & 3 private sector programs)			Tobacco Region Revitalization Commission R&D and SBIR Grants	Virginia Research Investment Fund
			Matching Funds	Eminent Researcher Recruitment	Commercialization (private sector)		
Statutory Language	The purpose of the Board shall be to provide financial support, in the form of grants, donations, or other assistance, for research efforts that have the potential of maximizing human health benefits for the citizens of the Commonwealth.	The consortium will contract with private entities, foundations and other governmental sources to capture and perform research in the biosciences. Initial exclusive focus will be around the Virginia core strength areas of bioinformatics and medical informatics, point of care diagnostics and drug discovery and delivery.	To (i) promote economic development by attracting and retaining high tech jobs; (ii) increase industry competitiveness by supporting innovative technologies; (iii) mobilize support for high tech industries to commercialize new products and processes; (iv) enhance and expand R&D capabilities of the institutions of higher education and coordinate such capabilities with the R&D activities and requirements of the public and private sectors, including transferring technological advances to the private sector; (v) expand knowledge pertaining to R&D among public and private entities; (vi) attract R&D facilities and contracts from the federal government and private sector; and (vii) facilitate and coordinate the marketing, organization, utilization and development of R&D.			The Commission is established for the purposes of determining the appropriate recipients of moneys in the Tobacco Indemnification and Community Revitalization Fund and causing distribution of such moneys to: (i) provide payments to tobacco farmers as compensation for the adverse economic effects resulting from loss of investment in specialized tobacco equipment and barns and lost tobacco production opportunities associated with a decline in quota; and (ii) revitalize tobacco dependent communities.	Moneys shall be used solely for grants and loans to (i) promote R&D excellence in the Commonwealth; (ii) foster innovative and collaborative research, development, and commercialization efforts in projects and programs with a high potential for economic development and job creation; (iii) position the Commonwealth as a national leader in science-based and technology-based research, development, and commercialization; (iv) attract and effectively recruit and retain eminent researchers to enhance research superiority at public institutions; and (v) encourage cooperation and collaboration among higher education research institutions, and with the private sector, in areas and with activities that foster economic development and job creation.
Purpose Stated on RFP or Website	Support the health-research efforts approved by the Board and any other purpose permitted by the enacting statutes.	To fund translational medicine projects in the life sciences. Projects should have a significant impact on human health and accelerate commercializing technologies emanating from collaborations with Virginia's research universities and industry	The Matching Funds Program assists qualified organizations in commercializing research or technologies and/or leveraging federal and private funds designated for commercialization. Target CRCF projects offer high potential for commercialization and economic benefit to Virginia.	The Eminent Researcher Recruitment Program assists public institutions of higher education acquire or enhance research superiority in qualified technologies by supporting the recruitment of a top scholar to the faculty to that institution. Examples include start-up package support, supplies, equipment, or upgrades to the researcher's laboratory.	Assists for-profit technology companies in Virginia in commercializing qualified technologies, products, or services that have a reasonable probability of enhancing the Commonwealth's national and global competitiveness. Applications must be for a proof-of-concept project, with the intent to validate the technology and enable commercialization.	R&D Grant Program: The Commission has determined that applied research with significant commercialization potential, with accompanying job creation and private sector capital investment, in the tobacco-dependent region is a key element of revitalization and seeks to provide grant funding to governmental or non-profit entities working with private partners to conduct research. SBIR-funded projects: The Committee anticipates accepting applications in Fall 2016 for projects that can demonstrate successful completion of a federal Small Business Innovation Research-funded Phase One proof of concept, and are applying for SBIR Phase Two funding.	TBD

	Commonwealth Health Research Fund	Virginia Biosciences Health Research Corp.	Center for Innovative Technology Commonwealth Research Commercialization Fund (2 public/non-profit & 3 private sector programs)			Tobacco Region Revitalization Commission R&D and SBIR Grants	Virginia Research Investment Fund
			Matching Funds	Eminent Researcher Recruitment	Commercialization (private sector)		
Focus Area	Traditional medical and biomedical research relating to the causes and cures of diseases as well as research related to health services and the delivery of health care.	Funds translational research and commercialization in the neurosciences, cardio/metabolic diseases, infectious diseases and cancer. Focus includes bioinformatics and medical informatics; point-of-care diagnostics; and drug discovery and delivery.	Those in Roadmap (e.g., cyber security, adv. manufacturing, energy, environment (water quality), information technology with particular interest in data analytics, life sciences including biotechnology, unmanned systems)			Energy (of primary interest to the Commission) Biomedical and Health Care Information Technology Chemical and Materials Environmental	Areas of focus for awards shall be those areas identified in the Commonwealth Research and Technology Strategic Roadmap, and shall include but not be limited to the biosciences, personalized medicine, cybersecurity, data analytics, and other areas designated in the general appropriation act.
Eligible Recipients	Public institutions of higher education, agencies of the Commonwealth, or nonprofits exempt from income taxation pursuant to § 501(c)(3) of the IRC and located in the Commonwealth.	Institutions that are members of the non-stock corporation research consortium (initially UVa, VCU, VT, GMU & EVMS; ODU joined subsequently); the consortium may contract with private entities, foundations and other governmental sources. At least two of the participating institutions are actively and significantly involved in collaborating on the research.	Virginia public or private institutions of higher education or associated intellectual property foundations that adopt a policy regarding the ownership, protection, assignment, and use of intellectual property; federal research facilities in Virginia; university research consortia that include Virginia college and university members; other nonprofit research institutions located in Virginia.	Virginia public institutions of higher education or associated intellectual property foundations that adopt a policy regarding the ownership, protection, assignment, and use of intellectual property	Businesses with operations in Virginia; collaborative partnerships are desired (and may involve colleges or universities). Must have Virginia as the principal place of business for the firm and its CEO. May have received up to 10 federal SBIR or STTR awards. May have received up to \$2 million in outside private investment (not including funds from family, friends, and/or founders) and had cumulative sales revenue of no more than \$3 million since January 1, 2012	<p>Eligible Applicants:</p> <ul style="list-style-type: none"> • Government entities within the tobacco region or their duly constituted political subdivisions (e.g. industrial development authority) • Non-profit entities, incorporated in Virginia, with an existing IRS 501(c) designation • Education or training institutions constituted and located in Virginia <p>Applications that will benefit a private entity must have a public purpose and be made by one of the above.</p>	Grants and loans may be awarded to public institutions of higher education in the Commonwealth or collaborations between public institutions of higher education in the Commonwealth and private entities.
Required Industry Partner(s)?	No	At least two of the VBHRC universities and one industry partner must	No, but letter required from the organization's	Applicants must involve a private sector partner with	Businesses are the only eligible recipients	R&D Grant: No SBIR companion grant: Assumed	TBD

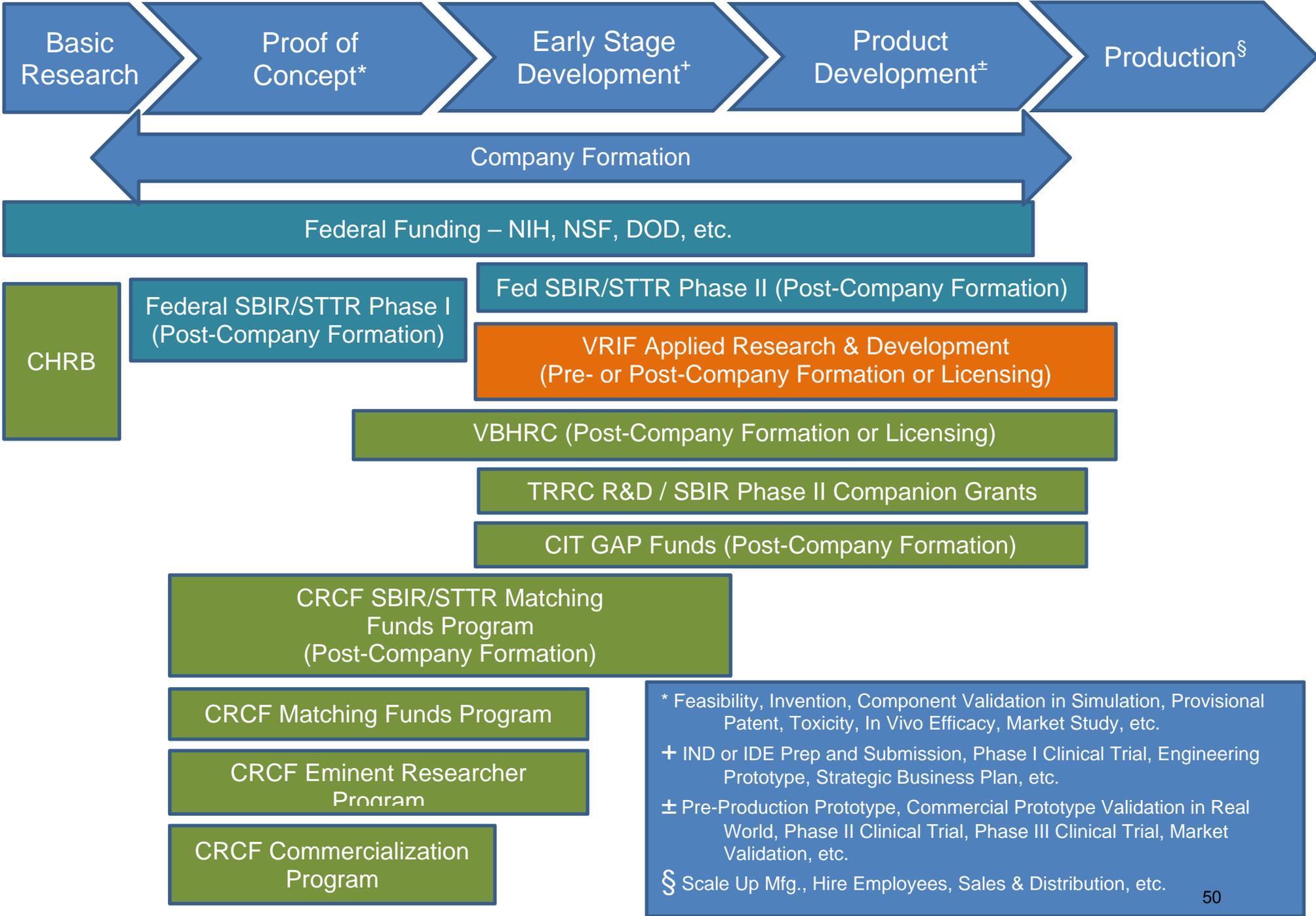
	Commonwealth Health Research Fund	Virginia Biosciences Health Research Corp.	Center for Innovative Technology Commonwealth Research Commercialization Fund (2 public/non-profit & 3 private sector programs)			Tobacco Region Revitalization Commission R&D and SBIR Grants	Virginia Research Investment Fund
			Matching Funds	Eminent Researcher Recruitment	Commercialization (private sector)		
		be in a substantive collaboration	licensing office or senior official discussing the market potential, target customers, and commercialization strategy and support for the technology or service being proposed.	business operations in the Commonwealth 50% of the match must come from the private partner		YES because SBIRs are awarded to companies (but TRRC grant will go to eligible entity only)	
Awards	One-year project: Max = \$100K; 2-yr project: Max = \$200K w/no more than \$100K in either year. No min/max projects/year.	In most-recent round of grantmaking, one-to-three awards in the range of \$200K-\$800K (annual grant, up to 18-month timeframe).	Each application may seek and be funded up to \$100,000. Organizations may submit up to 4 LOIs / applications and receive up to 4 awards. A Principal Investigator may submit and receive up to two.	Each application may seek and be funded up to \$250,000. Organizations may submit one LOI and subsequently one application	Each application may seek and be funded up to \$50,000. Organizations may submit up to 2 LOIs / applications and receive up to 2 awards in any combination under the Commercialization and SBIR and STTR Matching Funds Programs.	R&D Grants: The Commission has established minimum and maximum targets for awards. The minimum target is \$250,000 and the maximum is \$2 million per applicant, per award. Applicants are limited to two awards per project. SBIR-funded projects: Generally, the Commission intends to support costs in the \$50,000 - \$500,000 range that are critical to the project's success but are not eligible for SBIR funds. Approval of TRRC funds will be contingent on approval of SBIR Phase Two funding.	TBD
Matching Funds	The Applicant is responsible for providing the 33% matching funds, calculated against the amount of CHRB funding requested. All matching funds must be contributed by the Grantee Organization, not by the Collaborating	Awards must be matched at least dollar-for-dollar by funding from private entities, foundations & other gov't sources. The match must be a cash dollar for dollar match, not in-kind services or a waiver of indirect overhead charges.	One to one match required	Matching funds must be provided and be at least one-to-one to CRCF requested funds, with 50% of the match coming from the applicant institution and 50% of the match coming from the private sector	One to one match required	Awards must be matched dollar-for-dollar from non-Commission funds. Grantee must provide written evidence of a commitment of the required matching funds within 180 days after Commission approval of a grant (no TRRC funds will be disbursed until such time).	Any award from the Fund shall require a match of funds at least equal to the amount of the award.

	Commonwealth Health Research Fund	Virginia Biosciences Health Research Corp.	Center for Innovative Technology Commonwealth Research Commercialization Fund (2 public/non-profit & 3 private sector programs)			Tobacco Region Revitalization Commission R&D and SBIR Grants	Virginia Research Investment Fund
			Matching Funds	Eminent Researcher Recruitment	Commercialization (private sector)		
	Institution. Can use indirect costs or facilities and administrative (F&A) costs as part of, or all of, the matching funds			partner			
Timeline	July: RFP issued; Sept: concept papers due; Dec: papers selected; Feb: full proposals due; Apr: recommendations reviewed; May: presentations by applicants & decisions by Board; July: Disperse.	Varies depending on whether there is one cycle or two cycles in a fiscal year. Recent timeline: Aug: RFP issued; Sept: letters of interest (LOIs) due; Oct: presentations to Project Management and Oversight Panel (PMOP); Nov: Board decision; Dec. disburse awards	Sept. RFP issued; Nov. 10 letters of intent (LOIs) due, decisions w/in 5 days of receipt; Jan. 19 full applications due; CIT staff review, then external peer review, then Research and Technology Investment Advisory Committee review, then CIT Board approval; June: awards announced.			R&D awards are made irregularly; recent awards were made: Sept. 2016 May 2015 Jan., May & Sept. 2014 Sept. 2013 May & Sept. 2011	TBD
Reviewers & Decision to Award	Enacting statute does not mandate review process/personnel; proposal evaluation is left to Board's discretion. Board currently employs three former NIH staffers as expert reviewers.	Enacting budget language requires a "scientific advisory board." Corporation employs a 10-member Project Management and Oversight Panel (6 scientists, 1 VC and 3 corporate executives).	Applications will be evaluated initially by CIT, followed by an external review by subject matter experts, and subsequently by the RTIAC. After its review, the RTIAC will recommend awards to the CIT Board, which will consider those recommendations and make award decisions.			Not specified	The Council shall forward the application to an entity with recognized science and technology expertise for a review and certification of the scientific merits of the proposal, including a scoring or prioritization of applicant programs and projects deemed viable by the reviewing entity. Such entities include, but are not limited to, the Virginia Biosciences Health Research Corporation, the Innovation & Entrepreneurship Investment Authority, the Virginia Academy of Science, Engineering & Medicine, or any other entity deemed appropriate by the Council, including a scientific advisory committee created by the Council for the sole purpose of reviewing one or more applications. Any proposal receiving a favorable evaluation shall be forwarded, along with the scoring or prioritization, to the Committee for further review and a decision whether to award the proposal a grant or loan from the Fund.

	Commonwealth Health Research Fund	Virginia Biosciences Health Research Corp.	Center for Innovative Technology Commonwealth Research Commercialization Fund (2 public/non-profit & 3 private sector programs)			Tobacco Region Revitalization Commission R&D and SBIR Grants	Virginia Research Investment Fund
			Matching Funds	Eminent Researcher Recruitment	Commercialization (private sector)		
Criteria for Selection	<p>Establish specific criteria and procedures governing its decisions to support research efforts consistent with its purposes, including, but not limited to: (i) encouraging collaborative research efforts among two or more institutions or organizations, (ii) giving priority to those research efforts where Board support can be leveraged to foster contributions from federal agencies or other entities, and (iii) supporting both new research efforts and the expansion or continuation of existing research efforts.</p> <p>Statute requires: (i) clear statement of problem or opportunity to be addressed; (ii) specific objectives; (iii) description of how the results will maximize health benefits for Va citizens; (iv) budget for the project including other anticipated sources of financial assistance; and (v) time frame for the conduct of the research.</p>	<p>Requires: (i) at least two participating institutions be actively & significantly involved in collaborating on the research; (ii) awards must be matched at least dollar-for-dollar by funding from private entities, foundations & other gov't sources; (iii) research must hold potential for high impact near-term success in generating sponsored research, creating spin-off companies or creating new jobs.</p> <p>The research topic has been vetted by a scientific advisory board. The consortium will have near-term sustainability as a goal, along with corporate-sponsored research gains, new Virginia company start-ups, and job creation milestones.</p>	<p>In addition to category-specific criteria, applications must include a strategic plan that identifies: (i) how the project fits into the Roadmap, (ii) other funds that may be reasonably expected from other sources as a result of an award from the Fund, (iii) the potential for commercialization of the research or tech underlying the application, and (iv) opportunities for public & private collaboration.</p>	<p>An application will be evaluated on adherence to these Guidelines, including how completely it provides the information requested for all sections of the submission, and on the following criteria.</p> <ul style="list-style-type: none"> • Economic and technical benefits to the Commonwealth • Qualifications of the researcher being recruited • Quality of the program to which the researcher is being recruited • Strength and quality of work the researcher plans to accomplish in his / her new role • Likelihood of creating or enhancing research superiority at the university to which the researcher is being recruited • Reasonableness of project costs • Evaluation plan • Leverage of other funds • Demonstration of public / private 	<p>An application will be evaluated on adherence to the guidelines, including how completely it provides the information requested for all sections of the submission, and on the following criteria:</p> <ul style="list-style-type: none"> • Technical merit and feasibility; project work plan, including well-defined milestones • Economic and technical benefits to the Commonwealth • Time to commercialization and potential for follow-on funding • Qualifications of applicant organization and team to carry out the proposed activities • Reasonableness of project costs • Evaluation plan • Active third-party equity holders • Funding requested for direct costs; stronger consideration will be given to applications that request CRCF funds for direct costs only • Performance history and success on CRCF projects • Demonstration of public / private collaboration 	<p>Program guidelines adopted by the Commission are intended to attract entities who propose to:</p> <ul style="list-style-type: none"> • engage in applied research that is post proof-of-concept • invent and/or improve products, processes, or services that originate and remain in the Region (highest priority), or whose value is substantially increased in the Region (lower priority) • pursue commercialization within 36 months <p>Applications that propose to expend Commission resources outside of that Region, either directly or indirectly, will receive limited consideration. Likewise, research performed within the Region whose ultimate benefit is likely to be commercialized outside the Region without majority economic benefit to the Region will receive limited consideration.</p>	<p>The criteria for the award of grants and loans shall consider other grants, awards, loans, or funds awarded to the proposed program or project by the Commonwealth and shall require an applicant to indicate other applications for state grants, awards, loans, or funds currently pending at the time of the application for an award from the Fund.</p> <p>The criteria shall consider the potential of the program or project for which a grant or loan is sought to</p> <ol style="list-style-type: none"> culminate in the commercialization of research; culminate in the formation or spin-off of viable bioscience, biotechnology, cybersecurity, genomics, or similar companies; promote the build-out of scientific areas of expertise in science and technology; promote applied research and development; provide modern facilities or infrastructure for research and development; result in significant capital investment and job creation; or promote collaboration among the public institutions of higher education in the Commonwealth.

	Commonwealth Health Research Fund	Virginia Biosciences Health Research Corp.	Center for Innovative Technology Commonwealth Research Commercialization Fund (2 public/non-profit & 3 private sector programs)			Tobacco Region Revitalization Commission R&D and SBIR Grants	Virginia Research Investment Fund
			Matching Funds	Eminent Researcher Recruitment	Commercialization (private sector)		
				collaboration <ul style="list-style-type: none"> Funding requested for direct costs; stronger consideration will be given to applications that request CRCF funds for direct costs only Performance history and success on CRCF projects 			
Additional Info	<p>No more than 10 Concept Papers from a single agency, non-profit organization, or institution of higher education per funding cycle.</p> <p>In each calendar year, Board may expend an amount not to exceed 6% of the moving average of Fund's market value over the previous 5 years, on a one-year delayed basis, net of allowed administrative fees; however, Board is not obligated to make annual or other periodic disbursements or expenditures.</p>	<p>Participation by the five founding institutions and by others choosing to join requires a cash contribution from each entity in each of the first and second years of at least \$50,000, or a larger amount determined by members.</p>	<p>Chair is authorized to issue letters of financial commitment to assist applicants' leveraging of federal & private funds.</p>	<p>Applications must show recruit's superiority; inst's needs-meeting infrastructure; private partner(s) w/ops in Va.</p> <p>The following are acceptable recruitment scenarios:</p> <ul style="list-style-type: none"> Candidate identified Multiple candidates under consideration Candidate profiled: the university has detailed the profile of the candidate to be recruited 	<p>Applications may be collaborative; short time to commercialization; involve 3rd-party equity holders; with preference to previously-successful applicants.</p> <p>Requires that an intellectual property agreement be executed, when IP is or may be jointly developed, before funding is disbursed. Option agreements do not meet this criterion and thus do not satisfy the requirement for an IP agreement.</p>		TBD

Research and Innovation Continuum and Public Funding Sources



* Feasibility, Invention, Component Validation in Simulation, Provisional Patent, Toxicity, In Vivo Efficacy, Market Study, etc.
 + IND or IDE Prep and Submission, Phase I Clinical Trial, Engineering Prototype, Strategic Business Plan, etc.
 ± Pre-Production Prototype, Commercial Prototype Validation in Real World, Phase II Clinical Trial, Phase III Clinical Trial, Market Validation, etc.
 § Scale Up Mfg., Hire Employees, Sales & Distribution, etc.

STRATEGIC OPPORTUNITIES FOR VRIC CONSIDERATION

Background and Overview

In its preliminary work, the Virginia Research Investment Committee (VRIC) has sought to better understand state-level mechanisms in the Commonwealth and elsewhere for promoting, funding and commercializing translational academic research. Members have expressed interest in the identification of best practices, as well as limitations within and gaps between existing initiatives.

The committee's goal also seeks to provide advice to the State Council of Higher Education for Virginia (SCHEV) on setting the parameters of the Virginia Research Investment Fund (VRIF). Toward these ends, staff offers three potential strategic opportunities for consideration by the Committee:

- (i) a focusing on larger-scale, longer-term, latter-stage research and development (R&D);
- (ii) a targeting of state funding at current and future priority research areas; and
- (iii) a bridging of the gaps in research and commercialization infrastructure and expertise.

Staff concludes that these opportunities are the most relevant to the Committee's state-level focus on transformative research, commercialization, entrepreneurship and job creation.

Focus on Larger-Scale, Longer-Term, Latter-Stage R&D

As illustrated in the staff document "Research and Innovation Continuum and Public Funding Sources," much of the existent state financial support for academic research is available for smaller-scale, shorter-term projects in the continuum's earlier stages (i.e., the Basic Research stage and the Proof of Concept stage). Funding to support larger-scale, longer-term projects in the middle and latter stages (especially the Product Development stage and the Production stage) is less common.

The VRIF legislation says that the Fund shall be used to "foster innovative and collaborative research, development, and commercialization efforts ... in projects and programs with a high potential for economic development and job creation" (Paragraph C of § 23.1-3131). The criteria for VRIF applications and award decisions must consider the proposed project's potential to achieve one or more of seven outcomes, which include: "culminate in the commercialization of research"; "culminate in the formation or spin-off of viable ... companies"; "promote applied research and development"; and "result in significant capital investment and job creation" (Paragraph A of § 23.1-3133).

Therefore, the VRIF's design and intended outcomes begin to address the need for public funding for academic research beyond the Proof of Concept stage. Staff depicts such in its "Continuum" document via placement of the VRIF in the middle and latter stages of the research and innovation continuum. Staff also reflects these requirements in its draft organizing-principles and conceptual-frameworks documents for the VRIF award processes.

Target Public Funding at Current and Future State-Priority Research Areas

The purpose of the Commonwealth Research and Technology Strategic Roadmap, developed by the Center for Innovative Technology (CIT) on behalf of the Innovation and Entrepreneurship Investment Authority (IEIA), is to "identify research areas worthy of economic development and institutional focus" (Paragraph A of § 2.2-2221.2). The outcomes the Roadmap is intended to achieve include to "identify the Commonwealth's key industry sectors in which investments in technology should be made" by the state (Paragraph A of § 2.2-2221.2). As such, the Roadmap is enacted to guide, if not dictate, the Commonwealth's investment in academic research.

Per statute, the Roadmap's key sectors/fields may include, but are not limited to, "energy, conservation, environment, microelectronics, robotics and unmanned vehicle systems, advanced shipbuilding, or lifespan biology and medicine" (Paragraph A of § 2.2-2221.2).

However, also by statutory requirement, much of the funding provided for academic research via state entities such as the Commonwealth Health Research Board (CHRB) and the Virginia Bioscience Health Research Corporation (VBHRC) is concentrated in medical/biomedical and bio/life science fields. Other state grantors may also award funds in these fields.

The VRIC has the responsibility to make awards from the Fund that support priority research areas. The VRIF legislation says that "[a]reas of focus for awards shall be those areas identified in the ... Roadmap, and shall include but not be limited to the biosciences, personalized medicine, cybersecurity, data analytics, and other areas designated in the general appropriation act" (Paragraph C of § 23.1-3131). While the four research areas identified in the VRIF statute also are encompassed in the Roadmap's current 11 research sectors/fields, the Roadmap may not reflect adequately Virginia's most-promising current and future research areas. The current R&T Strategic Roadmap is for FY2015.*

The Committee has an opportunity to address these research-area priorities in its advice to SCHEV on its development of VRIF policies. In so doing, the VRIC and the Council will need to decide whether to proceed with:

- (a) all or a subset of the four research areas identified in the VRIF statutes; or
- (b) both or either of the research disciplines identified by the Virginia Research Alliance; or
- (c) the 11 research sectors/fields identified in the most-recent R&T Strategic Roadmap; or
- (d) one or more areas to be identified through additional analyses of the Commonwealth's academic-research strengths, weaknesses and opportunities.

Bridge Gaps in Research and Commercialization Infrastructure and Expertise

Collaboration is a key expectation, requirement and outcome in the enacting VRIF statutes. For example:

- Of VRIF funds' five codified purposes, the final is to "encourage cooperation and *collaboration* among higher education research institutions, and with the private sector, in areas and with activities that foster economic development and job creation" (Paragraph C of § 23.1-3131).
- Of VRIF proposals' seven codified award criteria, the final is that the project must "promote *collaboration* among the public institutions of higher education" (Paragraph A of § 23.1-3133).
- The sole codified VRIF-recipient restriction is that awards must be made to "public institutions of higher education ... or *collaborations* between public institutions ... and private entities" (Paragraph B of § 23.1-3133).

* CIT staff informed the Committee at its December meeting that the Roadmap is being updated, with a target of completion in 2018. Research universities' chief research officers, presenting to the Committee in October as the Virginia Research Alliance, offered their conclusion that cybersecurity and neurobiology are the most-promising fields for state investment at this time. During both these meetings, Committee members expressed interest in additional analyses of Virginia's current and potential research strengths and opportunities to achieve competitive advantages and national leadership (Minutes of October 12 and December 5, 2016 meetings).

Through these emphases on collaboration, the VRIF statutes acknowledge that no single public or private entity possesses a monopoly on good research ideas, processes, personnel, equipment or facilities. Further, this enacting legislation recognizes that large-scale economic development and job creation require broad participation within both individual and different sectors.

The VRIF statutes' expectations and requirements of collaboration also are at least tacit acknowledgements that opportunities exist within higher education and between public higher education and the private sector, particularly in terms of opportunities to bridge gaps in expertise and/or infrastructure. As Committee members have suggested, addressing these opportunities will foster and increase the translation of research outcomes into more economically impactful products, companies and jobs.

Such interaction can bring valuable insights about commercialization to researchers and universities, and it can expose researchers, tech-transfer officers and universities that are already quite active in commercialization to different methods and strategies used by others with different strengths and foci. Such collaborations represent significant opportunities and potential benefits to the Commonwealth's academic-research enterprise and its economy.

The VRIF statutes also incite greater interaction between higher education and the private sector, which is the origin of most entrepreneurship, company formation and job creation. Examples of such interaction in recent years include:

- Some universities have moved in more corporate directions in such ways as hiring Entrepreneurs (or Executives) in Residence to further bridge the public/private, non-profit/for-profit and academic/corporate divides.
- Vendors have developed online tools to catalog and showcase existing expertise, equipment/technology and facilities within and across universities and states. These tools facilitate collaboration within academe and between higher education and the private sector by allowing users to search where, how and by whom specific types of research are being conducted.
- Some states (e.g., Maryland and Florida) have created new entities to coordinate and shepherd commercialization of academic research (see staff documents "State-Funded Research-Related Programs in Other States, Parts 1 and 2").

Any effort to ascertain where and to what extent gaps exist in our academic research and commercialization expertise and/or infrastructure would require considerable financial, human and time resources, but it could be beneficial as a long-term endeavor.

In the short term, the Committee has an opportunity to:

- (a) urge the public institutions of higher education to increase their communication and collaboration with one another, while also better documenting and communicating how they work together; and
- (b) advise SCHEV to construct VRIF application guidelines that encourage proposals that involve greater interaction between higher education and the private sector, such as recruitment of Entrepreneurs in Residence or the establishment and maintenance of a state-wide online tool/portal.

In the longer term, the Committee has an opportunity to gauge the interest of higher education, state government and the private sector regarding pursuit of more-formal strategies, such as a state-level research-commercialization entity.