Commonwealth Research Commercialization Fund

Advancing Technology and Economic Development in Virginia by Investing in Priority Research and Commercialization Activities

ANNUAL REPORT

July 1, 2012 – June 30, 2013

Submitted by the Fund Administrator:
Center for Innovative Technology
on behalf of the Innovation and Entrepreneurship Investment Authority

October 1, 2013

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Executive Summary

In accordance with Code of Virginia Sections 2.2-2233.1 G and 2.2-2221 (18), and on behalf of the Innovation and Entrepreneurship Investment Authority (IEIA), the Center for Innovative Technology (CIT) respectfully submits this report regarding the performance of the Commonwealth Research Commercialization Fund (CRCF) in FY2013. The CRCF accelerates innovation and company formation in the Commonwealth, while solving important state, national, and international problems through technology research, development, and commercialization.

During the 2012 session of the General Assembly, $4.8 million was appropriated to CRCF for FY2013 for the purpose of advancing science- and technology-based research, development, and commercialization to drive economic growth in Virginia. CIT issued one FY2013 solicitation resulting in 42 awarded projects[1]. These projects are performed by companies, universities, and research institutes across the state and advance technology commercialization aligned with Virginia's key strategic technology priorities as outlined in the Commonwealth Research and Technology Strategic Roadmap. CRCF leveraged the Commonwealth's $3 million investment with approximately $5.7 million in matching funds; FY2013 carryover funds were designated for a fall FY2014 solicitation.

CRCF awards are selected by the CIT Board of Directors following a multi-step review process that includes funding recommendations made by the Research and Technology Investment Advisory Committee (RTIAC). The RTIAC is a ten-member, legislation-appointed body comprised of representatives from higher education, economic development, research institutes, venture capital firms, and technology corporations. The RTIAC also supports the development of the Roadmap.

FY2013 CRCF awards, along with awards made in FY2012, tackle major challenges in sectors from life sciences to cyber security to advanced manufacturing, among others. For example, CRCF invested in projects developing groundbreaking diagnostics and treatment options for some of the deadliest and most challenging cancers, including brain cancer, pancreatic cancer, and renal cancer, and parasitic diseases that are pervasive and difficult to treat. The FY2013 solicitation resulted in several awards, focused on research to treat and prevent diabetes; according to a 2011 report released by the Virginia Department of Health, the prevalence of diabetes in Virginia has increased steadily between 1996 and 2009 and at present, 13.8% of adults in Virginia have either diagnosed or undiagnosed diabetes[2]. Cyber security, a growing threat in the Commonwealth and worldwide, is addressed through several CRCF projects developing solutions to prevent data breaches and hacking. The work the Commonwealth organizations are doing, with CRCF support, have the potential to have a profound and lasting benefit to society through job, intellectual property, and company creation in Virginia.

[1] 43 projects were selected for funding; one organization declined its award

[2] *Diabetes in Virginia: Diabetes Prevention and Control Project*. Virginia Department of Health. Updated 7/2011. http://www.vdh.virginia.gov/ofhs/prevention/diabetes/documents/2012/pdf/Diabetes%20Burden%20Report1.pdf

CIT tracks projects during and for five years after their period of performance, as economic and technological outcomes are often realized a few years or more after a project is completed. As initial CRCF awards were made in FY2012, most projects remain underway or were recently completed. However, examples of the Fund's effectiveness in contributing to the economic, technological, and well-being of the Commonwealth follow.

- CRCF funds helped Virginia-based organizations secure private and public funding. For example, as a result of their CRCF award, Parabon NanoLabs of Northern Virginia developed relationships with two large companies – Janssen Pharmaceuticals and Johnson & Johnson – for its work to treat brain tumors; as of this writing, Parabon NanoLabs and Janssen Pharmaceuticals are moving toward a formal co-development partnership. These relationships led to additional funding and studies by the National Institutes of Health (NIH) and the Nanotechnology Characterization Laboratory (NCL) and, in the case of NCL, Parabon was accepted into NCL's highly sought-after testing program. In December 2012, *Huffington Post* named Parabon's Essemblix "drag and drop" drug-making platform one of the seven best inventions of 2012. Similarly, the CRCF award to Phthisis Diagnostics, a small business in Charlottesville, was crucial to $260,000 in private investment.

- CIT supported Innovative Marine Products and Solutions (IMPS), a small Virginia start-up company associated with intellectual property developed at the Virginia Institute of Marine Science (VIMS), William & Mary's graduate school in marine science. IMPS' products, biodegradable panels for blue crab, stone crab, and lobster fishing pots, are designed to reduce "ghost" fishing, in which lost or abandoned pots capture animals and result in environmental losses, as well as depleted resources for commercial and recreational harvest. CRCF funding facilitated product development and production; IMPS' products are available for purchase through a web-based retail store, with wide distribution expected in the near future. Validating the importance of such work in marine products, Virginia Governor Bob McDonnell endorsed the use of biodegradable components in fishing gear in his June 2013 Proclamation "Marine Debris Reduction Month".

- AFrame Digital, Inc., a small company located in Reston, addresses the need for long-term care of the world's aging population and in 2013 was selected as the preferred patient telemonitoring solution for Virginia's hospitals and health systems by the Virginia Hospital and Healthcare Association (VHHA). AFrame Digital's two CRCF awards advanced its work to create mobile health monitoring devices that detect impacts from fall-related events, respond to panic button presses, quickly locate patients and/or residents, and discretely observe the wearer's health and habits over time. Ultimately, its system provides a "safety net" for seniors and other people managing chronic conditions as they go about their activities of daily living. AFrame Digital is the recipient of multiple industry awards, including the 2011 CTIA Emerging Technology Award for Health and Wellness Solutions (Enterprise Class) and the Northern Virginia Technology Council's 2012 Destination Innovation Award for Small Business.

- CRCF's investment in SpydrSafe Mobile Security, Inc. accelerated the McLean-headquartered small business' successful launch of products that prevent enterprise data loss due to the intentional or inadvertent misuse of mobile applications deployed on smartphones and tablets. Associated with the CRCF award, SpydrSafe launched two versions of its SpydrSafe Mobile Security application for iOS and released a data loss prevention and app control agent for Google's Android mobile device platform. . As the threat of cyber security breaches become a great concern to individuals and businesses, work of companies such as SpydrSafe are becoming increasingly crucial to the preservation and security of mobile data.

- CRCF funds helped bring leading researchers to the Commonwealth. With support from Virginia Tech's Eminent Researcher Recruitment award in fall 2011, the Virginia Tech Carilion Research Institute (VTCRI) successfully recruited Dr. Robert Gourdie, a top scholar in the U.S. in heart regeneration and wound healing research. Dr. Gourdie has a national reputation in cardiovascular and regenerative medicine research. Since arriving in Virginia, he has brought several million dollars in federal funding for research into the Commonwealth, recruited and employed eight additional researchers, and provided a promising opportunity to relocate at least one start-up company to Virginia.

- Commercializing products is a key goal of the CRCF program, and that of its predecessor, the Commonwealth Technology Research Fund (CTRF). A 2008 CTRF award recipient, SpermCheck®, a spinout company from the University of Virginia, received approval in 2013 from Health Canada for the over-the-counter sale of the first and only FDA-approved at-home sperm test, SpermCheck® Fertility. The product became readily available in U.S. pharmacies in 2012, following online sales at select pharmacies since late 2010. Approval from Health Canada was a crucial step in the Charlottesville, Virginia-based company's continued success. SpermCheck Fertility has also received European Union (EU) clearance and will be rolled out in more than 2000 Boots pharmacies in England on October 21, 2013.

The FY2013 solicitation included five programs: Commercialization, Facilities Enhancement Loan, Matching Funds, SBIR Matching Funds, and STTR Matching Funds. The FY2012 Budget Bill provided for an expenditure of up to $1.5 million for the two latter programs, combined. Per legislative direction, awards made for CRCF projects must support technology sectors identified in the Commonwealth Research and Technology Strategic Roadmap. The Roadmap, a comprehensive planning tool Virginia leaders use to help determine research areas worthy of economic development and institutional focus, identifies technology sectors with the most commercial promise and that will drive economic growth throughout the state. Technology sectors eligible for funding in FY2013 were program-specific; the Commercialization and SBIR and STTR Matching Funds Programs limited submissions to four high-priority sectors, while the Facilities Enhancement Loan and Matching Funds Programs were open to submissions in the 11 technology areas identified in the Roadmap as strategic opportunities for the Commonwealth.

In FY2013, 104 proposals were submitted from seven of the ten technology regions in the Commonwealth and in all 11 industry sectors identified in the Roadmap as priorities eligible for CRCF funding; this resulted in 42 funded projects representing six of the ten regions and ten[3] of the 11 industry sectors. Since the inception of the CRCF program in 2011 legislation, 285 eligible proposals were submitted from all of the Commonwealth's ten technology regions and from these submissions, 89 projects have been awarded CRCF funding. Funded projects cover all 11 technology sectors.

In addition to overseeing the FY2013 solicitation, CIT submitted the FY2012 Annual Report in October 2012. This report provided CRCF highlights, profiled FY2012 awarded projects, and discussed FY2013 plans. There are currently 11 FY2012 projects still underway. CIT also leverages its programs to facilitate company creation and growth. For example, CRCF applicants are among candidates for and recipients of CIT GAP Fund investments.

The Administration and General Assembly continue to support the CRCF, appropriating $4.8 million for the Fund for FY2014. Planning for the FY2014 opportunities began in late FY2013.

FY2013 Solicitation

The Commonwealth Research Commercialization Fund (CRCF) is tied to the Commonwealth Research and Technology Strategic Roadmap, a comprehensive strategic planning tool Virginia leaders use to identify key industry sectors with commercial promise and worthy of institutional focus and economic development for Virginia. The Roadmap is developed through a consultative process that includes the Commonwealth's private sector technology community, academia and other nonprofit research organizations, and economic development professionals. CRCF awards are only made to those projects that further the goals set forth in the Roadmap.

In relation to other CIT funding programs, CRCF is part of a pipeline, working closely with the Federal Funding Assistance Program (FFAP) and the GAP family of funds. CRCF also complements other funding programs in the Commonwealth, such as the Virginia Innovation Partnership (VIP), a statewide network designed to accelerate innovation and economic growth. Funding for this program was awarded to the University of Virginia as part of the 2012 U.S. Department of Commerce's i6 Challenge.

A snapshot follows of the five programs offered in FY2013.

- **Commercialization Program**
  This program targeted young companies with product(s) in the proof-of-concept phase. Firms eligible for this program were established on or after December 3, 2011, while eligible technologies were cyber security, information technology for K-16 education, life sciences, and modeling and simulation.

[3] Includes both primary and secondary industry sectors

- **Facilities Enhancement Loan Program**
  This program helps qualifying universities and political subdivisions establish and/or upgrade facilities used to commercialize qualified research or technologies, including those developed at the institutions and by Virginia's private sector.

- **Matching Funds Program**
  This program helps public and private colleges, universities, other research institutes, and federal labs in Virginia leverage federal and private funds designated for the commercialization of qualified research or technologies. These matching funds may advance research to readiness for intellectual property protection, private sector investment, and/or help to qualify institutions for funding competitions. Applicants could propose work in one or more of the eleven technology sections identified in the Roadmap as strategic priorities.

- **SBIR Matching Funds Program**
  This program helps advance technology commercialization by young Virginia-based technology businesses that had won a Phase I and/or Phase II Small Business Innovative Research (SBIR) award in any one of four technologies: cyber security, information technology for K-16 education, life sciences, or modeling and simulation. Firms eligible for Phase I matching awards had to be established no earlier than December 3, 2009, while firms eligible for Phase II matching awards had to be established no earlier than December 3, 2007.

- **STTR Matching Funds Program**
  This program helps advance technology commercialization by young Virginia-based technology businesses that had won a Phase I and/or Phase II Small Business Technology Transfer (STTR) award in any one of four technologies: cyber security, information technology for K-16 education, life sciences, or modeling and simulation. Firms eligible for Phase I matching awards had to be established no earlier than December 3, 2009, while firms eligible for Phase II matching awards had to be established no earlier than December 3, 2007.

In FY2013, 104 proposals were received for all five available CRCF programs, totaling $7.38 million. Submitted proposals represented seven of the Commonwealth's ten technology regions and covered nine of the 11 industry sectors identified in the Roadmap. Applications in FY2013 exhibited a strong emphasis on the area of life sciences. Forty percent of the proposals received were funded across four of the five programs during this solicitation; 43 awards were made, and 42 awardees accepted funding. Awarded projects represent six of the ten regions and seven primary industry sectors: advanced manufacturing, cyber security, energy, environment, life sciences, modeling and simulation, and transportation.

An overview of each project is provided in Appendix A.

Preparations for FY2014

The General Assembly and Administration appropriated $4.8 million to CRCF for FY2014 and CIT began planning for two solicitations.

In FY2014, several of the awards made in FY2012 will be a year or more beyond their project end-date. The Fund Administrator will report on projects for up to five years after their period of performance in order to capture commercialization results and economic outcomes, including job and company creation, and new revenues.

Administration

Administrative activities in FY2013 included managing the solicitation and the Research and Technology Investment Advisory Committee (RTIAC). Activities included developing guidelines for each of the five programs in consultation with the technology community and the Administration, outreach, and award management for projects funded in FY2012. Of the $4.8M appropriated for FY2013, CIT received $175,000 for Fund management.

As Fund Administrator and with the support of the RTIAC, CIT developed the approach for the FY2013 solicitation, including program guidelines, review processes, and use of an online grants management system, CyberGrants, to facilitate application submissions and reporting. Following reviews of Letters of Intent (LOIs), CIT led a multi-step proposal review process. CIT performed an internal compliance review to determine which applications advanced to a review by subject matter experts. These subject matter experts – individuals from industry, academia, and government – evaluated and rated proposals. Those that advanced were reviewed by the RTIAC. The RTIAC assessed projects and recommended to the CIT Board of Directors which should be funded. The CIT Board made final selection decisions, after which awards were announced.

CIT maintained information on the Fund, including solicitations and award announcements, on the CIT website. Press releases described the request for proposals and, subsequently, award recipients. Outreach and communications also included email announcements and speaking engagements. Outreach efforts were supplemented by the additional communication networks of Virginia's regional technology councils; individual colleges and universities, research organizations, and federal labs; the Virginia Biotechnology Association (VABio); the State Council of Higher Education for Virginia (SCHEV); the Virginia Economic Development Partnership (VEDP); and the Administration.

Also as Fund Administrator, CIT managed awards and produced the FY2012 Annual Report. This included assessing performance on an ongoing basis. Additionally, CIT provided support to external organizations, state agencies, and researchers from academia, industry, and other members of the technology community that desired information about the Fund and future solicitations. Lastly, throughout the year, CIT provided oversight to ensure compliance with the CRCF guidelines and other requirements.

APPENDIX A: FY2013 Solicitation Award Details

Lead Institution	Project Title	Project Description	Period of Performance	Principal Investigator	CRCF Award	Match
COMMERCIALIZATION PROGRAM						
CyberSheath Services International, LLC	*Cyber Security Health Assessment*	Design, test, market, and promote a method by which organizations can assess themselves against standards-based information security controls	6/4/2013 – 12/31/2013	Eric Noonan	$42,500	$103,000
CyberSheath Services International, LLC	*Data Breach Cost Quantification Model*	Design, test, market, and promote a method by which organizations can quantify impacts and costs associated with cyber theft	6/3/2013 – 11/8/2013	Eric Noonan	$42,500	$92,598
IgM Immunotherapy, LLC	*Naturally-Occurring Immunoglobulin M (IgM) Antibodies to Prevent Autoimmune Diabetes*	Use an innovative strategy based on harnessing the body's naturally-occurring autoantibodies, one of the body's natural defense mechanisms, from human plasma and inject them at a dose that permanently cures juvenile-onset type 1 diabetes	6/3/2013 – 6/2/2014	Kenneth Brayman	$50,000	$50,000
Leone Bioventures, LLC	*Development of an Agricultural Fungicide*	Demonstrate the large-scale production of a novel biofungicide that is patented and capable of killing many fungi, including the one that causes Black Sigatoka disease of banana, pineapple, mango, and other crops	6/3/2013 – 6/3/2014	Edward Goyette	$49,920	$49,920
Neoantigenics LLC	*Critical Characterization of Candidate Monoclonal Antibodies for Generating Cancer Therapeutics*	Characterize their anti-SAS1B mAbs along various biochemical and cell biological parameters, generating data that will enable an informed decision about which mAb to invest considerable time and funding into making a "humanized" monoclonal antibody, which is envisioned to have multiple therapeutic and imaging applications; SAS1B is broadly expressed in various human urogenital tumors including	7/1/2013 – 6/30/2014	Brian Pollock	$50,000	$105,654

		advanced ovarian cancer, invasive bladder cancer, and the major form of renal cancer				
Neoantigenics LLC	*Survey of Human Urogenital Tumors Expressing the SAS 1B Oocyte-Associated Cancer Biomarker*	Survey pathology-obtained biopsy samples representing a wide variety of urogenital tumors to determine the ability of each mAb to detect the SAS1B biomarker in the target cancers	6/15/2013 – 4/30/2014	Brian Pollock	$50,000	$96,602
				TOTAL COMMERCIALIZATION PROGRAM AWARDS:	**$284,920**	
MATCHING FUNDS PROGRAM						
Commonwealth Center for Advanced Manufacturing	*Abrasive Blasting - Understanding and Optimizing the Process*	Understand various abrasive blasting operations, including process control, surface evaluation, and advanced abrasive blast techniques at CCAM's member companies.	6/3/2013 – 6/2/2014	Matt Stremler	$100,000	$187,931
Eastern Virginia Medical School	*Pre-Clinical Development of New Characterized Compounds that Preserve Functional Beta Cell Mass in Diabetes*	Perform proof-of-principle studies in animal models of disease to attain supporting efficacy data and progress development of novel compounds that the team's research has shown effectively protect insulin-producing cells from damage and build on existing support data, obtained with these compounds, in the form of proof-of-principle studies in animal models of disease to evaluate the best compound combinations to establish disease reversal	6/3/2013 – 9/30/2014	David Taylor-Fishwick	$100,000	$100,368
Eastern Virginia Medical School	*Proton Therapy Simulation and Treatment Planning Algorithm Development*	Develop an improved light ion/proton treatment planning system that can incorporate appropriate biological weighting in order to provide a straightforward way to implement radiobiological effectiveness (RBE) parameters into planning algorithms by weighting RBE as a model function of the calculated linear energy transfer of the ion beam	6/3/2013 – 5/31/2014	Cynthia Keppel	$100,000	$101,655
George Mason	*Sequencing Instrumentation*	Purchase an Ion Torrent to increase	6/3/2013 –	Patrick Gillevet	$95,564	$95,564

University	*Support for the Commercialization of Diagnostics of Dysbiosis in Gastrointestinal and Liver Diseases*	sequencing throughput in support of clinical trials to aid work in diagnosis and therapeutics that rely on pyrosequencing efforts and systems biology analyses	5/31/2014			
Old Dominion University Research Foundation	*Advanced Nano-architecture for High Efficiency Energy Convergence Systems*	Develop a commercially viable defense array of 1D nanostructures, while offering an unprecedented degree of controllability capable of creating new optical, electrical, and mechanical properties associated with their low dimensionalities and quantum confinement effects	6/3/2013 – 6/2/2014	Helmut Baumgart	$100,000	$100,000
Old Dominion University Research Foundation	*Efficient Diesel Exhaust Remediation Using A Nonthermal Plasma Reactor*	Develop a device that can be placed within a combustion engine to reform diesel with a plasma treatment to allow fuel to burn more efficiently and create fewer pollutants, as well as to place the plasma reactor in line with the vehicle's system; these novel approaches for contaminant reduction use non-thermal plasma in steam that can oxidize toxic organize compounds more thoroughly and efficiently than conventional means	6/3/2013 – 6/2/2014	Richard Heller	$99,471	$99,704
Old Dominion University Research Foundation	*Reducing Energy Use and Emissions through Innovative Technologies and Community Designs: Methodology and Application in Virginia*	Quantify the impacts of growth and technology strategies at the regional level by using modeling, simulation, and visualization tools, with the overall goal of enhancing livability and sustainability by creating an M&S system capable of addressing interactions between land use, transportation, and emissions as the foundation for research on sustainable urban development strategies	6/3/2013 – 6/2/2014	Asad Khattak	$100,000	$100,000
Old Dominion University Research Foundation	*Smart Combiner for Residential Photovoltaic Systems*	Develop a smart combiner for 5-50 kW range systems to solve the problem of identifying and locating defective solar panels on roof-mounted systems and alerting the owner	6/3/2013 – 6/2/2014	Shirshak Dhali	$75,000	$109,744

Southeastern Universities Research Association	*Development of Method for Reduced Dose Breast Specific Gamma Imaging*	Improve the capabilities of a dedicated gamma camera system by achieving adequate high spatial resolution along with ultra-high sensitivity, and reduction in injected dose while still providing good image quality for effective tumor detection	6/17/2013 – 6/16/2014	Andrew Weisenberger	$98,325	$111,943
Southwest Virginia Higher Education Center Foundation d/b/a Clean Energy R&D Center	*Tazewell County Renewable Natural Gas*	Engage in early-stage research and technology commercialization for cost-effective purification of landfill gas in Virginia	6/3/2013 – 11/24/2013	Edwin Rogers	$100,000	$2,365,000
The Rector and Visitors of the University of Virginia	*Generation of T Regulatory Cells for Type I Diabetes*	Use a novel strategy to modify immune cells (T-cells) from the patient to be immune tolerant and to suppress abnormal immune reactivity against the patient's islet cells that produce insulin and glucagon to allow the regeneration of the patient's islet cells and return of normal levels of insulin and glucagon	6/3/2013 – 6/2/2014	Mary Laughlin	$100,000	$100,000
The Rector and Visitors of the University of Virginia	*Hacker-Proofing the Web*	Demonstrate the effectiveness of Program DNA Shotgun Sequencing at defending real-world web applications against SQL injection attacks	7/1/2013 – 2/28/2014	Jack Davidson	$36,500	$36,500
The Rector and Visitors of the University of Virginia	*Monoclonal Antibodies to Target Tumor Surface Metalloprotease*	Identify the regions (extodomains) of a metalloprotease enzyme that is exposed and accessible on the cell membranes of ovarian and uterine cancer cells	6/3/2013 – 6/2/2014	John Herr	$100,000	$100,000
The Rector and Visitors of the University of Virginia	*System-Aware Cyber Security Sentinel*	Utilize an SAIC-developed COTS programmable security product to develop a new prototype of a secure application appliance platform (System-Aware Sentinel) that will provide additional protection to mission critical systems for new forms of cyber attacks	6/5/2013 – 6/4/2014	Barry Horowitz	$100,000	$100,000
The Rector and Visitors of the University of	*Therapeutic Targeting of Glioblastoma Stem Cells with Cav3.2 Blockers*	Study the mechanisms of action of specific drugs, determine how they can be best used to complement existing glioblastoma	6/3/2013 – 6/2/2014	Roger Abounader	$100,0000	$125,785

Virginia		therapies, and uncover biomarkers that predict responsiveness to the drugs				
The Rector and Visitors of the University of Virginia	*Thermal transport across GaN interfaces: Linking structural imperfections to thermal properties*	Develop a robust understanding of the effects of roughness, dislocations, and structure on the thermal properties across Gallium Nitride (GaN)-based interfaces	8/1/2013 – 7/31/2014	Patrick Hopkins	$100,000	$103,476
Virginia Commonwealth University	*Developing New Products to Prevent Healthcare-Associated Infections*	Develop new products that prevent healthcare-associated infections; researchers have derived a novel plastic-coating from hospitals using USP-grade albumin and have shown that this plasticized coating is stable at biomaterial surfaces and are able to effectively prevent bacterial adhesion, colonization, and biofilm formation on the surfaces, therefore avoiding catheter or intubation-associated infections	7/1/2013 – 12/30/2014	Xuejun Wen	$100,000	$100,000
Virginia Commonwealth University	*A Minimally Invasive Treatment for Cerebral Palsy Using Engineered Hydrogels*	Develop a minimally invasive treatment based on a novel injectable material developed by the researchers to stimulate the body's self repair ability for brain regeneration and the treatment of cerebral palsy	6/15/2013 – 12/14/2014	Ning Zhang	$100,000	$100,000
Virginia Polytechnic Institute and State University	*High Frequency Irreversible Electroporation for Lung Cancer and Other Endoscopic Ablation Applications*	Develop electronics and hardware necessary to deliver high frequency irreversible electroporation (H-FIRE) treatments through a bronchoscope to treat tumors seated deep within the lung, on, potentially, an out-patient basis	6/3/2013 – 6/2/2014	Rafael Davalos	$100,000	$100,000
Virginia Polytechnic Institute and State University	*Use of Electric Fields for the Isolation of Tumor Initiating Cells and Other Rare Cells*	Develop an automated system to "trap" certain cells in an electric field for culture and analysis suitable for use in a typical biology or clinical laboratory	6/3/2013 – 6/2/2014	Rafael Davalos	$100,000	$100,000
				TOTAL MATCHING FUNDS PROGRAM AWARDS:	**$1,904,770**	
SBIR MATCHING FUNDS PROGRAM						
algorithmRx LLC	*Computer Assisted Clinical Decision Support Tool for*	Support an SBIR project focused on developing a definitive clinical support tool	6/3/2013 – 12/2/2013	Steve Hutcherson	$50,000	$199,723

	Management of Statins	for clinicians to select the right statin in the right dosage for every patient to determine hypercholesterolemia				
Bear Technologies, LLC	*Design and Modeling of a Revolutionary Commercial High Torque Motor*	Scale design, model, and simulate versions of an SBIR Phase II motor design for a particular market segment through modeling and optimization of the motor's commercial development	7/1/2013 – 4/30/2014	Tom Myrick	$50,000	N/A
Ceres Nanosciences, Inc.	*Nanotrap - Enabled Biofluid Collection and Preservation Toolset*	Support an existing SBIR Phase II project to extend efforts to include verification students that demonstrate preservation and enrichment of a class of clinically relevant biomarkers previously identified through collaborative efforts with global pharmaceutical and life sciences industry partners	7/1/2013 – 6/30/2014	Ben Lepene	$50,000	N/A
ClearEdge3D, Inc.	*Novel Algorithms for Automated 3D Building Models and 3D Street Maps*	Develop a new software application which will automatically create full, detailed 3D building and terrain models from vehicle-mounted LIDAR sensor data for military planners, DHS logistics staff, and first responders	7/1/2013 – 6/30/2014	Christopher Scotton	$49,965	$49,965
Designed Material Technologies LLC*	*Modeling Growth of Crystalline Oxides on Silicon for High-K and Ferroelectric Applications*	Supplement an SBIR award applied for in December 2012 to develop an enabling technology for the growth of novel crystalline oxide materials on the silicon surface (the company declined its CRCF award after not securing the SBIR Phase I award from NSF)	7/1/2013 – 1/1/2014	Christopher Ashman	($49,973)	N/A
HemoShear, LLC	*Creating a Predictive Vascular System for Early Development*	Support an existing SBIR award from NHLBI to validate the organization's patented predictive technology that replicates human blood vessel systems and disease biology by applying human-derived blood-flow shear stress forces to primary human vascular cells in the laboratory; test over	8/26/2013 – 11/1/2013	Brian Wamhoff	$50,000	$58,069

		100 known drugs in the HemoShear system to demonstrate that test results correlate with known clinical observations of these drugs and develop an extensive database of vascular gene profiles used to compare with new drug compounds early in the R&D process to de-risk selection of compounds most likely to succeed in humans				
HemoShear, LLC	*Development of a Human Hepatocyte Predictive Pharmacology and Toxicology System*	Support a newly submitted SBIR Phase II to screen over 40 known drugs in the HemoShear liver system in order to validate the system in the eyes of customers and create a gene database with which to compare future drug candidates in order to select those candidates that are most likely to succeed in humans	10/1/2013 – 12/31/2013	Brian Wamhoff	$49,996	$90,316
iTi Health, Inc.	*Development of a Targeted Therapy for Pancreatic Cancer*	Develop a tumor-marker-targeted nanoparticle-based platform technology that is capable of being loaded with efficacious chemotherapies and can hone directly to pancreatic tumors and minimize toxicity to patients	6/3/2013 – 6/3/2014	Greg Fralish	$50,000	$301,341
Parabon NanoLabs, Inc.	*A Nano Pharmaceutical Platform for Creating Artificial Vaccines*	Support an existing SBIR Phase I award from the Office of the Secretary of Defense to demonstrate the feasibility of extending its Essemblix Drug Development Platform to produce Essemblix-V, a platform for creating synthetic vaccines from DNA nanostructures in order to eliminate biocontamination risk and dramatically reduce vaccine maintenance cost	6/3/2013 – 12/3/2013	Steven Armentrout	$50,000	N/A
Power Fingerprinting, Inc.	*Active Software Defense to Reduce Threat Capability Effectiveness*	Support an existing SBIR Phase I project to demonstrate the feasibility of creating an active defense solution based on power fingerprinting for embedded system applications	6/3/2013 – 12/2/2013	Carlos Aguayo Gonzalez	$50,000	N/A
RetiVue	*Atlas - A Handheld High Resolution Wide-field*	Develop the Atlas, a low-cost, high-resolution handheld device capable of	6/3/2013 – 5/31/2014	Paul Yates	$50,000	N/A

	Retinal Imager	wide-field imaging of the retina for easy diagnosis and screening for retinopathy of prematurity eye disease				
Rivanna Medical	*Three-Dimensional Ultrasound for Neuroaxial Anesthesia Guidance*	Support an NIH SBIR Phase I award on the development and feasibility testing of a low-cost, handheld medical device for neuroaxial anesthesia guidance in the obese	7/1/2013 – 12/31/2013	Frank Mauldin	$50,000	N/A
Rivanna Medical	*X-ray replacement for bone imaging with a portable ultrasound device*	Support an NSF SBIR Phase I project that addresses the clinical and market need for an X-ray replacement technology that is portable, low-cost, and safe by designing, fabricating, and testing an ultrasound transducer exhibiting superior mitigation of artifacts compared to a standard linear array transducer; demonstrate a handheld ultrasound imaging system with integrated position sensing enabling free-hand in vitro 3D bone image reconstructions; and demonstrate free-hand 3D bone image reconstructions in an ex vivo porcine lumbar spine model and compare with CT	7/1/2013 – 12/31/2013	Frank Mauldin	$50,000	N/A
S34A, Inc.	*Forensic Analysis of Solid State Drives*	Continue the research initiated by a DHS SBIR Phase I award to provide federal, state, and local investigators with the capability to conduct forensic analysis of solid state storage devices, as well as establish technology partnerships with key solid state drive manufacturers; the project will also lay the technical groundwork for developing hardware and software solutions in an SBIR Phase II	6/3/2013 – 8/31/2013	Hank Wallace	$30,000	N/A
Serpin Pharma, LLC	*Efficacy testing of SP16 in NOD mice*	Test a new peptide drug for treatment of type 1 diabetes in a mouse model of diabetes.	6/3/2013 – 12/3/2013	Soren Mogelsvang	$50,000	$150,000
SphynKx Therapeutics LLC	*Evaluation of Sphingosine Kinase Inhibitors for the Treatment of Chronic*	Prove the concept that the organization's recently optimized SphK inhibitors can be used to slow or halt the progression of	6/3/2013 – 10/31/2013	Kevin Lynch	$50,000	N/A

	Kidney Disease	kidney fibrosis by evaluating the compounds in two animal models of kidney fibrosis at U.Va. to set the stage for further development of the compounds for the treatment of chronic kidney disease				
				TOTAL SBIR MATCHING FUNDS PROGRAM AWARDS:	**$729,961**	
STTR MATCHING FUNDS PROGRAM						
Power Fingerprinting, Inc.	*Security for Wireless Devices: Security Monitoring and Intrusion Detection in SDR and CR Using Power Fingerprinting*	Develop an innovative mechanism to protect wireless devices based on software-defined radio (SDR) and cognitive radio (CR) and prevent their enhanced spectrum access capabilities from being used for malicious purposes or from increasing interference risks as a result of malicious attacks; power fingerprinting is a novel approach for integrity assessment that uses fine-grained side-channel information (power consumption) to detect security breaches in SDR/CR platforms	6/3/2013 – 12/2/2013	Carlos Aguayo Gonzalez	$50,000	N/A
				TOTAL STTR MATCHING FUNDS PROGRAM AWARDS:	**$50,000**	
				TOTAL CRCF FY2013 AWARDS:	**$2,969,651**	

* This FY2013 awards was declined; award amount not included in totals

FY2013 Funding Totals

PROGRAM	FY2013 TOTAL
Commercialization Program	$284,920
Facilities Enhancement Loan Program	$0
Matching Funds Program	$1,904,770
SBIR Matching Funds Program	$729,961
STTR Matching Funds Program	$50,000
ALL PROGRAMS	$2,969,651

APPENDIX B: RTIAC Members

The following individuals were members of the Research and Technology Investment Advisory Committee (RTIAC), the group responsible for making award recommendations to the CIT Board of Directors, in FY2013.

- **Martin Briley**, President and CEO, Virginia Economic Development Partnership (VEDP)
- **Daniel Gonzalez**, Principal, Avison Young
- **Robert Kahn**, Chairman, CEO & President, Corporation for National Research Initiatives (CNRI)
- **Mohammad Karim**, Vice President for Research, Old Dominion University (ODU)
- **Thomas Kirchmaier**, Division Senior Vice President and General Manager, Intelligence Solutions, General Dynamics Information Technology (GDIT)
- **Dennis Manos**, Vice Provost for Research and Graduate Professional Studies, College of William and Mary
- **Kenneth Newbold**, Vice Provost for Research and Public Service, James Madison University (JMU)
- **Robert Patzig**, Senior Managing Director and CIO, Third Security
- **Matthew Zingraff***, Vice President for Research, George Mason University (GMU)

* Dr. Zingraff replaced Dr. Thomas Skalak, U.Va.'s representative, in January 2013, following the appointment of Dr. Teresa Sullivan of U.Va. to the Boards of CIT and IEIA.