

THE COMMONWEALTH TECHNOLOGY RESEARCH FUND:

**ADVANCING TECHNOLOGY AND ECONOMIC DEVELOPMENT IN
VIRGINIA BY INVESTING IN HIGHER EDUCATION RESEARCH**



**ANNUAL REPORT
JULY 1, 2003 – JUNE 30, 2004**

**Submitted by the Fund Administrator:
Virginia's Center for Innovative Technology
The Commonwealth of Virginia Innovative Technology Authority
November 2004**

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EXECUTIVE SUMMARY

Per §2.2-2233.1.E of Title 22, Chapter 22, Article 3 of the Code of Virginia, annual reports are now being submitted in lieu of the quarterly reports initially required. This report covers the fiscal year of July 1, 2003 through June 30, 2004, although it should be noted that the periods of performance for the grants provided under the CTRF are not all on this same schedule.

A total of 12 grants were made: seven in July 2001, four in January 2002, and one in January 2003 for a total of \$24,574,630. Implementation costs (including honoraria for peer reviews) amounted to \$45,992, for a grand total of \$24,620,622 in expenses under this program. Of the 12 grants, three were completed within this report period: *Development of the VMASC Battle Lab Facility* (ODU); *Gilmer Hall Laboratory Renovations* (UVA); and the *Virginia Bioinformatics Consortium* (UVA). One final report has been received and the other two are pending. The remaining 9 projects are still underway, with ending dates between November 2004 and May 2006.

All grantees have been required to submit annual progress reports; however, they come in at various times of the year in accordance with the period of performance for each grant. In general, the following items have been achieved:

- Recruiting and hiring top candidates in various technology fields, including post-doctoral fellows, promising junior faculty and senior faculty who bring strong reputations and the ability to secure major federally-funded research.
- Leveraging of federal funding, including a \$5M, 5-year commitment for the Multidisciplinary University Research Initiative (MURI) at UVA and a \$6.5M appropriation for the Commonwealth Information Security Center.
- Relocation of a leading bioinformatics company to Virginia – Incogen invested \$2.4 million to relocate from South Carolina as a result of the College of William and Mary Industry Inducement Award.
- Establishment of strategic partnerships with businesses and other organizations to advance Virginia's leadership in technology research, such as the partnership between VCU, GMU, and INOVA that is working on cancer genomics and related diagnostic tools and therapies.
- Renovation and upgrading of research facilities at UVA's Gilmer Hall and the Virginia Modeling and Simulation Center at ODU.
- Acquisition of major scientific equipment enabling grantees to enhance their research programs and attract additional funding as well as new research staff.

BACKGROUND

The Commonwealth Technology Research Fund (CTRF) was created in the 2000 Session of the General Assembly to leverage federal and private investment in research at Virginia's public universities. The ultimate goal of this investment is to increase technological and economic development in Virginia. The Fund has three components:

- **Strategic Academic Enhancement Program:** This component is based on the evidence that top-ranked departments are disproportionately successful in attracting external research funds. In other words, past success and the reputation it garners for a department breeds future success in attracting external research funds. This program provides funds to help strong departments in Virginia's universities to become world-class research organizations. Funding under the strategic academic enhancement program is typically for recruitment packages for new faculty, purchase of specialized equipment, renovation of laboratories, funding for graduate research assistants, and similar activities.
- **Matching Funds Program:** Under this component, universities apply to the CTRF for matches to federal or private grant proposals they are preparing to submit. These matching funds not only help to qualify institutions for grant competitions; they also reflect on the state's and the institution's commitment to the project and influence decision-makers regarding the feasibility of the proposed research.
- **Industry Inducement Program:** This component helps universities upgrade research capacity in key departments in order to attract specific companies to locate or expand in Virginia.

Awards were to be considered for work in the following disciplines:

- Information technology and communications
- Biotechnology and bioinformatics
- Advanced materials and nanotechnology
- Advanced manufacturing and biomanufacturing
- Aerospace
- Energy
- Environmental technologies
- Transportation

The program was initiated in Fiscal Year 2002 with \$26M in funding, however, during the 2002 Session of the General Assembly (2002 amendments and 2002-2004 biennium) a decision was reached to discontinue funding the program as a part of statewide budget reductions. The Fund was reduced to cover expenditures and commitments already made up to that point (~\$24,620,600). A total of 12 projects were ultimately awarded grants – a summary of each appears in the next section and a detailed listing can be found on page 6.

The Fund was initially administered by the Department of Planning and Budget (DPB) with policy guidance provided by the Virginia Research and Technology Advisory Commission (VRTAC). In March 2003, the enabling legislation (§2.2-2515 of the Code of Virginia, Chapter 22, Article 3) was reenacted and amended to add a fourth component to support the efforts of the universities in commercializing technologies resulting from their research. At this time, administrative responsibility was also amended, naming the Innovative Technology Authority (ITA) in lieu of DPB, and the transition to ITA's operating arm, Virginia's Center for Innovative Technology, occurred at the end of June 2003. No new funds were appropriated though, therefore, this report covers activities related to the initial 12 grants only.

PROJECT SUMMARIES

Advancing Virginia's Information Security Expertise

Researchers at James Madison University, George Mason University, Hampton University, and Virginia Tech have established the Commonwealth Information Security Center (CISC), which addresses escalating attacks on computing systems. The universities have partnered with numerous large and small corporations as they've pursued the research and looked for commercial applications. CISC has also been successful in soliciting \$6.5M in Congressional funding to support its Critical Infrastructure Protection (CIP) program.

Cancer Genomics and Development of Diagnostic Tools and Therapies

Virginia Commonwealth University, George Mason University, and Inova Health Systems have joined together to explore the role genes play in cancer. The research will help develop more cost-effective means of diagnosing and treating cancer. Researchers will apply emerging technology to the health care field, and will work closely with technological companies in the Commonwealth.

Enhancing Virginia's Research Infrastructure for High Performance Manufacturing

Researchers at Virginia Tech, James Madison University, and the College of William and Mary have partnered with manufacturing firms to establish the Center for high Performance Manufacturing. This project will position Virginia as a leader in manufacturing research and education. The universities have further partnered with dozens of manufacturing firms and organizations across the nation for this project.

Collaborative Research in Bioinformatics

The Virginia Tech Department of Computer Science and the Virginia Bioinformatics Institute have forged a partnership, creating the infrastructure for world-class research, graduate education, and economic development in bioinformatics. This project uses bioinformatics to study stress in plants.

Development of the VMASC Battle Lab Facility

Researchers at Old Dominion University's Virginia Modeling, Analysis and Simulation Center (VMASC) have augmented their programs through better and more modern infrastructure improvements – allowing the conduct of world-class research, graduate education and economic development in this field – the results of which have both military and commercial applications.

Mucosal Therapy of Infectious & Autoimmune Diseases

Researchers at the University of Virginia, Virginia Commonwealth University and Virginia Tech have partnered with the biotechnology companies CropTech and TechLab to develop mucosal therapeutics through biotechnology. VCU will apply genomics and informatics technology to discover potential targets for immunotherapy or chemotherapy. UVA will study the mechanisms of regulation of mucosal immune responses. VT will develop edible plant vaccines and mucosal delivery systems. By bringing their unique strengths to the project, the three universities will establish a world-class resource for the development of pharmaceuticals.

Governor's Blue Ribbon Commission for a Review of Virginia's Research and Graduate Programs

Virginia Tech coordinated the commissioning of a panel of nationally recognized experts to examine the strengths and weaknesses of Virginia's nationally ranked research and graduate programs. This effort involved all the research universities in a significant effort to catalogue and evaluate programs, creating a basis for future investments. The Commission completed the majority of its work in the fall of 2003, but requested that the grant be held open until 2005 in order to conduct additional analyses with remaining funds.

The Development of an Environmentally Compliant, Multi-functional Coating for Aerospace Applications Using Molecular and Non-Engineering Methods

The University of Virginia, joined by researchers at Ohio State University, the University of Cincinnati, the University of New Mexico, Arizona State University, and the US Naval Academy, applied for and won a \$5M, five-year grant from NSF for a Multidisciplinary University Research Initiative (MURI). The \$728,000 CTRF Matching Funds grant was instrumental in obtaining this award – which will run through May 2006.

Gilmer Hall Laboratory Renovations: Cell and Molecular Biology Labs

The University of Virginia secured a federal grant (\$2M) for renovation of a portion of Gilmer Hall to provide laboratories for research in cell and molecular biology. The new research groups occupying the space complement existing strengths in the areas of morphogenesis, cellular motility, and differentiation and also relate to areas of strength in the School of Medicine. As with the MURI, this federal grant would not have happened without the CTRF Matching Funds Award (\$1M). The renovations were completed in December 2003.

Center for In-vivo Hyperpolarized Gas MR Imaging

With the CTRF grant, researchers at the University of Virginia were able to continue their investigations into the possible uses of hyperpolarized Helium-3 and Xenon-129 in medical imaging. These pharmaceuticals show great promise for improved imaging of lung diseases including asthma, emphysema, and cystic fibrosis. UVA has forged a partnership with Nycomed Amersham, as world leader in in-vivo diagnostic imaging to explore the possibilities these pharmaceuticals possess.

Virginia Bioinformatics Consortium (VBC)

Researchers at George Mason University, the University of Virginia, Virginia Commonwealth University and Virginia Tech have engaged in groundbreaking developments in the field of bioinformatics. This project has included negotiating standards for data management; developing shared data analysis resources; scaling up laboratory facilities at each university, and conducting collaborative research projects. The VBC has created a venue for Virginia universities to work together on state-of-the-art research and allow individual members of the group to maximize research capabilities at their respective institutions.

Bringing the Future of Bioinformatics to Virginia

The Institute for Computational Genomics, Inc. (INCOGEN) moved its facilities to Williamsburg, VA from South Carolina in order to collaborate with the College of William and Mary and the Virginia Bioinformatics Institute at Virginia Tech (VBI) in the creation of a

cooperative bioinformatics program. New courses have been created in the past two years and INCOGEN now also collaborates with Eastern Virginia Medical School and the James Madison University Governor's School for Science and Technology.

ACTIVITIES TO DATE

Administratively, activities in FY 2004 revolved around transitioning the management of the Fund from DPB to CIT. This included rolling over unused funds from FY 2003 to FY 2004, releasing the final year of funding when appropriate for those projects with FY 2004 funding commitments, processing no-cost extensions in those instances where the work could not be completed in the originally proposed period of time, and following up with the Principle Investigators with respect to progress and final reports. It should be noted that all project schedules were impacted in FY 2003 when only a portion of that year's funds were released initially. This was the timeframe during which the Commonwealth was undergoing budget reductions, and half the funding for that year was withheld until the state's financial position was better known. Ultimately, all funds were released, but it had the impact of delaying work for several months.

Copies of recent progress reports for each project are on file with the Fund administrator (CIT) and can be made available upon request. A full accounting of the impact of the Commonwealth's investment will be presented in a final report, once all projects have been completed.

TABLE OF GRANTS

Award No.	Current Period of Performance	Principal Investigator	Lead Institution	Title	Total CTRF Award	University Match	Federal Funds	Other Match	Total Proposed Match
Strategic Enhancement Program									
SE2002-01	7/1/2001 - 6/30/2005	Noftsinger	JMU	<i>Advancing Virginia's Information Security Expertise</i>	\$4,092,769	\$2,770,554	N/A	\$2,554,961	\$5,325,515
SE2002-02	7/1/2001 - 12/31/2004	Torr	VCU	<i>Cancer Genomics and Development of Diagnostic Tools</i>	\$3,000,000	\$3,000,000	N/A		\$3,000,000
SE2002-03	7/1/2001 - 6/30/2005	Chen	VT	<i>Enhancing Virginia's Research Infrastructure for High Performance Manufacturing</i>	\$4,339,577	\$4,614,107	N/A	\$500,000	\$5,114,107
SE2002-04	7/1/2001 - 6/30/2005	Kafura	VT	<i>Collaborative Research in Bioinformatics</i>	\$2,500,201	\$2,814,229	N/A	\$1,262,486	\$4,076,715
SE2002-05	1/1/2002 - 10/31/2003	Mielke	ODU	<i>Development of the VMASC Battle Lab Facility</i>	\$452,199	\$452,199	N/A		\$452,199
SE2002-06	11/1/2001 - 12/31/2005	Petri	UVA	<i>Mucosal Therapy of Infectious and Autoimmune Diseases</i>	\$1,800,000	\$1,800,000	N/A		\$1,800,000
SE2003-01	7/1/2002 - 6/30/2005	Steger	VT	<i>Governor's Blue Ribbon Commission</i>	\$100,000		N/A		\$0
Matching Funds Program									
MF2002-01	7/1/2002 - 5-15-2006	Scully	UVA	<i>The Development of an Environmentally Compliant, Multi-functional Coating for Aerospace Application Using Molecular- and Nano-Engineering Methods</i>	\$728,000	\$728,000	\$5,500,000		\$6,228,000
MF2003-01	1/1/2002 - 12/31/2003	Sundberg	UVA	<i>Gilmer Hall laboratory renovations: cell and molecular biology laboratories</i>	\$1,000,000	\$1,000,000	\$2,000,000		\$3,000,000
Industry Inducement Program									
IN2002-01	7/1/2001 - 6/30/05	Brookeman	UVA	<i>Center for In-Vivo Hyperpolarized Gas MR Imaging</i>	\$1,809,983	\$1,945,670	N/A		\$1,945,670
IN2002-02	7/1/2002 - 6/30/2004	Plank	UVA	<i>Virginia Bioinformatics Consortium</i>	\$1,500,000	\$1,580,404	N/A		\$1,580,404
IN2002-03	11/1/2001 - 10/31/2004	Manos	W&M	<i>Bringing the Future of Bioinformatics to Virginia</i>	\$1,087,196	\$1,038,171	N/A	\$2,663,730	\$3,701,901