FY 2013 ICTAS Request for Seed Proposals
(Seed-RFP)

ICTAS is soliciting a white paper submission from Virginia Tech faculty for two funding opportunities with anticipated support beginning July 1st, 2013 (FY 2014). White paper submissions will be considered for an invitation to submit a full proposal. If selected, a 5-page proposal will be requested for panel review and subsequent consideration for funding. ICTAS has approximately $2.2M available for funding projects for FY 14 (This figure includes award of second year projects). New for this year: Limit of one white paper submission per PI in each of the two funding categories.

1) Junior Faculty Collaborative (JFC) Proposals
Responses in this category will demonstrate an interdisciplinary, collaborative research relationship between tenure-track junior (non-tenured) and senior (tenured) faculty members. Proposal topics must be aligned with one or more of the ICTAS research thrust areas. (For more information regarding the strategic initiatives of ICTAS, please refer to http://www.ictas.vt.edu/index.html). Awards in this category are limited to two years, and are not expected to exceed $60K/year. In addition, a minimum of 75% of the requested support must be designated for use by the junior faculty member.

Project duration: 1-2 years. (Funding in the second year is contingent on demonstration of Satisfactory technical performance and scholarship, and available resources).

2) ICTAS BAA Proposals
ICTAS is seeking interdisciplinary, High Risk / High Impact research efforts capable of promoting significant growth for the university and ICTAS. All technical thrust areas will be considered for this seed funding, including emerging technologies that are not currently addressed under the umbrella of ICTAS. Responses in this category will directly address how the proposed effort is unique and capable of establishing or transforming a field of science and technology research. This program is intended for the support of new, transformative ideas, as opposed to further development of ongoing research projects. This year, we have developed eight BAA topics in which we have particular interest (The ICTAS BAA is a targeted program modeled after the federal Broad Agency Announcement opportunities). These are attached at the conclusion of this call. We selected these topics with the objective of building our capacity in areas that offer unique potential to improve our position in one or more of our research thrusts. While we encourage submissions in line with these targeted BAA topics, we recognize that there are likely other outstanding ideas outside of these BAA topics that are worthy of support. Thus, proposals in all areas of research that fit the mission of ICTAS will be considered. Awards in this category are limited to two years; awards are anticipated to range between $75K and $150K per year depending on the quality of the submission. Please note that these BAA topics
effectively replace the TSTS program as a means to target research programs that are more closely aligned with the strategic missions of our existing thrust areas and federal investment priorities. The topics are intended to complement proposal requests issued through our annual thrust RFP.

- White paper pre-proposals must be submitted using the online ICTAS Proposal and Reporting Portal and are due November 19, 2012 (5pm). The portal (ICTASPA) may be found at https://ictaspa.stl.vt.edu/pages/login.php.
- All awards are subject to continuing availability of funds.

Questions/advice/courtesy reviews? Please Contact:

**GENERAL QUESTIONS:** Robert B. Moore, 540-231-6015, rbmoore3@vt.edu

**NANOSCALE SCIENCE AND ENGINEERING:** Matt Hull, (540) 231-5812, mahull@vt.edu

**NANO-BIO INTERFACE:** Matt Hull, (540) 231-5812, mahull@vt.edu

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**EMERGING TECHNOLOGIES:** Jeff Beeby, (540) 231-2569, usnbb@vt.edu

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**Expected Timeline for the FY 2013 Seed-RFP Program**

**White Paper Submission Deadline:** November 19, 2012 at 5 p.m.

**Notification of Invitation for Full Proposal:** December 7, 2012

**Invited Proposal Deadline:** January 7, 2013 at 5 p.m.

**Panel Reviews:** January 21 – February 1, 2013

**Award Announcement:** February 22, 2013

**Awards effective:** July 1, 2013
FY 2013 Seed-RFP Review Process

White papers will be sorted by ICTAS Thrust Area (as designated by the PI on the ICTASPA whitepaper submission cover page...if more than one thrust is selected, all associated thrust areas will review). The white paper review will be a Blind Review (PI and co-PI names will be removed from the cover pages prior to distribution to the reviewers). White papers will be reviewed by ICTAS thrust leaders, program managers, and research faculty (see: http://www.ictas.vt.edu/research/index.html) with attention to the following criteria:

- Clear association with one or more ICTAS research thrust
- Interdisciplinarity (collaboration between diverse disciplines) is strongly encouraged
- Cutting edge science and technology
- Transformational potential
- Contribution to sustainability (in particular, proposals that seek to use existing space, facilities and processes at Virginia Tech as the test bed for sustainable solutions will be well received)

Each white paper reviewer will submit a rank order of the pre-proposals to the ICTAS AD of Research and Scholarship for consideration of invitation for full proposal.

Full proposals will be grouped into topical areas for review by panels of experts (at least 5 reviewers per panel). Panels will include members of the ICTAS Faculty Advisory Board and other senior faculty of Virginia Tech. Panel reviews will pay attention to the same criteria as stated above for the white papers with the addition of the following criteria:

- Results and impact of previous ICTAS seed funding (if relevant)
- Reasonable link between requested funds (budget details) and proposed outcome
- For JFC proposals, the specific role of the senior faculty mentor must be clearly defined
- Probability and impact of success
- Panel review process will emulate the standard NSF style with rankings of Excellent, Very Good, Good, Fair, and Poor
- Rankings will be tabulated for each panel for consideration and recommendation for funding by the ICTAS AD for Research and Scholarship

Programmatic Considerations for ICTAS Seed Funding

- Funds for faculty salary are not eligible for ICTAS Seed funding, and must not be included in the proposed budget.
- All funds should be budgeted as direct costs (Overhead – indirect costs – are not accepted for ICTAS Seed funding).
ICTAS BAA TOPICS

The following topics are of particular interest to the leadership of ICTAS and are targeted for the ICTAS BAA awards. Please note that, due to limited resources, we do not expect to fund all eight BAA topics in FY 2014.

We recognize that faculty may conceive transformative ideas beyond the specific topic areas defined here; therefore, any topic that fits within the mission of our ICTAS thrusts, is interdisciplinary, represents the cutting edge, is not already supported through existing thrust and center research, and has the potential for transformational contributions (especially with respect to sustainability) should be submitted and will be given due consideration.

For both the white papers and the full proposals, please indicate on the cover page, the BAA topic number addressed by your proposed project.

I. Exploring the Nexus of Computation and the Brain.

The human brain remains the most capable computer on the planet...for some applications. We also see applications where the brain is woefully slow or biased. Likewise, today’s computational tools provide an incredible ability to perform some operations, but are extremely limited in others. How do we fully exploit the power of the human mind and the computer? We seek a BROAD DIVERSITY OF DISCIPLINES in this effort as we see elements of discovery analytics, psychology, human computer interaction, cognition, sociology, wireless communications, neurology, anthropology, artificial intelligence, control theory and a host of other disciplines and specialties providing critical input into the broader investigation.

II. Science-Based Risk Minimization and Policy Development.

The intent of this topic is to promote more participation of scientists and engineers in risk management and policy development. The topic explicitly targets the interface of the hard and social sciences and includes individual and societal risk perception. Potential topics include: (a) Managing risk and certification policy for autonomous vehicles operating together or with manned vehicles (for example, how would one certify a UAV is “safe” to fly in airspace with manned aircraft or an autonomous vehicle is safe to operate on public roadways); (b) Environmental nanotechnology policy; (c) Biosafety risk analysis; (d) Bio-threat risk analysis, (e) Energy policy; (f) Terrorist threat assessment.

III. Sustainable Communities.

From our coal-fired power plant, to our water purification and sewage systems, to our often congested roadways, how can we take advantage of the many research strengths at VT to make not only our campus, but communities, both local and world-wide, more sustainable? Inspiring communities to be wholly committed to sustainability requires a cohesive strategy merging large scale solutions for energy production and transportation with smaller scale ideas in architecture,
informing consumers, and community action. We encourage multi-disciplinary proposals looking to improve both new and existing infrastructure. Examples could include, but are not limited to: (a) Energy Generation and Transmission; (b) Improving energy efficiency of new and/or existing residential and commercial buildings; (c) Cultivating sustainable transportation; (d) Sustainable Living; and (e) Impoverished and remote community resiliency.

IV. Sustainable Agriculture and Food Security.

By 2050, more than nine billion people are expected to inhabit the planet. Increasing population and adapting to climate change will place extraordinary demands on agriculture and the security of global food resources. The nexus of energy and water will strain the adequacy of global food and water supplies. In response, transformative technologies across the entire food supply chain to improve efficiency of agricultural practices and to ensure the safety of food supplies throughout their production, distribution, and storage. Responsive proposals should advance the science and engineering of sustainable agricultural and food security practices and lead to innovative, cost-effective solutions. Additionally, practices that will address the increasing scarcity of fresh water are critical to providing truly sustainable solutions. Sub-topic areas listed below are considered to be of particular interest, but proposals for relevant sub-topics not specifically identified here are also encouraged.

V. Materials by Design.

A secure, sustainable future requires innovative materials for energy generation and storage, medical devices, drug delivery, defense systems, and myriad other applications. Currently, the process of developing these materials and transitioning them for use in society can take 20 years or more. Aligned with the US Materials Genome Initiative, this topic requests proposals that integrate computational tools with fundamental chemistry and materials science and engineering to streamline the process of discovering and developing advanced materials for a sustainable future. Sub-topic areas including: (a) Materials for energy; (b) Materials for defense; (c) Materials for Health; and (d) Computational material design tools, are considered to be of particular importance, but proposals for relevant sub-topics not specifically identified here are also encouraged.

References:
3) DOE and Nanotechnology: http://science.energy.gov/bes/news-and-resources/presentations/nanotechnology-energizing-our-future/
5) Nanoinformatics Roadmap: http://eprints.internano.org/607/
VI. Intersections of Biology and Technology.

Steve Jobs noted, “The biggest innovations of the twenty-first century will be [at] the intersection of biology and technology”. Indeed, the convergence of fundamental biology with breakthroughs in nanoscale science and engineering, additive manufacturing, informatics, and engineered systems promises to wholly transform the way we manufacture devices, operate machines, treat disease, and meet many other critical societal needs. This topic requests proposals that bring together faculty teams at the intersections of biology and emerging technologies. Sub-topic areas including: (a) energy-efficient bio-inspired approaches to assemble or orient nanostructures that display novel and unexpected properties; (b) advancements in synthetic biology to develop biological processes that perform specific functions; and (c) bioinspired technologies for material or systems design, are considered to be of particular importance, but proposals for relevant sub-topics not specifically identified here are also encouraged. Applicants should contact the designated Program Manager to determine whether a specific sub-topic will be considered responsive.

References:
2) BIOFAB: International Open Facility Advancing Biotechnology (BIOFAB). www.biofab.org/

VII. Science to Society.

Across Virginia Tech, new discoveries in materials, medicine, energy, and the environment promise new solutions to society’s greatest challenges. ICTAS is committed to helping ‘invent the future’ by supporting transformative, interdisciplinary efforts that help bridge the gap between cutting-edge research discoveries and applications for unmet societal needs. We are particularly interested in proposals that link faculty researchers with experts in the fields of clinical medicine and industrial manufacturing. Sub-topic areas including (a) research that facilitates the translation of medical discoveries in the laboratory to clinical settings; and (b) sustainable, high-capacity manufacturing at the boundaries of conventional, additive, and nano-manufacturing, are considered to be of particular importance, but proposals for relevant sub-topics not specifically identified here are also encouraged. Applicants should contact the designated Program Manager to determine whether a specific sub-topic will be considered responsive.

References:
1) NIH Bedside-to-Bench Program: www.cc.nih.gov/ccc/btb/

VIII. A vibrant, continuous, sequentially and progressively oriented k-12 STEM Program

A vibrant, continuous, well thought out STEM program that encourages broad participation and enthusiasm similar to what we see in K-12 rec center/school sports programs is urgently needed. Even during times of economic uncertainty, there maintains an ever increasing demand for people in STEM fields – from technicians to engineers to academic researchers. Despite a handful of well-respected STEM outreach efforts, a cohesive, all-inclusive, sequentially progressive program has yet to pervade K-12 education to the same degree as other similar programs offered to youth. Compiling the lessons of successful, smaller scale programs and identifying potential collaborators, funding sources, and mentors are key to implementing a model that can be emulated across the country. A unique local opportunity exists with the opening of the brand new Blacksburg High School in Fall 2013. ICTAS seeks innovative interdisciplinary approaches that will permit unique and measurable contributions to the effort and not “just another STEM program.”