

**NSF EPSCoR RII – INTRA-CAMPUS CYBER CONNECTIVITY (RII C2)**

*SC EPSCoR/IDeA Solicitation Number: 09-101*

**Important Dates**

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**Release Date:** Friday, July 31, 2009

**Submission of Pre-Proposals:** 5:00 P.M. on Monday, August 31, 2009 in the South Carolina EPSCoR/IDeA Office

**Review by External Panel:** Friday, September 11, 2009

**Submission of Full Proposal:** 5:00 P.M. on Monday, October 5, 2009 in the South Carolina EPSCoR/IDeA Office

**Federal Submission:** Monday, November 2, 2009

**Anticipated Start Date:** Thursday, July 1, 2010

**Award Duration:** 12 to 24 months

**Program Information**

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This solicitation is open to all institutions of higher education in South Carolina. **This solicitation offers two separate opportunities: 1) a pre-proposal from a single institution may request up to a total of \$250,000 (direct plus indirect costs); or 2) a collaborative pre-proposal (two or more institutions) may request up to a total of \$750,000. Each institution is eligible to participate in only one (1) pre-proposal.**

The South Carolina EPSCoR/IDeA State Committee will be submitting a single, \$1 million proposal for the state in response to the NSF EPSCoR RII C2 solicitation (NSF 09-569). The NSF solicitation contains the following RII C2 program description:

*Broadband connectivity within and among campuses can advance jurisdictional progress toward broader research and educational engagement at the frontiers of discovery and innovation in science and engineering. Execution of well-articulated plans for the development, deployment, and improvement of broadband connectivity will foster collaboration, prompt innovation, broaden individual and institutional participation, strengthen e-learning, create jobs, develop the workforce, contribute to the economic development of jurisdictions, and help to facilitate participation in the computing based intellectual future.*

*Combined jurisdictional and EPSCoR investments have facilitated the development of cutting edge cyberinfrastructure in many of the jurisdictions' research intensive institutions. In these and other institutions within the jurisdictions, however, there remain significant gaps in cyber connectivity and broadband access. This is particularly true of less research intensive institutions, especially minority serving, two-year, four-year, and rural ones. RII C2 provides a unique opportunity for jurisdictions to address such issues and to provide community colleges and minority serving institutions with advanced connections to research and research-based education that will accelerate learning, discovery, and economic development in rural and underserved communities.*

*The primary drivers for RII C2 investments are broadband connectivity needs within and among academic campuses. World class science and engineering research, modern cyberinfrastructure, and innovative education in STEM disciplines that can be facilitated by enhanced broadband cyber connectivity are also important motivating elements. Such investments will facilitate discovery and innovation, and enable the development of a science and engineering workforce appropriate to the future of the jurisdiction and the nation. RII C2 investments are expected to result in measureable improvements in the individual and institutional diversity within the jurisdiction and ability to successfully pursue significant opportunities in science and engineering research, education, and workforce development. The RII C2 award is expected to add specific value to the jurisdiction's academic cyber and research infrastructure not generally available through other funding.*

*Awards made in response the RII C2 program will be funded under the American Recovery and Reinvestment Act of 2009 (ARRA). As such, awards will include special reporting requirements and other*

*non-standard terms and conditions. Unless otherwise specified, ARRA funding should be considered one-time funding.*

## **Pre-Proposal Guidelines**

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The SC EPSCoR/IDeA Program requires that all RII C2 pre-proposals:

- adhere to program objectives as described in this solicitation;
- provide background and rationale for the projects proposed;
- have a focus that is aligned with the NSF EPSCoR Track 1 and 2 awards (see Appendices D and E); and
- provide a budget and explanation of expected costs sufficient and reasonable for completion of the proposed tasks.

Pre-proposals submitted in response to this solicitation must be prepared using the following guidelines and specific forms listed. Pre-proposals must be prepared as an electronic document (Microsoft Word or PDF) with 1" margins and a font size no smaller than 11pt. All pre-proposals must include authorized institutional representative signature on both the Cover Sheet and Budget Page.

The Principal Investigator (PI) identified on the Cover Sheet and included in the pre-proposal shall be the designated contact person for the project and is expected to provide leadership in coordinating and integrating its activities. The PI will be held accountable for all scientific and programmatic responsibilities, including required reporting (see Award and Reporting Requirements). The Authorized Institutional Representative identified on the Cover Sheet will be held responsible for all fiscal obligations.

### **All RII C2 pre-proposals must be assembled in the following sequence:**

- Cover Sheet for pre-proposal to the SC EPSCoR/IDeA Program (Appendix A).
- Project Summary (maximum of 1/2 page) of the proposed RII C2 project and its anticipated impacts. Indicate in separate paragraphs the intellectual merit and broader impacts of the proposed work.
- Project Description (maximum of 5 pages) should contain the following elements:
  - Status and Overview detailing the current status of the proposed institutional broadband connectivity and strengths, barriers, and opportunities for further development of comprehensive inter-campus and intra-campus cyber connectivity and broadband access in support of overall objectives in research, education and innovation.
  - RII C2-enabled Research and Education Activities describing the research and education components that promise to stimulate sustainable improvements in research capacity and competitiveness. Include specific goals, objectives, timelines, and milestones. This section must show plans for the development, deployment, and improvement of broadband connectivity to foster collaboration, prompt innovation, broaden individual and institutional participation, strengthen e-learning, create jobs, develop the workforce, and contribute to economic development in South Carolina. A compelling rationale for how improvements in cyber connectivity and broadband access enabled by the proposed RII C2 will yield the desired objectives and outcomes must be provided.
  - Diversity Plan detailing the current state of diversity (institutional, individual, disciplinary, and geographic) within the proposed activities and clear plans for broader engagement of the human and institutional resources to be used in RII C2 activities. Particular attention should be given to underrepresented minorities in STEM (African-Americans, Pacific Islanders, Hispanics or Latinos, Native Americans, women, and/or persons with disabilities) and to 2-year, 4-year, rural, and minority-serving institutions. The plan must include specific goals, timelines and milestones, and anticipated outcomes of proposed activities.
  - Workforce Development Plan outlining how proposed activities will prepare and engage a diverse, next-generation STEM workforce to design, deploy, manage, and use new cyber-based technology and applications. Describe specific anticipated impacts of RII C2 enabled workforce development on the employment outlook in South Carolina.

- Management Plan describing how the project will be managed and provide a description of the roles of all individuals and organizations involved. The plan should include a description of how the management team will coordinate with the existing management structures of other RII projects. In addition, the plan must describe how the team will coordinate the investments and activities across various academic campuses. It is important that the project's management team be sufficient in number, diversity, and expertise to assume technical and administrative oversight of the project. It is expected that the management team will be responsible for working with other public and private sector partners to expand access to and breadth of broadband services across the jurisdiction.
  - Sustainability Plan presenting a plan for long-term sustainability of the improved cyber connectivity and broadband access, including maintenance, upgrades, and replacement of physical infrastructure. This plan must contain a strategy for sustaining the RII C2 enabled improvements in research and education, as well as strategies to ensure continuity of training and professional development activities for educators, technicians, and other personnel.
  - Evaluation and Assessment Plan including milestones and metrics to be used to evaluate and assess demonstrative impacts and outcomes, both during and after the award period.
- Budget Page for the project (Appendix B). See Budget section below for specific instructions.
  - Budget Explanation of estimated costs. Include support requested or available from other sources, including institutional, local, and federal agencies (maximum one page).
  - Biographical Sketches of PI and other senior personnel involved in project (maximum two pages per individual; NSF format).
  - Current and Pending Support of PI and other senior personnel involved in project, including title of project, sponsoring agency, period of support, amount, and level of effort for each investigator (Appendix C).

## **Budget**

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A pre-proposal from a single institution may request up to a total of \$250,000 (direct plus indirect costs) or a collaborative pre-proposal (two or more institutions) may request up to a total of \$750,000. The period of performance may be between twelve (12) and twenty-four (24) months.

All awards will be cost-reimbursable, and are governed by the federal cost principles for educational institutions (OMB Circular A-21).

Awardees should ensure that costs claimed are allowable and reasonable. Cost-share is encouraged, but not required. Any matching contributions from the institution or other sources should be listed in the budget and described in the budget explanation. Awardees are responsible for ensuring that costs of all sub-awards are subject to those cost principles and procedures appropriate to the sub-award type and organization involved.

## **Submission Instructions**

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Complete pre-proposals, including a signed Cover Sheet and Budget Page, must be submitted no later than 5:00 P.M. on Monday, August 31, 2009.

Pre-proposals must be submitted as: 1) a single MS Word or PDF file; 2) one printed and signed original; and 3) three printed copies to the South Carolina EPSCoR/IDeA Program. The electronic copies may be saved on a CD and mailed, along with the printed copy, to the address below.

South Carolina EPSCoR/IDeA Program  
1330 Lady Street, Suite 504  
Columbia, SC 29201

### **Incomplete or late submissions will not be accepted.**

Submission of a complete pre-proposal, including a signed Cover Sheet, signifies the applicant's agreement that the RII C2 pre-proposal will be released for external review. Oversight for the review is provided by the State Committee of the SC EPSCoR/IDeA Program.

## **Pre-Proposal Selection**

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All pre-proposals that meet the eligibility requirements and guidelines will be evaluated based upon the extent to which they meet specific criteria, including:

- Intellectual merit of the proposed activities;
- Significant broader impact on the state's research enterprise;
- Alignment with the NSF EPSCoR Track 1 and 2 awards (Appendices D and E);
- Integration of research and education;
- Integration of diversity into proposed activities;
- Extent to which proposed collaborations promote social interaction, including e-learning; and
- Reasonableness of budget.

Pre-proposals will undergo external peer-review and reviews will be provided to the PIs, excluding the identity of the reviewer. Full proposals will be expected to respond and/or incorporate responses to the reviewers' concerns.

## **Contact Information**

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General inquiries regarding this program should be made to:

T. Scott Little  
Director, SC EPSCoR/IDeA State Office  
[little@scra.org](mailto:little@scra.org)

1330 Lady Street, Suite 504  
Columbia, SC 29201  
Tel: 803.733.9060  
Fax: 803.376.1721  
www.scepscoridaea.org

# SC EPSCoR/IDeA

South Carolina Experimental Program to Stimulate Competitive Research and Institutional Development Awards

## COVER SHEET FOR PROPOSAL

SC EPSCoR/IDeA SOLICITATION NAME AND NUMBER			DATE SUBMITTED	
NAME OF Awardee Institution (Institution of PI)		ADDRESS OF Awardee Organization, including 9 digit ZIP code		
NAME OF COLLABORATING ORGANIZATION(S)				
1.		4.		
2.		5.		
3.		6.		
IS Awardee Organization (Check All That Apply)				
<input type="checkbox"/> FOR-PROFIT ORGANIZATION <input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS				
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)				
TITLE OF PROPOSED PROJECT				
REQUESTED AMOUNT \$		PROPOSED DURATION Months		REQUESTED STARTING DATE
TARGETED AGENCY OR ORGANIZATION (IF APPLICABLE)		SUBTOPIC (IF APPLICABLE)		FEDERAL PROPOSAL SUBMISSION DEADLINE
CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW				
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION				
<input type="checkbox"/> VERTEBRATE ANIMALS				
<input type="checkbox"/> HUMAN SUBJECTS				
<input type="checkbox"/> HAZARDOUS MATERIALS INCLUDING REGULATED BIOLOGICAL MATERIALS AND/OR RADIOACTIVE AND/OR OTHER REGULATED CHEMICALS/MATERIALS				
<input type="checkbox"/> INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED _____				
NAME	HIGHEST DEGREE	YEAR OF DEGREE	TELEPHONE NUMBER	EMAIL ADDRESS
PI				
Co-PI				
Co-PI				
Co-PI				
PI DEPARTMENT		PI MAILING ADDRESS		
PI FAX NUMBER				

**CERTIFICATION PAGE**

**Certification for Principal Investigators and Co-Principal Investigators**

I certify to the best of my knowledge that:

- (1) The statements herein (excluding scientific hypotheses and scientific opinions) are true and complete; and
- (2) The text and graphics herein as well as any accompanying publications or other documents, unless otherwise indicated, are the original work of the signatories or individuals working under their supervision. I agree to accept responsibility for the scientific conduct of the project and to provide the required project reports if an award is made as a result of this proposal. I understand that the willful provision of false information or concealing a material fact in this proposal or any other communication submitted is a criminal offense (U.S.Code, Title 18, Section 1001).

Name (Typed)	Signature	Date
PI		
Co-PI		
Co-PI		
Co-PI		

**Certification for Authorized Organizational/Institutional Representative**

By signing and submitting this proposal, the individual applicant or the authorized official of the applicant firm or company certifies that:

- (1) The statements made herein are true and complete to the best of their knowledge;
- (2) It agrees to accept the award terms and conditions and should these terms not be met, to negotiate a fair and reasonable plan to reimburse the South Carolina EPSCoR/IDeA Program/South Carolina Research Authority for expenditures incurred under the award;
- (3) The organization or its principals are not presently disbarred, suspended, proposed for disbarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal or State department or agency;
- (4) The organization is not delinquent on any Federal or State debt;
- (5) The organization operates as a drug-free workplace;
- (6) Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: Title VI of the Civil Rights Act of 1964 (P.L. 88-352, Title IX of the Education Amendments of 1972, as amended (20 U.S.C. § 1681-1683, and 1685-1686), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), the Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101-6107);
- (7) No funds will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of a Member of Congress in connection with the awarding of any Federal contract, grant, loan or cooperative agreement;
- (8) Submission of a complete proposal, including a signed Cover Sheet and Budget Page, signifies the applicant's agreement to release the proposal for external review; and
- (9) Failure to submit a proposal to the targeted agency or organization as listed on page 1 of the Cover Sheet will constitute DEFAULT under the related program. Further, SC EPSCoR/IDeA reserves the right to recover all previously expended funds issued under the related award and the right to refuse any future proposals for SC EPSCoR/IDeA funding.

Name (Typed)	Signature	Date
Telephone Number	Fax Number	Email Address

## BUDGET PAGE

ORGANIZATION							
PRINCIPAL INVESTIGATOR							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)			Funded Person-Months		Funds Requested	Non-Federal Matching Funds	Total Project Costs
			Cal	Aca			
1.							
2.							
3.							
4.							
5.							
6. ( ) OTHERS (List Individually on Budget Explanation Page)							
7. ( ) TOTAL SENIOR PERSONNEL (1-6)							
B. OTHER PERSONNEL (Show Number in Brackets)							
1. ( ) POST DOCTORAL ASSOCIATES							
2. ( ) OTHER PROFESSIONALS (Technician, Programmer, Etc.)							
3. ( ) GRADUATE STUDENTS							
4. ( ) UNDERGRADUATE STUDENTS							
5. ( ) SECRETARIAL – CLERICAL (If Charged Directly)							
6. ( ) OTHER							
TOTAL SALARIES AND WAGES (A+B)							
C. FRINGE BENEFITS (If Charged as Direct Costs)							
TOTAL SALARIES, WAGES, AND FRINGE BENEFITS (A+B+C)							
D. EQUIPMENT (List Item and Dollar Amount for Each Item Exceeding \$5,000.)							
TOTAL EQUIPMENT							
E. TRAVEL 1. DOMESTIC (Incl. Canada, Mexico, and U.S. Possessions)							
2. FOREIGN							
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ _____							
2. TRAVEL \$ _____							
3. SUBSISTENCE \$ _____							
4. OTHER \$ _____							
TOTAL PARTICIPANT COSTS							
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							
3. CONSULTANT SERVICES							
4. COMPUTER SERVICES							
5. SUBAWARDS							
6. OTHER							
TOTAL OTHER DIRECT COSTS (1 through 6)							
H. TOTAL DIRECT COSTS (A THROUGH G)							
I. INDIRECT COSTS (Specify Rate and Base)							
TOTAL INDIRECT COSTS							
J. TOTAL DIRECT AND INDIRECT COSTS (H+I)							
K. RESIDUAL FUNDS							
L. AMOUNT OF THIS REQUEST (J) OR (J minus K)							
M. COST-SHARING: PROPOSED LEVEL \$			AGREED LEVEL IF DIFFERENT \$				
PI/PD TYPED NAME & SIGNATURE					DATE		
ORG. REP. TYPED NAME & SIGNATURE					DATE		



## NSF EPSCOR RII TRACK-1 PROJECT SUMMARY

The South Carolina 2009 NSF EPSCoR RII Track-1 proposal presents an integrated plan to implement a statewide vision that will give South Carolina a competitive edge in the field of biofabrication — an emerging ‘*transforming*’ technology — operationally defined as computer-aided, layer-by-layer deposition of biologically-relevant material with the purpose of engineering functional 3D tissues and organs. Challenges lie on both the engineering and biological sides. Biology-based questions relate to identifying cell sources, optimizing hydrogels for cell growth and differentiation, and designing “blueprints” for computer-aided printing of functional tissues. A major challenge remains in achieving *vascularization* and maintaining viability of the printed construct. Without a vascular supply, thickness of tissue constructs is limited to four cell layers or less. To proceed to true organ level, one must successfully engineer a vascular supply, which requires creating a branching 3D tree-like construct. This challenge is the subject of the South Carolina Project and the research theme of the 2009 NSF EPSCoR RII Track-1 proposal.

The proposed Research Plan to engineer a 3D vascular tree is divided into five “thrust” areas. All require enabling infrastructure in terms of content expertise and technology systems. Thrust I focuses on analysis of structural-functional properties of an authentic (natural) branched vascular tree. Anticipated research milestones include a computer-aided design or simulation of a natural branched vascular tree based on the acquisition of detailed data inputs from histological, morphometric and immunohistochemical analyses of sequential segments, and biomechanical testing of sequential segments from a natural branched vascular tree. Thrust II focuses on directed differentiation of adult stem cells into monomer units of vascular cell types, specifically to induce stem cells isolated from fat tissue to enter a smooth muscle cell lineage. Thrust III requires functional biomechanical testing of engineered, sequential segments and comparison to naturally occurring (authentic) branched vascular trees. This requires an enabling technology for the scalable production of standard sized, vascular tissue spheroids having a single lumen surrounded by endothelial cells and smooth muscle cells. Thrust IV is biofabrication of a branched vascular tree, or creating linear 3-D, hollow tubular segments representing branches that can be transformed into branched “Y” or “T” vascular units. Thrust V focuses on accelerated tissue maturation of bioprinted, branched vascular tubes. This requires clever design and fabrication of a perfusion bioreactor, as well as evidence that one or more candidate maturogens can accelerate maturation.

The 2009 SC NSF EPSCoR RII focuses on a diverse subset of institutions including 3 research intensive institutions, 3 HBCUs (1 public and 2 private) and 2 other PUIs (1 private and 1 public), with outreach to 2 technical colleges. Together this will form an alliance for tissue biofabrication. The research infrastructure improvement strategies include: (1) engaging a diverse group of institutions that bring complementary approaches to research, education, training and production of South Carolina’s future STEM workforce; (2) recruiting 22 new tenure-track faculty at Claflin, Furman, MUSC, USC and USC-Beaufort, and Voorhees with interests and expertise in one or more of the enabling biofabrication technologies; (3) identifying and mentoring “target” junior faculty who can enhance the potential to successfully implement the SC Project; (4) creating a local and global virtual e-community that will facilitate and hasten the development of sophisticated databases on the vascular tree; (5) creating academic-industrial collaborations needed to overcome the major challenges of biofabrication; (6) integrating statewide initiatives for education, outreach, and communication to the general public; and (7) expanding a current bioprinting program at MUSC into an Advanced Tissue Biofabrication Center that will serve as the S&T hub and sustainable center.

Efforts directed towards strengthening STEM research and education in SC’s graduate and undergraduate institutions and technical colleges, and interfacing with K-12/pre-college level programs, are critical for building SC’s workforce and economy. Proposed RII activities support postdoctoral and graduate research training at Claflin, Clemson, Furman, MUSC, and USC. A new Masters program in Biorobotics and Biofabrication is in development at SC State University. Two 2+2 degree programs between Claflin and Greenville Technical College, and Voorhees and Denmark Technical College, will be supported with appropriate outreach to the K-12 sector.

The integrated 2009 RII plan includes diversity, cyberinfrastructure improvements, outreach and communication, sustainability, management, accountability and evaluation. The South Carolina Light Rail will be expanded to provide statewide high speed, high capacity linkage to regional, national and international cyber-networks and support collaborative e-communities in S&T and education. An Innovative Integration Board will advise, design, implement and review activities that bridge SC’s minority serving programs and integrate with the science, education, communication and sustainability programs of the RII. Educational innovations include development of e-textbooks and new curricula to recruit and train a diverse 21<sup>st</sup> century workforce. A novel outreach activity will expand the capacity of South Carolina’s reporters, journalists and journalism students to understand and report complex S&T developments and enhance science literacy statewide. The sustainability plan outlines specific approaches to obtain mainstream grants for research, training and technology development, as well as activities for mentoring, career development and technology transfer. An integrated, multi-year evaluation approach will measure progress towards goals, document outcomes and transformative results, and identify areas for improvement. An RII management team and External Advisory and Review Board will ensure implementation of the South Carolina Project and assist the South Carolina EPSCoR/IDeA Committee and its staff in meeting the overarching requirements for accountability and substantive impact.

## NSF EPSCOR RII TRACK-2 PROJECT SUMMARY

The partnership between South Carolina EPSCoR and Tennessee EPSCoR is based on existing and planned future collaborations in advanced materials and systems biology research, knowledge domains where computational science is driving new approaches and insights. We propose to build cyberinfrastructure (CI) linked, community specific knowledge environments that embody the desktop to TeraGrid ecosystem. In this ecosystem, the campus-based cyberinfrastructure at a regional research institution is an essential bridge for connecting faculty investigators to national resources such as the TeraGrid. Since NSF program guidelines for 2009 require use of the TeraGrid for all large computational resource requests, it is especially important to develop models that successfully bridge the current gap between desktop and TeraGrid. A notable gap exists in the inadequate interfacing of TeraGrid and non-TeraGrid national computational resources and data within several regions of the country including portions of South Carolina and Tennessee.

Cyberinfrastructure is more than just connecting people via advanced networks and sophisticated applications; CI is about engaging participants in the generation of knowledge. It is about creating opportunities for participants to share expertise, tools, and facilities in powerful ways that have the potential to significantly advance discovery. This proposal will create and implement a model for that coordination, building a seamless application development and deployment, technical support, training, and personal communications bridge from desktop to TeraGrid.

Now that this essential infrastructure is in place, strategic investments in research and computational scientists who can partner with domain scientists to use larger scale computational resources are needed. Writing and compiling software that can make full use of multi-core, typically heterogeneous large scale systems is a challenge. Researchers in advanced materials and systems biology may not have the expertise to solve (or solve in reasonable time) important computational problems that arise in the course of their investigations. We will address that need through a new, multi-tiered model that provides campus researchers with a seamless integration of local, regional, and national computational expertise to address their computational challenges. This multi-tiered model provides a communication and organizational fabric to bring undergraduate students into internships at a national laboratory, build communication and working partnerships among regional experts and support personnel, and leverage nationally funded training and support resources.

Our specific objectives, organized using the NSF's four cyberinfrastructure pillars, include:

- **Computation and Networks:** (a) improvements to network infrastructure in the two states; (b) extension of Clemson's "condominium cluster" model to a group of EPSCoR researchers; (c) facilitated use of the TeraGrid by two EPSCoR knowledge communities; (d) significant increase in computational expertise via hiring of six additional research scientists; petascale scaling of at least one project application;
- **Data:** (a) High Throughput data transfer via dedicated optical network paths, (b) storage and high throughput I/O for data.
- **Virtual Organizations:** a Science Gateway allowing researchers to harvest spare computational capacity; a "Systems Biology Workbench" for use by participants in this project; a "Computational Endstation for Advanced Materials," for use by participants in this project.
- **Education and Outreach:** (a) increased number of internships at ORNL for South Carolina undergraduates; (b) new members for the Oak Ridge Affiliate University program; (c) dissemination of our results to a broad audience; (d) strategic advances in the consortium's diversity and awareness of CI among diverse populations by leveraging ORNL outreach programs and partnership with the Minority-Serving Institution CI Empowerment Coalition (MSI-CIEC).

We are creating a model desktop to TeraGrid ecosystem anchored by a campus-based CI layer that might be termed a "Track 3" regional research resource bridging campus investigators to TeraGrid. The need for such a model has been identified by the EDUCAUSE Campus Cyberinfrastructure Working Group and the Coalition for Academic Scientific Computing (unpublished report from workshop, July 2008). We will define and describe how campuses can successfully leverage the TeraGrid program by enabling the systems biology and advanced materials applications described in this proposal.

Solving these technical and communication challenges is essential to scaling use of the TeraGrid. This effort could significantly contribute to increasing the TeraGrid's active user base above its current 1,000 user plateau. Our SC/TN consortium includes partner undergraduate universities (College of Charleston, the Citadel) and HBCUs (Claflin University and South Carolina State University) engagement and training outreach opportunities for the region, and an innovative dissemination plan. Our objectives focus on domain-specific collaborations with adequate computational support personnel, and a regional organization and communication plan, to achieve research-faculty led discovery outcomes.