GEORGIA RACE TO THE TOP
INNOVATION FUND
APPLICATION FACE SHEET

SECTION 1: APPLICANT AGENCY

Applicant Agency (Legal Name): Barrow County Board of Education

Legal Mailing Address: 179 West Athens Street

City: Winder County: Barrow State: GA Zip: 30680

Federal Employer I.D. #: 58-6000187 DUNS #: 183884121

Congressional District #: GA-7

Executive Officer Name: Wanda Creel Title: Superintendent

Street Address: 179 West Athens St. City: Winder State: GA Zip: 30680

Telephone: 678-425-2803 FAX: 770-867-4540 Email: wanda.creel@barrow.k12.ga.us

SECTION 2: PARTNERSHIP LEAD CONTACT

Contact Name: Edward Morrison Title: Special Projects

Street Address: 179 West Athens Street

City: Winder State: GA Zip: 30680

Telephone: 678-425-2874 FAX: 770-867-4540 Email: ed.morrison@barrow.k12.ga.us

SECTION 3: FISCAL CONTACT

Contact Name: Ken Cato Title: Executive Director of Finance

Street Address: 179 West Athens Street

City: Winder State: GA Zip: 30680

Telephone: 678-425-2885 FAX: 770-867-4540 Email: ken.cato@barrow.k12.ga.us

SECTION 4: GRANT AMOUNT REQUESTED: $1,772,325

SECTION 5: APPLICANT AGENCY FISCAL INFORMATION

1. Month of Fiscal Year End: June
2. Attach to the application, the applicant agency's financial audit.
3. Is applicant agency delinquent on any federal debt? NO X YES☐ If yes, attach a detailed explanation.
4. Did applicant agency receive 80 percent or more of its annual gross revenue in federal awards in its preceding fiscal year; and $25,000,000 or more in annual gross revenue from federal awards and in so doing is required to comply with "Federal Funding Accountability and Transparency Act"? NO X

YES☐ If yes, attach names and total compensation of the five most highly compensated officers of the grantee.

SECTION 6: PARTICIPANT DATA:

Approximate number of students served: 2,560
Population of focus (i.e. age, gender, race): Economically disadvantaged

SECTION 7: SERVICE DELIVERY AREA

Primary county or counties to be served: Barrow County

List other counties to be served (if any):

Congressional District(s) to be served: GA-7

SECTION 8: PROGRAM ACTIVITIES

Long Term Teacher/Scientist Collaborations

Alignment of Real Research Experiences to State K-12 Science Standards

In-depth Professional Development

STEM Curriculum Development & Lesson Plans

HD Interactive Video Conferences between Scientists & Students

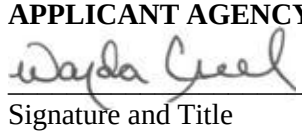
Creation of On-line Archive of Fully Aligned STEM Lessons and Projects

Publication of Video Clip Libraries for Long-Term Sustainability

SECTION 9: AUTHORIZING SIGNATURES

I, the undersigned, an authorized representative of the applicant, have read, understand, and agree to all relative conditions specified in the Race to the Top Innovation Fund Request for Proposals and having read all attachments thereto do submit this application on behalf of the applicant agency. If awarded a grant to implement the provision herein, I do certify that all applicable federal and state laws, rules, and regulations thereto will be followed.

APPLICANT AGENCY:



_____6/27/2011

Signature and Title Date

Executive Summary

21st Century STEM Collaborations: Applications of the Direct-to-Discovery Model is based on the hypothesis that a substantial increase in student engagement brings an increase in student interest and performance. The following coalition of educators propose to leverage the Direct To Discovery (D2D) curriculum and instruction delivery model developed over the past three years in a collaborative partnership between The Georgia Institute of Technology, The Georgia Board of Regents, and Barrow County Schools to provide a next-generation teaching and learning experiences in STEM courses to middle and high school students in Barrow County.

Barrow County Schools
Georgia Institute of Technology
Apple Computer, Inc.
ArtsNow!, Inc.
The Findings Group

Barrow County did not make adequate yearly progress as measured under No Child Left Behind in 2010 and has not made AYP as a district since 2004. Geographically, Barrow lies in the heart of the innovation crescent where future growth depends heavily on development of a tech-savvy work force. To both improve our school system, and to meet growing regional and national demand, Barrow County must provide superior and proven hands-on, inquiry-based, real-time, rigorous STEM educational experiences that build on an internet infrastructure and a staff of dedicated educators. Over 60% of Barrow's students are eligible for free or reduced lunch, a common indicator of low socio-economic status, but the research clearly demonstrates that under-represented and disadvantaged students do perform well in hands-on, technology-rich, inquiry-based environments. While we are concerned about our current situation, Barrow's population is dramatically changing – having increased by more than 57% over the past 10 years (U.S. Census Bureau), bringing increased diversity and increased demand for more and diverse education resources and technology.

Our proposal calls for a holistic approach to raise student performance in STEM disciplines. We begin in elementary schools with a professional development regime designed specifically to improve student understanding and performance in mathematics. We currently provide additional math training via computer based software. The professional development methods provided by ArtsNow may allow us to achieve even greater success through a more human and tactile approach which could eventually save us thousands of dollars in annual software fees while still providing a strong emphasis in mathematics early in a student's academic career.

Students moving on to middle and high school will need the strong foundation in math they developed in elementary school as they encounter STEM courses that have been infused with Direct To Discovery high-tech course enhancements. Over the term of our proposal, eight long-term collaborations between eight Barrow teachers and eight leading scientist from Georgia Tech will be established. Each teacher/scientist pair will create a series of between 3 to 5 one-hour lesson plans that will infuse the work of the lab into the requirements of the Georgia Performance Standards (GPS). These highly interactive sessions are delivered over 55" HD monitors with CD quality audio and are designed to make science both relative and engaging.

Once the sessions are created and field tested, they will be expanded within the district using a "train the trainer" model. At the completion of the project the eight sessions will be taught in multiple classrooms concurrently so that 25 science and math courses will be served between our middle and high schools. Additionally, a ninth "international" collaboration will be established between Barrow County Schools and Dr. David McKinnon at Charles Sturt University in Australia to create D2D sessions in astronomy where Barrow students can use their Internet2 connection to control the Australian telescope and photograph stars in the southern skies.

As exciting and engaging as these D2D sessions may be, they are only the beginning of the Direct to Discovery method. Each live session between a scientist and a classroom is automatically recorded and made available to students from the district video server. Students download these sessions onto their individual iPad2 touch tablets (provided to each D2D student). Using the intuitive media editing toolset included on every iPad2, students will re-imagine the sessions by cutting them and editing them along with other digital materials from the Internet as well as royalty free resources available from the district media archive. They will also include original video they shoot with the built in cameras and v-conferencing applications included with the iPads to create a host of original digital media for term papers, science reports, data models, research papers and science projects. The digital media skills applied by the students along with the increased understanding and interest in science generated from live interactions with state luminaries in disciplines as diverse as nanotechnology and marine biology will breathe new relevance and life into science. Coupled with the iPads, science and math may well become the coolest and most sought after classes in our course offerings.

Over the three year term of the grant services will be provided to 588 high school students, 672 middle school students and 1,300 elementary school students for a total of 2,560 students served. Barrow has a free and reduced lunch ratio of 60.96% indicating that 1,561 of these students are economically disadvantaged.

Section 1: Partnership Overview

Partners: the 21st Century STEM Collaborations: Applications of the Direct to Discovery Model coalition is comprised of the following entities:

- **Barrow County Schools (BCS)**: The mission of the Barrow County School district is to provide a "World Class Education with Hometown Values" to every student. Four years ago, the slow connection to the Internet was the primary hindrance in meeting our vision. We literally had to close access to the Internet at some schools in order to provide the bandwidth necessary to conduct on-line testing at other schools. Working in concert with Georgia Tech and the Georgia Board of Regents, we switched our Internet service provider from the commercial carrier provided by the state and became the first Georgia K-12 district to join Peachnet, Georgia's state run high speed network dedicated to research and education. On that day Barrow began operating the fastest K-12 network in the Americas including a permanent 50mb access to Internet2.

  The following year Barrow established itself as a K-12 research district and released its first whitepaper entitled Georgia's Able as an educational and economic development

recommendation to build out Peachnet to include Georgia K-12 districts along with the universities and colleges already served.

Later that year Barrow began Direct to Discovery (D2D) a long term research project in partnership with Georgia Tech to fully leverage our high speed network connection and serve as a field lab\developer in creating a series of high-tech course enhancements for middle and high school math and science classes. These sessions are designed for maximum excitement, interactivity and high-tech student appeal and bring leading scientists from Georgia's university research labs into long-term teaching and learning collaborations with math and science teachers. As a K-12 research district, all of our research projects are grant funded. Over the next three years GT and BCS pursued grants to conduct proof-of-concept testing in high definition (HD) video from remote locations around the world. We equipped several labs at Georgia Tech to transmit high-definition K-12 outreach sessions, and installed mobile HD video conference carts in BCS middle and high schools to receive them.

In FY2009-2010 we completed our first full year prototype session. Dr. Jud Ready, a nanotechnology professor from Georgia Tech and Chad Mote, the science department head at Apalchee High School worked through the entire D2D process which included developing the individual sessions (course enhancements) for Chad's advanced chemistry class during a 6 week summer fellowship in Dr. Ready's lab and collaboratively delivering the sessions to students over the course of the year. A wiki page was created to describe the creation of carbon nanotubes and students in the class performed 5 percentage points above their historical average. While these results are promising we need to expand the program to a much wider student base and fully align the D2D course enhancements with Georgia Performance Standards to produce authoritative data on the ability of this program to elevate and sustain increased student interest and performance in math and science.

- **The Georgia Institute of Technology (GT)**: The mission of Georgia Tech states that technological change is fundamental to the advancement of the human condition. The Georgia Tech community—students, staff, faculty, and alumni—will realize our motto of "Progress and Service" through effectiveness and innovation in teaching and learning, our research advances, and entrepreneurship in all sectors of society. We will be leaders in improving the human condition in Georgia, the United States, and around the globe.

  Over the past three years working with Barrow on the Direct To Discovery project the researchers and administrators at Georgia Tech have consistently stressed the need to maintain a high degree of objectivity and accountability in the development of the D2D model. It is important to deliver course enhancements that truly motivate students to improved performance, but it is imperative to produce accurate data on the projects ability to do so that will stand up to academic scrutiny or widespread adoption will be impossible.

  Further, Georgia Tech has opened the doors to all of its research facilities allowing D2D program developers to seek out labs where work that is visually exciting is being carried out by professors with charisma and the innate ability to work well with middle and high school students across the network infrastructure. By the end of this three year program, Georgia Tech will have 8 frontline

labs generating fully aligned course enhancements in science and math that are fully capable and ready to be scaled to statewide deployment.

- **Apple Computer Incorporated (Apple):** Apple is fully committed to elevating the educational use of technology to a new standard where students, teachers, administrators and network technicians can stop catering to the constant needs of finicky desktop and laptop computers and begin using mobile technologies that deliver an educational working environment free of software installations, data back-up and recovery requirements, computer viruses and hacking attacks, broadband bottlenecks, and never ending training requirements for end users.

  For students, such a learning environment will exist for them the moment they attend their first Direct to Discovery enhanced course. An iPad2 is provided for each teacher and student attending a D2D enhanced course. These units connect wirelessly to the schools high speed network and students will store their data and files on the district cloud. Combined with the inclusion of subject experts in the classroom via the D2D instruction model, the IPad2 units will provide the power and operational simplicity required for students to easily incorporate video from the live sessions along with original audio and video they will create with their iPads to create an endless stream of creative media projects infused with the core curriculum objectives that will make science both relative and exciting.

- **ArtsNow®:** ArtsNOW® is a nonprofit organization dedicated to transforming education through rigorous, innovative teaching strategies for the 21st century learner. This is accomplished by equipping teachers with professional development and resources to bring creativity and the arts into daily classroom instruction so all students succeed academically, socially, and artistically. Our team includes five primary collaborators who develop and deliver professional learning to K-12 educators. They include: Atlanta Ballet Centre for Dance Education, Emory University Center for Creativity and the Arts, Georgia State University Center for Collaborative and International Arts, Savannah College of Art & Design-Atlanta and Music-in-Education National Consortium.

  Professional educators know that learning is a lifelong endeavor. However, many pilot programs concentrate solely on a specific time or event in the educational experiences of a student without due consideration of prior knowledge or experiences that students bring or fail to bring into the process. Math and Science are major components of the core curriculum and are taught over the entire course of a student's K-12 career. Direct to Discovery is designed to bring the excitement and motivation of real discovery into the curriculum and therefore requires a prerequisite foundation in the basics of mathematics for students to fully participate in the advanced discussions and projects inherent in the program.

- **The Findings Group, LLC (TFG):** TFG is an evaluation firm in Atlanta, GA, primarily serving STEM projects in Georgia. A focus on STEM in Georgia equips them with a deep understanding of issues in STEM education in the state. They currently evaluate an array of NSF-funded projects throughout the state with principal investigators at Georgia Tech, Emory University, Georgia State University, the University of Georgia, and Armstrong Atlantic State University. They also serve many Georgia school districts through the evaluation of math/science partnership grants. The organization's president currently serves as the chair of the American Evaluation Association's PreK-12 Educational Evaluation Topical Interest group and provides evaluation

professional development through the University of Georgia and the National Science Foundation.

Section 2: Need for Project

Barrow County sits within Georgia's Innovation Crescent, a budding high-tech corridor between Atlanta and Athens seeing a dramatic increase in the number of technology companies particularly in industries such as biotechnology, nanotechnology, and life science. To match the increasing demand for a superior technical workforce, we must improve our students' ability to function as science and technology leaders. Barrow County did not make adequate yearly progress as measured under No Child Left Behind in 2010 and has not made AYP as a district since 2004. To both improve our school system, and to meet growing regional and national demand, Barrow County must provide superior and proven hands-on, inquiry-based, real-time, rigorous STEM educational experiences that build on an internet infrastructure and a staff of dedicated educators.

Without such support, Barrow County's 8th grade students will enter a high school in which 32% of African American students and 16% of economically disadvantaged students fail the High School Graduation Test in math, historically considered to be a minimum-competency test. Clearly, Barrow's need is great: 70% of this year's 8th grade students passed the state standardized science test and only 76% passed the math portion of the test. Looking more deeply, only two of three economically disadvantaged students passed math, and approximately 70% of African Americans passed. Additionally, Barrow scores on the 2010-11 GHSGT dropped below the state average in every category. More than half of Barrow's students are eligible for free or reduced lunch, a common indicator of low socio-economic status, but the research clearly demonstrates that under-represented and disadvantaged students do perform well in hands-on, technology-rich, inquiry-based environments. While we are concerned about our current situation, Barrow's population is dramatically changing – having increased by more than 57% over the past 10 years (U.S. Census Bureau), bringing increased diversity and increased demand for more and diverse education resources and technology.

A 2010-2011 study conducted by the Findings Group was conducted at sample schools within the Innovation Crescent to evaluate how changes in classroom practice affect student confidence, attitude, perceived usefulness, motivation and intent to persist in Biotechnology. These changes in perception and intent to persist are waypoints leading to improved student achievement. An excerpt from the regression analysis section of the report is included below.

Regression Analysis Across all Schools

To evaluate the relative importance of the constructs in predicting whether students intend to persist in biotechnology, a multiple regression analysis was utilized. See Figure 2 below. Overall, the results indicate that two constructs significantly predict intent to persist: Perceived Usefulness and Effective Motivation. To the extent that students perceive that biotechnology is useful in their lives and are motivated to succeed in biotechnology, their intent to pursue biotechnology increases. The regression model below explains 42.4% of the variability in how students' responded to the intent to persist items ($R2=.424$, $p <.001$). This suggests that 57.6% of the variability in how students' responded to the intent to persist items is not accounted for by the surveyed constructs.

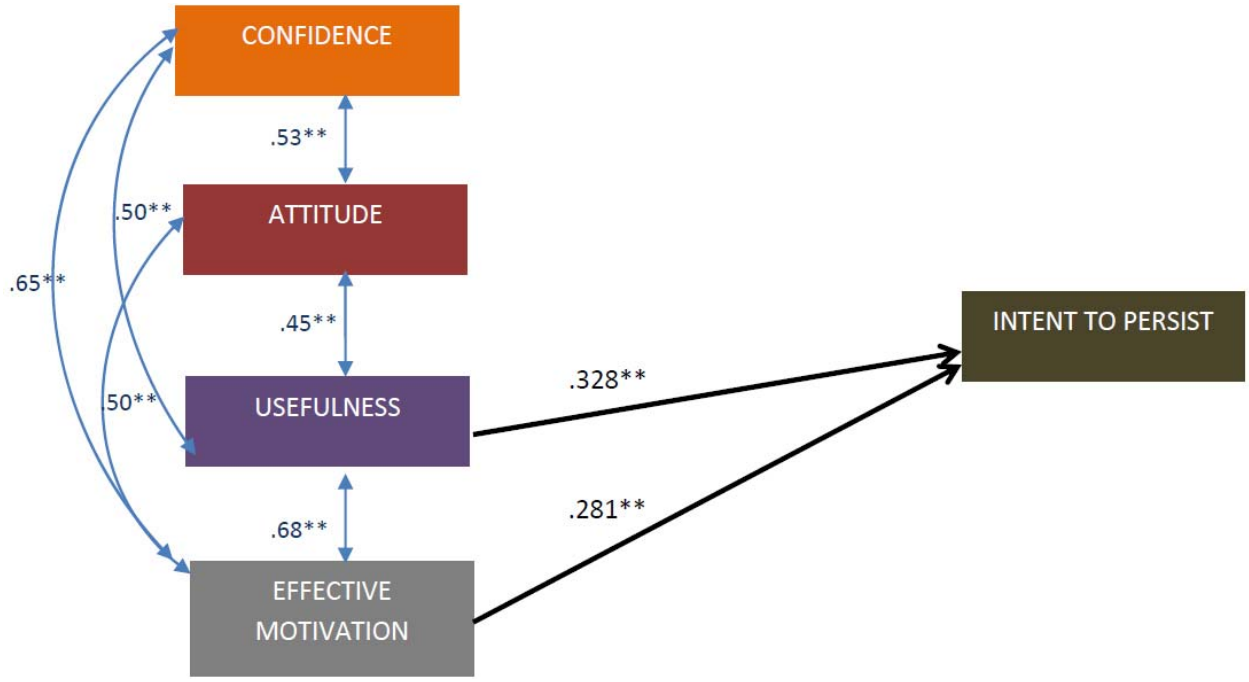


Figure 2. Overall, Multiple regression analysis (post, n=213; (R2=.424, p <.001).

Note. Numbers in black along directional paths represent standardized beta-weights (β); solid line= significant paths, * p<.05, **p<.01; omitted paths= non-significant paths. Numbers in blue along bidirectional paths represent Pearson Correlations (r),* p<.05, **p<.01.

Standardized beta weights indicate the number of standard deviations that the outcome will change as a result of one standard deviation change in the predictor variable. The standardized beta-value also provides information regarding the importance of a predictor in the model.

R2 signifies the amount of variation in the outcome variable, in this case "intent to persist," that is accounted for by the model. A significant R2 indicates that a significant amount of the variation is captured by the predictor variables.

Data from the report strongly indicate that students perceive a significant correlation between an intention to persist in biotechnology and usefulness (which means that they see biotechnology as useful for their future career plans) and motivation.

The Direct-to-Discovery Model is based on the hypothesis that a substantial increase in student engagement brings an increase in student interest and performance. While the long-term D2D collaborations have yet to be widely adopted, they bring subject experts directly into a project based working relationship with students and represent an exceptional approach to the unmet need to have science and math perceived as relevant and useful in the minds of students. Additionally, the high-tech learning environment inherent in D2D further motivate students towards excellence, brings science alive, and delivers the curriculum to our "screenage" students on their own tech-savvy terms.

Development Cycle for Direct To Discovery Course Enhancements

It is clear from the descriptions below that D2D represents an exceptional approach in addressing the unmet needs of Barrow students for STEM courses that go beyond the traditional norms.

Phase 1 (summer): Develop Course Enhancements
Nine (9) teachers (three each summer) attend a six week fellowship at Georgia Tech as part of the Georgia Intern Fellowship for Teachers (GIFT) program. The course textbook is used along with other materials so the teacher and scientist can look for specific units where the work in the lab contains elements that can be translated into an interactive project for students. D2D enhancements are usually comprised of between 3 and 5 one-hour, on-line exchanges between the lab and the classroom known collectively as D2D sessions. Teachers and scientist strive to create enhancements that are visually stimulating, and high interactive often involving remote access to lab equipment such as telescopes and electron microscopes. For example in the nanotechnology sessions students generate their own "recipes" for growing carbon nanotubes on top of a carbon wafer. The wafer is then sent to the electron microscope during session two where students learn to view and grade their nanotubes for quality and the ability to meet a predetermined specification. In these exercises, mathematics is incorporated into the lesson as students use the same formula presented in their chemistry books to adjust the volume of various gases injected into the vacuum chamber of a high-temperature furnace during the fabrication process.

Phase 2: Concurrent Field Trials
During the school year beginning just after the summer fellowships, teachers and scientists will field test the enhancements they created over the summer. The D2D sessions are introduced into the classroom as fully aligned course enhancements to the approved GPS curriculum. To meet the long term scalability requirements of the D2D model, it is necessary for the scientist to be able to interact effectively with two separate classrooms simultaneously. This capability doubles the number of students that can be reached concurrently from a single lab. The networked nature of the enhancements allows the second classroom to be in the same school or across the district. Also, regular videoconferences between the teacher(s) and scientist continue behind the scenes as the sessions are fine-tuned over the course of the year (or semester) to maximize their impact and ability to increase student interest in the course as a whole.

Dedicated Teaching & Learning Social Network

During the first half of year one, web application developers at Georgia Tech will use a variety of Open technologies to design, implement, and manage a hybrid social network design that combines the standard Facebook style communication options such as blogging, messaging and resource sharing with professional grade collaboration tools such as multi-user interactive whiteboards, on-line course development, and delivery and fully integrated web-based video conferencing.

A development partnership between project leaders in Barrow, participating D2D scientists and the web development team at Georgia Tech will continue over the entire term of this proposal to ensure a robust, feature-rich collaborative working environment is built and customized to provide a unique teaching and learning network designed specifically to support long term educational collaborations over great distances. This teaching and learning portal will also be designed to be highly scalable should the GDOE decide to adopt the system for regional or statewide implementation.

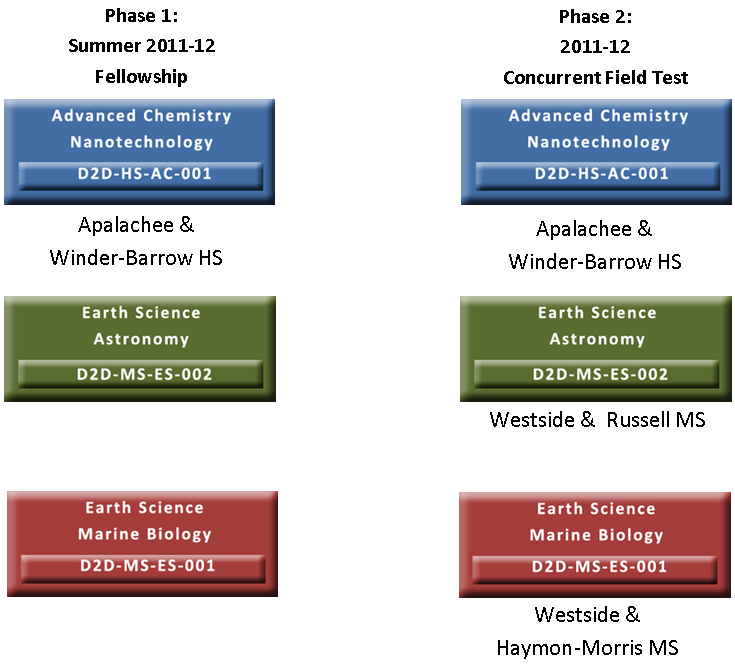
During phase 2, the original scientist and lead teacher along with the second teacher assisting with the field trials create a project folder on the dedicated teaching and learning portal. This dedicated portal will include accounts for every D2D and ArtsNow! teacher in the program and will eventually be scaled-up to include all Barrow teachers, administrators and also provide protected accounts for students. This T&L network supports the video codec built into the iPad2 units to make the student participation in D2D a mobile experience, along with shared whiteboard collaborations, data storage, direct publishing of student projects to the web, digital resource archives for copyright free media, messaging, on-line course development, homework assistance media and more.

Finally, during this phase the scientist begins training a graduate student to deliver the D2D enhancements. This is very important because the sessions need to be scheduled in advance and scientists are not always available to conduct them. Additionally, the scientist may need to work with a new lead teacher to develop a second series of D2D sessions while the grad student continues delivering the first series. This allows the enhancement sessions to remain at the cutting edge of science as research in the lab progresses over time.

Phase 3: Production to Scale

By the time the teachers and scientist make it to Phase three they have created their D2D enhancements, field tested them for a year in the lead teacher's classroom and simultaneously demonstrated the ability to "train the trainer" by expanding the use of the enhancements into a second classroom. On the university side, the scientist has worked to develop the enhancements and has delivered them simultaneously into both classrooms during the field tests. Also, a graduate student has been fully trained to deliver the enhancements from the lab unassisted. By the end of the project Georgia Tech will have 8 front line research labs fully equipped and trained for sustained K-12 STEM outreach using original course enhancements developed by Georgia scientists & teachers and aligned with Georgia K-12 performance standards. For more information on the outreach capacity of these labs, please refer to section 6: Quality of Sustainability Plan.

D2D Development Cycle Year 1

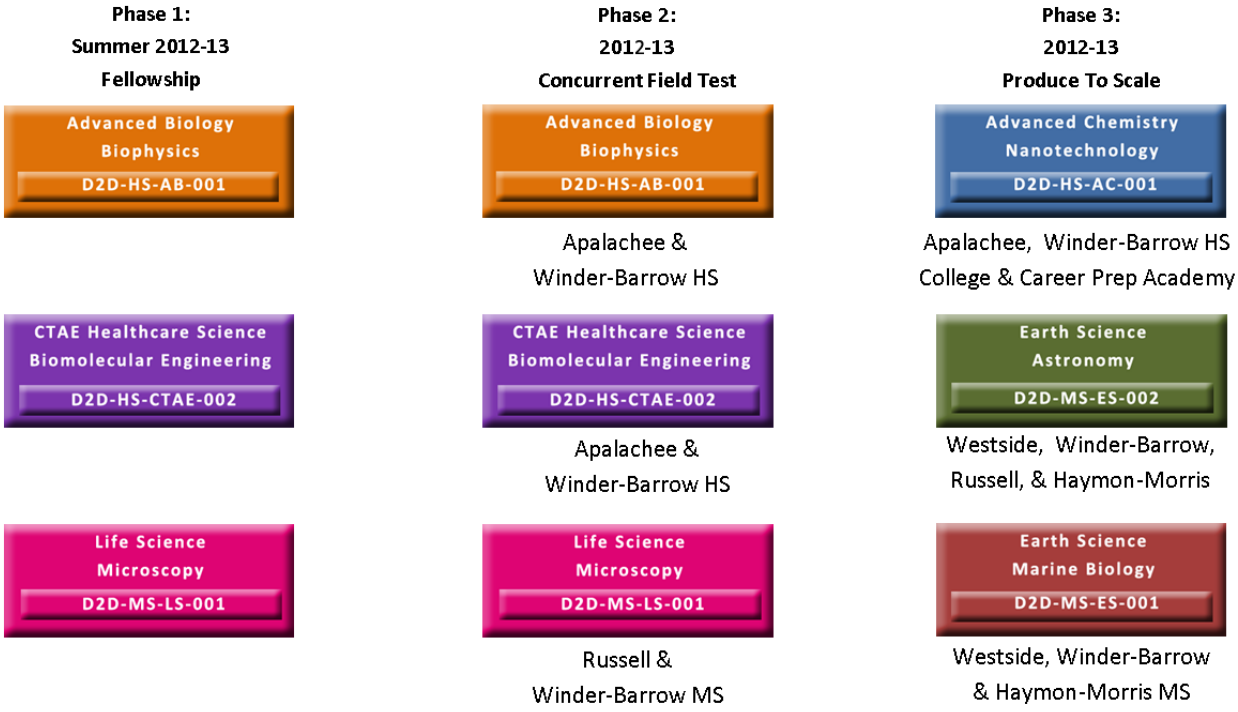


As indicated in the chart on the left, three teacher/scientist pairs are currently working to develop Direct to Discovery course enhancements in three different areas.

For example, an Advanced Chemistry course is being enhanced with interactive sessions from a working nanotechnology lab. The series of sessions are labeled D2D-HS-AC-001 indicating they are D2D sessions for high school level in Advance Chemistry series number 001.

The Advanced Chemistry sessions along with both of the middle school level Earth Science courses will be developed over the summer and begin concurrent field testing at the beginning of the school year. During the field tests a graduate student will be paid at 25% annual salary ($5000) to work with the scientist and learn to deliver the sessions independently by the end of concurrent field tests.

D2D Development Cycle Year 2



During the second year of development we can see D2D enhancement sessions are being developed for three more courses. Advance Biology at the high schools is being enhanced with interactive sessions from a Biophysics lab at Georgia Tech where students will work with microscopic laser beam-tweezers to manipulate individual molecules of blood. A CTAE course in Healthcare is being enhanced with sessions in Bimolecular Engineering and a middle school Life Science course is being enhanced with sessions from the microscopy lab where students are introduced to an electron microscope.

We also see that the first three sessions have completed their concurrent field tests and are now being produced to scale. The Enhanced Advanced Chemistry class is now being taught in all three high schools while the middle school science courses have been extended into more middle schools.

D2D Development Cycle: Year 3

By the end of the third year the project will have produced D2D enhancements for 9 MS and HS courses infusing real science into science instruction and blurring the traditional lines between k-12 and universities by establishing long-term working collaborations between researchers, teachers and students. Further, the project has brought 8 fully functional research labs up to full production level for K-12 outreach. Refer to section 6 of this proposal for information on scalability and sustainability of the Direct to Discovery method

ArtsNOW Professional Learning

ArtsNOW professional learning opportunities will be divided into three separate categories to maximize impact while targeting all eight Barrow County Elementary Schools. These categories include: two system-wide professional development workshops per year (one per semester), six days of in-class model teaching demonstration lessons per year (three per semester), and the design and development of a lesson plan resource bank that will be endorsed and disseminated from system level leadership. All professional learning experiences and resources will be aligned to Georgia Performance Standards for Mathematics and Science. Two leadership sites that will house all professional learning opportunities, Auburn Elementary School and Holsenbeck Elementary School, have been pre-identified and will serve as dissemination sites for both county school clusters.

Bi-annual professional development workshops will take place in the fall and spring semesters, and be structured as half-day hands-on sessions introducing educators (grades 3-5), arts specialists, and math

coaches to innovative instructional strategies integrating the arts with Mathematics and Science standards. Specific GPS standards will be targeted through data analysis and benchmark testing to identify pre-existing specific student deficiencies by strand and need for improvement and academic growth. Sessions will conclude with collaborative discussions based around adaptations and extensions utilizing the instructional strategies explored within each respective session.

Model-teaching demonstration lessons will target students in grades 3-5 at both aforementioned leadership sites. Each demonstration day will include three model lessons aligned to Mathematics and Science standards, totaling 18 model lessons per year for three years. These lessons will be video-taped, streamed-live for other county educators, and later utilized for sustainability purposes and maximum reach. Educators across the county will be held accountable by their administrative teams for viewing and implementing the instructional strategies employed in the in-class model demonstration lessons. All lessons include ArtsNOW Curriculum Guides to ensure ease and effectiveness of redelivery.

A lesson plan resource bank will be developed with representatives from all eight Barrow County Elementary Schools alongside ArtsNOW consultants from the primary collaborative team. This bank of educator resources will serve to equip elementary school educators across the county with innovative lessons that target specific Mathematics and Science GPS, promote critical and creative problem-solving, and address 21st Century Skills.

Section 3: Quality of Project Design

Over the three year term of our proposal we will enhance the study of math, science, and digital media production for the following groups of Barrow County students.

(MS & HS Science & Math)				
	Year 1	**Year 2**	**Year 3**	**Total**
Apalachee High	28	84	140	252
Winder-Barrow High	28	84	140	252
College & Career Preparatory Academy	0	0	84	84
Total High School	**56**	**168**	**364**	**588**
Westside Middle	56	56	84	196
Haymon-Morris Middle	28	56	84	168
Russell Middle	28	56	84	168
Winder-Barrow Middle	0	56	84	140
Total Middle School	**112**	**224**	**336**	**672**
(Elementary Math)				
	Year 1	**Year 2**	**Year 3**	**Total**
Auburn Elementary	60	60	60	180
Bethlehem Elementary	40	60	60	160
Bramlett Elementary	40	60	60	160
County Line Elementary	40	60	60	160
Holsenbeck Elementary	40	60	60	160
Kennedy Elementary	40	60	60	160
Statham Elementary	40	60	60	160
Yargo Elementary	40	60	60	160

Total Elementary School	**340**	**480**	**480**	**1,300**
Project Totals	**508**	**872**	**1,180**	**2,560**
Economically Disadvantaged*	**310**	**532**	**719**	**1,561**
*Barrow District Free & Reduced Lunch Ratio is 60.96%				

Additionally, the proposed project will incorporate the skills and talents of 25middle and high school teachers (each using D2D enhancements by the end of year 3), 9 research scientists (8 from Georgia Tech and one from Charles Sturt University, Australia), 24 elementary school teachers (3 from each elementary school) and 5 administrators and technologists (Curriculum Integration Coordinator, Math Integration Specialist, Testing Coordinator, Network Engineer, Special Projects Coordinator).

This proposal is designed to meet the goals outlined in Priority 1 of the RFP. An expedient way to see how effectively the D2D model meets these requirements is to include some of the applied learning opportunities taking place in the D2D enhanced classroom directly on to the Priority 1 guidelines.

Priority 1:
Students benefit from NEW APPLIED LEARNING OPPORTUNITIES. Aim to achieve positive student outcomes through innovative applied learning opportunities and experiences tied to at least one subject matter content area that will help students develop strong:

1) Problem solving skills. Students should learn how to solve problems by (but not limited to):
    a. Using content knowledge to design or improve a product, service, or system to meet an identified need; Between 3 and 5 rich, dynamic, hand-on learning experiences occur between the scientist in his/her lab and the students and teacher in the classroom over the course of a semester. Each live session is automatically recorded and saved to a video server that has been preconfigured for student and teacher access. These video files include both sides of the video conference so students can see and work with all the video from the lab and the classroom.

       To extend the motivation and interest generated during these sessions over the entire semester, teachers will deploy a problem-based learning format and assign students science and math projects that can be created and delivered digitally. Working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem. The role of the instructor is that of facilitator of learning, asking probing questions, providing appropriate resources, and leading class discussions. Projects will vary widely based on the parameters established by the teacher and the creativity brought to bear by each student.

       Typically, students will wirelessly download the original conference video(s) to their iPad2 devices from anywhere on campus. These digital video files are then cut, mixed with other digital content from other sources such as the Internet, the royalty free resources available on the district media archive or original material created by students. The completed media projects are rendered into web friendly formats for easy distribution over the district wide-area network as well as out to Internet and/or Intenet2.

The raw videos are re-imagined by our students into a host of original projects that as a minimum, require basic skills in digital file format conversion and transmission, creation of original audio and video media, mixing and editing projects together with source material (audio, video, animation, and stills) from numerous sources that come in a variety of formats.

Students are required to design projects around a broad theme such as "create digital media that will encourage students to select STEM courses during high school". This project could establish a direct connection between course content and the design of products and services to help meet the identified need of helping America create more scientists by increasing student interest in STEM disciplines earlier in their academic career.

Today, entertainment is America's number one export. These digital editing skills are not being taught in a separate course, with a separate classroom and teacher. The requirement to learn the skills is introduced in concert with a genuine need to use them. Over time, original student-generated content will permeate much of a schools digital landscape including blogs, student web sites and wikis, digital video and media pages, and a bevy of web 2.0 based applications.

The position of a Digital Media Producer recommended in this proposal will develop a series of on-line courses to demonstrate the basic use of iPads for communication and creation of original media and will work directly with teachers in planning student projects.

Students attending Barrow school during their high school years will graduate with real skills in the creation and management of digital content as a dividend of attending STEM courses in science and math infused with D2D enhancements.

b. Planning and organizing an event or activity from concept to completion; many of the digital products created by D2D students will begin with an original idea; and often require one or more processes such as a script, blocking, casting, rehearsal and creation of a digital story board. The overarching requirement of each project is to produce original media to meet a specific need or educational requirement.

c. Teaching a skill or planning a sequence of learning activities; and/or For example, the first generation of students could be assigned to create student orientation materials that next year's incoming students can use to quickly learn the basics of editing media on the iPad2.

d. Satisfying a client's needs. Creation of original media provides plenty of opportunity for students to perform work to meet the needs of a client. For example students might be asked to create a 60 second commercial designed to increase an elementary student's interest in math or science. These "commercials" will be played by the local TV station during half-time coverage of local football games. The importance of offering project –

based assignments that incorporate creativity and expression into science and math courses that have traditionally fallen to sage on the stage methods can be particularly important to minority students.

Claude Steele and Joshua Aronson performed the first experiments demonstrating that stereotype-threat can undermine intellectual performance. Their findings suggest that stereotype threat may occur in any situation where an individual faces the potential of confirming a negative stereotype. Using creative projects can help integrate creativity and production skills into the intellectual challenges inherent in the math and science course material. By deemphasizing the intellectual component in this manner, these courses can lead to better performance results for minority groups.

2) Communication skills and techniques. Students should learn how to apply communication tools and techniques by (but not limited to):
    a. Making oral presentations; Student media projects are all about communication. In most classes, students are limited in the number of opportunities to make oral presentations because class time is highly limited. Each time a student speaks to the camera built into their iPad2 to create a video segment, they are making an oral presentation. By making media products, each students opportunities to make meaningful oral presentations increases dramatically.

    b. Preparing written reports; and/or Preparation of written reports and creation of digital media are not mutually exclusive. The creation of original media projects makes assignments such as term papers, speeches, and science projects, more meaningful by leveraging publication on the web to greatly expand the audience. Teachers are still free to assign traditional writing projects to students as well. The infusion of media technology greatly expands assignment options

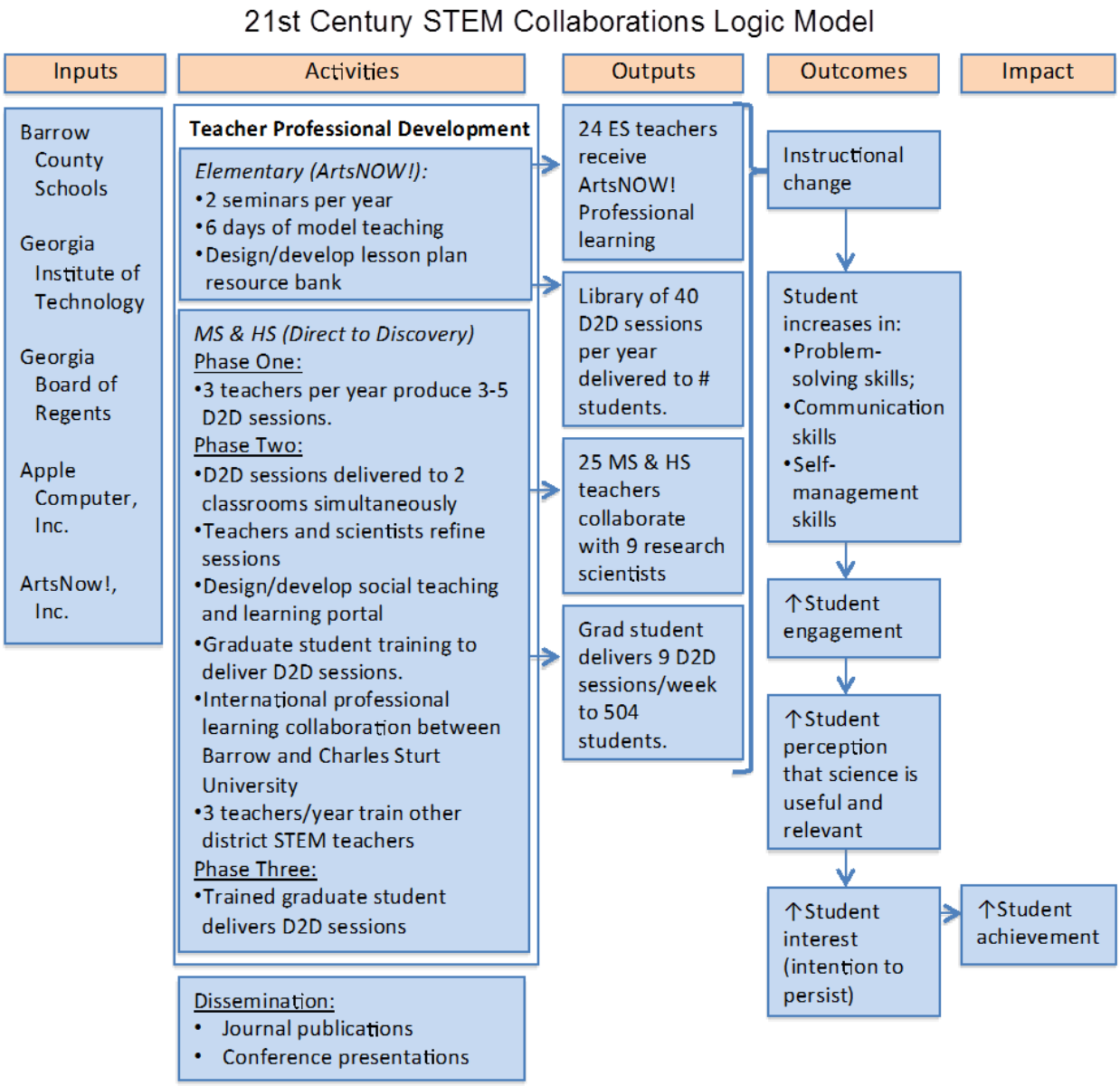
    c. Translating information from one format to another. Even in an enhanced D2D classroom a good deal of course information will be made available to students through the textbook and associated written materials. The inclusion hands-on, project based assignments will require students to regularly translate and edit materials between texts, web sites, photo and a host of other media to create an original piece of consumable media.

3) Self-management skills. Students will learn how to manage and direct their own learning by (but not limited to):
    a. Participating and/or leading teams; it is a common practice for teachers to group students into teams for various projects. For example a class can be divided into four teams with each assigned to create a 3 minute video describing a different aspect of the experiments they are running in conjunction with their Georgia Tech scientist.

    b. Taking responsibility for the evaluation of one's own work; and/or Planning and managing one's work activities. Publishing original digital media to the public is a big

motivator for students to put their best efforts into a project. The "publish to the web" aspect of most digital media projects brings a "public view" element that has historically been missing from most written assignments. All of a student's work on their iPad will be stored on the district cloud with additional opportunities to publish to the global audience via normal web based media outlets. Student will be required to manage their own files.

Section 4: Quality of Project Evaluation



Project Evaluation Description

The evaluation of 21st Century STEM Collaborations will be conducted by The Findings Group, LLC, an independent evaluation organization specializing in K-16 STEM evaluation. The proposed evaluation plan is designed to provide objective feedback of both performance and results measures. The evaluation

of the project emanates from the logic model (Figure 1) and is designed to provide ongoing, formative feedback as well as a summative evaluation.

The evaluation of 21st Century STEM Collaborations draws on the long-term goals of the Innovation Fund. The first goal, "Adopting standards and assessments that prepare students to succeed in college and the workplace and to compete in the global economy," is addressed through Barrow's value-added assessment model. The district has already established a practice of not only measuring student progress from year to year but of applying a model that demonstrates actual annual growth against projected growth.

The second goal, "Building data systems that measure student growth and success, and inform teachers and principals about how they can improve instruction," is addressed through the creation of a logic model which traces the school system's best thinking from professional development to instructional activity to student achievement. The logic model identifies how the program's activities affect critical predictors of student success (problem-solving skills, communication skills, self-management skills, student engagement, and perceptions of the relevance of their learning). By changing these critical student predictors, two outcome variables should be affected (students' intentions to persist in STEM and their actual achievement). This program enables line-of-sight measurement from teacher participation in professional learning to changes in the teachers' classrooms to changes in student success predictors to student outcomes.

Third, the partnership between The Findings Group, LLC, and Barrow County Schools addresses the third long-term goal of the Innovation Fund, "Recruiting, preparing, rewarding, and retaining effective teachers and principals, especially where they are needed most." The partnership addresses this goal by engaging teachers in the evaluation process. The evaluation plan specifically includes teachers and principals as stakeholders, data collectors, and critical informants. Principals and teachers are stakeholders who provide guidance to the program in response to formative and summative evaluation reports. The evaluation plan asks them to collect rubric-based data on student communication skills and to administer student surveys. Finally, they are critical informants asked to report on the critical connection between teacher professional development, classroom changes, and anticipated student outcomes.

Fourth, the partnership addresses the fourth long-term goal, "Turning around our lowest-achieving schools." While Barrow County Schools are not among the lowest-performing schools, Barrow County has not made adequate yearly progress since 2004, is seeing dramatic shifts in diversity, and serves student populations who are dramatically under-represented in most STEM fields. This partnership focuses not only on measuring student achievement but also on measuring the achievement of populations of students in comparison with one another.

Overall, the evaluation plan is designed to measure critical points between teacher professional development and student achievement. It enumerates the number of teachers served, their relationships with practicing scientists, the development and delivery of learning artifacts, changes in instruction, the impact of those changes on student characteristics (e.g. problem-solving skills, engagement, etc.), students intentions to persist in STEM education and careers, and student achievement on state assessments.

Section 5: Quality of Project Management Plan

The partnerships between Barrow County Schools, Georgia Tech and The Findings Group have been in place over the entire three year R&D period. The project is now ready for a full-scale field test to gather data relative to its ability to improve student performance in STEM subjects, attract students to STEM courses, and encourage students to seek STEM degrees in college.

Two years ago we realized that the D2D program could be made even stronger if the math skills of participating middle school students could be improved prior to taking a D2D enriched class. We discovered the ArtsNow team and ran a school level pilot program at Auburn Elementary school that has received very positive reviews by teachers, students and parents. This year we will receive standardized testing data from these students, but it seems clear from student performance on classroom assignments that the ArtsNow program offers an attractive and highly tactile solution to improve elementary math skills at the appropriate grade levels relative to D2D participation.

Finally, we have partnered with Apple Inc. to complete the technology requirements of next generation distance learning by providing the classroom components needed to extend the impact of the increased student interest and motivation generated by D2D enhancement sessions across the entire term of a course. The iPad2 units offer a highly interactive, 24/7 mobile computing experience for students and include a digital media creation software suite that is intuitive to use and ideally suited to the highly visual D2D experience.

Key Project Personnel

Edward Morrison developed this proposal and serves as the project director. He has been a school system IT Director for over fifteen years and holds a BS in strategic planning and logistics. As director for information technology at Barrow County Schools for the past ten years, he wrote the district motto of "World class education with Hometown Values" and has strived to move the district forward in pursuit of that vision. He brought the system from a copper wire, frame-relay network to a broadband fiber optic network providing 1Gb connectivity to every district facility and recently established high capacity connectivity to Georgia's own research and education network (Peachnet) including a dedicated broadband connection to Internet2. He is a founding partner in Direct to Discovery and has presented D2D seminars, demonstrations and presentations both nationally and internationally via global R&E networks. He established multiple partnerships with technology companies such as LifeSize to donate the initial "proof-of-concept" video conferencing units to GT and Barrow. He also partnered with Promethean to provide free interactive whiteboards for every middle school science classroom in support of D2D. Additionally, Mr. Morrison implemented the districts first enterprise level database systems for student services, finance, inventory, work orders, and human resources. Mr. Morrison will provide executive oversight for the project and direct supervision over the design of the T&L social network defined in Goal 3 of the scope of work.

Caroline Bucky, the district coordinator for technology integration, holds a M.Ed. in Educational Technology and has ten years of experience in this role. She will supervise all course enhancement development, professional development and classroom level implementation inherent in the project. She has developed and delivered over thirty technology integrated professional learning courses, both face-to-face and online. Performance-based courses, requiring on-site follow up, bring her into the classroom to

ensure standards have been met. Many of her course ideas and experience originate from the collective expertise of her Professional/Personal Learning Network (PLN), which she established in 2007 using social networking sites. Comprised of over 300 individuals around the world who work in her field, Ms. Bucky has capitalized on her collaborative relationships to introduce and implement cloud-based applications throughout the district. Most notable is the private label Wikispaces domain, which provides every administrator, teacher and student with a common platform on which they can create, communicate, collaborate, and publish a variety of content.

Jim Demmers is a Senior Research Associate in the Information and Communications Laboratory at the Georgia Tech Research Institute. Mr. Demmers will serve as Ms. Bucky's primary liaison for participating scientists, programmers and departments at Georgia Tech. Jim will ensure the integrity of the program from ensuring teacher/scientist scheduling of the summer GIFT fellowships, network, hardware, and lab scheduling support for the delivery of D2D course enhancements. Mr. Demmers will also oversee the design and development of a web portal that will be used as a front-end communications interface to allow researchers, teachers, and students to collaborate and share best practices. Mr. Demmers will also work closely with the media producer to film promotional and professional development materials from the labs and remote locations.

Dr. Tom McKlin has practiced education evaluation for over a decade and runs a research and evaluation firm, The Findings Group, LLC, which has a staff of four Ph.D.'s. with degrees in Instructional Technology, Social Psychology, Educational Psychology, and Neuroscience. TFG currently provides evaluation services to two-dozen active programs, 15 of which are federally funded through NSF, NIH, U.S. DOE, or DOD. Altogether, these projects represent approximately $20M in federal and state funding. Dr. McKlin and his staff focus their work primarily on K-16 STEM education, and many of these programs address diversity (gender, race/ethnicity, and ability) within STEM fields. Dr. McKlin previously worked as the Director of Evaluation for Georgia Tech's Center for Education Integrating Science, Mathematics, and Computing (CEISMC), a unit supporting over $18M in funded projects. His current clients include Georgia Tech, Georgia State University, Emory University, the University of Georgia, Armstrong Atlantic State University, Spelman College, Ohio State University, the National Center for Women in Information Technology, Computing Research Association, Coalition to Diversify Computing, and various school districts within Georgia.

Additional Personnel

The proposal calls for the creation of two support positions to be in place over the three year term of the project. Both positions will report directly to Ms. Bucky.

The Digital Media Producer is the key technologist for three primary areas. First the producer will create original video of the summer fellowships, classroom activities and scientist profiles for the professional development section of the dedicated T&L network developed by GT as the key communication, collaboration and support system for the project. Additionally the media producer will be the primary course developer for on-line teacher and student training in video editing and media production using an Apple iPad. This will also include creating an archive of student created digital media. And finally, the producer will generate commercial quality educational content from the GT labs in support of the project sustainability plan.

Mathematics is the language of science. The Math Integration Specialist will ensure that math and mathematic concepts are infused to the greatest extent practical in the D2D course enhancements as they are developed in support of the various middle and high school courses. The Math Specialist will also work closely with the ArtsNow math program in the elementary grades to assist in the professional development of participating teachers and with project evaluators to ensure the integrity of student performance data generated over the term of the project. Finally, the Math Specialist will assist in the creation of on-line professional development materials for the dedicated T&L network to advance the goals of the project and drive down the cost of sustainability.

Section 6 Quality of Sustainability Plan

This proposal recommends the development of a home grown solution that grays the traditional lines separating K-12 and the state's colleges and universities and application of a time tested solution for improving elementary math scores as a one-two punch for improving student performance in middle and high school STEM subjects.

The ArtsNow segment is comprised primarily of a professional development regime that can be maintained easily once the districts eight elementary schools have converted to the new approach. The Digital Media Producer and Math Integration Specialist will produce a short on-line course that will be rolled into new teacher orientation. We will also monitor the performance data for signs the ArtsNow process may over a cost cutting alternative to some of the computer based processes currently in place.

The district plans to fold the two new positions of Digital Media Producer and Math Integration Specialist into the local organizational structure. Beyond their tasking for this proposal, they will begin creation of on-line homework assistance videos and resources in support of the entire core curriculum and participate in future grant proposals.

Barrow County Schools is a K-12 Research District with an active agenda to remain proactive in researching practical solutions to student performance as our public schools evolve over time. As such we rely on grant funding and strategic partnerships to support our research and continuing development efforts over time. When the data shows a clear and attainable advantage for our students, the results of our research will be incorporated into our standard operations.

The Direct to Discovery model presented in this proposal will be maintained in Barrow by creating professional course enhancement video clip libraries to supplement science course delivery in schools without the benefit of high capacity networks. We have entered into preliminary talks with Safari Montage who is very interested in the possibility of publishing the video clips we create from front line Georgia research labs on an international scale with royalties flowing back to the labs to sustain the delivery of live D2D enhancements into Barrow. Our video clip libraries will fill a market niche that exists because traditional video comes out years after science discoveries have been made and our clips will take students to the very edge of science discovery.

Finally, the D2D process itself is being developed in a format that allows the process to be scaled to serve a much larger population of students. This is done primarily by focusing the creation of the D2D enhancements on teacher/scientist teams with the delivery of D2D enhancements focused on graduate students. The table on page 20 provides a simplified look at the underlying business model.

The table below assumes graduate students work a 24 hour week for 8 months each year for a salary of $20,000. Also, keep in mind that each session (course enhancement) runs for about 1 hour and on average a single high school course would be enhanced by 4 sessions over a single semester.

Direct To Discovery Scalability

	50% Grad Student Salary	Hours Per Week	Sessions Per Month	Classrooms Served Per Session	Courses Enhanced Per Semester	Courses Enhanced Per Year	Students Per Course	Students Served Per Year	Annual Cost Per Student
1 Lab	$10,000	12	48	2	96	192	28	5,376	$1.86
8 Labs	$80,000	96	384	2	768	1,526	28	43,008	$1.86
Barrow Annual Consumption Year 3 and Beyond						22	28	616	
Remaining Capacity						**1,514**	**28**	**42,392**	

Specific details would be unique to each lab. For instance, some labs may only be able to contribute fewer hours of K-12 outreach based on the needs of ongoing research. Additionally the chart is based on 8 months or 32 weeks of availability. The actual amount of lab time available can't be computed until the calendars for the labs and K-12 schools are examined to determine exactly how many enhancement sessions can be made available from each lab over the course of a year.

However, it is very clear that the Georgia Developed D2D model is easily within reach should the state or GDOE decide to pursue the concept of teacher/scientist collaborations, subject experts in the classroom supporting an interactive, inquiry-based learning process for STEM courses. Additionally, the D2D model can be extended to all core subjects should the student performance results from this proposal lend credence to a large scale deployment.

One cannot help but wonder what long-term impact tying our K-12 STEM courses directly to our frontline research labs may have on building a tech savvy work force or attracting new industry to Georgia. But we believe the data derived from this proposal will indicate it is an idea worth exploring.

GOVERNOR'S OFFICE OF PLANNING AND BUDGET
RACE TO THE TOP INNOVATION FUND BUDGET FORM

Name of Partnership: 21st Century STEM Collaborations: Applications of the Direct-to-Discovery Model	

SECTION A - BUDGET SUMMARY
INNOVATION FUND COSTS

Budget Categories	Project Year 1 (a)	Project Year 2 (b)	Project Year 3 (c)	Total (d)
1. Personnel	$197,000	$215,000	$234,000	$646,000
2. Fringe Benefits	$27,700	$27,700	$27,700	$83,100
3. Travel	$3,000	$3,000	$2,000	$8,000
4. Equipment	$565,305	$47,220	$0	$612,525
5. Supplies	$2,000	$2,000	$1,000	$5,000
6. Contractual	$170,100	$125,100	$105,000	$400,200
7. Construction	$0	$0	$0	$0
8. Other (iPad Apps)	$3500	$3500	$3500	$10,500
9. Total Direct Costs (lines 1-8)	$968,605	$423,520	$373,200	$1,765,325
10. Indirect Costs*	$0	$0	$0	$0
11. Training Stipends	$3,000	$2,000	$2,000	$7,000
12. Total Costs (lines 9-11)	$971,605	$425,520	$375,200	$1,772,325

SECTION B - BUDGET SUMMARY
NON-INNOVATION FUND COSTS

Budget Categories	Project Year 1 (a)	Project Year 2 (b)	Project Year 3 (c)	Total (d)
1. Personnel	$0	$0	$0	$0
2. Fringe Benefits	$0	$0	$0	$0
3. Travel	$0	$0	$0	$0
4. Equipment	$234,000	$0	$0	$234,000
5. Supplies	$0	$0	$0	$0
6. Contractual	$0	$0	$0	$0
7. Construction	$147,000	$0	$0	$147,000
8. Other	$0	$0	$0	$0
9. Total Direct Costs (lines 1-8)	$0	$0	$0	$0
10. Indirect Costs*	$0	$0	$0	$0
11. Training Stipends	$0	$0	$0	$0
12. Total Costs (lines 9-11)	$381,000			$381,000

SECTION C – BUDGET NARRATIVE (see instructions)

Budget Narrative

Section A: Innovation Fund Costs

Line Items 1 and 2: The personnel and Fringe Benefits line items are comprised of salary requirements for two full time positions and three partial salary requirements for incumbent personnel running over the entire three year period.

- The Direct To Discovery model is steeped in advance networking and digital media technologies. A full-time **Digital Media Producer/Trainer** is required to produce all of the original video, audio, animated and still media required by our proposal including:
    - Chronicles of the (6 week) teacher/scientist curriculum development and alignment sessions in Georgia Tech labs conducted each summer
    - Creation of prerecorded video of lab experiments and demonstrations required to meet the curriculum alignment and sustainability requirements of the project
    - Classroom video of Direct To Discovery and ArtsNOW in action
    - Professional development for all participating teachers on creating original content using Apple iPads and associated applications
    - Homework assistance videos available 24/7 from district website
    - Guest teaching in classrooms to introduce students participating in Direct To Discovery classrooms to pulling recordings of the classroom sessions with scientists from the video server and reinventing them into original projects using iPad2 units and associated applications and original content created by students including blogs, podcasts, video clips, stills, and wiki's
- A full-time, certified **Math Integration Specialist/Trainer** will attend summer sessions; moving between the various teacher/scientist teams to ensure an emphasis on math is imbedded in the lesson plans and interactive student activities created for each discipline from nanotechnology to marine biology. The Math specialist will also work closely with the ArtsNOW staff to establish sustainable train the trainer models and new teacher orientation. This position also serves as a lead collaborator and support touchstone for teachers building collaborations and resource collections on the dedicated teaching and learning network developed for this project.
- Coordinating the efforts of the Web Application Developer, Digital Media Producer, and the Math Integration Specialist will require an estimated 35% of the district **Technology Integration Specialists** time over the three years covered by this proposal. We are requesting $30,000 annually to cover the cost of project oversight.
- We are requesting a total of $21,000 for grant preparation, implementation oversight, and routine administrative overhead to meet the project reporting and accountability requirements of the project. This amount comprises 7% of the salary for the Project Director.
- Support for the networking infrastructure needed to provide multiple HD video streams to and from a dozen or more classrooms simultaneously, installation of secure wireless technology in schools, and support for hundreds of iPad2 represents 35% of our **Senior Network Administrator's** salary at $25,000 annually.

- The Senior Research Associate at GT serves as the primary liaison for the project, coordinates the selection of scientists and will oversee the development of the T&L network portal at an annual cost of $30,000 which represents 15% of his annual salary.
- In order to provide reliability and scalability to the Direct To Discovery process it is necessary for **graduate students** working with the scientists to participate in the K-12 outreach activities of the lab. This provides the reliability needed to ensure teachers that the events will happen at the scheduled times. This is very important because the teacher/scientist pairs designed these sessions to occur in concert with specific elements of the Georgia course curriculum. Compensation for graduate students is $5,000 for during the year the D2D sessions for the lab are in field testing and $10,000 for year 2 and 3 once they are fully trained to conduct concurrent outreach sessions on their own.

Position	**Year 1**	**Year 2**	**Year 3**	**Total**
Digital Media Producer	$45,000	$45,000	$45,000	$135,000
Math integration Specialist	$45,000	$45,000	$45,000	$135,000
Tech Integration Specialist	$30,000	$30,000	$30,000	$90,000
Senior Network Administrator	$25,000	$25,000	$25,000	$75,000
Project Director	$12,000	$5,000	$4,000	$21,000
Senior Research Associate	$30,000	$30,000	$30,000	$90,000
Graduate Students	$10,000	$35,000	$55,000	$100,000
	$197,000	$215,000	$234,000	**$646,000**
Fringe Benefits	**Year 1**	**Year 2**	**Year 3**	**Total**
Digital Media Producer	$11,200	$11,200	$11,200	$33,600
Math Integration Specialist	$16,500	$16,500	$16,500	$49,500
	$27,700	$27,700	$27,700	**$83,100**

Line Item 3: The ArtsNOW component of the project takes place locally within our elementary schools and does not require a travel allotment. The Direct To Discovery component relies on next generation distance learning technologies that greatly reduce the level of travel required. However, lead teachers are required to travel from Barrow to the Georgia Tech campus during the summer to work in collaboration with their assigned scientist to create the on-line curriculum enhancement sessions and the Media Producer will travel from Barrow to the GT labs filming canned video sequences to support the live sessions and the clip library required for sustainability

	Year 1	**Year 2**	**Year 3**	**Total**
Travel	$3,000	$3,000	$2,000	$8,000

Line Item 4: The equipment needs of our project are listed in Section A for items requiring innovation funds and also in Section B for $234,000 donated to the project by The Harrison Foundation for HS and MS Videoconferencing Carts. Also, a good deal of the equipment is already in place as the result of the previous three years of proof-of-concept and feasibility testing conducted by Georgia Tech and Barrow County Schools in the development of the Direct To Discovery model. For example some of the participating labs have already been configured with cameras, HD conferencing codecs and large screen monitors. And, with the exception of the new career academy charter school, all of the Barrow middle and high schools are equipped with two mobile teleconferencing carts that include a 55” LED display, video

camera & codec along with wireless microphones. Prices for all equipment referenced in this budget include full replacement warranty for the three year term of the project.

Georgia Tech	**Year 1**	**Year 2**	**Comments**
Network Bridge	$51,300		Allows multiple HD streams streams to and from labs
Network Video Center	$23,670		Allows each D2D session to be recorded and published to web
Network Transversal	$9,600		Allows streams to be securely run inside and outside firewall as needed
Media Field Kit	$5,650		Allows D2D sessions to be broadcast in the field via skype . The single kit will support all participating labs and includes: HDC-TM700K HD camcorder (2) - $2120 Extra Battery (2) - $80 Camera Bag (2) - $50 Tripod (2) - $200 Lifesize Passport System - $3200
Production Kits for (2) labs	$7,720		Upgrade 2 proof-of-concept labs to D2D production status. Each kit includes Lifesize PTZ Camera & Tripod $3,460, and wireless microphone kit $400
V-Conf Kits For (3) labs		$47,220	Three additional labs will be configured to provide D2D sessions. Kits include Lifesize Team Codec $10,780, 46" Samsung LED Display $1,100, Lifesize PTZ camera & Tripod $3,460, and wireless microphones $400
iPad2 Units For Scientists & Grad Students	$12,672		It is important to sync the equipment standards in use in the classroom with the program development and delivery teams in the labs. Teachers will bring their iPads into the labs during the summer fellowships.
	$110,612	$47,220	
Barrow City Schools	**Year 1**		
Network Bridge	$51,300		Allows Multiple HD streams streams to and from classrooms & content providers
Media Field Kit	$5,650		Contains the same equipment as the GT field kit above. Used by the Media Producer for all filming requirements including remote netcasts from conferences
iPad2 units for teachers, support staff, and Professional development	$27,456		Barrow will have 22 classrooms participating in D2D along with network, curriculum integration, and professional development support. (39 units total)
iPad2 units for students attending a D2D enhanced course	$355,432		Each of the 22 classrooms will require an iPad for each participating student. 616 units computed at 22 classes with 28 students each.
MacBook Pro and MacPro Quad	$7,255		The MacPro Quad is used by the Digital Media Producer to edit and render media into final product files. The Macbook is used by the Math Integration Specialist since her job takes place mostly in the field
Collaboration Cart	$7,600		V-conferencing cart for new Career Academy Charter School. Includes Lifesize Express $6,500, Cart $700, Wireless Mics $400
	$454,693		
Total Equipment	$565,305	$47,220	**$612,525**

Line Item 5: Supplies consist mostly of consumables including various forms of blank media, as well as paper and toner for professional development materials. The bulk of teacher and student created materials will be digital.

	Year 1	Year 2	Year 3	Total
Supplies	$2,000	$2,000	$1,000	$5,000

Line Item 6: Four primary segments of the project will be provided through contractual services from three of our coalition partners.

- The GIFT program at Georgia Tech provides the perfect medium for our lead teachers to meet and work over the summer in various research labs to create highly motivational course enhancements that are aligned to the Georgia performance standards in middle and high school math and science courses. The cost is $6,700 per teacher and includes stipends for participating teachers.
- The OIT department will be contracted to develop and implement a dedicated social networking and collaboration environment to serve as an on-line teaching and learning community for all teachers, scientists, and administrators participating in the continual development and use of live Direct To Discovery course enhancements. Beginning with a Facebook type set of social networking services, this portal will also include a full suite of collaboration tools including web based video conferencing, shared whiteboards and a host of digital media resources.
- ArtsNow! provides advanced professional development and teaching methodologies that effectively infuse life and interest into the study of mathematics through a blended approach that leverages rhythm and timing patterns inherent in music and dance to break through the boredom and span of attention barriers that make math difficult for many elementary students.
- The Findings Group illustrates the overarching logic model for our proposal and works directly with educators and administrators at Barrow and Georgia Tech to establish academically sound measurement and evaluation criteria for use over the entire three year period.

Georgia Tech GIFT Program	$20,100	$20,100		$40,200
Georgia Tech T&L Portal	$90,000	$45,000	$45,000	$180,000
ArtsNow!	$40,000	$40,000	$40,000	$120,000
The Findings Group	$20,000	$20,000	$20,000	$60,000
	$170,100	$125,100	$105,000	**$400,200**

Line Item 7: Not applicable

Line Item 8: Includes $3500 per year ($10,500 Total) for the purchase of iPad2 apps that teachers may find appropriate to customize the D2D experience for their class. This is enough to fund 1 app for every iPad2 each year.

Line Item 10: Not applicable

Line Item 11: Over the duration of the project the overall cost of professional development (including **stipends**) will decline as the teaching and learning portal developed for the project by Georgia Tech is leveraged more fully. We are requesting 30 days at $100/day for year 1, declining to 20 days in year 2 and 10 days in year 3.

	Year 1	Year 2	Year 3	Total
Stipends	$3,000	$2,000	$1,000	$6,000

Section B

Section B Non-Innovation Fund Costs

Line Items 1, 2 and 3: Not applicable

Line Item 4: Last year the Harrison Foundation awarded Barrow a $234,000 grant to begin the Direct To Discovery implementation in middle schools and high schools. Each HS and MS now has 2 mobile videoconference carts and our network was upgraded so teachers can record both sides of a video conference regardless where it originates.

Line Item 5 and 6: Not applicable

Line Item 7: If bond funds are available as detailed in Item 4: Grant Award Agreement on page 12 of the RFP, Barrow requests consideration for funds totaling $147,000 to connect our new College and Career Preparatory Academy to our Colleen Williams Cultural Center which houses our local TV station and community theater building . Barrow is one of the first 10 districts in Georgia fully approved as a charter system so this new high school academy is also a charter school. This gigabyte fiber connection will allow the cultural center to become a content provider for our high school broadcast media courses. Since we operate a high speed fiber ring this connection will bring this wonderful community resource into every school and more specifically into our D2D enhanced science and math classes. Students will create a variety of original projects such as commercials urging students to attend college or sign-up for science and math courses that can be aired to the general public during local football games and a host of other opportunities that students will imagine on their own. This single run will bring the public into the D2D process in a very meaningful way and allow this wonderful county resource to participate fully as a distance learning content provider and for the public to receive on-air content from any Barrow classroom.

Line Items 8, 9, 10 and 11: Not applicable

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) is entered into by and between the Governor's Office of Planning and Budget (OPB) and 21st Century STEM Collaborations: Applications of the Direct-to-Discovery Model (Partnership). The purpose of this agreement is to establish a framework of collaboration, as well as articulate specific roles and responsibilities in support of the State in its implementation of approved Innovation Fund projects.

I. SCOPE OF WORK

Exhibit 1, the Preliminary Scope of Work, indicates the work that the Partnership is agreeing to implement.

II. PROJECT ADMINISTRATION

A. PARTNERSHIP RESPONSIBILITIES

The Partnership agrees to:

1) Implement the plan as identified in Exhibit I of this agreement;
2) Actively participate in all relevant convenings, communities of practice, or other practice-sharing events that are organized or sponsored by OPB, the Georgia Department of Education, the Governor's Office of Student Achievement and the US Department of Education;
3) Post to any website specified by the State in a timely manner, all non-proprietary products and lessons learned using funds associated with the Innovation Fund;
4) Participate, as requested, in any evaluations of this grant conducted by the State or agency conducting business on behalf of the State;
5) Be responsive to State requests for information including the status of the project, project implementation, outcomes, and any problems anticipated or encountered; and
6) Participate in meetings and telephone conferences with the State to discuss (a) progress of the project, (b) potential dissemination of resulting non-proprietary products and lessons learned, (c) plans for subsequent years of the Innovation Fund grant period, and (d) other matters related to the Innovation Fund grant and associated plans.

B. STATE RESPONSIBILITIES

The State agrees to:

1) Timely distribute the Partnership's grant during the course of the project period;
2) Provide feedback on the Partnership's status updates, annual reports, any interim reports, and projects plans and products; and
3) Identify sources of technical assistance for the project.

C. JOINT RESPONSIBILITIES

1) OPB and the Partnership will each appoint a key contact person for the Innovation Fund grant.
2) These key contacts from OPB and the Partnership will maintain frequent communication to facilitate cooperation under this MOU.
3) State and Partnership grant personnel will work together to determine appropriate timelines for project updates and status reports throughout the grant period.
4) State and Partnership grant personnel will negotiate in good faith to continue to achieve the overall goals of the Innovation Fund.

D. STATE RECOURSE FOR PARTNERSHIP NON-PERFORMANCE

If OPB determines that the Partnership is not meeting its goals, timelines, budget, or annual targets or is not fulfilling other applicable requirements, OPB will take appropriate enforcement action, which could

include a collaborative process between OPB and the Partnership, or any of the enforcement measures that are detailed in 34 CFR section 80.43 including putting the Partnership on reimbursement payment status, temporarily withholding funds, or disallowing costs.

III. ASSURANCES

The Partnership hereby certifies and represents that it:

1) Has all requisite power and authority to execute this MOU;
2) Agrees to implement the work indicated in Exhibit I, if funded;
3) Will comply with all terms of the grant and all applicable Federal and State laws and regulations, including laws and regulations applicable to the Race to the Top program and the applicable provisions of EDGAR (34 CFR Parts 74,75, 77, 79, 80, 81, 82, 84, 85, 86, 97, 98 and 99).

IV. MODIFICATIONS

This Memorandum of Understanding may be amended only by written agreement signed by each of the parties involved.

V. DURATION/TERMINATION

This Memorandum of Understanding shall be effective, beginning with the date of the last signature hereon and, if a grant is received, ending upon the expiration of the grant project period, or upon mutual agreement of the parties, whichever occurs first.

VI. SIGNATURES

Partnership Executive Official – required:

Wayda Creel
Signature/Date

Dr. Wanda Creel, Superintendent, Barrow County Schools
Wanda Creel, Superintendent
Print Name/Title

Partnership Member

Partnership Member – required:

Lyn Stanfield
Signature/Date

Lyn Stanfield
Print Name/Title Strategic Relations Mgr.

Partnership Member – required:

6/28/2011
Signature/Date

Tom McKlin, President
Print Name/Title The Findings group, LLC

Partnership Member – required:

6/28/2011
Signature/Date

Tom McKlin, President
Print Name/Title The Findings group, LLC

Partnership Member – required:

Pamela W Millice
Signature/Date

Pamela Millice,
Print Name/Title ArtsNOW Chief Executive Officer

Governor's Office of Planning and Budget – required:

_____

Signature/Date

_____

Print Name/Title

ASSURANCES

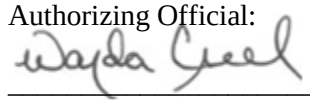
The Applicant hereby assures and certifies compliance with all federal statutes, regulations, policies, guidelines and requirements, including OMB Circulars No. A-21, A-87, A-110, A-122, A-133; E.O. 12372 and Uniform Administrative Requirements for Grants and Cooperative Agreements 28 CFR, Part 66, Common rule, that govern the application, acceptance and use of federal funds for this federally-assisted project.
Also the Applicant assures and certifies that:

1. It possesses legal authority to apply for the grant; that a resolution, motion or similar action has been duly adopted or passed as an official act of the applicant's governing body, authorizing the filing of the application, including all understandings and assurances contained therein, and directing and authorizing the person identified as the official representative of the applicant to act in connection with the application and to provide such additional information
2. It will comply with requirements of the provisions of the Uniform Relocation Assistance and Real Property Acquisitions Act of 1970 (P.L. 91-646) which provides for fair and equitable treatment of persons displaced as a result of federal and federally - assisted programs.
3. It will comply with provisions of federal law which limit certain political activities of employees of a State or local unit of government whose principal employment is in connection with an activity financed in whole or in part by federal grants. (5 USC 1501, et seq.)
4. It will comply with the minimum wage and maximum hours provisions of the Federal Fair Labor Standards Act if applicable.
5. It will establish safeguards to prohibit employees from using their positions for a purpose that is or gives the appearance of being motivated by a desire for private gain for themselves or others, particularly those with whom they have family, business, or other ties.
6. It will give the sponsoring agency or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the grant.
7. It will comply with all requirements imposed by the federal sponsoring agency concerning special requirements of law, program requirements, and other administrative requirements.
8. It will insure that the facilities under its ownership, lease or supervision which shall be utilized in the accomplishment of the project are not listed on the Environmental Protection Agency's (EPA) list of Violating Facilities and that it will notify the federal grantor agency of the receipt of any communication from the Director of the EPA Office of Federal Activities indicating that a facility to be used in the project is under consideration for listing by the EPA.
9. It will comply with the flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973, Public Law 93-234, 87 Stat. 975, approved December 31, 1976, Section 102(a) requires, on and after March 2, 1975, the purchase of flood insurance in communities where such insurance is available as a condition for the receipt of any federal financial assistance for construction or acquisition purposes for use in any area that has been identified by the Secretary of the Department of Housing and Urban Development as an area having special flood hazards. The phrase "federal financial assistance" includes any form of loan, grant, guaranty, insurance payment, rebate, subsidy, disaster assistance loan or grant, or any other form of direct or indirect federal assistance.
10. It will assist the federal grantor agency in its compliance with Section 106 of the National Historic Preservation Act of 1966 as amended (16 USC 470), Executive Order 11593, and the Archeological and Historical Preservation Act of 1966 (16 USC 569 a-1 et seq.) by (a) consulting with the State

Historic Preservation Officer on the conduct of investigations, as necessary, to identify properties listed in or eligible for inclusion in the National Register of Historic Places that are subject to adverse effects (see 36 CFR Part 800.8) by the activity, and notifying the federal grantor agency of the existence of any such properties, and by (b) complying with all requirements established by the federal grantor agency to avoid or mitigate adverse effects upon such properties.

11. It will comply, and assure the compliance of all its sub-grantees and contractors, with the applicable provisions of Title I of the Omnibus Crime Control and Safe Streets Act of 1968, as amended, the Juvenile Justice and Delinquency Prevention Act, or the Victims of Crime Act, as appropriate; the provisions of the current edition of the Office of Justice Programs Financial and Administrative Guide for Grants, M7100.1; and all other applicable federal laws, orders, circulars, or regulations.
12. It will comply with the provisions of 28 CFR applicable to grants and cooperative agreements including Part 18, Administrative Review Procedure; Part 20, Criminal Justice Information Systems; Part 22, Confidentiality of Identifiable Research and Statistical Information; Part 23, Criminal Intelligence Systems Operating Policies; Part 30, Intergovernmental Review of Department of Justice Programs and Activities; Part 42, Nondiscrimination/Equal Employment Opportunity Policies and Procedures; Part 61, Procedures for Implementing the National Environmental Policy Act; Part 63, Floodplain Management and Wetland Protection Procedures; and federal laws or regulations applicable to Federal Assistance Programs.
13. It will comply, and all its contractors will comply, with the nondiscrimination requirements of the Omnibus Crime Control and Safe Streets Act of 1968, as amended, 42 USC 3789(d), or Victims of Crime Act (as appropriate); Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973, as amended; Subtitle A, Title II of the Americans with Disabilities Act (ADA) (1990); Title IX of the Education Amendments of 1972; the Age Discrimination Act of 1975; Department of Justice Non-Discrimination Regulations, 28 CFR Part 42, Subparts C, D, E, and G; and Department of Justice regulations on disability discrimination, 28 CFR Part 35 and Part 39.
14. In the event a federal or state court or federal or state administrative agency makes a finding of discrimination after a due process hearing on the grounds of race, color, religion, national origin, sex, or disability against a recipient of funds, the recipient will forward a copy of the finding to the Office for Civil Rights, Office of Justice Programs.
15. It will provide an Equal Employment Opportunity Program if required to maintain one, where the application is for $500,000 or more.
16. It will comply with the provisions of the Coastal Barrier Resources Act (P.L. 97-348) dated October 19, 1982 (16 USC 3501 et seq.) which prohibits the expenditure of most new federal funds within the units of the Coastal Barrier Resources System.
17. It will comply will all ARRA requirements. All funds must be spent with an unprecedented level of transparency and accountability. Accordingly, recipients of ARRA funds must maintain accurate, complete, and reliable documentation of all ARRA expenditures.

Authorizing Official:



_____Superintendent___6/27/2011

Signature and Title Date

NON-SUPPLANTING CERTIFICATION

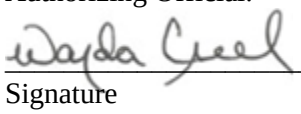
Regulations require certification to the effect that grant funds will not be used to increase state or local funds that would, in the absence of such grant aid, be made available for the purpose of this grant program.

CERTIFICATION:

I certify that grant funds will not be used to supplant state or local funds that would otherwise be available for implementation of this grant program.

I further certify that the program proposed in the grant application meets all the requirements of the applicable Race to the Top Innovation Fund Request for Proposal; that all the information presented is correct and that the applicant will comply with the provisions of the Governor's Office of Planning and Budget, all applicable federal and state laws, and the above mentioned certification should a grant be awarded.

Authorizing Official:



Signature

Superintendent, Barrow County Schools 6/27/2011

Title Date

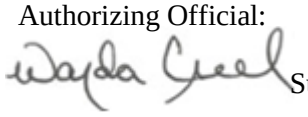
IMMIGRATION AND SECURITY FORM

A. In order to insure compliance with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act OCGA 13-10-90 et.seq., Contractor must initial one of the sections below:

Contractor has 500 or more employees and Contractor warrants that Contractor has complied with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act by registering at https://www.vis-dhs.com/EmployerRegistration and verifying information of all new employees; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et.seq. Contractor has 100-499 employees and Contractor warrants that no later than July 1, 2008, Contractor will register at https://www.visdhs.com/EmployerRegistration to verify information of all new employees in order to comply with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et.seq. Contractor has 99 or fewer employees and Contractor warrants that no later than July 1, 2009, Contractor will register at https://www.visdhs.com/EmployerRegistration to verify information of all new employees in order to comply with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et.seq.

B. Contractor warrants that Contractor has included a similar provision in all written agreements with any subcontractors engaged to perform site under this Contract.

Authorizing Official:



Superintendent 6/27/2011

Signature and Title Date

CERTIFICATION REGARDING LOBBYING (ED 80-0013)

Certification for Contracts, Grants, Loans and Cooperative Agreements.

The undersigned certifies, to the best of his or her knowledge and belief, that:

1) No Federal appropriated funds have been paid or 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 Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal Loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

2) If any funds other Federal appropriated funds have been paid or will be paid 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 Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loam or cooperative agreement, the undersigned shall complete and submit Standard Form – LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance.

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee or any agency, a member of Congress, an officer or employee of Congress or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Authorizing Official:

Wayda Creel Superintendent 6/27/2011

Signature and Title Date

OTHER CERTIFICATIONS

Regulations require certification to the effect that grant funds will not be used to increase state or local funds that would, in the absence of such grant aid, be made available for the purpose of this grant program.

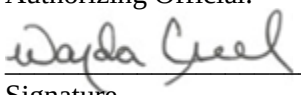
1. Any person associated with the program that has reasonable cause to believe that a child has been or is being abused, shall be required to report or cause report to be made with regard to the abuse as provided in O.C.G.A. 19-7-5.

2. Background investigations (Georgia Crime Information Center) are required on all persons with direct contact with children and youth. It is left to the discretion of the Partnership to determine the methodology for completing these investigations.

3. Establish/enforce an Internet Security Policy when minor participants and/or staff have online access (supervised or unsupervised). This includes any technology provided by PLC funding and technology used by participants.

4. The grantee agrees to comply with Public Law 103-227, also known as the Pro-Children Act of 1994, which requires that smoking not be permitted in any portion of any indoor facility owed or leased or contracted for by the grantee and used routinely or regularly for the provision of healthy care, day care, early childhood development site, education or library site to children under the age of 18. Failure to comply with the provisions of the law may result in the imposition of a civil monetary penalty up to $1,000 for each violation and/or the imposition of an administrative compliance order on the grantee.

Authorizing Official:



Signature

Superintendent 6/27/27

Title Date

RACE TO THE TOP INNOVATION FUND SCOPE OF WORK

RACE TO THE TOP INNOVATION FUND SCOPE OF WORK				
NAME OF PARTNERSHIP: 21ST CENTURY STEM COLLABORATIONS: APPLICATIONS OF THE DIRECT-TO-DISCOVERY MODEL				
GOAL 1: DEVELOP AND IMPLEMENT LONG-TERM, NETWORK BASED TEACHING AND LEARNING COLLABORATIONS BETWEEN PRACTICING RESEARCH SCIENTISTS AND TEACHERS IN MIDDLE AND HIGH SCHOOL MATH AND SCIENCE CLASSES.				
ACTIVITY	**IMPLEMENTATION STEPS**	**TIMELINE**	**RESPONSIBILITY**	**FUNDING SOURCE**
Ensure access to high bandwidth/low latency network for university & district	Connection to Peachnet places state universities and district on Georgia's dedicated research and education network	Complete	Barrow and GT	Local Funds
Install HD video conferencing equipment in labs and classrooms	Install video conferencing equipment in (3) labs & upgrade camera in 2 labs. Complete network routing and video server installations at GT and BCS	Year 1 (Classroom units already installed)	Barrow and GT	Innovation Fund
Ensure capacity to meet project work requirements is available in labs and schools	Provide partial salary for graduate students in the labs and key school district personnel. Hire Media Producer and Math Integration Specialist at district	Year 1,2,3	Barrow and GT	Innovation Fund
Develop on-line professional development course for new teachers	The Media Producer works with teachers and scientist to create on-line orientation videos for incoming teachers that have not attended GIFT and in support of district "train-the-trainer" model. Courses available on dedicated T&L network portal	Year 1 & 2	Barrow and GT	Innovation Fund
GOAL 2: CREATE INTERACTIVE COURSE ENHANCEMENTS DELIVERED BY SCIENTISTS AND GRADUATE STUDENTS THAT BRING HEIGHTENED RELEVANCE AND INTEREST INTO THE STUDY OF MATH AND SCIENCE AND EXPAND LEARNING EXPERIENCES FOR STUDENTS.				
ACTIVITY	**IMPLEMENTATION STEPS**	**TIMELINE**	**RESPONSIBILITY**	**FUNDING SOURCE**
Teacher/Scientist teams create original D2D course enhancements	Leverage the GIFT program at GT to send teachers on 6 week, summer fellowships with scientists to create D2D course enhancements aligned to GPS	Year 1,2,3	Barrow and GT	Innovation Fund
Field test D2D course enhancements in actual classrooms	Lead teacher returns from GIFT and partners with another district teacher to field test the new D2D course enhancements in 2 classrooms – tweaking as necessary	Year 1,2,3	Barrow and GT	Innovation Fund
Collect student performance data and evaluation measurements	The Findings Group, BCS Testing coordinator and data reporting manager will adhere to accountability and evaluation norms established in section 4 of this proposal	Year 1,2,3	Barrow and The Findings Group	Innovation Fund
Scale content delivery capacity of labs to meet local and or state requirements	This project creates an enormous renewable educational resource by equipping 8 leading research labs with powerful K-12 outreach capacity.	Year 3 and beyond	GT	Innovation Fund

Activity	Implementation Steps	Timeline	Responsibility	Funding Source
Goal 3: Establish a network based teaching and learning portal to facilitate professional learning, teacher to teacher collaborations, Teacher to outside subject expert collaborations, and the sharing of ideas, methods and resources.				
Define services required	Stakeholders establish modular requirements of T&L Portal including selection of specific services to be made available within the portal structure	August 2011	Barrow and GT	Innovation Fund
Build server to specification	Programmers develop social network at GT and begin assigning account access for testing group of teachers and scientists	Sept-Nov 2011	GT	Innovation Fund
Testing and modifications	Lead teachers use system and provide feedback for improvement. All D2D teachers and scientists are full account access while development feedback to programmers continues	Over course of project	Barrow and GT	Innovation Fund
Backup and security systems are complete and turn-key server is ready for transfer	Programmers and barrow networking team install T&L network server in Barrow server farm for sustainability after year three	Year 3	Barrow and GT	Innovation Fund
Goal 4: Improve the mastery of math skills in elementary school to prepare students to fully participate in the advanced science and math opportunities awaiting them in middle and high school.				
System-wide professional development workshops	Two sessions per year (one per semester), structured as half-day hands-on sessions introducing educators from all 8 elementary schools (grades 3-5), arts specialists, and math coaches to innovative instructional strategies integrating the arts with specific Mathematics and Science standards	Year 1,2,3	ArtsNow	Innovation Fund
In-class model teaching demonstrations	Six days of in-class demonstrations with students modeling innovative instruction to be observed and/or video-taped and live streamed for maximum reach	Year 1,2,3	ArtsNow	Innovation Fund
Design and development of Innovative Lesson Resource Bank for Disseminstion	Lesson bank to be developed with representatives from all 8 Barrow County Elementary Schools alongside ArtsNOW consultants; will be housed on county website and endorsed to all elementary educators	Year 1,2,3	ArtsNow	Innovation Fund
Goal 5: Disseminate findings widely to educators, community leaders and stakeholders				
Local invitations	Educators, community leaders, and local stakeholders will be invited to observe direct-to-discovery classes	Year 2, 3 & beyond	Barrow	Innovation Fund
State level dissemination	Presentations at Georgia educational conferences including GAEL, GaETC, and CoSN	Year 2, 3 & beyond	Barrow, GT, ArtsNow, and The Findings Group	Innovation Fund
National dissemination	Presentation at Teaching & Learning, ISTE, and Internet2 conferences	Year 2, 3 & beyond	Barrow, GT, ArtsNow, and The Findings Group	Innovation Fund
Periodicals	Various periodicals will be targeted for article submissions including T&L, and eSchool News	Year 2, 3 & beyond	Barrow, GT, ArtsNow, and The Findings Group	Innovation Fund
Global	Postings on D2D projects, teacher testimonials, student comments, scientists observations and schedule of events will be made to www.d2d-gt.org and www.directtodiscovery.org	Year 2, 3 & beyond	Barrow & GT	Local Funds

1. GEORGIA BENEFITS FROM A STRONGER UNDERSTANDING OF THE TYPES OF INNOVATIVE PROGRAMS, STRATEGIES, AND PRACTICES THAT WILL LEAD TO POSITIVE IMPROVEMENTS IN APPLIED LEARNING, TEACHER INDUCTION, AND HOMEGROWN TEACHER PIPELINE EFFORTS*		
INDICATOR(S)	DATA COLLECTION METHODS(S)	FREQUENCY OF DATA COLLECTION/REVIEW
2,560 students demonstrate improvements in problem solving and self-management skills from beginning of the academic year to the end.	Student problem-solving abilities often lie in their perceptions about their own problem-solving abilities such as their goal orientation, interest, critical thinking, metacognitive self regulation, effort regulation, and help seeking. We propose to measure problem-solving and self-management skills using the Motivated Strategies for Learning Questionnaire (MLSQ)	Annually with a pre-administration in September and post-administration in late March or early April.
2,560 students demonstrate improvements in communication skills	Teacher rubric to assess student communication skills. Evaluators collect scores and compare scores from the beginning of the course to the end for elementary, middle, and high school students in program-impacted courses.	
Number and percentage of middle and high school students that experienced a specified gain in problem-solving, communication and self-management skills	Survey participating students using the following scales: • Student Engagement scale from the Student Climate Survey (Cronbach's alpha = 0.72 when administered in 2010-2011 to a similarly-sized school district in Georgia). • Perceived Usefulness of STEM (Cronbach's alpha = 0.916 when administered to biotechnology students in Cobb, Gwinnett, Barrow, and Walton during the 2010-2011 school year) • Intention to Persist (Cronbach's alphas range from 0.81 to 0.93)	Annually with a pre-administration in September and post-administration in late March or early April.
Number and percentage of elementary students that experienced a specified gain in problem-solving, communication and self-management skills	Survey elementary students' engagement in STEM using either: • Baldwin Confidence Survey Form • AWE's Upper Elementary Survey Form • Or another scale tailored to measure 3-5 grade STEM engagement	

***This proposal specifically addresses improvement in applied learning

2. GEORGIA BENEFITS FROM A MEASURABLY STRONGER COMMITMENT FROM PUBLIC AND PRIVATE SECTORS TO SUPPORT AND ADVANCE POSITIVE ACADEMIC OUTCOMES FOR STUDENTS		
INDICATOR(S)	DATA COLLECTION METHODS(S)	FREQUENCY OF DATA COLLECTION/REVIEW
Dollar amount raised or leveraged to support ongoing implementation of proposed initiative	Collection and tally of project donations and funding sources	Annually, reflectively in June.

3. GEORGIA BENEFITS FROM AN INCREASED NUMBER AND PERCENTAGE OF STUDENTS AND TEACHERS WHO WILL HAVE ACCESS TO INNOVATIVE PROGRAMS, STRATEGIES, AND PRACTICES RELATED TO APPLIED LEARNING AND TEACHER/LEADER RECRUITMENT AND DEVELOPMENT		
INDICATOR(S)	DATA COLLECTION METHODS(S)	FREQUENCY OF DATA COLLECTION/REVIEW
Number of middle and high school teachers served (target = 25)	Participant database	Updated quarterly
Number of elementary teachers served (target = 24)		
Number of administrators and technologists served (target = 7)		
Number of Georgia Tech research scientists served (target = 9)		

4. GEORGIA BENEFITS FROM IMPROVED STUDENT OUTCOMES		
INDICATOR(S)	DATA COLLECTION METHODS(S)	FREQUENCY OF DATA COLLECTION/REVIEW
Increased student achievement among high school students taking Physical Science and Biology End of Course Tests (EOCT). • Biology: increase from 70.0% Meets/Exceeds in 2011 to 84.0% Meets/Exceeds in 2014 • Physical Science: increase from 72.2% Meets/Exceeds in 2011 to 85.0% in Meets/Exceeds in 2014. • Or a 5.0 NCE value-added increase relative to Georgia State Average on either measure	Increase in pass rate or value added progress from year to year on EOCTs in Biology and Physical Science	Data are collected annually (calculated at the end of June); analyzed as an outcome variable in regression models, and disaggregated by race/ethnicity, gender, and ability.
Increase student achievement among middle school students in EOCT Science as follows: • Grade 6: increase from 78.25% (2011) Meets/Exceeds to 95.0 % in 2014 • Grade 7: increase from 86.80% (2011) Meets/Exceeds to 95.0 % in 2014 • Grade 8: increase from 70.19% (2011) Meets/Exceeds to 95.0 % in 2014 • Or a 5.0 NCE value-added increase relative to Georgia State Average on either measure	Increase in pass rate or value added progress from year to year on CRCT in Science.	
Increase student achievement among elementary school students on the CRCT as follows: Math: • Grade 3: increase from 83.65% (2011) Meets/Exceeds to 95.0 % in 2014 • Grade 4: increase from 84.83% (2011) Meets/Exceeds to 95.0 % in 2014 • Grade 5: increase from 90.07% (2011) Meets/Exceeds to 95.0 % in 2014 Science: • Grade 3: increase from 81.89% (2011) Meets/Exceeds to 95.0 % in 2014 • Grade 4: increase from 81.37% (2011) Meets/Exceeds to 95.0 % in 2014 • Grade 5: 8 increase from 79.60% (2011) Meets/Exceeds to 95.0 % in 2014 • Or 5.0 NCE value-added growth relative to state average on any Science or Math assessment listed above.	Increase in pass rate or value added progress from year to year on CRCT in Science and Math.	

5. ADDITIONAL MEASURES: OUTPUTS AND INSTRUCTIONAL CHANGE		
INDICATOR(S)	DATA COLLECTION METHODS(S)	FREQUENCY OF DATA COLLECTION/REVIEW
Teacher professional development outputs	Tracking tools (sign-in sheets and activity logs) to measure the number of teachers receiving professional learning, the number of D2D sessions per year, the number of students receiving D2D sessions, and the number of collaborations among teachers and practicing scientists	Monthly updates to tracking tools. Data will be analyzed using descriptive statistics.
Instructional change	Interviews or group interviews with teachers receiving professional learning.	Annual interviews using an interview protocol following Guskey's model for professional development