

Louisiana Board of Regents
2011 Academic Program/Low Completer Review
APPEAL for CONTINUATION of Existing Academic Program

Please submit an electronic copy (email attachment, Word or Word Perfect Document preferred; signed PDF may also be attached) of the completed document to Dr. Karen Denby, Associate Commissioner for Academic Affairs, at karen.denby@la.gov no later than **Monday, February 28, 2011**. Early submission is welcome. All requests for continuation must be submitted through the appropriate system office. Address all 10 issues, but please limit the response to three pages or less. Recommendations to the Board of Regents will be based on this appeal, as well as consideration of the statewide inventory and relevance to institutional role and scope, particularly for graduate-level programs.

Note: Upon completion of the 3rd page, with a few key information that had to be noted more than once, we still had critical data and information to provide. Hence, we request the forgiveness of the reader for providing these data and information on the 4th page. The high quality of the programs (as measured by totally external standards), the high grant and service production of the faculty and the significant publication records are all services to SUBR, Louisiana, and the Nation.

General Information

DATE: February 24, 2011

Campus: Southern University and A&M College in Baton Rouge	Program: Title, CIP, Degree/Certificate Awarded Department of Physics, CIP: 400801, BS Degree Program in Physics
Contact Person & Access Info (if clarification is needed): Diola Bagayoko, Ph.D., Chairman Telephone: 225-771-2730 (Office) 225-205-7482 (Cell); Fax: 225-771-4341 E-mail: Diola_Bagayoko@subr.edu or Bagayoko@aol.com Room 232 W. James Hall, SUBR, Baton Rouge, LA 70813	

1. Brief description of the program, including enrollment by year classification, faculty support by type, space/facilities, and administrative support.

The department offers the BS degree program in Physics. Its graduates, until fall 2010, were mostly prepared to pursue advanced degrees (MS, Ph.D.), which they have done successfully at a rate (over 70%) higher than graduates from any other physics department known to us.

It has 14 full time faculty members and sometimes employs 2 full time equivalent (FTE) of adjunct faculty members to meet the extensive needs for its service courses for science and technology majors and the rest of the University.

The Department has provided for its administrative support needs through grants, from the summer of 2009 to present.

The enrollment of the Department of Physics declined in the mid to late 2000s, due to dispositions of the University that prevented the Timbuktu Academy from recruiting physics majors. These dispositions ended in 2009. As per official data, the undergraduate enrollment in 2007-08, 2008-09, 2009-10 were 13, 15, and 20, respectively. With the return of the Academy to the recruitment of majors, our enrollment already jumped by 1/3 in 2009-10, en route to well over 30. One indication of this occurrence is the fact that when the Board of Regents employed consultants to review all public physics departments in 1996, the Department of Physics at SUBR is the only one they commended. Their report noted: *"The undergraduate Physics Program at SUBR is among the best we have encountered anywhere ... and the vehicle for this has been the altogether remarkable organization, the Timbuktu Academy."* Our enrollment at the time was over 50!

The Department occupies the first floor and most (3/4) of the second floor in James Hall. It has eight (8) large instructional laboratories, nine (9) research laboratories (medium size), and 18 offices that meet its needs.

An Important Note: A 1992 study of the University showed that the Department of Physics generated, in student credit hours (SCHs), more than \$200,000 than was spent on the Department. This occurred before the Timbuktu Academy's impact led to a jump in the enrollment of majors to over 60. It was below 20 at the time. While the exact amount of this surplus is not known today, a surplus does exist, as SCH production data.

Enrollment: Declared Majors	SPRING 2011 enrollment Data:					
	FR	SOPH	JR	SR	M/Sp	PhD
	9	3	2	6	2	N/Ap
Faculty Support of this Major	T	TT	FT	PT	Adjunct	Other
And for service courses	13	1			2	

Space/facilities; administrative support; etc.

The Department occupies the first floor and most (3/4) of the second floor in James Hall. It has eight (8) large instructional laboratories, nine (9) research laboratories (medium size), and 18 offices that just meet its needs.
The Department, as of the summer of 2009, has been providing for its administrative support personnel through grants.

2. Projected enrollments (majors) and completers for the next five years with justification for such projections.

2010-11		2011-12		2012-13		2013-14		2014-15	
Enrl	Compl	Enrl	Compl	Enrl	Compl	Enrl	Compl	Enrl	Compl
20	4	25	2	28	3	31	6	34	7

Justification: Please note that the completion data should only be viewed in light of the enrollment data for spring 2011 – given the lag time (of four (4) years) between enrollment and graduation. Now that the Timbuktu Academy recruits Physics majors, the enrollment in Physics is expected to rise far above 30, with an average yearly BS degree production over eight (8) or higher per year. Another indication of the fact that the Department can more than deliver stems from the fact that it graduated 10, 9, 11, and 10 students with BS degrees in Physics in 1996, 1997, 1998, and 1999, respectively (when the Timbuktu Academy recruited and mentored majors as it resumed doing in 2009). These data are as per certified degree data from the Board of Regents.

As of fall 2010, the Department has instituted *concentrations in Physics Education, Computational Physics, and Applied Physics*. These concentrations will significantly contribute to the increase of the enrollment and degree production of the Department. Before the introduction of these concentrations, the Department only recruited students on the Ph.D. track. The intensive mathematical content of this Ph.D. tract partly explains the relatively low number of majors. Please note, however, that we reached over 60 majors in the mid 1990s with the recruitment and mentoring of the Academy.

The estimated BS degree production per year, as shown above, takes into account the fact that not all students in the senior class graduate in a given year. Cooperative education semester at research sites, sicknesses, a few instances of missing courses, etc., partly explain this situation.

3. Contribution to economic health/development of the state.

The contribution of the Department of Physics to the economy of the state of Louisiana cannot be described totally in the few pages that are allowed. Hence, we simply provide bullets that drastically summarize these contributions.

- The production of 83 African American BS degree holders in physics, from 1995 to present, is one major contribution.
- The training of future engineers, scientists, and general university students in the fundamental science of physics constitutes another major contribution.
- The Department of Physics has infused significant amounts of funds into the economy of the State of Louisiana. Specifically, from 2005 to 2011, Departmental faculty member acquired **\$28,227,198 of which \$6,722,000, in grants awarded in 2010, are to be spent from fall 2011 to spring 2015** Here we mention the very many jobs created because of these grants, the building of the state infrastructure (including \$3,948,000 for minority Ph.D. students at LSU, the equipping of SUBR's instructional and research laboratories, and several Million in scholarships to minority students at SUBR and the rest of the state, through the Louis Stokes Louisiana Alliance for Minority Participation). At the web site of the Department (www.phys.subr.edu), we provide a detailed listing of these grants and contracts.
- The production of new knowledge and processes through research is a key contribution of the department to the economic development of the State of Louisiana. In particular, faculty members published 224 research articles reporting their findings. Several of these publications literally changed the field in which they were made. Additionally, three faculty members participate in large international collaborations like IceCube and Auger.
- The service activities of the Department have immensely benefited Louisiana. The summer academic enrichment programs for pre-college students, run by the Timbuktu Academy (mostly at no cost to participants) from 1992 to present, rendered more services than we can describe here. Indeed, the average American College Test scores of these 60 students, after six (6) weeks every summer, jumped by as much as the average high school adds to an ACT score over thirty (36) weeks – According to ACT data. The Department worked with Forest Heights Elementary to totally turn it around, from nose diving school performance scores to Exemplary Academic Growth (and over \$60,000 reward from the State). The Department also worked to lift up the SPS of Prescott Middle school in 2005-06 by 11.2 while the target growth number set by the State was 8.6. Through our LIGO involvement, the Department has played a pivotal role in the Education Outreach program of LIGO. This program continues to affect hundreds of pre-college and college students per year.
- Unquestionably, the production of BS degree holders in Physics who also earned certification in secondary education will immensely benefit the state and the nation. Also the Computational Physics and Applied Physics concentrations will directly address the workforce needs of the state at levels that are often neglected but which are vital for economic development.

4. Uniqueness or relevance to the region or area.

As we noted since 1988, there is "unnecessary duplication" when we have (1) geographic proximity of identical programs, (2) equal or comparable access to these programs (*meaning 2.a same admission criteria, 2.b same or close costs and hence ability of the students to pay, and 3.c same campus atmosphere and probability of having a sense of belonging*), and (3) same student

constituents [flexible hours for workers, support system for mothers].

The uniqueness of this program stems from the fact that while LSU’s Department of Physics and Astronomy is about 10 miles away and that it is doing a great job with its research mission, undergraduate teaching, and service, from 1995 to 2010, it only produced ten (10) minority BS degree holders in Physics – according to certified data from the Board of Regents. (We do not know if any of these students are African Americans). Please note well that LSU produced *many tens of White students* with BS degrees in Physics. The point here is to underscore the fact that during the same period, SUBR produced 83 African American BS degree holders, over 70% of whom successfully pursued or are pursuing graduate degrees.

A key relevance of the Department of Physics consists of its delivery of competitive, standard-based physics instruction to engineering, science, and other majors across the University. We note well that the Southern Association of College and Schools (SACS) made it clear that it wants students in science, engineering, sociology, Arts, Nursing, Architecture, Education, etc., to take Physics in a Physics Department. In a department, collegiate policy of checks-and-balance guarantees that standard-based instruction is maintained. With a small group of physicists somewhere (different from a degree granting department), it is only a matter of time before the standards are lost as individual preferences take over.

The concentrations noted above, and that are effective as of fall 2010, significantly add to the relevance and uniqueness of the Department to the region and area.

5. Institution’s need to maintain this program to support other programs, or to maintain accreditation, or because of (justified, documented) anticipated cost/revenue loss with elimination (e.g., recent major investments, external funding support, tuition, etc).

The revenues loss, in terms of grants will be no less than \$5,600,000 – per year. Please note well that the faculty members will not be able to harness these major grants when they are not in a bona fide degree program as required by many federal agencies.

As for the support for the rest of the instructional enterprise of the University, please see Paragraph 3 in Item 4.

All the six (6) paragraphs in Item 5 are relevant answers to this question, in a large sense.

6. Placement of graduates (positions held, places of employment, enrollment in graduate or baccalaureate study).

2009-10 Graduates	2008-09 Graduates
India Snowden – Science/Math teacher, Prescott Middle School (to enter Graduate School in the fall of 2011)	Cacey Stevens – Ph.D. program in Physics, University of Chicago, with NSF Graduate Research Fellowship
	India Anderson – Ph.D. program in Environmental Science, LSU
	Sharmain Lazard – MS program in Project Management, DeVry University – Math instructor, Baker School System

7. Passage rate of completers on licensure/certification exams or measures.

Number of Completers	Licensures/Certification Measure	Passage Rate
2009-10:	N/Ap	
2008-09:	N/Ap	
2007-08:	N/Ap	

8. Program quality as reflected by regional or national reputation, faculty qualifications, and the documented achievements of program graduates.

- The only one of the public physics departments commended by the Board of Regents reviewers in 1996: Their report noted: *“The undergraduate Physics Program at SUBR is among the best we have encountered anywhere ... and the vehicle for this has been the altogether remarkable organization, the Timbuktu Academy.”*
- 70% of our graduates attend and succeed in graduate school. From 1995 to present, 12 of our graduates have earned Ph.D. degrees in physics and directly related fields from institutions that include University of Michigan, LSU, University of Florida (Gainesville), University of Iowa, University of Houston; Two (2) earned the Ph.D. in science Education; One (1) obtained the Ph.D. in Physiology; Three (3) earned Jurist Doctorate degrees; And One (1) obtained the medical doctorate (MD) degree.. Nine (9) are successfully pursuing Ph.D. degrees at institutions that include the University of Chicago, LSU, California Institute of Technology (Cal Tech), and the University of Wisconsin at Madison.
- From 1995 to 2009, SUBR’s Physics alumni accounted for 7.18% of African Americans who earned Physics Ph.D. in the US, with several years (i.e., 1995, 2006, 2009) where they represented 10% or more of African Americans who earned a

Ph.D. in Physics.

- The refereed publications of the faculty are a key criterion of the quality of a program in Academia. From 2005 to 2010, the Departmental faculty published 224, mostly refereed publications. The detailed listing of these publications is available at the web site of the Department (www.phys.subr.edu).
- Additionally, several faculty members serve as referees or on editorial boards of some of the best professional journals in Physics, including Physical Review Letters, Physical Review B, and the journal of the Optical Society of America.
- From 2005 to 2010, faculty members made over 250 international, national, and local presentations on their findings and on educational and school reforms.
- For the last three years, the American Physical Society (APS) has called on the Timbuktu Academy to present its model for systemic mentoring to ensure the success of minority students in Ph.D. degree programs – new physics faculty members and to 100 physics department chairs.
- The Director of the Timbuktu Academy (a Physics faculty) is a charter recipient of *the US Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring* in 1996. He also received *the 2009 Lifetime Mentor Award from the American Association for the Advancement of Science (AAAS)*. The Timbuktu Academy itself received *the 2002 US Presidential Award for Excellence* and the Academy and its Director jointly received *the 2007 Benjamin Banneker Legacy Award*. These awards are added indications of our quality as recognized across the nation.

9. Other measures of program productivity other than numbers of graduates (grants, publications or other).

We recall the following:

- The refereed publications of the faculty are a key criterion of the quality of a program in Academia. From 2005 to 2010, the Departmental faculty published 224, mostly refereed publications. The detailed listing of these publications is available at the web site of the Department (www.phys.subr.edu).
- From 2005 to 2010, faculty members made over 250 international, national, and local presentations on their findings and on educational and school reforms.
- The Department of Physics has infused significant amounts of funds into the economy of the State of Louisiana. Specifically, from 2005 to 2011, Departmental faculty member acquired **\$28,227,198 of which \$6,722,000, in grants awarded in 2010, are to be spent from fall 2011 to spring 2015. Here we also mention the very many jobs created because of these grants, the building of the state infrastructure (including \$3,948,000 for minority Ph.D. students at LSU, the equipping of SUBR's instructional and research laboratory, and several millions of scholarships to minority students at SUBR and the rest of the state, through the Louis Stokes Louisiana Alliance for Minority Participation). At the web site of the Department (www.phys.subr.edu) we provide a detailed listing of these grants and contracts.**

10. Duplication. In cases where other programs *in the statewide inventory, within the same CIP code and level*, exist, compelling evidence to warrant the continuation of the degree program at this institution. Address plans and efforts toward collaboration or sharing resources with other, similar programs in the state or region, new delivery mechanisms, etc.

The uniqueness of this program stems from the fact that while LSU's Department of Physics and Astronomy is about 10 miles away and that it is doing a great job with its research mission, undergraduate teaching, and service, from 1995 to 2010, it only produced 10 minority BS degree holders in Physics – according to certified data from the Board of Regents. (We do not know if any one of these students is an African American.. Our Department graduated 11 African Americans in 1998 alone.) Please note that LSU produced *tens of White students* with BS degrees in Physics. The point here is to underscore the fact that during the same period, SUBR produced eighty three (83) African American BS degree holders, over 70% of whom successfully pursued graduate degrees.

Other Information

Present any other significantly pertinent information that has not been requested.

A 1992 study of the University showed that the Department of Physics generated, in student credit hours (SCHs), \$200,000 more than was spent on the Department. This occurred before the Timbuktu Academy's impact led to a jump in the enrollment of majors to over 60. It was below 20 at the time. While the exact amount of this surplus is not known today, a surplus does exist, as per the SCH production data. So, if cost is the issue, the BS degree program in Physics should be maintained. The quality of instruction, exemplary grantsmanship, as per the faculty publication record higher than in some Ph.D. degree programs, are key reasons for maintaining this program. Moreover, it is the only one in the proximity producing African American BS degree holders in Physics. Item 10 above underscores the fact that without the BS degree program in Physics, at SUBR, African Americans will be disenfranchised from participation in the science that undergirds not only engineering and others, but also the entire scientific and technological enterprise of America – as far as the fundamental laws and principles that enter into invention, design, and fabrication of devices. After all, "Physics is the scientific discipline concerned with the fundamental forces of nature and with the motion and properties of matter-energy in space-time." So, unless something entails no energy and no matter and does not occur in space or time, physics will be relevant to it.