

To: Members of the Louisiana Tech University Senate

From: Z. D. "Dick" Greenwood

Date: May 9, 2018

Subject: University Senate Chair Award Information Packet

I am honored to be the COES nominee for the 2018 Senate Chair Award and pleased to provide the following information that you requested. Thank you for your consideration.

Sincerely,

Dick Greenwood

1. Statement of My Beliefs Concerning the Importance of Teaching, Research, and Community/University Service to the Overall Mission of the University

Teaching, research, and service are the three pillars upon which a successful academic career is built at Louisiana Tech University. While research opportunities at Tech first attracted me to come here, I have been deeply committed to, and have valued, the teaching and service opportunities that I have experienced.

Teaching should be the primary mission of a university faculty, and I give my teaching responsibilities at Louisiana Tech top priority.

As noted in the list of courses above, I have taught most frequently Phys 201 and 202. This is the calculus-based introductory physics sequence that is required of many engineering and science majors at Tech. These courses are of vital importance to these students because they form the foundation upon which all their subsequent courses are based. Therefore, I take the job of teaching this course very seriously. When I teach, I stress the fundamentals of physics just as a good coach stresses the fundamentals of a sport. On a daily basis, I challenge my students to apply the new material, by solving a problem based on that concept at home. I encourage them to visit me in my office that same day, if they are unable to work the problem. I also hold problem-solving sessions for my students, outside of normal class hours.

I have been involved in the development of the COES curriculum and, in particular, the successful integration of Phys 201 and 202 with math and engineering courses. I also have tried varying my format and style over the years in an effort to keep the courses fresh and interesting. My experiment with teaching Phys 201 in a PowerPoint lecture format, while allowing me to cover more material in the quarter, was viewed very negatively by my students in the spring of 2015 (see below). I adjusted my format accordingly and have seen the evaluations improve.

In addition, I have taught upper level courses to mostly physics majors. These courses are fun for me and for the students who are generally highly motivated. I also enjoy the teaching

associated with mentoring my graduate students in their research projects. While this activity may be construed as research, for me it is an aspect of teaching that I truly enjoy and cherish.

This brings me to my thoughts on **research**. It is possible to do both very focused and interdisciplinary research at Louisiana Tech, and both should be encouraged. I consider my particle physics research to fall in the focused research category and my grid computing research, interdisciplinary. All research should be fundable, result in numerous publications and provide a platform for training and teaching graduate students.

I do experimental research in particle physics at the most fundamental level. The mysteries of the universe appear to be beautifully symmetric. The fact that we can explain much of what we know about the universe with just a few elegant equations fascinates me and motivates my research activities. To expand our knowledge of particle physics requires us to observe collisions of particles with higher energies than ever before. That is why I have been proud to be a co-PI on the Dzero experiment at Fermilab near Chicago and the team leader for Tech on the Atlas experiment at the Large Hadron Collider located at the CERN laboratory near Geneva, Switzerland. Thanks to the discovery of the Higgs boson in 2012, the LHC has probably become the most widely recognized science project on the planet!

During my tenure at Louisiana Tech, I have served as PI or co-PI in support of particle physics research resulting in approximately \$3.5 million in grant awards to the University, and during the last five years, 110 [“well-known”](#) publications and 12 conference presentations, while mentoring aspiring students each quarter.

A major challenge in performing these “big science” projects is the enormous amount of data generated at the experiments and the simulated data generated to understand these experiments. I have been fortunate to be at Tech which has been a major player and stakeholder in LONI, the Louisiana Optical Network Infrastructure. LONI is a fiber optic system that forms a network among the major research institutions in Louisiana and other national and international data centers at up to 100 gigabytes per second speeds. Because of the LONI computing infrastructure, my research has become interdisciplinary in nature: part physics and part computer science. A good deal of my research involves moving and processing enormous data sets on international computing grids and has led to my involvement with the Open Science Grid and a regional grid organization, DOSAR, for which I have been the convener for the last twelve years.

My **service** work is tied to both my teaching and research activities. I find that serving on various university and college committees feeds into and draws from my teaching and research. Because of this, service activities are of great value to me professionally, helping to make me a more “university- and community-aware” professor. Because of my earlier research in nuclear physics, I have served for more than 12 years now as the Nuclear Safety Officer. This experience along with teaching a course on radiation safety has naturally led to my service on the University Radiation Committee and the BRIRC (Biosafety and Radionuclide Institutional Review Committee). Similarly, my involvement in LONI and high energy physics research has led to my appointment to the university research council. My community service work such as proctoring science district rally tests and judging the regional science fair has followed from my

teaching and research interests. Other committees I have served on, such as the COES Space Team, the COES Tenure and Promotion Committee, COES Leadership Team Associate and numerous graduate-student advising committees have all benefited from and add to my teaching and researcher roles. Outside the University, my work in grid computing applied to physics has led to my participation for several years in the Biennial African School on Fundamental Physics and its Applications, which has been an important international outreach program in various African countries.

2. List of Courses Taught with Teacher Evaluations

Year	Quarter	Course	Title	Rating
2017-2018	WINTER	PHYS 423	PHYSICAL MECHANICS II	N/A *
2017-2018	FALL	PHYS 422	PHYSICAL MECHANICS I	4.0
2016-2017	SPRING	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.8
2016-2017	WINTER	PHYS 202	PHYSICS FOR ENGR AND SCI II	2.6
2016-2017	FALL	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.7
2015-2016	SPRING	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.7
2015-2016	WINTER	PHYS 202	PHYSICS FOR ENGR AND SCI II	3.1
2015-2016	FALL	PHYS 209	GENERAL PHYSICS II	2.8
2014-2015	SPRING	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.2
2014-2015	WINTER	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.8
2014-2015	FALL	PHYS 202	PHYSICS FOR ENGR AND SCI II	3.5
2013-2014	SPRING	PHYS 201	PHYSICS FOR ENGR AND SCI I	3.0
2013-2014	WINTER	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.6
2013-2014	FALL	PHYS 202	PHYSICS FOR ENGR AND SCI II	2.8
2012-2013	SPRING	PHYS 201	PHYSICS FOR ENGR AND SCI I	2.8
2012-2013	WINTER	PHYS 201	PHYSICS FOR ENGR AND SCI I	3.1
2012-2013	FALL	PHYS 202	PHYSICS FOR ENGR AND SCI II	3.3

*Missed most of 2017-2018 Winter quarter due to surgery and recovery.

3. A Selected List of Publications, Grants and Similar Activities

I am an author on over 200 publications during the last five years. Here is a selected list.

1) PERFORMANCE OF THE ATLAS TRIGGER SYSTEM IN 2015
BY ATLAS COLLABORATION (MORAD AABOUD ET AL.).
ARXIV:1611.09661 [HEP-EX]. EUR.PHYS.J. C77 (2017) NO.5, 317.

2) PERFORMANCE OF $B\bar{B}$ -JET IDENTIFICATION IN THE ATLAS EXPERIMENT BY ATLAS COLLABORATION
(GEORGES AAD ET AL.).
ARXIV:1512.01094 [HEP-EX]. JINST 11 (2016) NO.04, P04008.

3) MEASUREMENTS OF THE HIGGS BOSON PRODUCTION AND DECAY RATES AND COUPLING STRENGTHS
USING PP COLLISION DATA AT $\sqrt{s}=7\sqrt{s}$ AND 8 TEV IN THE ATLAS EXPERIMENT BY ATLAS
COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1507.04548 [HEP-EX]. EUR.PHYS.J. C76 (2016) NO.1, 6.

- 4) SEARCH FOR HIGH-MASS DIBOSON RESONANCES WITH BOSON-TAGGED JETS IN PROTON-PROTON COLLISIONS AT $\sqrt{s}=8$ TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1506.00962 [HEP-EX]. JHEP 1512 (2015) 055.
- 5) SEARCH FOR NEW PHENOMENA IN FINAL STATES WITH AN ENERGETIC JET AND LARGE MISSING TRANSVERSE MOMENTUM IN PP COLLISIONS AT $\sqrt{s}=8$ TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1502.01518 [HEP-EX]. EUR.PHYS.J. C75 (2015) NO.7, 299, ERRATUM: EUR.PHYS.J. C75 (2015) NO.9, 408.
- 6) MEASUREMENT OF HIGGS BOSON PRODUCTION IN THE DIPHOTON DECAY CHANNEL IN PP COLLISIONS AT CENTER-OF-MASS ENERGIES OF 7 AND 8 TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1408.7084 [HEP-EX]. PHYS.REV. D90 (2014) NO.11, 112015.
- 7) ELECTRON AND PHOTON ENERGY CALIBRATION WITH THE ATLAS DETECTOR USING LHC RUN 1 DATA BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1407.5063 [HEP-EX]. EUR.PHYS.J. C74 (2014) NO.10, 3071.
- 8) MEASUREMENT OF THE MUON RECONSTRUCTION PERFORMANCE OF THE ATLAS DETECTOR USING 2011 AND 2012 LHC PROTON-PROTON COLLISION DATA BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1407.3935 [HEP-EX]. EUR.PHYS.J. C74 (2014) NO.11, 3130.
- 9) SEARCH FOR NEW PHENOMENA IN THE DIJET MASS DISTRIBUTION USING p - p COLLISION DATA AT $\sqrt{s}=8$ TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1407.1376 [HEP-EX]. PHYS.REV. D91 (2015) NO.5, 052007.
- 10) MEASUREMENT OF THE HIGGS BOSON MASS FROM THE $H \rightarrow \gamma\gamma$ AND $H \rightarrow ZZ^{*} \rightarrow 4\ell$ CHANNELS WITH THE ATLAS DETECTOR USING 25 FB⁻¹ OF pp COLLISION DATA BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1406.3827 [HEP-EX]. PHYS.REV. D90 (2014) NO.5, 052004.
- 11) JET ENERGY MEASUREMENT AND ITS SYSTEMATIC UNCERTAINTY IN PROTON-PROTON COLLISIONS AT $\sqrt{s}=7$ TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1406.0076 [HEP-EX]. EUR.PHYS.J. C75 (2015) 17.
- 12) SEARCH FOR SQUARKS AND GLUINOS WITH THE ATLAS DETECTOR IN FINAL STATES WITH JETS AND MISSING TRANSVERSE MOMENTUM USING $\sqrt{s}=8$ TEV PROTON-PROTON COLLISION DATA BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1405.7875 [HEP-EX]. JHEP 1409 (2014) 176.
- 13) SEARCH FOR HIGH-MASS DILEPTON RESONANCES IN PP COLLISIONS AT $\sqrt{s}=8$ TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1405.4123 [HEP-EX]. PHYS.REV. D90 (2014) NO.5, 052005.
- 14) ELECTRON RECONSTRUCTION AND IDENTIFICATION EFFICIENCY MEASUREMENTS WITH THE ATLAS DETECTOR USING THE 2011 LHC PROTON-PROTON COLLISION DATA BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1404.2240 [HEP-EX]. EUR.PHYS.J. C74 (2014) NO.7, 2941.
- 15) SEARCH FOR A LIGHT CHARGED HIGGS BOSON IN THE DECAY CHANNEL $H^+ \rightarrow C\bar{S}$ IN $T\bar{T}$ EVENTS USING PP COLLISIONS AT $\sqrt{s}=7$ TEV WITH THE ATLAS DETECTOR BY ATLAS COLLABORATION (GEORGES AAD ET AL.).
ARXIV:1302.3694 [HEP-EX]. EUR.PHYS.J. C73 (2013) NO.6, 2465.

Grant Activities

Project/Proposal Title: High Energy Physics Research at the Energy Frontier at Louisiana Tech
Source of Support: DoE Total Award Amount: \$601,000 04/01/13-03/31/16

Project/Proposal Title: Bridge Funding: High Energy Physics at the Energy Frontier at Louisiana Tech
Source of Support: DoE Total Award Amount: \$43,091
04/01/16-03/31/17

Project/Proposal Title: High Energy Physics at the Energy Frontier at Louisiana Tech
Source of Support: NSF Total Award Amount: \$440,718 Pending

4. A Selected List of Community/University Service Activities

College Service

Safety Committee, Member

Tenure and Promotion Committee (Chair on two occasions)

University Service

BRIRC, (Biosafety and Radionuclide Institution Review Committee) (September 1, 2008 - Present).

University Safety Committee, Committee Member, (September 1, 2007 - Present).

Research Council, Member (September 1, 2006 - Present).

Radiation Committee, Chairman (September 1, 2005 - Present).

Nuclear Safety Officer (September 1, 2005 - Present).

Community Service

North Louisiana High School Rally Proctor

Boy Scouts of America Council

Professional Service

DOSAR, Convener, Workshop Organizer.

Biennial African School on Fundamental Physics and its Applications, Organizer and Instructor:

- Kumasi, Ghana, 15 July 2012 - 8 August 2012

- Dakar, Senegal, 3 - 23 August 2014

- Kigali, Rwanda, 29 July 2016 - 21 August 2016