

**University Senate Chair Award  
Nominee Information Packet  
PEDRO A. DEROSA**

*Research with an integrated education experience. Diversity in teaching methods, research topics and approaches, people I work with, and tasks I tackle. Service where needed, are characteristics that define my approach to this profession I have the honor to practice.*

**COURSES TAUGHT AND OVERALL STUDENT'S EVALUATION**

Louisiana Tech University, Physics program

PHYS201: Physics for Engineering and Science

Fall 2015 (3.2)      Winter 2018-2019 (3.5)      Fall 2019 (2.7)

PHYS261: General Physics Lab

Spring 2018 (3.3)      Spring 2019 (N/A)      Winter 2019-2020 (N/A)

PHYS304: Physical Optics

Spring 2018 (3.7)      Spring 2020 (N/A yet)

PHYS307: Thermodynamics

Spring 2017 (3.7)      Spring 2019 (4.0)

PHYS320: Optics Laboratory I

Spring 2020 (N/A yet)

PHYS412 Solid State Physics

Fall 2016 (3.0)      Fall 2017 (3.3)      Fall 2019 (3.4)

PHYS512 Solid State Physics

Fall 2016 (3.5)      Fall 2017 (3.4)      Fall 2019 (4.0)

CHEM450C Solid State Chemistry

Fall 2016 (4.0)      Fall 2017 (3.5)

PHYS533: Statistical Mechanics

Winter 2015-2016 (3.9)      Winter 2017-2018 (3.7)      Winter 2019-2020 (4.0)

Grambling State University, Department of Mathematics and Physics (Student's evaluation not available)

SCI 105: Physical Science Lab (Fall 2015, Spring 2016)

PHYS153: General Physics I (Fall 2016)

PHYS154: General Physics II (Spring 2017)

**STATEMENT OF BELIEFS IN TEACHING, RESEARCH AND SERVICE**

I will not add anything novel by saying that teaching, research, and service are the three pillars over which a higher education institution must stand on. From the beginning of my education, research was coined on me as pretty much the whole purpose of my career. It might very well be so, however no matter how advanced the research is, it is perishable if the knowledge is not transferred to those that come after us, our students. As time passed it became evident that my work has no purpose if I do not educate, may that be in the classroom, establishing the base on

which students will build their careers, or in the lab, where the students develop their skills to apply the knowledge for which they came to TECH.

I have conducted scientific research since the day I joined TECH and has maintained federal funding for the last 13-14 years. In addition, I have received private funding (Shell) and state funding. I have lead research grants (NSF, Air Force, BoR), educational grants (Shell corporation, NSF), and recently in the Social Sciences, to study the effect of the campus environment on African American Science Identity, an NSF funded collaboration with Grambling State University and Purdue. Throughout my career, that included 13 years as a joint faculty with Grambling state University, I have always worked with Graduate and Undergraduate students, run summer internships, and worked with high school teachers, via workshops and research. A recurrent objective in my activities has been integration, undergraduate students working with graduate students, Grambling students working with TECH students, high school teachers working in funded research, educational projects from scientific research.

I take TECH's vision to heart: *“Louisiana Tech University will be recognized as a top public research university with an unparalleled integrated educational experience”*

“Research with an integrated education experience” is what I do. That is the way I feel research, this is the only way academic research makes sense to me, developed knowledge while training, or rather to train, the next generation, there is no other way.

As an educator I am convinced that we cannot learn *for* our students, we are not educating if we feed the students predigested concepts. Learning supposes work, simply because we learn better when we make the appropriate connections between concepts ourselves, our job as educators is to provide all the tools the student need to learn, but they have to do the learning, we have to guide them, challenge them, and certainly answer their questions, but the students have to generate those questions. We just have to trigger those questions with our teaching.

In the classroom, I mix regular lectures with technology-based activities, videos, demos, and group activities. In the lower level classes, I spend time discussing the scientific method. I am convinced that a big part of discussion in the media about scientific facts arise from the misunderstanding of what science actually is and how the Scientific Method works, so illustrating with journal articles and videos from personalities like Richard Feynman and Niel deGrasse Tyson, I tried to increase the understanding of what science is and it is not. I humbly think that if everybody understands this, the discussion will be much more civilized.

When it comes to the subjects of the courses, I try to illustrate my classes as much as I can, incorporate journal articles and reliable news articles, video, and demos. My classes require a lot of group work and I have increasing the number of classes I offer using the flip classroom approach what gives me time to engage in a class discussion that I consider more productive than lecturing. This has not come without inconvenience, some of which I am still working through. One big problem is those students that just do not go over the material before the class discussion and are not prepared for the activities I planned. I am working to identify the best incentive for them. Sometimes it works sometimes it doesn't, actually a bolder approach I took last Fall in general physics I, seem to have caused some discomfort and the students did let me know, I got the lowest evaluation I have ever had (2.7), certainly in this course. I am looking forward to offering this class again, this coming winter to incorporate what I learned from student's feedback. In upper level

classes, discussions are ubiquitous, even in regular lecture classes, I trigger discussions and they work really well. Actually, the online modality we are all forced to use, has offered me a good opportunity. I can mix regular lectures with recorded classes. Tuesday classes are normally recorded and students are asked to watch them before the class that then turns into a discussion. The small size allows me to track participation quite well.

Overall, I understand that the way I was educated does no longer work and I strive to educate myself on how this new generations receives information and adapt to it. I teach physics, a large number of my students start the course convinced they are about to go through an ordeal and yet I manage to have a good class. In the last five years, I have taught physics to non-science major, to engineers, to scientist, I have taught undergraduate and graduate students. I taught at Louisiana Tech and I taught at Grambling State with good report from the students.

That leaves us with the third pillar, service, but service is ubiquitous to all human activities; service is a distinctive characteristic of a civilized and organized society. Like most faculty I have served in a number of committees at all levels, including the University Graduate Council and the University Research Council. I have also had the pleasure to serve as a mentor to junior faculty as part of the OWISE office's mentoring program, a very rewarding experience. In the last 6 years I have mentored 7 different junior faculty members. I have served the profession reviewing journal article and grant proposals, but I also served in the Louisiana Academy of Science as a section chair, Division Director (current) and President (2017-2019).

Soon after being promoted to full professor, simultaneously at TECH and Grambling, TECH offered to have me 100% of the time. I considered that a great opportunity, the overhead associated with traveling back and forth between Grambling and TECH and the double load of meetings and overall the logistics that makes very hard to be as effective as I could be. I found virtually impossible to get involved in all the activities a full professor normally is involved and maintaining the quality of my work at both places. When TECH made the offer, I decided that I needed to make TECH worthwhile and was looking for opportunities to step up and help. The opportunity came last year when the position of Program Chair in Physics became available. That is not a position that was at all attractive to me, but I felt the program needed a push, needed to increase recruitment and retention, needed to increasingly involve its students and I felt I could do the job. This opportunity did not come at the best possible time, with a couple of my grants coming to an end, I needed to double up my efforts to secure further funding, but I felt my Program needed me at this time. Whether the decision was right or wrong, time will tell, but I needed to take a risk and move way out of my comfort zone. For those of you reading this that are not in the College of Engineering and Science, Program chairs are not administrators, they are regular 9 months' faculty with the added load to coordinate program activities. This comes on top of the regular duties and has no additional salary attached to it, and in most cases, are temporary position that are passed along to another faculty within a few years, after which the faculty comes back to be a regular faculty. The effect this move will have on my career is still to be seen, I just hope I can make a difference for my program.

I believe I have made my mark in all the aspects of this job, I feel I live up to TECH mission and vision and that I placed student's education as the priority it needs to be. I don't choose one aspect of my position over the other; you will find faculty at TECH that are better instructors than I am, faculty that are more successful researchers than I am, and faculty that serve TECH in more ways than I am, but a few that can maintain high activity and high quality simultaneously in all

the three. That is why I dared to accept the nomination for the Faculty Senate Chair Award, the most prestigious faculty award at TECH. Whether I deserve it more than the other candidates is of course for you to decide, but I believe I have represent what this Award is about and thus, I respectfully submit this packet for your consideration.

### **Selected Scientific Publications**

- “Molecular Dynamics Simulation of the Interaction of a Peptide and 2D Materials with Individual Residue Resolution” Andrew J. Stroud, Gary Leuty, Christopher Muratore, Pedro A. Derosa, and Rajiv J Berry. *Computational Materials Science*, 169 109112, **2019**
- “Psychological Momentum and Inertia: Toward a Model of Academic Motivation” Eric D. Deemer, Pedro A. Derosa, Stacey A. Duhon, and Aryn M. Dotterer. *The Journal of Career Development*. **2019** (in Press)
- “Printed biomolecular templates for 2D material patterning” Christopher Muratore, Abigail Juhl, Andrew Stroud, D. Lai, Ali Jawaid, Katherine Burzynski, Jessica Dagher, Gary Leuty, Christina Harsch, Steve Kim, Yen Ngo, Nicholas Glavin, Rajiv Berry, Michael Durstock, Pedro Derosa, Ajit Roy, Emily Heckman, and Rajesh Naik. *Applied Physics Letters*, 112 (23) 233704, **2018**
- “The Role of Agglomeration in the Conductivity of Carbon Nanotube Composites near Percolation”, Taylor Tarlton, Ethan Sullivan, Joshua Brown, and Pedro A. Derosa. *Journal of Applied Physics*, 121 085103, **2017**
- “Distance-Dependent Measurements of the Conductance of Porphyrin Nanorods Studied with Conductive Probe Atomic Force Microscopy”, Xianglin Zhai, Denzel Alexander, Pedro Derosa, and Jayne C. Garno. *Langmuir*, 33 (5), 1132-1138, **2017**
- “Conductive-Probe Measurements with Nanodots of Free-base and Metallated Porphyrins”, Xianglin Zhai, Neepa Malsi Kumari Kuruppu Arachchige, Pedro A. Derosa, and Jayne C. Garno. *Journal of Colloids and Interface Science*, 486, 38-45, **2017**.
- “Simulation of Stimuli-triggered Release of Molecular Species from Halloysite Nanotubes”, Divya Elumalai, Joshua Tully, Yuri Lvov, and Pedro Derosa. *Journal of Applied Physics*, 120 134311 **2016**.
- “A Statistical Approach towards a Predictive Model on Charge Transport Properties in Carbon Nanotube Composites”, Taylor Tarlton, Joshua Brown, Benjamin Beach, and Pedro Derosa. *Composites B*. 100 56-67, **2016**.
- “CTViz: A Tool for the Visualization of Transport in Nanocomposites”, Benjamin Beach, Joshua Brown, Taylor Tarlton, Pedro Derosa. *Journal of Molecular Graphics and Modelling*, 66, 168-173, **2016**.
- Spin-controlled Conductivity in a Thiophene-Functionalized Iron-Bis(dicarbollide)”, Benjamin Beach, Dustin Sauriol, Pedro Derosa. *Journal of Electronic Materials*, 45 (4) 2150-2159, **2016**.
- “Effect of Spin State and Junction configuration in the Conductivity of metal-Bisdicarbollide Cages”, Benjamin Beach, Dustin Sauriol, and Pedro Derosa. *Proceedings of the 15<sup>th</sup> International Conference on Nanotechnology*. 1182-1185. Conference Date: July 27-30, 2015, publication date: January 20, **2016**. Peer reviewed conference proceeding
- “Effects of Impurities and Lattice Imperfections on the Conductive Properties of MoS<sub>2</sub>” Andrew Stroud, Gary Leuty, Christopher Muratore, Rajiv Berry, and Pedro Derosa. *Proceedings of the 15<sup>th</sup> International Conference on Nanotechnology*. 613-616, Conference Date: July 27-30, 2015, publication date: January 20, **2016**. Peer reviewed conference proceeding

- “Implementation of a Simulation Model of the Controlled Release of Molecular Species from Halloysites Nanotubes” Divya Narayan Elumalai, Yuri Lvov, and Pedro A Derosa. Journal of Encapsulation and Adsorption Science, 5 (1) 74-92, **2015**.

### Funded research

- “Collaborative Research: Identity Development Evaluation of African American Science Students (IDEAAS)”, National Science Foundation. \$573,790 (LA Tech budget \$136,946, GSU budget \$161,375). Role: LA Tech PI. **Current**
- “Louisiana Consortium for Innovation in Manufacturing and Materials (CIMM)”, National Science Foundation-EPSCoR. (GSU PI and representative in the outreach committee until 2017, member of the Leadership Team. \$20,000,000 (LA Tech Budget \$4,281,382 GSU budget of \$400,000) 08/01/2015-07/31/2020. PI: Dr. Michael Khonsari (multi-institutional grant). NSF EPSCoR Cooperative Agreement No. EPS-1003897
- “Research Collaboration Program: Multiscale Modeling and Simulation of Materials Systems”, Air Force Research Lab, \$558,000 (09/03/2013-11/30/2018). FA8650-13-C-5800 PI: Pedro Derosa
- “Genetic Assessment of the Space Environment using MEMS Technologies” NASA-EPSCoR, \$750,000 (09/01/2013-08/31/2017). Role: co-PI for Louisiana Tech and PI for Grambling (Grambling Budget \$108,789).
- “Louisiana Alliance for Simulation-Guided Materials Applications (LA-SiGMA)”, National Science Foundation-EPSCoR. (GSU representative in the EEWD committee, member of the Project Execution Team (PET). \$20,000,000 (LA Tech Budget \$3,006,890 GSU budget of \$184,812) 10/01/2010-01/31/2016. PI: Dr. Michael Khonsari (multi-institutional grant).
- “Collaborative Methods for Addressing Student-Success in Totality (CMAST), National Science Foundation. \$1,996,020 06/16/2017-06/15/2018. I move 100% to TECH a couple of months after this grant started so I had to pass on my duties.

### Service Activities

#### Service to Tech

- **Member**, Louisiana Tech University Research Council, Fall 2015-Present
- **Member**, Louisiana Tech University Graduate Council, Fall 2015-Present
- **Member** Faculty search committees
- **Chair** Program Tenure and Promotion Committee
- **Faculty Mentor** to junior faculty

#### Service to profession/community

- **Director** Physicals Science Division, Louisiana Academy of Science, Spring 2017-current
- **President** Louisiana Academy of Science- Spring 2017-Spring 2019
- **Chair** organization committee of the 2017 Annual Meeting of the Louisiana Academy of Science, Louisiana Tech University, Ruston, LA March 2017
- **Chair**, Physics Section of the Louisiana Academy of Science, Fall 2009-Spring 2017
- **Reviewer** peer-reviewed journals and proposals to federal agencies.