



REQUIRED Cover Page

APPLICATION FOR PROFESSIONAL DEVELOPMENT GRANT

****All applicants please complete this cover page.**

Choose one: <input type="checkbox"/> Creative activity <input type="checkbox"/> Research activity <input checked="" type="checkbox"/> Professional Enhancement activity	Date of Last PDG Award (Semester and Year awarded): Summer 2006 Date of ATU Faculty Appointment (Semester and Year): Fall 2001
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1. Project Title: Improving the College Introductory Astronomy Survey Course for Non-Science Majors (Chautauqua Short Course)

2. Name of Applicant: Dr. Wilson J. Gonzalez-Espada

3. School (abbrev): PLS

4. Department: Physical Science

5. Campus Mail Address: McEver Hall, Office 203

6. Campus Phone: 968-0248

7. Amount Requested: \$2,195

8. Total Cost of Project: \$2,195

9. Does this project involve:

10. Duration of Project: July 12-16, 2007

Yes No

☐ ☒ human subjects?

☐ ☒ animals/animal care facility?

☐ ☒ radioactive materials?

☐ ☒ hazardous materials?

☐ ☒ biological agents or toxins restricted by the USA Patriot Act?

☐ ☒ copyright or patent potential?

☐ ☒ utilization of space **not** currently available to the PI/PD?

☐ ☒ the purchase of equipment/instrumentation/software currently **available** to the PI/PD?

NOTE: If the answer is "yes" to any of the above questions, the investigator must attach appropriate documentation of approval or justification for use/purchase.

SIGNATURES

Wilson J. Gonzalez-Espada 2007 Apr 27
Department Head Date

Michael A. Johnson 4-27-07
Dean Date

This Section to be completed by the Office of Academic Affairs

PDC Committee Award Recommendation: Yes _____ No _____

PDC Committee Proposal Rank: _____ of _____ Total Proposals.

Recommendation of VPAA: Yes _____ No _____

Recommendation of President: Yes _____ No _____

Award Date: _____

PROFESSIONAL DEVELOPMENT GRANT PROPOSAL

A. COVER PAGE

B. ABSTRACT

Between July 13-15, 2007, a short course on teaching astronomy to non-science majors will be sponsored by NASA/JPL and NSF Chautauqua. Completing this course will help me become more effective in teaching this topic in my PHSC 1013 course and, as a consequence, will help me achieve Tech's general education goals as described in the Catalog. I am respectfully requesting approval for this proposal in order to cover related expenses, estimated in about \$2,200.

C. PURPOSE / OBJECTIVES

According to their website, NSF Chautauqua Short Courses are an annual series of forums in which scholars at the frontiers of various sciences meet intensively for several days with undergraduate college teachers of science. The courses are held at colleges and universities throughout the United States as well as at selected special sites. These forums provide an opportunity for invited scholars to communicate new knowledge, concepts, and techniques directly to college teachers in ways which are immediately beneficial to their teaching. The primary aim is to enable undergraduate teachers in the sciences to keep their teaching current with respect to both content and pedagogy.

The Chautauqua course I am interested in completing is called "Improving the College Introductory Astronomy Survey Course for Non-Science Majors Through Active Learning". The overarching goal of this workshop is for participants to become familiar with learner-centered teaching and assessment materials, as well as how to implement them in their college astronomy courses. The course is described as follows: "This two and three-day, interactive teaching

excellence workshop focuses on dilemmas astronomy teachers face and offers practical solutions for the troubling issues in curriculum, instruction, and assessment. After reviewing the latest research about how students learn, participants will define and set measurable student learning goals and objectives for students in their astronomy courses. To improve instruction, participants will learn how to create productive learning environments by using interactive lectures, peer instruction, engaging demonstrations, collaborative groups, tutorials, and observational projects. Participants will also learn how to create more effective multiple-choice tests and implement authentic assessment strategies including portfolio assessment, performance tasks, and concept maps. Participants will orchestrate a syllabus that creates a student-centered learning environment.”

D. SIGNIFICANCE / NEED

The physical sciences in general, as astronomy in particular, provide a unique environment for teaching the excitement of scientific inquiry to college students. In fact, a physical science course is a general education requirement of Arkansas Tech University. As such, students are expected to “show competence in reasoning and handling abstract and quantitative ideas” and to “comprehend the basic principles, philosophy, and methodology of science and the influence of science and technology on society” after completing a physical science course (Arkansas Tech University, 2006, p. 80).

Unfortunately, high quality physical science teaching often presents a challenge because many students who take the course are frequently apprehensive of physics (Dykstra, Boyle, and Monarch, 1992; Hart and Cottle, 1993; Laws, 1997), astronomy (Christensen, 2005; Diakidoy and Kendeou, 2001) and mathematics courses (Gonzalez-Espada, 2005; Hudson and McIntire, 1977). Enriching my knowledge of astronomy will undoubtedly help me teach that section of the

course better (Shipman, 2006, chapter 18), improving student learning as measured by objective class assessments.

E. PROCESS FOR ATTAINMENT OF OBJECTIVES / GOALS

The short course “Improving the College Introductory Astronomy Survey Course for Non-Science Majors Through Active Learning” is presented by Timothy Slater, Edward Prather, and Gina Brissenden. They are astronomers in the Conceptual Astronomy and Physics Education Research (CAPER) Team at University of Arizona's Steward Observatory, where their scholarship focuses on the teaching and learning of astronomy. The course is sponsored by NASA-JPL Center for Astronomy Education and it is cosponsored by the National Science Foundation's Chautauqua Summer Program. The course is scheduled for Friday, Saturday, & Sunday, July 13-15, 2007 from 9:00 a.m. – 5:00 p.m. in San Juan, Puerto Rico. I will depart from Arkansas July 12 and will return July 16.

F. DISSEMINATION OF RESULTS

The knowledge gained by completing the professional development course will be included in the astronomy section of my Introduction to Physical Science (PHSC 1013) courses. This will impact about 100 students per semester.

G. REPEATED REQUESTS n/a

H. BUDGET

The itemized expenses appear on a separate page. I was informed that the travel budget for the Physical Science Department is almost gone, so no cost-sharing is proposed. The applicant will devote 8 hours/day x 3 days = 24 hours attending the course plus travel time.

**PROPOSED BUDGET
FACULTY RESEARCH GRANT**
(Include budget categories as appropriate)

1.	Graduate assistant stipend	__0__
2.	Non-work study stipend	__0__
3.	*Supplies (please list items to be purchased and estimated price per item including taxes and shipping, if appropriate):	
	Total estimated supplies	__0__
4.	Travel (please list travel expenditures by date and estimated costs):	
	Airline ticket	\$700
	Hotel 4 nights	\$750
	Hotel Parking	\$120
	Car rental	\$300
	Meals	\$150
	Registration	\$50
	Airport parking	\$50
	Mileage RSVL – LR airport	\$75
	Estimated Price	\$2195
	Total estimated travel	\$2195
5.	*Capital Outlay (please list items to be purchased and estimated price per item including taxes and shipping, if appropriate):	
	Total estimated capital outlay	__0__
	TOTAL PROPOSED BUDGET	\$2195

***Items purchased under \$2,500 (including taxes and shipping) are considered supply items. Capital Outlay items are those which cost \$2,500 or more (including taxes and shipping). Please contact the Purchasing Office for questionable items.**

I. BIBLIOGRAPHY:

Arkansas Tech University (2006). *Undergraduate catalog 2006-07*. Russellville, AR: Arkansas Tech University.

Christensen. T. (2005). Changing the learning environment in large general education astronomy classes. *Journal of College Science Teaching*, 35(3), 34.

Diakidoy, I. A. N. and Kendeou, P. (2001). Facilitating conceptual change in astronomy: A comparison of the effectiveness of two instructional approaches. *Learning and Instruction*, 11(1), 1-20.

Dykstra DI, CF Boyle, and IA Monarch. 1992. Studying conceptual change in learning physics. *Science Education* 76: 615-652.

Gonzalez-Espada, W. J. (2005). Succeeding in Introduction to Physical Science: Is mathematics background important? *Journal of the Arkansas Academy of Science*, 58, 60-64.

Hart. G. E., and P. D. Cottle (1993). Academic backgrounds and achievement in college physics. *The Physics Teacher*, 31, 470-475.

Hudson, H. T., and W. R. McIntire 1977. Correlation between mathematical skills and success in physics. *American Journal of Physics*, 45, 470-471.

Laws, P. W. (1997). Millikan Lecture 1996: Promoting active learning based on physics education research in introductory physics courses. *American Journal of Physics*, 65, 14-21.

Shipman, J. T., Wilson, J. D., and Todd, A. W. (2006). *An introduction to physical science*, 11th edition. Boston, MA: Houghton Mifflin Co.

J. APPLICATION VITA

BIOGRAPHICAL SKETCH

NAME Gonzalez-Espada, Wilson	POSITION TITLE Assistant Professor of Physical Science and Science Education		
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
University of Georgia, Athens	Ph.D.	2001	Science Education
Interamerican University of Puerto Rico, San German	M.A.	1997	Science Education
University of Puerto Rico, Rio Piedras	B.A.	1993	Physics Education

Positions and Employment

1993-1995	Science and Math Teacher, Notre Dame High School, Caguas, PR
1996-1998	Instructor of Physics and Mathematics, Department of Physics and Mathematics, Instituto Tecnológico de Puerto Rico, Ponce, PR
2001-2006	Assistant Professor of Physical Science and Science Education, School of Physical and Life Science, Arkansas Tech University, Russellville, AR

Other Experience and Professional Memberships

1994	Summer Research Intern, University of Wisconsin Medical School, Madison, WI.
1998-present	Member, American Association of Physics Teachers.
1998-2001	Research Assistant, The University of Georgia, Athens, GA.
1999-2001	Member, Southeastern Association of Educators and Teachers of Science (SAETS).
1999	Summer Research Intern, Hispanic Association of Colleges and Universities USDA Forest Service, Athens, GA.
2001-present	Member, AOK Section of the American Association of Physics Teachers.
2001-present	Member, Arkansas Academy of Science.
2002-present	Member, Arkansas Science Teachers Association.
2003	Summer Visiting Scholar, Center for Fairness in Assessment, Educational Testing Service, Princeton NJ.
2004	Summer Research Fellow, Center for Applied Research and Evaluation, Arkansas Children's Hospital/University of Arkansas for Medical Sciences, Little Rock, AR.
2004-present	Member, National Science Teachers Association.
2005	Summer Research Fellow and REU Co-Mentor, Center for the Analysis and Prediction of Storms, National Weather Center, Norman, OK.
2005-present	Physical Science Laboratory Coordinator, Department of Physical Science, Arkansas Tech University.
2005-present	Member, Mid-South Educational Research Association.

Selected peer-reviewed publications (publications selected from 23 publications)

- Gonzalez-Espada, W. J. (2003). A last chance for getting it right: Addressing misconceptions in physical science through independent research. *The Physics Teacher*, 41(1), 36-38.
- Gonzalez-Espada, W. J. (2003). Physics education research in the United States: A summary of its rationale and main findings. *Journal of Science Education/REC*, 4(1), 5-7.
- Gonzalez-Espada, W. J. (2004). Multicultural education: Helping students succeed in science. *Electronic Journal of Literacy through Science*, 3(12).
- Gonzalez-Espada, W. J. (2005). Inmigración y multiculturalismo educativo: El caso de los estudiantes dominicanos en las escuelas puertorriqueñas. *Revista Iberoamericana de Educación*, 36(12), 1-9.
- Gonzalez-Espada, W. J., and Trantham, K. (2005). How is energy like money? Using analogies in physics teaching. *School Science Review*, 86(317), 85-90.
- Gonzalez-Espada, W. J. (2005). Succeeding in Introduction to Physical Science: Is mathematics background important? *Journal of the Arkansas Academy of Science*, 58, 60-64.
- Zaras, D. S. and Gonzalez-Espada, W. J. (2006). Evaluation of the impact of the NWC REU Program compared with other undergraduate research experiences. *Journal of Geoscience Education*, 54(5), 541-549.
- González-Espada, W. J. and Napoleoni-Milán, R. L. (2006). The impact of the freshman year experience on science students. In J. J. Mintzes and W. H. Leonard (eds.), *Handbook of college science teaching*. Arlington, VA: National Science Teachers Association, pp. 351-358.
- Gonzalez-Espada, W. J. (2006). The influence of Puerto Rican physics teachers' political beliefs in their pedagogical practices. *Journal of Science Education/REC*, 7(2), 109-113.
- Gonzalez-Espada, W. J., Ochoa, Eduardo R., Ibarra, Melissa J., and Vargas, Perla A. (2006). Perceptions of differential treatment from the viewpoints of attending physicians, residents, and Hispanic parents in Arkansas. *Hispanic Health Care International*, 4(3), 157-167.
- Torres, S. M. and Gonzalez-Espada, W. J. (2006). Calculating "g" from acoustic Doppler data. *The Physics Teacher*, 44(8), 536-539.
- Gonzalez-Espada, W. J., Ibarra, Melissa J., Ochoa, Eduardo R., and Vargas, Perla A. (2006). Multicultural medical encounters: The experience at a pediatric clinic. *Journal of the Arkansas Medical Society*, 102(8), 227-229.
- Gonzalez-Espada, W. J. (2007). Using simple statistics to assure science fair success. *Science Scope*, 30(9), 54-56.

Research Support (completed)

Grant no. 28991

6/1/2004-8/1-2004

UAMS/BRIN

Cultural Expectations and Their Role in Physician-Patient Communication (with Dr. Perla Vegas). University of Arkansas for Medical Sciences' Biomedical Research Infrastructure Network. Role – Co-Investigator.

No current or pending research support.



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Center for Astronomy Education

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Workshops

Workshops

San Juan Workshop

Friday, Saturday, & Sunday, July 13-15, 2007
9:00 am – 5:00 pm

Condado Plaza Hotel & Casino
999 Ashford Ave.
San Juan PR 00907
<http://www.topuertorico.org/tinfo.shtml>

Improving the College Introductory Astronomy Survey Course for Non-Science Majors Through Active Learning: A Tier I (Introductory) Workshop (with an astrobiology strand)

Presented by Timothy Slater, Edward Prather, and Gina Brissenden (University of Arizona). It is cosponsored by the National Science Foundation's Chautauqua Summer Program, and is being held in conjunction with Bioastronomy 2007.

The overarching goal of this workshop is for participants to become familiar with *learner-centered* teaching and assessment materials, as well as how to implement them in their **college** astronomy courses.

To accomplish this goal, participants in our workshop will learn how to create productive learning environments by reviewing research on the nature of teaching and learning; setting course goals and objectives; and using interactive lectures, peer instruction, engaging demonstrations, collaborative groups, tutorials, and ranking tasks. Participants will also learn how to create more effective multiple-choice tests.

This workshop is designed for **college** faculty, post-docs, and graduate students currently teaching astronomy (or who think they will be in the near future).

If you are not a **college** faculty, post-doc, or graduate student, but you would still like to attend the workshop, please contact our Program Manager, [Gina Brissenden](#) to be put on our waiting list.

FEE: The NSF Chautauqua Summer Program charges a \$50 non-refundable registration fee. Please make check payable to the "NSF Chautauqua Program, and send your check to:

Gina Brissenden
University of Arizona
Department of Astronomy



San Juan, Puerto Rico

Cosmos 2007

Steward Observatory, Rm. N208A
933 N. Cherry Ave.
Tucson, AZ 85721

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-

Directions

For all the travel information you'll need, please go to the [Biastronomy 2007 travel page](#).

[back to top](#)

Hotel Information

This workshop is being held in conjunction with Bioastronomy 2007. In order to get the conference rate you cannot book directly with the hotel, but instead book through the meeting website. The conference rates are good 3 days prior to, and 3 days after, the conference. To book your room, please go to the Bioastronomy 2007 hotel booking site.

[back to top](#)



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Curator: Gina Brissenden
Webmaster: Cornell Lewis
Last Updated: 29 Jan 2007