

## Application Details

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### Manage Application: ALG Textbook Transformation Grant

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**Award Cycle:** Round 4

**Internal Submission Deadline:** Monday, September 7, 2015

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**Application Title:** 154

**Submitter First Name:** Sarah

**Submitter Last Name:** White

**Submitter Title:** Associate Vice President for Research

**Submitter Email Address:** ogc@gru.edu

**Submitter Phone Number:** 706-721-2592

**Submitter Campus Role:** Sponsored Programs Office

**Applicant First Name:** Neal

**Applicant Last Name:** Smith

**Applicant Email Address:** nsmith12@gru.edu

**Applicant Phone Number:** 706-737-1672

**Primary Appointment Title:** Associate Professor and Interim Chair,  
Department of Mathematics

**Institution Name(s):** Georgia Regents University

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**Team Members (Name, Title, Department, Institutions if different, and email address for each):**

Neal Smith, Associate Professor of Mathematics and Interim Chair, Department of Mathematics, nsmith12@gru.edu

Daphne Skipper, Lecturer of Mathematics, dapskipper@gru.edu

Christopher Terry, Assistant Professor of Mathematics, cterry2@gru.edu

Marvalisa Payne, Lecturer of Mathematics, mpayne@gru.edu

**Sponsor, (Name, Title, Department, Institution):**

Rickey Hicks, Dean, College of Science and Mathematics, Georgia Regents University

**Proposal Title:** 154

**Course Names, Course Numbers and Semesters Offered:**

Elementary Statistics, MATH 2210, Fall/Spring/Summer

**Final Semester of Instruction:** Spring 2017

**Average Number of Students per Course Section:** 30

**Number of Course Sections Affected by Implementation in Academic Year:** 37

**Total Number of Students Affected by Implementation in Academic Year:** 1110

**List the original course materials for students (including title, whether optional or required, & cost for each item):** Elementary Statistics Using Ti-83/84, (4E + New Msl W/E), Triola, ISBN 978-0-13-387379-5, required, \$143.95 per student  
TI-83/84 Graphing Calculator, required, \$109.00 per student

**Proposal Categories:** OpenStax Textbooks

**Requested Amount of Funding:** \$20800

**Original per Student Cost:** \$252.95

**Post-Proposal Projected Student Cost:** \$141.95 (OpenStax textbook with Webassign access + TI-83/84), \$109.00 (OpenStax textbook without Webassign access + TI-83/84), or \$0.00 (OpenStax textbook without Webassign access with alternative technology)

**Projected Per Student Savings:** At least \$111.00, up to \$252.95

**Plan for Hosting Materials:** Other

**Project Goals:**

The goal of this project is to promote access to higher education and to promote its affordability by adopting low- or no-cost materials in MATH 2210 (Elementary Statistics), which has the largest enrollment of any single course in the Department of Mathematics at Georgia Regents University. This project is anticipated to impact over 1000 students per year. By transitioning from a traditional textbook to a low-cost or no-cost alternative, there is a potential savings to our students of at least \$100,000 per academic year. MATH 2210 is a core area D course for many student populations at GRU, and we expect this cost savings to eliminate a barrier to progression and retention for a large student population.

**Statement of Transformation:**

A large and increasing number of students at Georgia Regents University take MATH 2210 as an Area D core elective; it is currently the most-populated mathematics course at the university, with over 1000 students enrolling in the course in academic year 2014-15. Among instructors of MATH 2210, there have been reports of students declining to purchase the textbook, as well as comments on various instructors' course evaluations that the current textbook was not all that helpful.

The goal of this transformation is to adopt a low-cost or no-cost textbook for use in MATH 2210, and establish a departmental infrastructure so that the mathematics faculty will embrace the use of open textbooks in not only MATH 2210, but potentially other mathematics courses as well. By developing supplemental materials (homework exercises and projects, supplemental videos, materials integrating a variety of different technologies [TI-83/84, Microsoft Excel, R]), and by creating a pre-made set of online homework problems for instructors who wish to use that feature in their courses, we seek to make the transition to a low- or no-cost textbook as easy as possible for a very diverse group of instructors who teach MATH 2210 (ranging from graduate teaching assistants to non-tenured lecturers to tenured faculty members) as seamless as possible.

Since over 1000 students enrolled in MATH 2210 in AY 2014-15, and that number is expected to increase, this transformation will impact approximately 15% of the undergraduate student population at GRU. We hope to make the cost of a college education more affordable, as high costs represent a serious barrier to retention, progression, and graduation.

**Transformation Action Plan:**

One reason MATH 2210 is the focus of our transformation plan is that a large number of students take MATH 2210, while the course is taught by comparatively few members of the

department. Fewer instructors to coordinate will serve to facilitate the transition to a low- or no-cost textbook. Further, during the last few years our department has begun to use graduate students to teach MATH 2210. Having a common body of homework problems and supplemental materials will make it easier for inexperienced graduate teaching assistants to provide a positive learning experience for their students.

Dr. Neal Smith, Interim Chair of the Department of Mathematics, will lead this project. He has taught MATH 2210 many times and he already has some experience with the use of no-cost materials, having taught several such courses in the past, including MATH 2210, using a collection of original materials. Also, Dr. Smith will serve as the liaison with the Advisory Committee on Mathematical Subjects and will be responsible for preparing the various status reports needed during the grant period. Further, as interim department chair, Smith will oversee the project and will develop some of the supplemental materials, including some of the materials where a no-cost technology option (the R statistics platform) is used in addition to the open textbook.

Dr. Christopher Terry, the department's resident expert in assessment, will be in charge of various assessments related to this plan. He will be in charge of collecting data to determine if course outcomes using the low-cost materials are comparable to an established baseline. In addition, he will be responsible for developing and implementing a questionnaire to collect feedback from students and faculty regarding the use of the low-cost materials.

Dr. Daphne Skipper will be responsible for aligning the common course syllabus to the textbook and for the creation of various supplementary materials for use by all instructors of the course. Additionally, Dr. Skipper will pilot the use of low-cost smartphone apps that emulate the TI-83/84 calculator, thereby increasing the cost savings to students.

Ms. Marvalisa Payne will be responsible for creating supplementary materials for those instructors who wish to use Microsoft Excel as an alternative to the TI-83/84 calculator. All four team members will work to determine an appropriate body of online homework problems for use by instructors who want an online homework option.

**Quantitative & Qualitative Measures:** To measure the quantitative impact of the use of the OpenStax text, we will examine the grade distributions (including D, F, W, and WF data) in the sections of MATH 2210 which adopt the open textbook, comparing these distributions with baseline data. All MATH 2210 courses at GRU have common questions embedded in the final exam; by examining data about students' performance on these common questions, we can assess if there has been any significant change in student performance after adoption of the open text. We anticipate similar performance on the embedded questions, and it is our hope that an increase in course success rates will follow after adoption of the open text.

In addition, we will examine data from the GRU College of Science and Mathematics course evaluation instrument (specifically its question #5, "Course materials such as textbook, handouts, and other materials provided by the instructor contributed to my understanding of the course material") and compare this with the corresponding pre-adoption data. The team will develop a brief questionnaire to obtain student and faculty feedback on the new materials.

Specific questions to the students may include:

1. Did the textbook contribute to your understanding of the course material?
2. (if applicable) Did completion of the online homework contribute to your understanding of the course material?
3. Did the supplementary materials provided contribute to your understanding of the course material?
4. Which version(s) of the OpenStax textbook did you use (free pdf, iBook, printed copy, Webassign digital copy with online homework)?
5. How does the quality of the OpenStax textbook in this course compare with traditional textbooks you have used in other courses (significantly better, somewhat better, about the same, somewhat worse, significantly worse)?

Specific questions to the faculty may include:

1. Is the open textbook of suitable level for

the course?

2. (if applicable) Was the pre-selected collection of online homework problems adequate for the needs of your course?
3. Were the supplemental materials used in your course and if so, were they well-written and useful?
4. How does the quality of the OpenStax textbook in this course compare with traditional textbooks you have used in other courses that you have taught (significantly better, somewhat better, about the same, somewhat worse, significantly worse)?

### **Timeline:**

Fall 2015/Spring 2016: Skipper and Smith will pilot use of the OpenStax text in a limited number of MATH 2210 courses to anticipate any issues associated with its adoption.

January-April 2016: Create supplementary materials for the open textbooks for use beginning in fall 2016, create assignments in WebAssign, design end-of-semester questionnaire.

May 2016: Conduct training to inform department faculty about availability of supplementary materials in advance of transition to open texts in fall 2016.

August 2016: Wide-scale course offerings with open texts begin.

October 2016: Preliminary reports on the implementation.

December 2016: Administer course evaluations and questionnaires.

January 2017: Analyze student success and questionnaire data.

March 2017: Analyze student evaluation data.

May 2017: Prepare final report.

### **Budget:**

We are requesting a total of \$20,800, broken down as follows:

\$5000: course release for Smith

\$5000: course release for Skipper

\$5000: course release for Terry

\$5000: course release for Payne

\$800: cover cost of traveling to required kick-off meeting.

### **Sustainability Plan:**

MATH 2210 is offered each fall, spring, and summer, and we anticipate that once the open text is used, we will continue to use the open text. The department will maintain a library of materials for the open course on its department website, and one member of the team will maintain the online homework for the course in WebAssign, thereby allowing it to be shared with any instructor teaching MATH 2210. Responses to the student questionnaires will be used to modify some of the supplemental materials as needed.

Once the materials are created, there will be no additional expenses associated with their maintenance, as they can be housed on the department's website.

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August 19, 2015

Affordable Learning Georgia

Dear Sir or Madam:

On behalf of the College of Science and Mathematics at Georgia Regents University, I strongly support the proposal put forth by Dr. Neal Smith, Dr. Daphne Skipper, Dr. Christopher Terry, and Ms. Marvalisa Payne to Affordable Learning Georgia. The College of Science and Mathematics at GRU recognizes the importance of student progression and retention, and we believe that the use of open-source and low-cost textbooks and educational resources can play an important role in student progression and retention.

This project will support the creation of low- or no-cost sections of MATH 2210 (Elementary Statistics) at Georgia Regents University. Approximately 1000 students take this course each academic year, as it is a core area D option for biology, health science, business, and a number of other majors. The textbook currently used in MATH 2210 retails for \$143.95, and the proposed low-cost materials would reduce this figure to \$32.95 or less. Through the use of open-source software, students could also be spared the additional expense of purchasing a graphing calculator as well. This makes for a cost savings of anywhere from \$111 to over \$200 per student, equating to a potential cost savings of over \$100,000 per year to the students.

We believe this project is very sustainable. If this proposal is funded, course releases for the involved team members will enable them to develop materials to run low-cost sections of MATH 2210. Once the materials are developed, this will provide momentum for additional faculty to embrace the use of low- and no-cost materials. The office of the Dean will provide support to this project as indicated in the grant proposal, and we will work with the team members to ensure compliance with state and university guidelines should this proposal be funded.

Thank you for your consideration of this proposal, as the support of programs like Affordable Learning Georgia play a vital role in making this type of curricular innovation possible.

Best regards,

Rickey P. Hicks, PhD

Dean

College of Science and Mathematics