

The Need for Interdisciplinary Undergraduate Research

William J. Joel*

Graphics Research Group, Western Connecticut State University, USA

Abstract

In 2009, the ACM/SIGGRAPH Education Committee established an Undergraduate Research Alliance [UNDERGRADUATE RESEARCH ALLIANCE] to foster the development of undergraduate research, in computer graphics and interactive techniques, across all related disciplines. Since its inception, the Alliance has hosted sessions at the annual SIGGRAPH conferences to allow educators and other the chance to discuss what they have accomplished and what still needs to be done. If we in the SIGGRAPH community wish to continue to expand the envelope of knowledge, it is necessary that we engage students in the exploration of new ideas as early as possible in their education. The purpose of this poster, therefore, is to present a case study for undergraduate research with the hopes that it spurs others to join in this endeavor.

Keywords: undergraduate, research, curriculum.

Concepts: Computing education;

1 Introduction

In 1998, the Boyer Commission produced a report [BOYER COMMISSION, 1998] that challenged universities to utilize the expertise in their graduate and research programs to create research learning experiences for undergraduate students that foster critical thinking, clear writing, and coherent speaking. Subsequently, Fechheimer et al [FECHHEIMER, 2011] showed that for undergraduate students "[E]xtended participation in research for more than a single semester is correlated with an increase in GPA"

More importantly, undergraduate research fosters a better understanding of the role an undergraduate's education will play in her/his career. "Undergraduate researchers learn tolerance for obstacles faced in the research process, how knowledge is constructed, independence, increased self-confidence, and a readiness for more demanding research. These benefits are an

advantage in any career path." [LOPATTO, 2010]

Still, given these findings it is surprising that a vast number of universities and colleges do not incorporate novel research as a significant required component of undergraduate education. And what is even more prescient is to foster an interdisciplinary approach to undergraduate research in computer graphics and interactive techniques.

2 Undergraduate Research Alliance

In 2009, the ACM/SIGGRAPH Education Committee established an Undergraduate Research Alliance [UNDERGRADUATE RESEARCH ALLIANCE] to foster undergraduate research, in computer graphics and interactive techniques, across all related disciplines. The Alliance attempts to bring educators and others together to answer three questions.

First, what exactly is undergraduate research in computer graphics and interactive techniques? Second, what impediments, if any, exist to the establishment and success of undergraduate research? Third, what types of support are necessary?

Participants in Alliance sessions defined undergraduate research as any novel research activity undertaken by an undergraduate student. More specifically, the group decided to focus on research activities where the student is the primary investigator. Impediments identified included lack of support with respect to space, time and funding; and lack of appropriate training of undergraduates in research principals and methods prior to engaging in research.

In addition, two types of support were identified. First, the respective institution needs to publically accept the premise that undergraduate research is important and essential. Second, funding, space and time need to be made available to insure the success of research.

Alliance members have suggested that the establishment of inter-institutional research projects could help alleviative this funding issue by allowing various undergraduate institutions to share both knowledge and resources.

3 Case Study: Western Connecticut State University

Western Connecticut State University (WCSU) is located in Danbury, CT, USA, and has an undergraduate population of approximately 4,250. At WCSU, the Graphics Research Group (GRG) has funded original student research for the past two summers, and plans to do so in 2016 as well. These summer research opportunities are open to all undergraduates at WCSU regardless of their major. It is the belief of GRG that students from any discipline can and should engage in original research. A poster is being submitted to this year's SIGGRAPH conference

* email: joelw@wcsu.edu

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based on the work of one of last year's research projects ("Quantification of 3D Character Aesthetic Behavior"). Recently WCSU has developed a new major in Digital & Interactive Media Arts, which is co-managed by the Art, Communication & Media Arts, and Computer Science departments. It is hoped that this new major will join GRG in furthering its goals.

Even though GRG has seen continued growth and success in its efforts, it has not been easy. Given the interdisciplinary nature of its work, and the fact that many of its research projects are small and narrowly defined, it has been difficult to locate suitable funding sources. Fortunately, GRG has a local donor through whom it has been able to fund its initiatives.

4 Future

It is hoped that through such vehicles as this poster, that Alliance initiatives can be more widely disseminated, and thereby benefit the wider educational community. This is the task charged to the Alliance's Director, the author of this presentation.

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