Statement of Undergraduate Research Supervision

Mustafa Al Lail

1 Importance of Undergraduate Research

Studies have shown that students learn best when they are engaged in active inquiry. Consequently, undergraduate research should primarily focus on fostering student learning. Original research results can be produced when faculty members supervise undergraduates as they apply classroom knowledge and skills in an innovative way.

As a professor, I am committed to undergraduate research, because I believe a major factor of student success stems from the dedication of faculty. My research in Computer Science is intrinsically driven by my desire to help students develop intellectually. I view research with undergraduates as an opportunity to teach them a variety of knowledge and skills as well as to produce original research results.

Involving students in research has many benefits for students, faculty, and universities. For students, research plays a critical role in the intellectual understanding of the scientific methods and tools that are used in Computer Science. Once those methods are learned, students can apply them to a variety of scientific problems and fields. Research also helps students gain in-depth functional knowledge, develop their critical thinking skills, and enhance their independent problem-solving abilities. Undergraduate research can be done in teams, hence, students can improve their teamwork and communication skills. Furthermore, research can introduce students to interesting topics that might inspire them to pursue further work in a graduate school or future career.

Professors can benefit from research as well. It keeps them involved in cutting-edge knowledge that can enhance their teaching. Research is also important for faculty to contribute to the advancement of the Computer Science body of knowledge. Furthermore, undergraduate research projects can realize the missions of universities because they enhance their commitment to overcoming the scientific, technological, and social challenges of societies.

2 Motivating Students

Research has shown that students' motivation determines, directs, and sustains what they learn. As undergraduate research is a learning process, the question then is: *How do we motivate students to work with us on research projects?*

Students are motivated to work on research when they find positive value in engaging in a research topic, expect to achieve the desired goals successfully, and receive support from their faculty mentor. I will further describe my approach in addressing each of these factors that motivate students.

The importance of research is one of the key factors that motivate students to pursue it. The project should be of high scientific value and should address interesting problems. When describing a research project to students, I describe the significance of the research and highlight what students gain by engaging with it. To do this, I follow the strategies below to establish the high value of a research project:

1. Design an authentic, real-world, and interesting project
2. Connect the research to the student's interests
3. Show the relevance of the project to students' current and future academic and career ambitions
4. Be enthusiastic and passionate about the project and the students' learning

Though students must see the value of doing research to be motivated, they still need to have high expectations of success. To address this factor, I use the following strategies to enhance students' expectations:

1. Break down the undergraduate research project into a set of tasks, each of which is challenging yet appropriate at undergraduate-level. This task also includes stating the expectations of the project in a precise and clear way
2. Provide support to the student to achieve successful results early in the project
3. Provide frequent support and feedback to the undergraduate student researcher
4. Educate students about research methods and how to succeed. This strategy also includes describing effective research strategies such as finding relevant resources, brainstorming ideas, writing and presenting scientific papers and results.