

# Indiana University Kokomo

## School of Sciences

### 2020 Strategic Plan

#### **School of Sciences – Mission**

The mission of the School of Sciences is to provide students with the undergraduate academic, research, and experiential background that will enable them to pursue meaningful careers in science-, mathematics- and informatics-related fields or to meet general education or program requirements in their major. The purposeful combination of theoretical and practical educational experiences coupled with the breadth of the available degrees will enable students to prepare for a wide variety of graduate programs, professional schools, secondary school teaching careers, and/or entry into the workplace. Students graduating from the School of Sciences will be prepared to become lifelong learners who are able to make positive contributions in a world where questions involving scientific and quantitative literacy, environmental quality, sustainability, and technology are becoming increasingly important.

#### **School of Sciences - Background**

The School of Sciences was established on July 1, 2012. Prior to that date, the School of Sciences was the Science, Mathematics, and Informatics Department within the School of Arts and Sciences. In 2012 the General Studies Program also was added to the degrees hosted in the School of Sciences. Reorganization of the School of Arts and Sciences took place, in part, to provide more autonomy to the various Sciences, Mathematics, and Informatics units and to increase the visibility of these programs on- and off-campus. Since then, the School of Sciences has been doing very well. Student enrollment in our majors is strong and we are constantly involved in community outreach programs designed to attract high school graduates to our programs. In the last few years, B.S. degrees have been introduced, including a new degree in Biochemistry. A new track in “Earth and Sustainability Sciences” also was added to the Biological and Physical Sciences B.S. degree. Besides these degrees, the School of Sciences offers degrees in biology, biological and physical sciences, chemistry, informatics, and mathematics. Several minors also are available. The School of Sciences is primarily housed in Hunt Hall, which opened in 2001 and contains state-of-the-art laboratory facilities. A new Math Commons is scheduled to open in 2016 in the renovated Main Building.

#### **IU Kokomo Campus Strategic Priorities, 2014-2020**

The IU Kokomo Strategic Plan consists of five strategic priorities. They are:

- Strategic Priority I - Preparing students for a 21st century global economy by delivering innovative and relevant academic programs
- Strategic Priority II - Increasing college enrollment and degree attainment in north central Indiana
- Strategic Priority III - Promoting the culture of discovery and creativity among students, faculty, staff, and community members
- Strategic Priority IV - Being a valued regional partner by enhancing relationships with community members and alumni

- Strategic Priority V - Supporting the professional growth of faculty and staff

### **School of Sciences – 2020 Strategic Plan**

Using the campus Strategic Priorities as a guide, the School of Sciences Faculty and Staff have identified several goals and objectives that will steer additional growth and development in the School of Sciences for the coming years. However, this does not mean that other areas of endeavor or current activities will be ignored. These new goals and objectives, described below, are in areas where additional growth and development is desirable.

#### **1) DEVELOP NEW COGNATES IN INFORMATICS– *linked to Strategic Priority I***

The Informatics B.S. degree program has experienced solid growth over the past few years. This trend is reflected by a growing need, nationwide, for graduates with skills in computing-related disciplines. The job outlook for those graduates is excellent. According to the 2014 U.S. News and World Report, five of the top 12 best current jobs are in computing-related fields (# 1 software developer, # 2 computer system analyst, # 9 web developer, # 11 information security analyst, # 12 database administrator). The U.S. Bureau of Labor Statistics predicts that the demand for these jobs through year 2022 will grow by 22-32%.

Currently, most informatics students graduate with either a “business” cognate or a “new media” cognate. However, other needs have developed since these cognates were originally developed on our campus in 2007. Both the influx of informatics students and the increasing demand for graduates are requiring us to think about new cognates and new degree areas in order to meet the demand for computing-related experts. Therefore, due to the high demand for graduates with skills in computing-related disciplines (see above), the School of Sciences proposes, as a specific goal, to introduce a “computer science” cognate. The addition of a computer science cognate is a short-term step that will eventually lead to the development of a proposal for a computer science B.S. degree on campus.

In Spring 2015, the School of Sciences submitted a proposal requesting an “Environmental and Earth Sciences” cognate for Informatics students. “Environmental informatics”, “geographic information systems”, and “geoinformatics” are growing disciplines involving the application of information technology to create, address, store, and model environmental data. Major universities offer degrees in environmental informatics and the discipline has its own journal (*Journal of Environmental Informatics*) which was first published in 2003. Accordingly, the objective of the Environmental and Earth Sciences cognate is to prepare informatics students to work in environmentally-related businesses and agencies. With a diverse scientific background, students will be well prepared to apply informatics and computing tools to address challenges in environmental applications related to air, water, and soil analyses as well as environmental impacts on ecosystems and the sustainability of the species living within those ecosystems. According to the Bureau of Labor Statistics, the demand for environmental scientists and specialists is predicted to increase from 85,900 in 2008 to 109,800 in 2018 for a change of 23,900 or +28%. ([ftp://ftp.bls.gov/pub/special.requests/ep/ind-occ.matrix/occ\\_pdf/occ\\_19-2041.pdf](ftp://ftp.bls.gov/pub/special.requests/ep/ind-occ.matrix/occ_pdf/occ_19-2041.pdf).) Therefore, a cognate in this area for informatics students is well-suited to better serve this industry.

#### **2) CREATE A NEW DEGREE IN COMPUTER SCIENCE – *linked to Strategic Priority I***

Following the introduction of the computer science cognate, we will assess the success of both the computer science (CS) courses and cognate after two years with respect to enrollment, scheduling, and student success. Positive results would include the following:

- At least three of the new CS courses in the cognate have been offered and have enrolled at least 10 students in each section.

- Students have declared computer science as their cognate. Two years may not be sufficient to produce many informatics graduates with the new CS cognate, but we expect to see several informatics majors taking courses toward the CS cognate.

Assuming positive assessment results with the new computer science courses and cognate, the School of Sciences anticipates that we will be able to recommend the establishment of a stand-alone B.S. degree program in computer science.

### **3) INCREASE THE OPPORTUNITIES FOR INTERNSHIPS – *linked to Strategic Priorities I & IV***

Recent discussions with high school students, parents, college students, and advisory board members have highlighted the need for increased internship experiences for our students. Students who graduate with work-related experiences are more likely to find employment rapidly. Although some of our students do take internships, these numbers are relatively low. The School of Sciences aims to increase the number of internship opportunities for all of our students. In order to do so, one of our specific goals is to increase relations with potential business partners in our service areas. The School of Sciences needs to have a greater presence and voice in North Central Indiana.

### **4) SUPPORT THE ESTABLISHMENT OF THE NEW MATH COMMONS – *linked to Strategic Priority II***

Having an inviting space dedicated to the exploration of mathematics will be attractive to prospective students and their parents. Providing additional space and opportunity for interactions between students and faculty and between students and peer tutors will increase the probability of student success in math classes required for completion of the general education quantitative literacy goal. Additional purpose-designed mathematics classrooms with state of the art equipment will result in improved mathematics instruction, which will facilitate a greater level of student achievement in the transitional and general education mathematics courses. With the renovations of the Main Building, the new Math Commons will become a reality. The current plans include moving the math faculty offices to the Main Building. The Math Commons will include classrooms, a computer lab, a Math Resource Room, faculty offices, as well as tutoring and small-group study spaces. The School of Sciences will work with the administration to ensure that resources are in place so that the new facilities can be very effective in the long run. The School of Sciences is striving to have a Math Commons that is innovative, welcoming, engaging, and student-centered. Some specific goals that the mathematics faculty would like to accomplish:

- Increase student participation in voluntary mathematics study sessions as a route to increased student success.
- Use the new Math Resource Center as a location for our Math Circle outreach program, giving high school students an inviting and appropriate space for experiencing mathematics.
- Host regular events in the new space to increase student engagement in mathematics, both for major students as well as other students with quantitative interests. One such program that is already running and could benefit from the space is the biweekly “Dead Poets Society”, a problem-solving seminar.

### **5) BECOME A SCHOOL RECOGNIZED FOR INNOVATIVE EDUCATION AND UNDERGRADUATE RESEARCH – *linked to Strategic Priority I, II, & III***

The School of Sciences faculty will continue to be creative in their approach teaching and learning. Various approaches to teaching have been implemented (or have been proposed) by our faculty in recent years. These include hybrid courses, online teaching, online tutoring, additional math tutoring in some courses, lab tutoring in the natural sciences, undergraduate research with faculty, the use of

clickers, team-based learning, flipped classrooms, to name a few. In 2014, we initiated a partnership with the Area Health Education Center (AHEC) of North Central Indiana to establish a “STEPS” program. The STEPS program is a pre-med preparatory program in which selected students go through an MCAT preparation course, mock interviews, job shadowing experiences, and meetings with medical professionals. We will continue to promote and improve pre-professional programs with the goal of increasing student admissions to professional schools and post-baccalaureate programs such as medicine, dentistry, and pharmacy.

Another innovative pedagogical approach involves making connections with the fine arts, adding A(rt) to “STEM” to create “STEAM”. STEAM is a new concept in education (<http://stemtosteam.org/>), providing some interesting new ideas about how to integrate different disciplines. It has been tested at IU Kokomo in some classes and with a few research projects.

An important addition to our facilities would be a greenhouse. We have begun discussions to build a greenhouse on campus, which would be a new facility where we can teach additional plant science and nutrition (health sciences) courses. A greenhouse would also benefit faculty research, and it would allow us to broaden our curriculum in biology. The School of Sciences will continue to pursue the creation of a greenhouse on campus, with the objective of having one by 2020.

Undergraduate research has been a hallmark of the School of Sciences for many years and we will continue to promote it. With the introduction of B.S. degrees in 2012, a 3-credit research experience is now required for students before they graduate from most of our B.S. degrees. We will continue to develop our undergraduate research courses and program and make them an even more relevant part of the student learning experience. Specific goals in this area include the increase in capstone course offerings as well as increased student participation in conferences.

The School of Sciences faculty will continue to develop and integrate new pedagogical methods in the classroom (or outside of the classroom such as in research experiences and internships) so that the School of Sciences becomes highly recognized with innovative approaches to student learning. Specific goals for the next few years include the following:

- Creating faculty mentor-freshman and upper classman mentor-freshman relationships for all freshmen. We will initially pilot this program with the intent of expanding it to all incoming freshmen in the future.
- Increasing peer-tutoring opportunities in lower-level classes.
- Adding new online and hybrid classes, especially for informatics, service courses, and general education courses so that scheduling can be more flexible for students.
- Evaluating offering online tutoring in selected mathematic courses.
- Developing further partnerships with AHEC and others to better prepare and serve our pre-professional students.
- Adding more capstone course offerings and increasing conference attendance for undergraduate students.

## **6) SERVE INTERNATIONAL STUDENTS - - *linked to Strategic Priority II***

The IU Kokomo campus is moving toward enrolling more international students. The School of Sciences will strive to serve these students with relevant curricular and extracurricular programs and service. We will work with the administration to attract international students to our program and to find ways to best serve them once they are on campus. This will include working with the current clubs (pre-professional club and informatics club) to increase social activities and to integrate those studies into the fabric of the School.

**7) INCREASE THE NUMBER OF GRADUATES – *linked to Strategic Priority II***

Nationwide, graduation rates in the sciences are lower than in many other disciplines. While we must maintain our standard of excellence, the School of Sciences specifically aims, through the strategies discussed in this plan, to continuously increase the number of IU Kokomo students graduating with a School of Sciences (STEM) degree. We will also strive to increase the number of students we send to professional schools every year.

In summary, by promoting our programs in the communities we serve as well as to international students we aim to attract and support learners who will (1) benefit from an engaged faculty and staff who offer innovative teaching and learning opportunities and (2) be prepared to successfully compete for twenty-first century jobs or admission to post-baccalaureate programs.