3rd **W**orld conference on **I**ntegrated **S**TEaM **E**ducation through **R**obotics (**WISER**)

(Last Updated on May 12, 2018)

Friday, 9am ~ 3pm, May 18, 2018

In conjunction with World Robofest 2018

A200 Auditorium, Lawrence Technological University, Michigan, USA

Conference moderator: Dr. Sibrina Collins

Welcome Remarks by Dr. CJ Chung, Found & Director of Robofest – 9:00am

Presenter (s)	Title	Abstract	Links to Paper / Slides	P. Time
Elmer Santos & CJ Chung	Analysis of Robofest Game Data	An analysis of data from the Robofest Game competition from 2016 to 2018. Statistics from the various years are compared to see the level of difficulty and the learning based on the game scores. Statistics from a new set of "second chance" competitions, the Michigan Invitationals, showed improvement in performance outcomes as well as gaining more population in the middle-class.	PDF Slides	9:10 am
IMTIAZ AHMED KHAN	Present status and future of Robotic in India	Visionary Bill Gates, the Japanese Robotics Association and the European Commission have something in common: they all believe robotics will be as important tomorrow as computers are today. This means all future engineers, doctors, scientists, technocrats and researchers in applied sciences will benefit from learning about robotics. Robotics is a Revolution of 21st Century. India is considered to be the hub of IT professionals, Bangalore is capital of IT Industry in India- from where I belong, how are we Indians in relationship to others in this new Revolution - Robotics, the present situation, the future and the potentials, …….. the same applies to many developing and under developing countries, a wakeup call to all countries dreaming for the future.	PDF Slides	9:30 am
Dr. Latha Murthy	Promoting creativity through robotics	Robotics offers a new idea of what creativity looks like. In today's' technology-driven world, it's important now more than ever to prepare students for the future. Teaching robotics to young students throughout their schooling can increase their ability to be creative and innovative thinkers and more productive members of society. Many governments have already recognized the importance of robotics in the classroom and have begun to create programs and laws that would incorporate it into their public education system. To meet the challenges of the modern workplace, today's education is calling for curriculum that integrates STEM learning and creative problem solving in the classroom. I have found that creativity in the classroom is better harnessed when it is encouraged and is critical for today's students, particularly when using robotics. One common misconception about creativity that many of my students have is that to be creative, you need to have a knack for drawing, painting or storytelling. What I try to teach through robotics is what I believe the true definition of creativity is: doing or thinking about things differently. While robotics may seem overwhelming at first, it is truly a great tool to implement in the classroom to promote a culture of creativity. Not only does it emphasize meaningful problem-based learning, it also offers unique applications for hands-on learning in cooperative groups, allowing students to gain important communication and teamwork skills necessary for the modern workplace.	PDF Slides	10:00 am
Ashwini Anil	Robotics as a Design Pathway to STEM success in Indian Education	In the year 2016, India produced the maximum graduates worldwide with 78 million fresh graduates of which 2.6 million were from STEM. However, there still persists a shortage of skilled talent in STEM sectors. According to industry experts and academicians, one of the chief contributors to the talent mismatch is the disparity between college curriculum and industry expectations. Some colleges in India follow a theoretical than practical hands-on based STEM curriculum. There is more emphasis in learning STEM concepts through definitions and by rote methodology. Due to the lack of practical and hands-on	PDF Slides	10:30 am

		learning in colleges, some students are not skilled to meet the industry standards. To bridge this gap in Indian education, Robotics can be used as a design pathway to STEM success in Indian education. The following are few examples on how Robotics can be used to teach STEM concepts: 1. Inertia – Build a Dragster robot. Code the robot to move with top speed (wheelie), stop suddenly, wait for 1 second and then move at top speed. Because of the sudden stop while moving at high speed, the robot lifts up. And then the robots go down (does a wheelie) again when moved at high speed. This is an easy way to practically learn about Inertia (or Newton's First Law of Motion) 2. Gears – Build a Windmill or a Robot with multiple gear attachments. Through this, the students learn the concepts of Gears, Gear Ratio, Gear Up, Gear Down, Speed & Torque. 3. Ratchet Mechanism – Build an Inchworm. The Inchworm is designed to move only in the forward direction. It cannot move back because of the ratchet mechanism. By including Robotics as part of the curriculum, the concepts of Science, Technology, Engineering and Math can be integrated into a fun and hands-on learning		
Dr. Yawen Li	Using robotics to enhance learning in elementary students: One team's experience	Improving K-12 education in Science, technology, engineering, art and mathematics (STEaM) is a high priority for the US Department of Education. Robotics provides an excellent platform for elementary students to learn STEaM as it allows them to learn through active engagement and participation. We started a Troy Robotics Club in 2016 that includes elementary students, student mentors in high school, parent coaches, technical mentors, and other enthusiastic supporting parents. The students meet weekly to learn robotics building and programming, and practice presentation, critical thinking and problem solving skills through various team activities and assignments. The students' interest in robotics has been greatly enhanced through participation in Robofest and First Lego League (FLL) competitions. We will share lesson plans we developed, and resources and references we found useful. We will also discuss the different experience in Robofest and FLL, and lessons learned in preparing for these competitions.	PDF Slides	11:00 am
SHIVAKUM AR.S	Lessons learned from robotics competitions	Lessons learned from robotics competitions and best practices in team management. Participating in a Robotics competitions are more than robots. It's about people, it's about learning to work together, it's working together towards a shared goal, doing teamwork, it's about finding and using each individual's unique talent to make them and accomplish the task. It's about applying skills that will lead to success in whatever kids do in life. The robotics competitions will increase the awareness and interest in science and technology, increased focus on science and engineering careers. Nowadays there are many robotic kits on the basis of which educational courses can be created Mechatronics Control Kit, VEX, TETRIX, Lego Mindstorms. Getting physically real results pretty quickly contributes to the formation of learners independence, developing their leadership skills, promotes a positive educational process. Robotics also provides prestige and growth of interest in the field of engineering and design, which greatly waned recently. Thus, the use of robotics in education will create a powerful impulse that will contribute to addressing a wide range of tasks: x growing interest in the development and training of engineering and design directions of preparation and specialties; This is my fifth year working with kids for preparing them for the Robotic competition, national and international. I'd like to tell that I have everything figured out and that my 25+ years of experience building custom equipment, using many cad software's and managing engineers and technician at my industry, however, I must admit that I learn more every year than the students do. Sure, I have more experience and technical skills than they do but they certainly have me beat in terms of enthusiasm, a "can do" attitude and imagination. Robotics is a fun-filled field that integrates academic subjects, real life applications and workplace competencies. Kids learn math, physics, electronics, mechanics, geometry, engineering, and computer science for use in real-life applications. The hands-on learning process required to build robots helps Kids gain workplace competencies such as project management, time management, resource sharing, teamwork, problem solving, systems analysis, communication skills.		11:30 am
		Lunch Break (Noon ~ 1:00pm)		

Jacky Yau	STEM Education in Hong Kong	A sharing of robotics and STEM education in Hong Kong. The talk includes how the presenter starts his robotics education business in Hong Kong and assess how the business has changed over the years.	PDF Slides	1:00 pm
Jose Avendano	MATLAB and Simulink for Robotics Education	This presentation will cover several aspects of MathWorks involvement in robotics and STEM education and an overview of the implementation of our tools for the programming and simulation of robotic systems. There will also be demonstrations on our available MATLAB and Simulink curriculum, dedicated support for common educational hardware (Arduino, LEGO, VEX, Raspberry Pi), complimentary licenses for student competition and content created specifically to aid in STEM education.	PDF Slides	1:30 pm
Justin Chan	Computer Vision based Language Assistant	The presentation describes a procedure of implementing a language assistant application. In such application, the user wears a special pointing device and points at a word. The application than use optical character recognition to recognize the word and search for the word's meaning from an online dictionary.	PDF Slides	2:00 pm
Le Coupanec Jacques	A pedagogical experimentation in France	A Robotics course has been provided to 10th graders since 2010. It aims to make them discover mechanics, electronics and computer science by designing and building robots. This course is provided in English in order to get students to explain in English the functioning of their robots. And to ensure their motivation, the robots are presented in an international contest in an English-speaking country. First, I will introduce the French education system and explain why it is important to provide our students with such a course. Then I will present the evolution of our robots during these last eight years and the different technical breakthroughs. Finally, I will describe the scheme of work adopted to teach mechanics, electronics and computer science. It's an ambitious project since students are involved in all the stages of the designing and the building of their robot: drawing kinematic diagrams, creating models and assemblies by using SolidWorks, testing electronic circuits and soldering them on their electronic card, driving a peripheral device by using a micro-controller, machining all the parts of their robot, assembling them, beautifying their robot and programming the final choreography.	Video Presentation PDF Slides	2:30 pm
Eric Liu	Development of Python / OpenCV Based Robotics System and Application in Vision Centric Challenge (VCC)	This presentation will introduce a new robotics system (Python/OpenCV platform) as a new tool for STEM education for LTU Robofest's VCC. The topic will include: (a) Why Python for VCC? (b) Hardware environment: L2Bot & Low cost motor controller (LOCOMOCO) (c) Software environment: Python and OpenCV (d) application of new system in 2018 VCC: FiCO (videos) (e) Python/OpenCV vs. C#/EmguCV	PDF Slides	3:00 pm

2018 WISER Program Committee
- Dr. CJ Chung, General Chair, Professor of Computer Science, Lawrence Technological University
- Dr. Sibrina Collins, Moderator, Executive Director of Marburger STEM Center, Lawrence Technological University

Photo Album of the conference