

Report for IEEE CSS Outreach Project “A summer camp for video-game based control learning for middle-school girls”

Dr. Yongqiang Wang, IEEE Senior Member (membership number 92147604).

Affiliation: Assistant Professor, Department of Electrical and Computer Engineering, Clemson University

Email address: yongqiw@clemson.edu Phone: 864 656-5923

Postal address: Room 332, Fluor Daniel Building, Department of Electrical and Computer Engineering, Clemson University, Clemson SC 29634.

With the help of the project, we developed a racing game platform for control education of middle-school students. In this platform, every car has separated steering control, acceleration control, and throttle control, which gives students flexibilities to test/design various control schemes. We also included models for various communication channels, which allows students to test cooperative control schemes for connected vehicles under different communication channels. The platform synchronizes simulations so that they run in real time, and gives the look and sound of commercial video racing-car games. Two screen shots of the developed platform are given in Fig. 1. Using this computer game platform, students can see and sense the basic elements of automatic control in an everyday object (a car): the sensor, the controller, and the actuator. Students can also design and test out various control strategies on the cars and check the corresponding steering outcomes with fun.



Fig. 1. Screen shots from the developed video game platform for control education

The game education platform was used in outreach activities to about 100 middle-school students in 2017 (February 18, 25, and June 18-25) at Clemson University through university-organized outreach programs “Girl Scouts” and “STEM Days.” A sample program is given in the appendix. Some pictures on the outreach days are given in Fig. 2. The exit survey shows that the middle-school students become more interested in control and STEM.



Fig. 2. Photos for one of the Girl Scouts days.



Fig. 3. Photos for one of the STEM days.

Appendix: The sample program for one of the outreach activities to middle-school girls (Girl Scouts)

Brought to you by...

Serita Acker, Program Director

WISE Big Sisters & PEER Mentors

Angela Edwards	Zach Boykin	Rebecca Fantone
Candice Saunders	Emily Gottberg	Jhordan Jenkins
Charlie Perez	Ellie Hill	Teirra Holloman
Crystal Pee	Shannon Roberson	Monique Mack
Rachel Thompson	Emma Coleman	Carrington Jones
Kathrine Allen	Kelsey Sullivan	Yogi Rana
Natalia Arbelaez	Nicole Michaud	Elana Martin
Tamara Ortega	Kiamber McCrorey	Quinton Gilliard
Tyler Ford	Rachel Thomson	Megan Stahlberger

WISE&PEER Staff

Lisa Jackson
Nancy Parra
Francene Thomas
VeeAnder Mealing

Professors

Allison Yaguchi & Dr. Eric Davis
Dr. Leah Casabianca
Dr. Yongqiang Wang
Dr. Brandon Ross

Lockheed Martin Staff



Welcome!

Hello, my name is Serita Acker, and I am the director of the PEER & WISE program here at Clemson University. I would like to welcome you to our campus. We hope you enjoy the activities we have set up for you to learn about many different fields of engineering and science.

Have a Great Day!

Serita Acker



“Engineers Dream Big!”

Saturday, February 25, 2017

- | | | |
|---------------|--|---------------------|
| 9:00 - 9:25 | Check In and Meet and Greet
You will check yourself in while meeting peers from other troops. Enjoy our complimentary refreshments. | Freeman Hall |
| 9:30 - 9:45 | Welcome
<i>Serita Acker, Program Director</i>
You will receive a brief overview of your day, and speak with a few Clemson students about their experience at Clemson. | Freeman Hall |
| 9:45 - 10:00 | Pre-Survey Explanation & Instructions | Freeman Hall |
| 10:00 - 10:15 | Picture Time! | Freeman Hall |
| 10:20 - 11:20 | Session 1 | *See Below |
| 11:30 - 12:30 | Session 2 | *See Below |
| 12:40-1:40 | Lunch with PEER& WISE Mentors & Lockheed Martin Staff Presentation | Freeman Hall |
| 1:45 -2:45 | Session 3 | *See Below |
| 2:55 - 3:55 | Session 4 | *See Below |
| 4:05 - 4:20 | Wrap Up & Post-Survey | Freeman Hall |

We hope you enjoyed your day here at Clemson!
NOTE: You will be divided into 4 groups. Below is a Schedule for each group.

	Group 1	Group 2	Group 3	Group 4
Session 1	Chemical Engineering	Chemistry	Computer Eng.	Civil Eng.
Session 2	Computer Eng.	Chemical Engineering	Civil Eng.	Chemistry
Session 3	Chemistry	Civil Eng.	Chemical Engineering	Computer Eng.
Session 4	Civil Eng.	Computer Eng.	Chemistry	Chemical Engineering

Chemical Eng.
Chemistry
Computer
Civil Engineering

Allison Yaguchi & Dr. Davis
Dr. Casabianca
Dr. Wang
Dr. Ross

Earle Hall, Unit Ops Lab
Hunter Hall 158
Fluor Daniel 132
Lowry 115