

# Zikang (Karl) Sheng

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## EDUCATIONAL BACKGROUND

**Rice University** 08/2022 - Present

*Master of Electrical and Computer Engineering*

**Stevens Institute of Technology** 08/2018 - 05/2022

*Bachelor of Engineering in Computer Engineering, Minor in Computer Science* Overall GPA: 3.98/4.00

- Honors & Awards: IEEE Young Professionals, IEEE-HKN member, Dean's list (2018 Fall – 2022 Spring)
- Programming Language & Software: Java, C++, Python, ARM assembly, VHDL, MATLAB, Arduino, LabVIEW, SolidWorks

## RESEARCH PROJECTS

**Undergraduate Senior Design: Work Performance Tracker** 08/2021 - 05/2022

*Team Member (5-member team)*

- Developed a hardware device and a companion web-based app to aid desk-workers in managing time and boosting productivity by tracking exact time spent on daily tasks and displaying data using various infographics to reveal users' work habits
- Prototyped the device by using electrical components (Raspberry Pi Zero W, rotary encoder, LCD display, and push buttons), modeling and 3D printing mechanical components (shell body, back case, and dial)
- Implemented Python programs to control the electrical components, collect and communicate the back-end data on Raspberry Pi
- Designed a web-based GUI to analyze and display meaningful data through various graphic charts using Django web framework
- Provided a globally accessible website for data presentation and customization by exposing the local server to the internet
- Progress updates, demo videos, and project deliverables are available on the website (<https://sites.google.com/stevens.edu/tasktop>)

**Real-World Cityscape Dataset for Anomaly Detection** 05/2021 - 08/2021

*Individual Project*

- Modified *The Cityscapes Dataset for Semantic Urban Scene Understanding* and created a new anomalous cityscape image dataset by generating 1525 modified images with 13 classes of anomalies
- Designed a program to extract objects from the predefined segmentation maps of original cityscape images, classify the objects based on their classes, and randomly rotate and place the anomalies into the cityscape backgrounds

**Image Processing: Edge Detection in Selected Region** 02/2021 - 05/2021

*Team Leader (2-member team)*

- Clarified the words or objects in a specific area in an image by allowing user to select the region, transferring the perspective, and highlighting the outlines of the objects in the region
- Used C++ and OpenCV library to implement cursor position, perspective transform, edge detection, and global thresholding functions, and verified the program in several real-world circumstances

**Modeling and Simulation: Amusement Park Simulation** 02/2021 - 05/2021

*Team Leader (4-member team)*

- Studied the effects of ticket booth placement on the overall performance of an amusement park operation by modeling the queueing status using OMNET++
- Conducted an online survey on the open hours, daily attendance, and queueing time at ticket booth and different attractions of a real amusement park
- Modeled the customer arrival time and service times based on the survey data and their corresponding statistical distribution
- Ascertained the most optimal queueing situation by simulating and comparing new designs with different ticket booth placements

**Digital System Design: Audio Visual Equalizer** 08/2020 - 12/2020

*Team Leader (3-member team)*

- Visualized the real-time sound volume on a VGA monitor by programming on Nexys A7 FPGA board using VHDL
- Proposed the design project, facilitated communication and collaboration among team members, implemented deserializer module to process sound data captured by the built-in PDM microphone
- Contributed to the course labs by proposing an alternative approach and optimizing the code for students without potentiometers

**Modulation Classification Using Deep Learning** 05/2019 - 07/2019

*Team Member (7-member team)*

- Classified QPSK Modulation signals with different noise effects using LeNet-based CNN deep learning model and generated over 9000 constellation diagrams with additive white Gaussian noise using MATLAB for training the model
- Presented the research in the 7<sup>th</sup> Annual IEEE North Jersey Advanced Communications Symposium on Sep 14, 2019
- Co-authored the paper *Classification of QPSK Signals with Different Phase Noise Levels Using Deep Learning*, which was published in the 29th Wireless and Optical Communications Conference (WOCC) (<https://ieeexplore.ieee.org/document/9114928>)