Matthew Phillip Ruffner

Website: ruffdev.com Email: matthew.ruffner@uky.edu LinkedIn: matt-ruffner GitHub: github.com/ruffner

EDUCATION

University of Kentucky
Ph.D. in Electrical Engineering, Advisor: Daniel L. Lau

2019-Current
University of Kentucky
M.S. in Electrical Engineering, GPA: 3.56/4.00

Thesis: "Design of a Machine Vision Camera for Spatial Augmented Reality"

University of Kentucky

Lexington, KY
Lexington, KY

Experience

Badger Technologies

Nicholasville, KY

2013 - 2017

ROS Intern Summer 2019

- Update aisle navigation and add support for multiple depth cameras to mitigate sun blinding

B.S. in Electrical Engineering, Computer Engineering and Computer Science, GPA: 3.48/4.00

University of Kentucky

Lexington, KY

Graduate Research Assistant in Electrical and Computer Engineering

Summer 2017

- PCB design for machine vision camera synchronization

University of Kentucky

Lexington, KY

Undergraduate Research Assistant in Electrical and Computer Engineering

2016 - 2017

- Assembled an engineering model of the University's third cubesat for a re-fly mission
- Developed and implemented firmware for the Electronic Power Supply in the cubesat

MosquitoMate, Inc.

Lexington, KY

Undergraduate Hardware/Software Research Engineer

2016 - 2017

- Created WiFi enabled heating and temperature logging solution for feeding mosquitoes
- Created custom hardware for collecting audio data from mosquitoes

University of Kentucky

Lexington, KY

Undergraduate Research Assistant in Computer Science

2013 - 2015

- Created web scheduler for faculty/student advising meetings
- Setup, configured, and maintained machines with Ubuntu Linux

SKILLS

- Embedded/Desktop Programming: 6 years experience with C/C++ and Qt. Proficient in Python, MATLAB and LATEX. Very quick to learn new APIs and software. Comfortable with Linux/OSX/Windows as daily driver.
- Linux: 11 years experience. Proficient with Git, Emacs, and Make. Comfortable on a CLI as well as using Bash scripts, dotfiles and aliases to expedite routine workflows.
- ECAD/MCAD: 5 years experience with Autodesk EAGLE, 2 and 4 layer designs. Proficient in Autodesk Inventor.
- Rapid Prototyping: 6 years experience with FDM/FFF 3D printing, oscilloscopes, logic analyzers, and other electronic analysis equipment. 11 years experience with Arduino programming and low level sensor interfacing and assembly. 15 years experience soldering and circuit assembly.

PROJECTS

•	Small Robot Control PCB - github.com/UKyKORA/SBMCS_PCB	2020
	Dual motor controller with encoder-based speed control, 9-axis IMU, battery regulation and current monitoring	
•	Small Robot Control Firmware - github.com/UKyKORA/SBMCS_Firmware	2020
	A FreeRTOS based telemetry publishing and motor control system using ROS serial interface	
•	KREPE Flight Computer - github.com/krups/iss-hardware	2019
	KREPE Flight Computer - github.com/krups/iss-hardware Data logging and transmission control board for a set of TPS measurement probes	
•	Wireless Monitoring Node - github.com/ruffner/measure-mesh	2018
	Sensor node and gateway electrical design, firmware plus SQL logging and plotting	

SCHOLARSHIPS AND AWARDS

• Graduated Cum Laude from the University of Kentucky	Spring 2017
• Awarded Dean's List for Fall 2013	Spring 2014
• UK Presidential Scholarship (full tuition)	Spring 2013
• UK William C. Parker Scholarship (yearly stipend)	Spring 2013
• Kentucky Educational Excellence Scholarship (yearly stipend)	Spring 2013
• Jackson Energy Scholarship (one time stipend award)	Fall 2012

PATENTS

 Matthew P. Ruffner, Kevin D. Donohue, Michael J. Sikora, U.S. Utility Patent Application No. 16/843,542 A MOTION FEEDBACK DEVICE, submitted April 8, 2020

Publications

- [1] Y. Yu, D. L. Lau, M. P. Ruffner, and K. Liu, "Dual-projector structured light 3d shape measurement", *Appl. Opt.*, vol. 59, no. 4, pp. 964–974, Feb. 2020.
- [2] M. P. Ruffner, Y. Yu, and D. L. Lau, "Structured light smart camera for spatial augmented reality applications", in *Emerging Digital Micromirror Device Based Systems and Applications XI*, M. R. Douglass, J. Ehmke, and B. L. Lee, Eds., International Society for Optics and Photonics, vol. 10932, SPIE, 2019, pp. 85–95.
- [3] Y. Yu, D. L. Lau, and M. P. Ruffner, "3D scanning by means of dual-projector structured light illumination", in *Emerging Digital Micromirror Device Based Systems and Applications XI*, M. R. Douglass, J. Ehmke, and B. L. Lee, Eds., International Society for Optics and Photonics, vol. 10932, SPIE, 2019, pp. 117–125.

Extracurricular Activities

- EE/Firmware lead and co-founder of the Kentucky Organization of Robotics and Automation 2019—Current Creating robots for competitive events as well as promoting STEM education in the Lexington community through outreach, ukykora.org
- Co-founder of MoveTones, LLC 2018-Current Developing electronic hardware kits to promote musical education and exploration, as well as provide an intuitive, interactive microprocessor learning platform, movetones.com

• Best solo project: University of Kentucky CatHacks Hackathon Artistic persistence of vision display piece Spring 2015

• Volunteer at 2018 Kentucky Derby Helped collect refuse in the in-field

Spring 2018