Matthew Phillip Ruffner

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Education

University of Kentucky — Lexington, KY
Ph.D. in Electrical Engineering, Advisor: James E. Lumpp — 2020–2024
- Dissertation: "Electronics Design for KREPE Atmospheric Entry Capsule Avionics"

University of Kentucky — Lexington, KY
M.S. in Electrical Engineering, GPA: 3.56/4.00 — 2017–2019
- Thesis: "Design of a Machine Vision Camera for Spatial Augmented Reality"

University of Kentucky — Lexington, KY
B.S. in Electrical Engineering, Computer Engineering and Computer Science, GPA: 3.48/4.00 — 2013–2017

Experience

Badger Technologies — Nicholasville, KY
ROS Intern — Summer 2019
- Update aisle navigation and add support for multiple depth cameras to mitigate sun blinding

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:** 10 years experience with C/C++. Proficient in Qt, Python, MATLAB and LaTeX. Quick to learn new APIs and software. Comfortable with Linux/OSX/Windows
- **Linux:** 15 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:** 8 years experience with ECAD using Autodesk EAGLE and KiCad multi-layer designs. Proficient in Autodesk Inventor.

- **Rapid Prototyping:** 10 years experience with FDM/FFF 3D printing, oscilloscopes, logic analyzers, and other electronic analysis equipment. 11 years experience embedded programming and low level sensor interfacing and assembly. 15 years experience soldering and circuit assembly.

Scholarships and Awards

- Awarded the Graduate Assistance in Areas of National Need (GAANN) fellowship, providing up to 5 years of funding for doctoral studies. Spring 2021
- 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

Publications

[1] M. P. Ruffner, J. D. Schmidt, I. S. Rowe, R. D. Nolin, W. Smith, and A. Martin, "Electronics design and testing of the krepe atmospheric entry capsule avionics", *IEEE Journal on Miniaturization for Air and Space Systems*, pp. 1–1, Aug. 2023.

[2] J. D. Schmidt, M. P. Ruffner, J. T. Nichols, I. S. Rowe, R. D. Nolin, K. F. Ford, W. T. Smith, and A. Martin, "Kentucky Re-entry Universal Payload System (KRUPS): Overview of hypersonic re-entry flight", in *AIAA SCITECH 2023 Forum*, 2023, p. 0206.

[3] J. D. Schmidt, J. T. Nichols, M. P. Ruffner, R. D. Nolin, W. T. Smith, and A. Martin, "Kentucky re-entry universal payload system (krups): Design and testing for hypersonic re-entry flight", in *AIAA SCITECH 2022 Forum*. Dec. 2021. eprint: https://arc.aiaa.org/doi/pdf/10.2514/6.2022-1576.

[4] J. D. Schmidt, J. T. Nichols, M. P. Ruffner, R. D. Nolin, W. T. Smith, and A. Martin, "Kentucky Re-Entry Universal Payload System (KRUPS): Design and Testing of Capsules for Re-Entry Flight", *IPPW 2021 - Session 3: EDL Technology, Science, and Instrumentations*, 2021.

[5] J. D. Schmidt, J. T. Nichols, M. P. Ruffner, R. G. Nolin, W. T. Smith, and A. Martin, "Kentucky re-entry universal payload system (krups): Design and testing for orbital flight", Jul. 2021. eprint: https://arc.aiaa.org/doi/pdf/10.2514/6.2021-3129.

[6] 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.

[7] 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.

[8] 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.