Nate Lannan

Education

December 2017 — **M.S.E.E.**, *Oklahoma State University*, Stillwater.
Focus in digital signal processing, unmanned systems, robotics, and deep learning.

May 2010 — **B.S.E.E. and B.S.Co.E.**, *University of Kentucky*, Lexington, *Summa Cum Laude*.
Focus in signal processing, robotics, and computer processor design.

Experience

2021–present — **Assistant Professor of Practice**, *Oklahoma State University*, Stillwater, OK.
Instructor for Design of Engineering Systems and Capstone Design.

2018–2021 — **Research and Teaching Assistant**, *Oklahoma State University*, Stillwater, OK.
Explore new methods of human motion refinement with a focus on deep learning. Design and implement a human following robot for use in a clinical setting. Teach lab for a mid-level undergraduate computer architecture class.
Detailed achievements:
- Redesign lab materials to accommodate for the 2020 COVID-19 pandemic;
- Guest lecturer for Biomimetics in Engineering, MAE 5010;
- 2019 STEM Robotics Summer Camp lecturer;
- 2019 Oklahoma State Science and Engineering Fair judge.

2015–2018 — **Research Engineer**, *Oklahoma State University*, Stillwater, OK.
Embedded systems research engineer for Unmanned Systems Research Institute. Design and implementation of unmanned aerial vehicle control and navigation, sensor data collection, and computer vision systems.
Detailed achievements:
- Embedded system design for the GE Raven project:
  - Write C++ interface for autonomous navigation;
  - Write C++ pcap interface for LiDar data collection;
  - Write C++/Python Bluetooth serial interface for laser methane meter;
- Write C++ autonomous path planning software for DJI Matrice UAVs;
- Write Caffe/Python Code for CNN object recognition system to recognize UAVs;
- Write OpenCV/Python code for autonomous navigation of 3dr Solo UAV;
- Act as mentor to undergraduate students for NASA SOAR project;
- Design the data acquisition portion of a UAV system for ILS inspection with the FAA.

203 General Academic Building – Oklahoma State University – Stillwater
+1 (405) 744 8040 • *nate.lannan@okstate.edu* • *natelannan*
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2010–2014 **Security Firmware Test Engineer**, *Aerotek*, Lexington, KY.

Responsible for design, implementation, and maintenance of high-end printer automation in a success driven Agile/Scrum environment.

Detailed achievements:

- Develop, maintain, and execute printer security test plans;
- Test printers for Common Criteria government certification;
- Develop, maintain, and execute test procedures for disk wiping and memory wiping processes;
- Develop, maintain, and execute test procedures for contact and contactless card-based authentication;
- Utilize white hat hacking techniques on printers:
  - Fuzzing, injection, cross site scripting, DOS, 0-day exploits;
- Server admin for test environments.

2003–2014 **Systems Tech, Audio Engineer, and Assistant Sound Designer**, *Smithsonian Institution*, Washington, D.C..

Assist in the design for sound reinforcement at the annual Smithsonian Folklife Festival, as well as install, maintain, and operate sound equipment.

Detailed achievements:

- Digitize and archive audio as the lead intern for the Save Our Sounds project;
- Worked with notable acts such as Questlove, George Clinton, Ralph Stanley, Ali Farka Toure, The Mighty Sparrow, and Hazel Dickens;
- Interact with a wide range of artists from internationally diverse cultures.

2004–2014 **Audio Engineer**, *National Council for the Traditional Arts*, Silver Spring, MD.

Install and operate sound equipment for folk festivals and tours across the United States.

Detailed achievements:

- Acted as A2 for the Masters of Caribbean Music tour;
- Worked closely with several NEA National Heritage Fellows;
- Credited audio engineer on "All Together Now: 15 Years of The Richmond Folk Festival Live" album.

Skills

- C/C++
- Python
- Perl
- Java
- C#
- Lua
- Torch/PyTorch
- TensorFlow
- Caffe
- Theano
- OpenCV
- ROS
- Cuda/PyCuda
- Motorola 68K
- ARM
- Unity/Maya
- MATLAB
- Verilog
- SVN/Git
- DJI SDK

Honors and Awards

2020 20th Annual IEEE International Conference on Bioinformatics and Bioengineering Best Student Paper

2019 CEAT Dean's Overall Outstanding Graduate Student Award

2019 CEAT Outstanding Graduate Student in Electrical Engineering

2010 Winner of University of Kentucky's Electrical Engineering Senior Design Competition

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Publications

[1] Nate Lannan, Le Zhou, and Guoliang Fan. Human motion enhancement via Tobit Kalman filter-assisted autoencoder. *Manuscript submitted for publication*, 2021.

[2] Le Zhou, Nate Lannan, and Guoliang Fan. Human motion enhancement via Tobit particle filtering and differential evolution. In *2021 IEEE International Conference on Image Processing (ICIP)*, in press.

[3] Le Zhou, Nate Lannan, Guoliang Fan, and Jerome Hausselle. Human motion enhancement via joint optimization of kinematic and anthropometric constraints. *EAI Endorsed Transactions on Bioengineering and Bioinformatics: Online First*, April 2021.

[4] Nate Lannan, Le Zhou, Guoliang Fan, and Jerome Hausselle. Human motion enhancement using nonlinear Kalman filter assisted convolutional autoencoders. In *2020 IEEE 20th International Conference on Bioinformatics and Bioengineering (BIBE)*, December 2020.

[5] Le Zhou, Nate Lannan, Guoliang Fan, and Jerome Hausselle. A hybrid approach to human motion enhancement under kinematic and anthropometric constraints. In *2020 IEEE 20th International Conference on Bioinformatics and Bioengineering (BIBE)*, December 2020.

[6] Nate Lannan and Guoliang Fan. Filter guided manifold optimization in the autoencoder latent space. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, June 2019.

[7] Geoffrey W. Donnell, Jordan A. Feight, Nate Lannan, and Jamey D. Jacob. Wind characterization using onboard IMU of sUAS. In *2018 Atmospheric Flight Mechanics Conference*, June 2018.