Elijah R. **Jensen**

Physicist · Engineer · Pilot

Department of Physics, University of Louisville

802-310-6912 | ejensen141@gmail.com | ejensen141.github.io | ejensen141

Education

University of Louisville — *Louisville, KY*

PhD in Physics — *2015 - 2018*

- Thesis: High Dynamic Range Optical Devices and Applications
- Advisor: John Kielkopf
- Focus: Electro-mechanical engineering, High Dynamic Range Optical Sensing, Micro Machining.

University of Louisville — *Louisville, KY*

Masters of Science in Physics — *2013 - 2015*

University of Vermont — *Burlington, VT*

Electrical Engineering Masters Program — *2012 - 2013*

Austin Peay State University — *Clarksville, TN*

Bachelor of Science in Physics (Magna Cum Laude) — *2009 - 2012*

Academic Positions

University of Louisville — *Applied Physics*

Graduate Research Assistant — *Aug. 2015 -Aug. 2018*

University of Louisville — *Physics*

Graduate Teaching Assistant — *Aug. 2013 -Aug. 2015*

University of Vermont — *Electrical Engineering*

Graduate Research Assistant — *Aug. 2012 -Aug. 2013*

Austin Peay State University — *Academic Support*

Tutor — *Aug. 2009 -Aug. 2012*

Research Interests

- Aerospace Engineering
- Electronics/Microelectronics; Electromagnetic Theory
- Mechanical Engineering (Device Construction)
- Computational Science (Modeling of Electrical Properties)
- Optics
- MEMS and Materials Science (Electronic Structures)
- Energy Engineering for Efficient Transportation

Research Projects

Current Projects:

- High Dynamic Range Seismic Sensing using custom designed 32bit DAQ.
- Design of custom IR camera utilizing FPGA technology.
- Design of single pixel HDR imaging devices utilizing FPGA processing and 32bit HDR DAQ.
- Electromechanical Design for Rotary and Linear motion.

Research at University of Louisville

- High Dynamic Range Instrument Design
- Optical Detection of Surface Waves.
- High Dynamic Range Seismic Sensing using custom designed 32bit DAQ.
- Design of 24 bit Analog to Digital Capture device.
- "Visualizing" Seismic Waves via Audio Conversion.

2013-2017

Research at University of Vermont

- Computational modeling of micro and nano-scale antenna designs (THz and IR sensing ap- plications).
- Computational modeling of EM waves.
- Design of effcient, safe, and reliable Transformer-less Power supplies.
- Electric Motor controller design (MOSFET switching).

2012-2013

Research at Austin Peay State University

- Dynamo design for Regenerative braking in electric vehicles.
- PCB manufacturing with desktop CNC milling machines. (new computer code and processes)
- Electric Car Research with FSAE team. (team leader)
- Solar Panel Power Regulation circuits. This uses some of the same ideas from the Regenerative systems. These systems use a complex circuit to ensure that the batteries accept charging even under low power conditions.
- Developed firmware for ATMEL microcontroller projects.
- Computational modeling of Zinc Nano-wire
- Used nwchem and Guassian to model a Zinc nano-wire for possible use in nano photo- voltaics

2010-2012

Presentations and Talks

SPIE Optics + Photonics Conference — *San Diego,CA*

"Observation and analysis of modulation and noise in visible and near-infrared diffuse ambient daylight" — *2017*

Graduate Research Symposium — *Louisville, KY*

"Optics Beyond the Red (Infrared Antenna Design)" — *2016*

University of Vermont — *Burlington, VT*

"Lithography, Double Patterning (how to make a nano-trace)" — *2012*

American Association of Physics Teachers Tennessee Conference — *Murfreesboro, TN*

- "Design of 80V, 19 HP motor controller for EV" (Poster)
- "Design of Safe and Reliable Transformerless Power Supply" (Poster)
- "PCB production in small fabrication lab" (Poster)

2012

Austin Peay State University Undergraduate Poster Session — *Clarksville, TN*

- "Computational Analysis of dynamo generator."
- "Solar Power Power Regulator using Switching Technology"
- "Computational Analysis of Complex AC Circuits."

2011

Publications

"Observation and analysis of modulation and noise in visible and near-infrared diffuse ambient daylight" — *SPIE Proceedings Volume 10403*

John Kielkopf, Elijah Jensen,Frank O. Clark, Jeff Hay

Infrared Remote Sensing and Instrumentation XXV August 2017

"Fractional Intensity Modulation Of Diffusely Scattered Light" — *SPIE Proceedings Volume 9608*

John Kielkopf, Elijah Jensen, Frank O. Clark, Bradley Noyes

Infrared Remote Sensing and Instrumentation XXIII September 2015

"Remote Optical Detection Of Ground Vibrations" — *SPIE Proceedings Volume 9608*

Robert M. Shroll, Benjamin St. Peter, Steven Richtsmeier, Bridget Tannian, Elijah Jensen, John Kielkopf, Wellesley E. Pereira

Infrared Remote Sensing and Instrumentation XXIII September 2015

Honors, Awards & Scholarships

Honors & Awards

2015	**Iyad Khair Award**, for Excellence in Physics	*University of Louisville*
2013	**Dean's List**, All Semesters	*University of Vermont*
2012	**Robert F. Sears Award**, In Recognition of Excellence in the Sciences	*Austin Peay State University*
2011	**Pi Mu Epsilon Inductee**, Math Honorary Society	*Austin Peay State University*
2010	**Phi Kappa Phi Inductee**, Math Honorary Society	*Austin Peay State University*
2009	**Dean's List**, All Semesters	*Austin Peay State University*

Scholarships

2017	**GNAS Research Grant**, Small Grants for Graduate Research	*University of Louisville*
2017	**GSC Research Grant**, Small Grants for Graduate Research	*University of Louisville*
2015	**GNAS Research Grant**, Small Grants for Graduate Research	*University of Louisville*
2011	**NSF MaPs Scholarship**, Recipient of two MaPs Scholarships	*Austin Peay State University*
2010	**Space Grant**, Recipient of three Space Grants	*Austin Peay State University*

Skills

Computer Skills

LaTeX, MATLAB, Mathematica, Maple, R, C/C++, FORTRAN, JavaScript, Python, Html/PHP, Verilog, LABVIEW, MatLab, Microsoft Word, Microsoft Excel, Microsoft PowerPoint.

Engineering Skills

Function Generators, Power Supplies, Multimeters, Function Generators, Power Supplies, Breadboarding, SMD soldering, PCB production, CO2 Laser Equipment, Laser Diodes, Microcontrollers, FPGA hardware, Physics Laboratory Equipment, Lathe (Manual and CNC), Milling (CNC and Manual), 3D Printing, Ultrahigh vacuum systems, Repair of any equipment listed.

Design Skills

Electrical Circuit Design, Schematic capture, Advanced PCB design, Mechanical Design, Electro-Mechanical Apparatus Design.

Aviation Certificates and Ratings

Private Pilot Certificate with High Performance Aircraft rating. Remote UAV pilot.

Service

Graduate Student Council — *University of Louisville*
Representative and Finance Director — *2015 - 2017*
- Served as Director of Finance for 2017 academic year.

Graduate Student Union — *University of Louisville*
Representative — *2015 - 2017*
- Served as Department Representative

Texas Instruments Expert Advisory Panel
Consultant — *2015 - PRESENT*

Affiliations

- **IEEE**
- **SPIE**
- **Sigma Pi Sigma**
- **Pi Mu Epsilon**
- **AOPA**
- **EAA**