

## CURRICULUM VITAE

Jared Keith Averitt

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### Education:

Attended Austin Peay State University (APSU); August 2008 – May 2012 and May 2015 – May 2020

Attended Middle Tennessee State University (MTSU); August 2012 – May 2013

Graduate May 2020 from **Austin Peay State University**

Primary major: Physics

Secondary major: Biology

Primary minor: Mathematics

Secondary minor: Chemistry

Institution GPA: 3.32

Physics / Math GPA: 3.850

### Membership of Professional Societies:

2010 - Current

Tri-Beta Biological honor society member

2019 - Current

Del Square Psi member

2018 - Current

Sigma Phi Sigma member

### Honors, Awards, Fellowships, Grants:

September 2019

NASA Space Grant (Total funds: \$2,000)

May 2019

NASA Space Grant (Total funds: \$2,000)

September 2018

NASA Space Grant (Total funds: \$2,000)

May 2016 - April 2017

APSU Presidential Research Scholar (Total funds: \$5,000)

Fall 2016 – Fall 2017

Dean's List

Summer 2015

APSU Summer Undergraduate Research Fellowship (Total funds: \$2,000)

## Research Experience (employment):

### Department of Biology, Austin Peay State University

August 2009 – May 2012 and May 2015 – May 2018

#### **Undergraduate Research Assistant**

- Assistant to Dr. Sergei Markov conducting study on optimal conditions for microorganisms for production of biofuels
- Practiced required techniques for growing and collecting data from microorganisms in aseptic conditions
- Designed and built diverse range of prototype bioreactors
- Developed and implemented assorted methods and techniques to gather data for analysis

### Department of Physics, Engineering and Astronomy, Austin Peay State University

August 2018 – Current

#### **Undergraduate Research Assistant**

- Assistant to Dr. Roman Holovchak working in his Materials Fabrication and Characterization lab, primarily Positron Annihilation Lifetime Spectroscopy (PALS) of solids
- Designed and built a source preparation apparatus to uniformly deposit the radioactive positron source onto a thin film.
- Designed and built an apparatus to hold the positron source between identical samples during measurements, this was designed and was produced using a 3D printer.
- Graphed and analyzed data collected by the PALS instrument using LT-9 software and Matlab

## Publication:

[1] S. Markov, **J. Averitt**, B. Waldron. “Bioreactor for glycerol conversion into H<sub>2</sub> by bacterium *Enterobacter aerogenes*” *International Journal of Hydrogen Energy*, Vol 36, 2011. P 262-266. <https://doi.org/10.1016/j.ijhydene.2010.09.090>

## Conference Presentations:

[1] **J.K. Averitt**, R. Golovchak. “Positron Annihilation Lifetime Spectroscopy of Natural Quartz (SiO<sub>2</sub>)”. NASA Southeast Regional Space Grant Meeting. Nashville, Tennessee, September 26-27, 2019. Poster

[2] **J.K. Averitt**, R. Golovchak. “Re-usable  $\beta^+$  source - sample sandwich for positron annihilation lifetime spectroscopy”. Annual Meeting of the Tennessee Section of the American Association of Physics Teachers. (TAAPT 2019). Knoxville, Tennessee, March 29-30, 2019. Poster

[3] **J.K. Averitt**, R. Golovchak. “Re-usable Positron Source for Non-Destructive Positron Annihilation Lifetime Spectroscopy of Solids”. Tennessee Posters at the Capitol. Nashville, Tennessee, Feb. 26, 2019. Poster

## Conference Presentations [continued]:

[4] **J.K. Averitt**, R. Golovchak. “Design and Preparation Of Positron Source For Non-Destructive Positron Annihilation Lifetime Spectroscopy”. 85th Annual Meeting of the APS Southeastern Section (SESAPS-2018). Knoxville, Tennessee, Nov. 8–10, 2018. *Bulletin of the American Physical Society*. Abstract: D05.00042. Poster. <http://meetings.aps.org/link/BAPS.2018.SES.D05.42>

[5] **J. Averitt**, S. Childs, S. Markov. “Biomass and oil production by microalga *Neochloris oleoabundans* in floating, rocking and stationary bag photobioreactors”. National Conference on Undergraduate Research (NCUR-2018). Oklahoma City, Oklahoma. April 4-7, 2018. Poster. [http://apps.cur.org/ncur2018/search/display\\_ncur.aspx?id=106963](http://apps.cur.org/ncur2018/search/display_ncur.aspx?id=106963)

[6] **J.K. Averitt**, S. Markov. “Novel floating-type photobioreactor for microalga growth and biofuel production”. 125<sup>th</sup> Annual Meeting of Tennessee Academy of Science (TAS-2015), Murfreesboro, Tennessee, Nov. 20, 2015 Oral. <http://www.tennacadofsci.org/forms/2015%20TAS%20Program%20final.pdf>

[7] **J. Averitt**, S. Markov. “Bioreactor for glycerol conversion into H<sub>2</sub> and ethanol by bacterium *Enterobacter aerogenes*”. 111<sup>th</sup> Annual General Meeting of American Society for Microbiology (ASM-2011). New Orleans, Louisiana. May 21-24, 2011. Poster

## Research Related Skills:

**Computational Methods:** Data structures and algorithms, working with Linux and windows subsystems, use of higher-level languages of Mathematica and MATLAB for computations and graphing, implementation of programming languages C++ and Fortran, document processing using LaTeX, LT-9 software for graphing Positron Annihilation Lifetime Spectroscopy data

**Material Characterization:** Positron Annihilation Lifetime Spectroscopy (PALS) using ORTEC, Confocal Raman Spectroscopy using a HORIBA XploRa

**Fabrication:** Autodesk Software (Inventor, Fusion 360), 3D-Printing (Maker-bot)

**Microscopy;** Scanning electron microscopy (SEM) using a Hitachi S-3400 Scanning Electron Microscope/Oxford Aztec INCA X-Act, compound-light, Confocal, DIC, Bright Field, and Wide Field Fluorescence, phase contrast

**Biochemical Analysis;** PCR (Quantitative and Real-time), ELISA, horizontal gene transformations.

**Chemical Analysis:** Nuclear Magnetic Resonance (NMR) using Bruker Fourier 300, Ultraviolet visible spectroscopy (UV-Vis) using a Hewlett-Packard 8453, Gas Chromatography (GC) particularly used: PerkinElmer Autosystem XL, Gas-Gow, Fourier-transform Infrared Spectroscopy (FTIR) used a Bruker Tensor 27, Mass Spectrometry (MS) using a Thermo Finnigan LCQ Advantage. General wet chemistry, organic purification of solids using distillations, extractions and crystallization., structural and functional group determination of organics.

**Teaching Experience (employment):****Academic Support Center, APSU**

January 2018-May 2018

**Certified College Reading & Learning Association (CRLA) Peer Tutor Level 1**

- Worked under Academic Support Center director, Martin Golson. Provided group and one-on-one tutoring for APSU students. Supported many STEM subjects, including:
  - College algebra
  - Elementary statistics
  - Calculus (1,2,3)
  - Organic Chemistry (1,2)
  - Algebra Based Physics (1,2)
  - Calculus Based Physics (1,2)
  - Anatomy and Physiology (1)

February 2018-current

**Structured Learning Assistant (SLA) Leader Level 3**

- Worked under Academic Support Center director, Martin Golson as a student teaching assistant. Trained to help students improve their academic performance. Working closely with faculty to support students enrolled in SLA-supported sections. Conducted bi-weekly workshops which support course content and help students improve the study and test taking skills needed to succeed in the course. Supported the courses;
  - Algebra Based Physics (1,2)
  - Calculus Based Physics (1,2)
  - Elementary Statistics

**Tennessee Governor's School for Computational Physics, Department of Physics, Engineering and Astronomy, APSU**

June 2019

**Peer Mentor**

- Pre-college program for hard-working high school sophomores and juniors with an interest in the STEM fields. Students that complete the course earn 7 college credits in a Computational Methods course. Worked directly under the program director, Dr. Alex King. Grading assignments and helping the students succeed by giving advice and guiding them in experimental setup, computer-based data acquisition, computational modelling of the system using , coding in the language of Fortran 95 and interpretation of the results during the 3-week program. More information: <https://www.apsu.edu/governors-school/>

**Tri-County Upward Bound, APSU, Funded by the Department of Education**

June - July 2019

**Summer Session Instructor for Physics**

- Pre-college preparatory program for economically disadvantaged high school students that is funded by the US Department of Education and is sponsored locally by Austin Peay State University to prepare them for postsecondary education. Worked under the Tri-County Upward Bound director, Melissa Conwell. Prepared and executed lesson plans where students are actively engaged in a meaningful learning experience, maintained a safe environment for students, reported grades for students' progress at the end of the 5-week program.

## References:

### Academic Advisors:

#### **Alex King**

Professor and Chair, Department of Physics, Engineering and Astronomy  
Director, Tennessee Governor's School for Computational Physics  
Austin Peay State University  
(931) 221-6102 , [kinga@apsu.edu](mailto:kinga@apsu.edu)

#### **Pei Xiong-Skiba**

Professor, Department of Physics, Engineering and Astronomy  
Austin Peay State University  
(931) 221-6118, [xiongp@apsu.edu](mailto:xiongp@apsu.edu)

### Research Advisors:

#### **Sergei Markov**

Professor, Department of Biology  
Austin Peay State University  
(931) 221-7440, [markovs@apsu.edu](mailto:markovs@apsu.edu)

#### **Roman Holovchak** (Golovchak in print)

Associate Professor, Department of Physics, Engineering and Astronomy  
Austin Peay State University  
(931) 221-6361, [holovchakr@apsu.edu](mailto:holovchakr@apsu.edu)

### Character:

#### **James Thompson**

Professor, Department of Biology  
Austin Peay State University  
(931) 221-6286, [thompsonj@apsu.edu](mailto:thompsonj@apsu.edu)

### Employment:

#### **Melissa Conwell**

Director, Tri-County Upward Bound  
Austin Peay State University  
(931) 221-6412, [conwellm@apsu.edu](mailto:conwellm@apsu.edu)

#### **Martin Golson**

Director, Academic Support Center  
Austin Peay State University  
(931) 221-6553, [golsonm@apsu.edu](mailto:golsonm@apsu.edu)