Julie Butler

Physics Graduate Student at Michigan State University

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RESEARCH EXPERIENCE

Probing the Connection Between Deep Learning and Many-Body Physics

January 2020 - PRESENT

- Theoretical Nuclear Physics and Machine Learning
- Michigan State University, MI
- Dr. Morten Hjorth-Jensen

Solving Many-Body Methods with Deep Learning and Cloud Computing

MAY 2018 - PRESENT

- Theoretical Nuclear Physics, Machine Learning, and Cloud Computing
- Michigan State University, MI
- Dr. Morten Hjorth-Jensen

Rotational Analysis of Beryllium Isotopes with JISP16 and Daejeon16 Interactions

MAY 2017 - JULY 2017

- Theoretical Nuclear Physics
- University of Notre Dame, IN
- Dr. Mark Carpio

Determination of the Aluminium Background Signal in the Qweak Experiment

MAY 2016 - AUGUST 2016

- Experimental Nuclear Physics
- William and Mary, VA
- Dr. David Armstrong

Parallelization of the Method of Feasible Directions

MARCH 2017 - MAY 2018

- Mathematics and Computer Science
- Erskine College, SC
- Dr. Artur Gorka

Water Purification Abilities of Titania Photocatalyst

JANUARY 2016 - MAY 2018

- Environmental Chemistry
- Erskine College, SC
- Dr. Joel Boyd

COMPUTATIONAL SKILLS

- Python
  - NumPy
  - SciPy
  - Tensorflow
  - Keras
  - SciKit-Learn
  - Matplotlib
  - Seaborn
  - SymPy
  - MPI4Py
- C++
- Java
- Markdown
- LaTeX
- Bash Shell and Programming
- SLURM
- OpenMP
- OpenMPI
- CUDA Parallelization
- Microsoft Azure
  - Virtual Machines
- GitHub and GitPages
- Linux

EDUCATION

Michigan State University, East Lansing, MI — *Ph.D. in Theoretical Nuclear Physics and Computational Science*

MAY 2018 - PRESENT

- GPA:
- Tentative Thesis Title: *Solving Many-Body Methods with Deep Learning*

Erskine College, Due West, SC — *Bachelor of Science in Physics and Chemistry, Bachelor of Arts in Mathematics*

AUGUST 2014 - MAY 2018

- Honors in Mathematics and Chemistry
- GPA: 3.988
- Major GPA: 4.000

AWARDS, SCHOLARSHIPS, AND FELLOWSHIPS

Cloud Computing Fellowship - Michigan State University
AWARDED OCTOBER 2020

Awarded to fifteen Michigan State University graduate students with funding to pursue an investigation into the use of cloud computing in thesis research projects.

Outstanding Graduate Student: Graduate TA Award, Introductory Course - Michigan State University
AWARDED MAY 2019

Awarded to teaching assistants in introductory physics classes. Recipients are chosen by the professors of the classes.

Dr. Everett Askins Sloan Outstanding Senior Award - Erskine College
AWARDED MAY 2018

Awarded to the most outstanding senior in the physical sciences.

Faculty Endowed Scholarship - Erskine College
AWARDED MAY 2017

Awarded to the most promising student from the junior class.

Sloan Physical Chemistry Award - Erskine College
AWARDED MAY 2017

Awarded to the student with the highest grade in Physical Chemistry

Garnet Circle - Erskine College
AWARDED AUGUST 2015, AUGUST 2016, AND AUGUST 2017

Awarded to the twenty five students with the highest GPA from the previous academic year.

Dr. and Mrs. E.L. Reid Scholarship - Erskine College
AWARDED MAY 2015

Awarded to the student with the highest score in General Chemistry.

Roy S. Smith Scholarship - Erskine College
AWARDED MAY 2015

Awarded to the top mathematics major from the freshman class.

Davis Family Scholarship - Erskine College
AWARDED AUGUST 2015

Awarded to the top science major from the freshman class.

SELECTED PRESENTATIONS

Deep Learning and the Many-Body Problem
Research Discussion at the Facility for Rare Isotope Beams

- November 2019
- Oral Presentation
- East Lansing, MI

Parallelization of the Method of Feasible Directions
Mathematical Association of America, Southeastern Section 97th Annual Meeting

- March 2018
- Poster Presentation
- Clemson, SC

Iron-Modified TiO_2 for the photocatalytic degradation of tetracycline and tylosin
255th American Chemical Society National Meeting and Exposition

- March 2018
- Oral Presentation
- New Orleans, LA

Rotational Analysis of Beryllium Isotopes Using JISP16 and Daejeon16 Interactions
Fall Meeting of the American Physical Society, Division of Nuclear Physics

- October 2017
- Poster Presentation
- Pittsburgh, PA

Determination of the Aluminum Background Signal in the Qweak Experiment
253rd American Chemical Society National Meeting and Exposition

- April 2017
- Oral Presentation
- San Francisco, CA

WORK EXPERIENCE

P-Cubed and EMP-Cubed Graduate Teaching Assistant
August 2018 - Present

- Michigan State University
- Supervisor: Richard Hallstein

Assists with all aspects of teaching P-Cubed and EMP-Cubed, flipped format classrooms for introductory mechanics and electricity and magnetism, respectively. This includes acting as a facilitator during class and holding office hours, in addition to writing and grading exams.

Chemistry and Physics Lab Assistant
August 2015-May 2018

- Erskine College
- Supervisors: Dr. Howard Thomas and Dr. Joel Boyd

Assisted with the preparation, clean up, and instruction of chemistry and physics labs, ranging from introductory to advanced level in addition to performing general laboratory maintenance.

Supplemental Instruction Leader
August 2015 - Present

- Erskine College
- Supervisor: Jeanne Bell

Aided students by holding bi-weekly session to review the material covered in class and to assist with homework problems. Was assigned to General Chemistry I and II, General Physics I and II, Introduction to Statistics, and Calculus I.

EXTRACURRICULAR ACTIVITIES

Ascension Robotics Club
OCTOBER 2019 - PRESENT

Founder and Mentor. Formed a team in the FIRST LEGO robotics league with local children. Aid the team members in all aspects involved in the robotics league including construction of the robotics and programming.

Due West Maker's Club
APRIL 2016 - MAY 2017

Founder and mentor. Instructed high school students in electronics and programming in conjunction with the Due West Robotics Club.

Erskine Chapter of the American Chemical Society
AUGUST 2015 - PRESENT

Assisted with chemistry education events on campus and at local schools. Was the social media coordinator from August 2016 to August 2017 which involved managing the chapter's social media pages.

Selected Presentations (Continued)

Determination of the Aluminum Background Signal in the Qweak Experiment
OCTOBER 2016

- Fall Meeting of the American Physical Society, Division of Nuclear Physics
- Poster Presentation
- Vancouver, BC

WORKSHOPS

Machine Learning Summer School
MAY 2019

- Facility for Rare Isotope Beams
- Organizer: Dr. Morten Hjorth-Jensen

Involved a lecture component and hands-on programming sessions. Covered many topics in machine learning that can be applied in the physical sciences.

REFERENCES

Morten Hjorth-Jensen
THESIS ADVISOR

- Michigan State University
- hjensen@nscl.msu.edu
- morten.hjorth-jensen@fys.uio.no
- 517-908-7290

Howard Thomas
FORMER ACADEMIC ADVISOR

- Erskine College
- hthomas@erskine.edu
- 864-379-8824

Joel Boyd
FORMER RESEARCH ADVISOR

- Erskine College
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- 864-379-6573