JALEN CATES

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EDUCATION

University of Alabama, Tuscaloosa (UA) Expected May 2020
Honors B.S. in Physics & Mathematics

CURRENT PROJECTS

Computation of Quantum Properties with a GPU May 2019 - Present
Implementing algorithms to calculate quantities like the spin susceptibility of a two-dimensional material. Python and C/C++ interfaces to CUDA have been used with Monte Carlo integration techniques.

Machine-Learning Techniques for Novel Gas Sensors May 2019 - Present
Using machine-learning algorithms in python to interpret the output of chemical sensors. The goal is robust, cheap, and small sensors for toxins with funding from the Department of Defense.

RESEARCH EXPERIENCE

Hauser Lab Group, University of Alabama May 2017 - Present
Undergraduate Research Assistant

- Independently wrote three successful undergraduate research grant proposals.
- Synthesized samples through solid-state techniques and magnetron sputtering.
- Conducted Density Functional Theory calculations and interpreted results.

Tse Research Group, University of Alabama May 2019 - Present
Undergraduate Research Assistant

- Translated FORTRAN linear algebra routines and Bessel functions into python CUDA device functions.
- Used high-performance computing clusters to test various algorithms in development.

TECHNICAL STRENGTHS

Programming	Python, C++/C, Bash, CUDA
Software	MATLAB, VASP, git, LaTeX, Linux
Laboratory Skills	Solid-state synthesis, X-ray crystallography, Magnetron sputtering

WORK EXPERIENCE

University of Alabama, Office of Instructional Technology September 2019 - Present
HPC Student Assistant

- Maintained the high-performance computing (HPC) cluster for other researchers.
- Performed systematic testing of software performance with a plethora of configurations.
- Handled sensitive data in a manner compliant with FERPA and other regulations.

University of Alabama, Department of Physics and Astronomy February 2019 - May 2019
Learning Assistant

- Assisted with the instruction of introductory physics course on electricity and magnetism with calculus.
- Answered questions during in-class activities with the Socratic method.
- Guided students through laboratory activities in a "studio physics" environment.

University of Alabama, Housing and Residential Communities July 2017 - May 2019
Residential Advisor

- Created an inclusive, educational environment in the Blount Living-Learning Community.
- Informed residents about campus resources and activities.
- Enforced the Community Living Standards in the residence hall.

AWARDS

Housing and Residential Communities Big Al of the Month, UA	October 2018
Undergraduate Creativity and Research Academy Grant, UA	Fall 2018
Student Government Association Research Grant, UA	Spring 2018
Undergraduate Creativity and Research Academy Grant, UA	Fall 2017
Presidential Scholarship, UA	Fall 2016 - Present

OUTREACH AND SERVICE

UA Society of Physics Students AP Physics Review Night	April 2019
UA Society of Physics Students High School Outreach	March 2019
UA Association for Women in Science Halloween Outreach	October 2018
Arts Renaissance in Tuscaloosa Schools	August 2017 - November 2017
AP Calculus Mentor, College First Program with Impact Alabama	June 2017

POSTER PRESENTATIONS

A&S Undergraduate Research, Scholarship, & Creative Activity Conference, UA April 2019
Presentation Finalist: Ab initio calculations of the structural, electronic, and magnetic properties of the Inverse Heusler Cr2FeSi

Undergraduate Research & Creative Activity Conference, UA March 2019
Ab initio calculations of the structural, electronic, and magnetic properties of the Inverse Heusler Cr2FeSi

A&S Undergraduate Research, Scholarship, & Creative Activity Conference, UA April 2018
The superconducting properties of YBCO minutely-doped with Dysprosium

Undergraduate Research & Creative Activity Conference, UA March 2018
The superconducting properties of YBCO minutely-doped with Dysprosium

PROFESSIONAL MEMBERSHIPS

Chapter Secretary, Society of Physics Students	Fall 2018 - Present
Emerging Scholars Program	2016 - 2017
American Physical Society	2016 - Present
Society of Physics Students	2016 - Present
Blount Scholars Program	2016 - 2019