

Alan Salcedo Gomez

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EDUCATION

The University of Texas at El Paso (UTEP)

December 2019

B.Sc. in Physics, Mathematics, *with honors*

Overall GPA: 4.0/4.0

Senior Honors Thesis: Assessment of Fermi-Löwdin Orbitals on Self-Interaction Corrected Density Functional Theory with the Regularized SCAN Functional Approximation (Expected).

- Member, University Honors Program (UHP) March 2016 - Present
- Participant, William Lowell Putnam Mathematical Competition 2016

Escuela Preparatoria Central de Ciudad Juarez

June 2015

High School, valedictorian

GPA: 3.88/4.0

RESEARCH EXPERIENCE

UTEP Physics Department

El Paso, TX

Undergraduate Research Assistant

January 2019 - December 2019

Supervisors: **Prof. Rajendra Zope**

- Worked as part of the FLOSIC collaboration at the UTEP Electronic Structure Laboratory studying the effects of Self-Interaction Correction (SIC) with Fermi-Löwdin Orbitals (FLO) on Density Functional Theory using the regularized Strongly Constrained and Appropriately Normed (rSCAN) functional.
- Compared the numerical performance of rSCAN and SCAN with FLOSIC on calculating total energies of atoms and molecules, reaction barrier heights, and vibrational frequencies of water clusters.

ORNL Physics Division

Oak Ridge, TN

U. of Tennessee, Knoxville, Research Fellow

June 2018 - August 2018

Supervisor: **Dr. Alfredo Galindo-Uribarri**

- Performed datacuts and background stability checks for the PROSPECT experiment aiding to obtain the antineutrino energy spectrum of ^{235}U fission from the High Flux Isotope Reactor.
- Attended a one-week collaboration data analysis workshop at Yale Wright Laboratory.

MIT Center for Theoretical Physics

Cambridge, MA

MIT Summer Research Program Fellow

June 2017 - August 2017

Supervisors: **Prof. John W. Negele**, Prof. Phiala Shanahan, and Dr. Andrew Pochinsky

- Investigated the efficiency of Deep Neural Networks (DNN's) on classifying classical oscillators and predicting the evolution of their coordinates and momenta (read abstract [here](#)).
- Wrote the codes generating the training data sets with Python, constructed and trained the DNNs using TensorFlow.

UTEP Physics Department

El Paso, TX

Undergraduate Research Assistant

June 2016 - May 2017

Supervisor: **Prof. Jorge A. Lopez**

- Performed more than 300 simulations of isospin-asymmetric nuclear matter using Classical Molecular Dynamics to investigate their symmetry energy and to obtain their isospin-extended phase diagrams of liquid-gas coexistence state.
- Created plots of energy and pressure per nucleon vs. density for the publication of *Symmetry energy in the liquid-gas mixture* (read acknowledgements [here](#)).

POSTERS PRESENTED

- 8 **Salcedo, A.**, Yamamoto, Y., Zope, R. (2019). Assessment of rSCAN with FLOSIC. *FLOSIC All Hands Collaboration Meeting*.
- 7 **Salcedo, A.**, Yamamoto, Y., Zope, R. (2019). Aspects of Self-Interaction Correction to the Regularized SCAN Functional on Density Functional Theory. *UTEP Campus Office of Undergraduate Research Initiatives Annual Symposium*
- 6 Venegas, D., **Salcedo, A.**, Galindo, A. (2018). Background Characterization at the High Flux Isotope Reactor. *5th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan. Bulletin Vol. 63:12, HA 60*.
- 5 Hackett, B., **Salcedo, A.**, Venegas, D. (2018). Background Characterization at the High Flux Isotope Reactor. *25th International Conference on the Application of Accelerators in Research and Industry. CAARI Book of Abstracts, 189, #398*.
- 4 **Salcedo, A.**, et al. (2017) Liquid-gas Coexistence Phase in Nuclear Matter. *Fission Experiments and Theoretical Advances. FIESTA 2017 School & Workshop Book of Abstracts, 70*.
- 3 **Salcedo, A.**, et al. (2017) Classification of Dynamical Systems and Prediction of their Physical States Using Deep Learning. *31st Annual MIT Summer Research Poster Session. Link to Abstract*.
- 2 **Salcedo, A.**, López, J., Ramirez-Homs, E. (2016). *Isospin-Symmetry Dependent Properties of Nuclear Matter. Joint Meeting of the Four Corners and Texas Sections of the American Physical Society. Abstract ID: BAPS.2016.TSF.E1.53*
- 1 **Salcedo, A.**, López, J., Ramirez-Homs, E. (2016). *Isospin-Symmetry Dependent Properties of Nuclear Matter. UTEP Campus Office of Undergraduate Research Initiatives Annual Symposium*.

SCHOOLS AND WORKSHOPS

- 3 **Summer School in Theoretical Physics**; Utrecht University, Institute for Theoretical Physics; Utrecht, Netherlands. Aug. 2018
- 2 **Fission Experiments and Theoretical Advances (FIESTA)**; Los Alamos National Laboratory; Santa Fe, NM. Sept. 2017
- 1 **Nuclear Science Summer School (NS³)**; NSCL / Michigan State University (MSU); East Lansing, MI. May 2017

HONORS AND AWARDS

- **Conference Experience for Undergraduates (CEU) Travel Award**, American Physical Society Division of Nuclear Physics. 2018
- **SURPASS Fellowship**, for Summer Research Assistantship, UTEP Campus Office of Undergraduate Research Initiatives (COURI). 2016
- **Max Planck Physics contest**, 1st and 2nd place winner (300 participants), Universidad Autonoma de Ciudad Juarez (UACJ). 2014 and 2015
- **Jovenes en Accion Finalist**, national leadership program organized by the U.S. Embassy in México. 2014

- **State Youth Award on Social Engagement**, State of Chihuahua Government. 2014
- First place winner on three local and state level Mathematics and Computer Science competitions. 2013-2014

TEACHING EXPERIENCE

UTEP Physics Department

Undergraduate Teaching Assistant

- **Grader**, Analytical Mechanics I, Electromagnetics I, and Computational Methods for Physics Problems. Fall 2019
- **PHYS 2420 and 2421, Teaching Assistant**, Teaching and grading for Introductory Mechanics and Electromagnetism calculus-based problem solving recitation sections for Physicists. Spring 2018 - Spring 2019
- **PHYS 2420, Teaching Assistant**, Teaching and grading for two Introductory Mechanics recitation sections for Engineers, 2 per semester. Fall 2016 - Fall 2017
- **Grader**, Physical Science courses for Education majors, 3 per semester. Spring 2016

OUTREACH TALKS

- **Science Internship Panel**, UTEP Career Center (Invited). Oct. 2018

SOFTWARE EXPERIENCE

- Data Analysis Software: ROOT, Gnuplot.
- Programming Languages: C, Java, Python, Fortran90.
- Other Software: LaTeX, HDF.

COMMUNITY

UTEP Society of Physics Students, *President*

May 2019 - Present

- Created games for K-12 students illustrating concepts of Particle Physics and Optics (Read description [here](#)).
- Imparted talks about academic opportunities in physics at UTEP to more than 200 high school students in Juarez, Mexico (refer to my [website](#)).

UTEP Society of Physics Students, *Secretary*

August 2018 - May 2019

- Initiated the series of UTEP Physics Undergraduate Colloquia and delivered pilot talk: *The Prospect Antineutrino Experiment* (See slides [here](#)).

U.S. Consulate in Ciudad Juarez, México, *Youth Council, Founding Member*

Sept. 2014 - Sept. 2016

- Chaired logistics committee of leadership camp for 350 middle school students: *The Rolling Youth Camp* (Read information [here](#)).

Transcendental Agents of Change (ACT), *Cofounder*

August 2014 - May 2016