

# YOUSSEF H EWEIS

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## RESEARCH INTERESTS

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Mechanical and Electrical Designs  
High Energy Particle Astrophysics and Cosmology  
Data Science  
Psychological Pedagogy  
Creating a better environment to live in.

## EDUCATION

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**IOWA STATE UNIVERSITY** Ames, IA  
Masters of Science in Astrophysics August 2019 - May 2021

**RUTGERS UNIVERSITY** New Brunswick, NJ  
B.S. in Mechanical Engineering May 2019  
Astrophysics Major  
French - Literary Studies Major  
Summer Semester Abroad, Paris 2017

## RESEARCH EXPERIENCE

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**IOWA STATE UNIVERSITY**  
**Graduate Assistant** August 2019 - October 2020  
Joined the VERITAS collaboration (studying High Energy Astrophysics)  
Mentoring two undergraduate students  
Guided highschool student through basic data processing  
Processed earlier stages of gamma-ray emission data, in the form of cherenkov showers  
Calibrated a constant to normalize data values from different pathways through our collaboration's telescope  
Developed tools to analyze gamma-ray emission maps on a three dimensional spherical surface  
Analyzed different procedures of obtaining different levels of gamma-ray signal significance

**RUTGERS UNIVERSITY, PHYSICS AND ASTRONOMY, DATA REDUCTION**  
**Research Assistant** May 2018 – June 2019  
Extracted spectroscopic data of possible supernova candidates  
Updated pipeline program that automatically extracts spectroscopic data

**RUTGERS UNIVERSITY, PHYSICS AND ASTRONOMY**  
**Senior Honors Thesis** September 2018 – May 2019  
Using python (pynbody) to analyze data in cosmological simulations  
Post-processing and comparing the evolution of high pressure simulated star particles with Globular Clusters

## GRADUATE COURSES

IOWA STATE UNIVERSITY

Ames, IA

- Mathematical Methods for Physicists
- Electrodynamics
- Quantum Physics
- Cosmology
- Computational Physics
- Lie Algebra
- Quantum Field Theory
- Observational Astronomy
- Galactic Astronomy

## CLASS PROJECTS

RUTGERS UNIVERSITY, FRENCH DEPARTMENT

### Interdisciplinary Honors Thesis

Spring 2019

Summarized some concepts of my physics honors thesis and translated it into french, then created analogies between physics concepts and french symbolism poetry

RUTGERS UNIVERSITY, PHYSICS AND ASTRONOMY

### Research Paper on the Source of the Galactic Center Excess

Fall 2018

Researched the methods used to identify the galactic center excess  
Listed different types of dark matter and the density and luminosity profiles of self-annihilating dark matter  
Addressed calculated results of simulated millisecond pulsar radiation

RUTGERS UNIVERSITY, MECHANICAL ENGINEERING AND AEROSPACE

### Analyzing a simulated capacitor

Fall 2018

Changed the geometry of a capacitor, shape, and cell structure of a capacitor, and analyzed the effects on the electric field

RUTGERS UNIVERSITY, LANGUAGE DEPARTMENT

### Conversation Exchange

Fall 2018

Exchanged Arabic and French with a french international student every week for an hour

RUTGERS UNIVERSITY, MECHANICAL ENGINEERING AND AEROSPACE

### Building a Drone that can carry a one pound payload

Fall 2017 – Spring 2018

In addition to the work done on the previous drone, we analyzed the change of the center of mass during the release of payloads

RUTGERS UNIVERSITY, MECHANICAL ENGINEERING AND AEROSPACE

### Building a drone out of scratch

Fall 2017

Studied the laws of aeronautics to guarantee stability in the air, and created an excel sheet that converts all the dimensions of the plane to diagnostic values

Researched the internal composition of electronics of a drone, and put together a working assembly

**RUTGERS UNIVERSITY, MECHANICAL ENGINEERING AND AEROSPACE**

**Research Paper on the Hubble Space Telescope**

Fall 2017

Researched the history of the HST and other space telescopes  
Analyzed the advantages compared to other space and ground-based telescopes  
Inspected future variations of the HST, such as the James Webb Space Telescope

**RUTGERS UNIVERSITY, EDUCATION**

Fall 2015

**Physics Education Poster**

Researched multiple learning techniques employed in a classroom  
Analyzed the specific techniques relevant for physics education  
Developed better self-learning skills

**EMPLOYMENT**

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**IOWA STATE UNIVERSITY GRADUATE COLLEGE**

**AMES, IA**

**Teaching Assistant**

August 2019 - December 2020

Teaching the principles of general Astronomy to non science majors. Recitations go over concepts discussed in lecture in addition to planetarium screenings of constellations and astrophysical bodies  
Teaching and grading intermediate astrophysics principles, concerning solar systems, for engineering students  
Instructing introduction physics lab courses for engineering students

**RUTGERS PHYSICS DEPARTMENT - RUTGERS UNIVERSITY**

**PISCATAWAY, NJ**

**Lab Assistant**

May 2018 – August 2018

Setup and tested lab equipment for freshmen and sophomore physics labs  
Organized and repaired equipment such as: multimeters, cables, toy cars, etc  
Learned valuable self-discipline skills

**RUTGERS PHYSICS DEPARTMENT - RUTGERS UNIVERSITY**

**PISCATAWAY, NJ**

**Part Time Lecturer**

September 2017 – May 2018

Instructed a general mechanics lab, in addition to some classical physics  
Instructed an electricity and magnetism lab, in addition to some modern physics

**RUTGERS PHYSICS EDUCATION DEPARTMENT - RUTGERS UNIVERSITY**

**PISCATAWAY, NJ**

**Student reflector**

January 2016 – May 2016

Wrote a reflection every week on a Modern physics and optics lab  
Attempted to assist the staff in the creation of the labs from a student's perspective

**RUTGERS LEARNING CENTER - RUTGERS UNIVERSITY**

**PISCATAWAY, NJ**

**Learning Assistant**

September 2015 – May 2017

Overviewed engineering-based physics courses alongside a teaching assistant

Graded pre-labs and mini-labs  
Led weekly Study Groups  
Attended multiple teaching workshops

**SECAUCUS PUBLIC LIBRARY AND BUSINESS RESOURCE CENTER**

**Secaucus, NJ**

June 2015 – September 2015

Assisted patrons at the circulation front, with computer problems, and finding inventory  
Gained prompt research skills in finding documents and library material

**RUTGERS AMESALL DEPARTMENT – RUTGERS UNIVERSITY**

**Piscataway, NJ**

**Student Administrative Assistant**

September 2014 – May 2015

Designed an advertising brochure  
Emailed, printed, and copied department documents  
Assembled and disbanded office equipment such as boxes

**WESTSIDE HIGH SCHOOL- MATH DEPARTMENT**

**OMAHA, NE**

**Math tutor/teacher assistant**

June 2014

Tutored various high school students (mainly juniors) in advanced algebra for a summer school program  
Significantly segmented my grasp of algebra II concepts

**LEADERSHIP & SERVICE**

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Vice President/Former President, Rutgers Chess Club	8 semesters
American Institute of Aeronautics and Astronautics (AIAA)	4 semesters
Club Member, Society of Physics Students (SPS)	4 semesters
Club Member, Rutgers Philosophy Club	2 semesters
Presenter, Iowa State Planetarium Show	2 semesters
Egyptian Student Association Treasurer	2 semesters

**CERTIFICATIONS**

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Substitute Authorization	January 2021 - August 2026
Post Graduate Program in Data Science and Business Analytics	Expected September 2021

**TECHNICAL SKILLS & AWARDS**

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**Computer Skills:** HTML, Matlab, Python, C, C++, ROOT, Excel, ANSYS, COMSOL, Solidworks

**Languages:** Arabic(fluent), French(advanced)

**Honors & Awards:**

Dean's list for the School of Engineering (6/10) (Rutgers)  
Gertrude and Peter Nora Memorial Scholarship (Rutgers)  
Preparation in STEM Leadership Program Scholarship (Rutgers)  
Albert M. Wolohojian Memorial Travel Scholarship (Rutgers)  
SPS Travel Award (Rutgers)

Aresty Conference Funding (Rutgers)

Paul Robeson Scholar (Rutgers)

Richard G. Patrick Award (Teaching Award at Iowa State University)