



# SWAPNIL BHATTA

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📍 Hattiesburg, MS | 📞 (601)466-3221 | ✉️ [swpnl007@gmail.com](mailto:swpnl007@gmail.com)

Physics and astronomy enthusiast, interested in general cosmology and astrodynamics. Experienced in data segmentation, predictive analytics and machine learning methods. Competent learner with positive work ethic and great communication skills.

Some of the sections below have hyperlinks linking to relevant documents or more details. An up-to-date curriculum vitae can be found [here](#).

## EDUCATION

### UNIVERSITY OF SOUTHERN MISSISSIPPI | Hattiesburg, MS | 2020

Bachelors of Science (Honors)  
Physics and Astronomy | Mathematics

## CAREER SUMMARY

### TEACHING ASSISTANT | University of Southern Mississippi | 2018 AUG- PRESENT

*Description and Duties:*

- Worked as a teaching assistant for the university's school of mathematics and natural sciences, the only undergraduate teaching assistant for physics.
- Responsible for conducting lectures on core principles implemented in the lab experiments, supervising and grading lab activities which included lab reports, quizzes and tests. Taught the following courses;
  - [General Physics Lab](#) (PHY 111L, 2018 & 2019 fall): Experiments demonstrating Kinematics, Newton's laws, energy, and momentum.
  - [Advanced Electronics Lab](#) (PHY 327L, 2019 spring): Fundamentals of vacuum and semiconductor devices with applications to scientific instrumentation.

### MATH TUTOR | University of Southern Mississippi | 2016 MAR- 2018 MAY

*Description and Duties:*

- Worked as a mathematics tutor for the university's Math Zone, tutored students in college level algebra, statistics, trigonometry and calculus.
- Responsible for articulating mathematical concepts to students that visit the Math Zone and helping them based on their individual needs.

### ADMINISTRATIVE ASSISTANT | University of Southern Mississippi | 2016 JAN- 2018 MAY

*Description and Duties:*

- Worked as the senior administrative assistant for the university's Writing Center. Responsible for interacting with clientele, helping manage day to day functions of the center and diligent record keeping. Further tasked with training and supervising new administrative assistants.

### SOCIAL MEDIA MANAGER | General Institute Nepal | 2015 Jun-Jul

*Description and Duties:*

- Worked as a social media manager for a language consultancy firm, trained in SEO.
- Responsible for e-marketing, creating, supervising social media content, and interacting with customers online.

## CONTENT MODERATOR | NEPTECH Solutions | 2014 NOV- 2015 APRIL

### Description and Duties:

- Worked as a content moderator and supervisor for a language transcription company.
  - Responsible for moderating the transcribed content for error, formulating new techniques and schemes for consumer interaction, quality control and evaluation of existing staff.
- Worked in a fast paced environment requiring utmost efficiency and communication.

## RELEVANT EXTRACURRICULAR EXPERIENCE

### Data Analytics Virtual Internship | KPMG Australia | 2020 May – July

- A virtual internship at KPMG International Cooperative Australia through the Inside Sherpa platform.
- Worked on multiple stages of a data segmentation project. Used Python to identify limitations of the client's dataset, quality assessment, and to process filtered data. Used Tableau for visualizations and dashboard.

### Data Analytics Virtual Internship | ANZ Banking Group | 2020 June – July

- A virtual internship at ANZ banking group through the Inside Sherpa platform.
- Worked on financial transaction datasets. Used Python and Tableau for correlation analysis and predictive analytics based on the transaction data.

## SKILLS AND QUALIFICATIONS

- Experience in computational physics along with data segmentation, analytics and visualization gained through research and extracurricular data projects. Simulations of physical systems with dynamic parameters.
- Experienced in managing and executing large-scale objectives through competent planning and execution.
- Excellent written and oral communication acquired through experiences in leadership, public relations, branding and marketing.
- Languages: English (bilingual fluency), Nepali (bilingual fluency), Hindi (working fluency).

### COMPUTATIONAL SKILLSET

	Experienced	Proficient	Advanced Beginner
Languages	FORTRAN*	Python*, MATLAB*	R*, C++, Wolfram Cloud, Maple*, SQL, HTML 5, CSS
Environment	Windows*	Linux*, macOS	
Hardware	PC*	Mac	
Software	Microsoft Office Suite*, LaTeX*	Tableau	Adobe Photoshop,

\*indicates certification or demonstrated usage in projects.

## RESEARCH PROJECTS

### PERTURBATION OF LAGRANGE POINTS IN EFFECTIVE POTENTIAL SIMULATIONS | Honors

#### Thesis Project for Physics | Spring 2020

Research Advisor: Dr. Michael Vera

Analysis of the orbital positions of the Lagrange points firstly in a classical two-body configuration, followed by a computational analysis of their positions in a dynamic system after introducing the gravitational influences of other bodies. Used FORTRAN for computation, compiled in a Linux environment, plots through MATLAB and the paper itself in LaTeX.

## **ASTROMETRIC ANALYSIS OF THE AGB STAR R SCULPTORIS | Our Solar Siblings Research Project | Fall 2019 - Ongoing**

*Research Advisor: Dr. Christopher Sirola*

Analysis of the photometric parameters of the AGB star R Sculptoris using astrometry and data analysis, searching for the existence of a companion star. Data obtained through remote access of the Las Cumbres Observatory. Used Python for computation, compiled in Windows and the paper itself in LaTeX.

## **ANALOGS OF THE SCHWARZSCHILD METRIC IN FLAT SPACE-TIME | Cross Scholar Research Project | Spring 2020 - Ongoing**

*Research Advisor: Dr. Sungwook Lee*

An exploration of flat space-time, seeking mathematical solutions for an analog of the Schwarzschild metric. Used Maple for computation, and the paper itself in LaTeX.

### **CAPSTONE PROJECTS**

#### **ATTENUATION OF RADIATION THROUGH THE ABSORPTION OF GAMMA RAYS |**

#### **Capstone Project in Radiation | Spring 2020**

*Advisor: Dr. Jeremy Scott*

Analysis of the linear and mass attenuation coefficient of various lead samples based on their absorption of gamma rays emitted by various radionuclides. In fulfillment of the capstone project requirement for a degree in physics.

#### **OBSERVABLE UNIVERSE – FUTURE: Literature Review | Capstone Project for Physics | Spring 2020**

#### **TIME SERIES ANALYSIS OF THE ORBITAL DISTANCE BETWEEN THE MOON AND THE EARTH | Capstone Project in Data Analysis | Spring 2019**

*Advisor: Dr. Bernd Schroeder*

Time series analysis of the orbital distance between the Moon and the Earth, through data obtained from NASA's New Horizons program. In fulfillment of the capstone project requirement for a degree in mathematics. Used R for data analysis.

#### **STATISTICAL ANALYSIS OF LITERACY RATE AND ITS RELATIONSHIP WITH GDP PER CAPITA | Capstone Project in Data Analysis | Spring 2019**

*Advisor: Dr. Bernd Schroeder*

### **PROFESSIONAL APPOINTMENTS**

#### **PRESIDENT | Society of Physics Students – Southern Miss Chapter | 2018 MAY – 2020 MAY**

Serving as the President for the Society of Physics Students chapter at Southern Miss.

#### **STUDENT AMBASSADOR | American Physical Society | 2018 AUG – 2020 MAY**

Serving as a student ambassador for the American Physical Society.

#### **ASSOCIATE ZONE COUNCILOR | Society of Physics Students | 2018 JUN – 2019 MAY**

Served on the Society of Physics Students National Council as the associate zone councilor for Zone 10, representing all SPS chapters from Louisiana, Arkansas, Mississippi and lower Tennessee.

## **PROFESSIONAL MEMBERSHIPS**

Society of Physics Students (SPS)  
American Physics Society (APS)  
Society for Industrial and Applied Mathematics (SIAM)  
American Astronomical Society (AAS)  
Sigma Pi Sigma Honors Society

## **HONORS AND AWARDS**

Presidents and Deans list for various semesters at the University of Southern Mississippi.  
Outstanding Freshman Nominee (USM 2016).  
Out-of-State Scholarship Award (2015-2019).  
[William F. St. Clair Endowed Scholarship Program in Physics](#) (2015-2020).  
Wright W. and Annie Rea Cross Mathematics Undergraduate Research Scholarship (2019)  
Society of Physics Students Leadership Scholarship (2019)  
SPS at USM Physics Student of the Year (2019)

## **WORKSHOPS AND ACADEMIC CONFERENCES**

Python Excel to MySQL: Analytic Techniques for Business Specialization | Coursea | Summer 2020  
Data Driven Astronomy – University of Sydney | Summer 2020  
American Physical Society – Leadership Conference | Jan 2020  
NS<sup>3</sup> Nuclear Science Summer School – Michigan State University | Summer 2019  
Leadership Summit – University of Southern Mississippi | 2016, 2017  
Genesis Nepal : Shaping your Future – A two week course on positive life (2011)  
Genesis Nepal : Reaching Self-Actualization in life (2013)

## **COMMUNITY ENGAGEMENT**

### **EDUCATIONAL OUTREACH | 2017- 2020**

Through the SPS chapter at Southern Miss, helped promote physics in the community through various educational outreach activities and SPS grants. Actively involved with the clubs outreach to students from K-12.

### **THE INTERNATIONAL CLUB AND BS UNION | University of Southern Mississippi | 2015-Present**

Helped organize and facilitate activities and events for International Students at the university, primarily to help overcome a possible cultural shock and help promote interaction with a different community. Volunteered in various community clean-up events like the Big Event organized by the school and the city of Hattiesburg.

### **EDUCATION FOR ALL | Shikshya Nepal | 2015**

Helped collect books and reading material for donation campaigns by a NGO in Nepal. Further helped distribute these collected materials to under-privileged schools in rural Nepal.

**BLOOD DONATION CAMPAIGNS | Red Cross Nepal | 2014**

Participated in blood donation campaigns organized by Red Cross Nepal, helped raise awareness my community about the importance of blood donation campaigns.

**VOLUNTEERING AND COMMUNITY SERVICE| Various NGOs | 2015.**

Volunteered in rehabilitation programs such as building temporary shelters, distributing food and clothes in various regions of Nepal during the aftermath of the Nepal earthquake of 2015.

**HOBBIES AND INTERESTS**

I enjoy science-fiction as movies and literature. I like video games, and love being around animals. I am also fond of travelling and plan to invest more time in it in the near future.

**REFERENCES**

Dr. Michael Vera ([Michael.Vera@usm.edu](mailto:Michael.Vera@usm.edu)) Dr. Christopher Sirola ([Christopher.Sirola@usm.edu](mailto:Christopher.Sirola@usm.edu))

Faculty Head, Physics and Astronomy

Associate Professor for Astronomy, USM