# Yutao ZHOU

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## EDUCATION

**University of California – Santa Barbara** **Santa Barbara, CA**

***BS** in Physics* *Sep 2018 – Dec 2021*

**Overall GPA**: 3.67/4.00

**Dean's Honors List** in 2021 Winter

## ACADEMIC PROJECTS

**Analog Electronics Laboratories** **Santa Barbara, CA**

*PHYS 127AL Course Projects* *Mar 2021 – Jun 2021*

- Designed circuits to switch and amplify the input wave with a common-emitter amplifier, a differential amplifier, or an operational amplifier, respectively
- Fabricated a light-responsive buzzer using photosensitive resistors, LEDs, a 555 Timer chip, and capacitor resistors
- Built a circuit with photosensitive diodes to receive and record signals emitted by a LED bulb through alternating brightness as controlled by a 555 Timer chip

**Introduction to Scientific Computing Laboratories** **Santa Barbara, CA**

*PHYS 129L Course Projects* *Jan 2021 – Mar 2021*

- Mastered the Dictionary in Python, converted String to Int, and derived Julian Day based on the date entered
- Calculated the complex plane, drew a fractal image, and plotted a 3D image of a rotatable airy disk
- Practiced Discrete Fourier Transform, Fourier analysis algorithm, and drawing method
- Exercised Gaussian approximations, integral algorithm, and Monte Carlo simulation

**Auroral Morphology Classification Based on Unsupervised Clustering** **Beijing, CN**

*Research Project at National Space Science Center, CAS (Advisor: Prof. Ziming Zou)* *Aug 2019 – Sep 2019*

- Familiarized with the unsupervised clustering algorithm, KNN algorithm, and K-means algorithm
- Learned about calling the underlying algorithm in the SkLearn machine learning library
- Consulted literature on the morphological categories of aurora observation images in the whole sky and collected the data sources of aurora images
- Programmed to realize morphological clustering of aurora images

## WORK EXPERIENCE

**Deepchem Co., Ltd.** **Beijing, CN**

*Python Intern* *June 2019 – Present*

- Individual project: creating automatically data preparation algorithm for ORCA(A calculation software in chemistry) on server.
- Individual project: creating automatically data collection algorithm from five files we got from ORCA calculation on the server. Including data synchronization from different files and error handling. The algorithm will try to solve the problem when an error is detected.
- Individual project: writing script that collecting specified data from user-specified folder.
- Individual project: attempting to writing script that convert FUNSMILE(our company's way of naming compound structure) to SMILE(a general chemistry structure naming). Company decide to stop this project after a week.
- Individual project: writing script that could communicate with chemistry experiment equipment remotely in the lab and control them to experiment. I used SOCKET and designed an algorithm that could check two-way connections automatically.
- Individual project: testing Psi4 calculation speed on the server with different threads and memory settings. Did polyfit to find mathematical minimum time and test hypothesis and wrote reports.
- Individual project: writing script that find missing data set in database from id queries excle. Data filtering and aligning. Extracting 3D cartesian coordinate and get SMILE with OpenBabel python package. Creat and

maintain SQL database. Entract data from xyz file, excle file, and coverted SMILE and insert it in to SQL database(including checking repeating data in database).

- Individual project: writing script that filter and classify files. ZIP choosen file type and upload them to server with POST with login and token.
- Group project: create calculation task distribution systems. Work with the front end, and other co-walkers to create a web-based platform that would distribute calculation jobs from the distribution server to different calculation servers based on calculation servers status (Thread usage) and the number of threads that the user declared when submitting task. I am in charge of all the work after the calculation job started. More specifically the following works:
  - All of the jobs below were performed accordingly to different calculation types, which include ORCA, Gaussian, VASP, and Lammps.
  - Use GET to check job status on platform and handle manue stop from user. While inclue a series of actions inclue stop job in SLURM.
  - Use GET and POST to check front end job status and submit log content from calculation to distribution server in real-time.
  - Zip needed calculation result and use POST to upload file to the distribution server.
  - Handle a series of situations including but not limited to:
    - Unexpected termination of calculation on calculation server
    - Manual stop or delete from the user
    - Manual cancel job from the server
    - Missing calculation file(calculation files were uploaded from the user when they submit a job)
    - Calculation did not start correctly and was terminated right after being submitted with SLURM.
    - Front end server offline
    - Continuity when my program was accidentally stopped. All of the calculating jobs will back to normal as soon as restart my program. If there are calculation tasks that had been completed they will be uploaded to the distribution server as normal and the log will appear as normal. If there were a new calculation job it will be recognized and tracked. If there are calculation job that was submitted and completed while my program was not running their result will be upload to the distribution server normally as soon as my program start.

**Beijing MeiQuan Science and Technology Development Co., Ltd.** **Beijing, CN**

*Part-time Administrative Assistant* *June 2019 – Present*

- Read the products' CAD structure drawings and specifications, make optimization suggestions, participate in new products development, and introduce product features to potential clients
- Produce promotional materials remotely, such as the company's and products' brochures, using PPT and LaTeX
- Discuss project alternatives with the customer including but not limited to problem-solving.
- Hands-on experience with product production and shipping.

**Research Institute of Nanjing Runnan Medical Electronics Co., Ltd.** **Remote**

*Part-time Analytical Assistant* *June 2021 – July 2021*

- Collected clinical data in Python and drew signal waveforms, such as electrocardiogram (ECG), electromechanical film ballistocardiogram (BCG), LC BCG, etc.
- Identified the signal peak through local maximization, calculated the peak distance, and measured the beat-by-beat cardiac cycle of ECG signal through plotting the waveform
- Extracted the beat-by-beat cardiac cycle of any BCG signal with or without the synchronous ECG signal reference

## EXTRACURRICULAR ACTIVITIES

**UCSB COLLABORATE** **Santa Barbara, CA**

*Student representative* *Sep 2021 – present*

- Discuss with university officials on behalf of the MLPS Mathematical, Life, and Physical Sciences students about the appropriate allocation and improvement of teaching materials, methods, and support

**UCSB Physics Circus** **Santa Barbara, CA**

*Core member* *Sep 2020 – present*

- Deliver intriguing physics lectures to local elementary schools via Zoom
- Co-designed the Balloon Thermal Experiment and created the featured homepage on Home Experiments Website: https://circus.physics.ucsb.edu/home-experiments/
- Get reported several times by *The Current*, UCSB's official magazine

**UCSB College of Letter and Science** **Santa Barbara, CA**

*Academic peer advisor* *Mar 2020 – present*

- Advise peer students on educational plans and provide suggestions on course selection
- Operate Qless, a virtual walk-in platform, deal with progress checks and petitions, explain paperwork procedure and academic policies of the college, and address student concerns especially caused by the pandemic
- Handle academic appointments, provide study plans, and answer potential consequences for certain academic actions

## SKILLS & SPECIALTIES

**Languages**: Chinese Mandarin (Native); English (Proficiently fluent)

**Computer Skills**: Python, MATLAB, Latex, Auto Desk CAD, EasyEDA, MS Office series, Shell script

**Hobbies**: Playing golf, Bowling, Karting, Archery, Singing, Reading, Digging into Python programming, Learning intriguing knowledge on YouTube