

JOB TITLE	Modeling of oil and gas in the oil reservoir for oil recovery enhancement
JOB ID	812037
SUMMER HOURS	340
WINTER HOURS	408
POSITION TYPE	Research

JOB DESCRIPTION

An undergraduate student (UG) assigned to this project will work closely with a graduate student, Walid Mazyan, who is developing accurate models simulating the flow inside the porous oil reservoir. The undergraduate student will be responsible to determine properties in one of the categories including i) porosity and permeability; ii) saturation and capillary pressure; iii) wettability and diffusivity. The accuracy of the models highly depends on the properties of the porous reservoir. The student will be responsible to test the samples provided by the industry partner (Shell Canada) to identify the relationship between these properties and oil recovery. The tasks in the projects include setup preparation, property measurement, data analysis, reports and conference proceeding preparation (which will be presented at the 2016 International Petroleum Technology Conference in December 2016). The student will also attend and present the work in our weekly meetings. The student's involvements in this project will be around 340 hours over the summer session and 408 hours for the winter session.

QUALIFICATIONS

Knowledge of Matlab and/or Microsoft Excel would be advantageous for this position. The student should have backgrounds in thermofluidics and heat transfer. The undergraduate student should have general problem-solving skills.

STUDENT LEARNING COMPONENTS

1. Develop and enhance student's personal and professional development:

The undergraduate student will be first trained and oriented to the general laboratory rules and safety practices by myself and the graduate student. I will also go through the student's schedule to teach how to maintain balance between the course work and the Workstudy project proposed here. In the second week, the undergraduate student will receive an extensive training regarding the specific research tasks, objectives, and the timeline. During our weekly group meetings, the student will give presentations which will enhance his/her communication skills and provide an opportunity to receive comments on the work. We will also have videoconference meetings every two months with the researchers at Shell, the company which will provide some of porous samples. The students will plan the events, book the room, set up the facility, participate in discussion and present their results. This type of exposure to real industry problems will enhance the student's motivation and intellectual curiosity. The student will also be active in attending on-campus student leadership

conferences, as well as preparing two reports, submitting a journal paper, and presenting at International Petroleum Technology Conference.

2. Offer an opportunity to develop workplace skills:

The undergraduate student will lead the experimental aspects of the porous media research which will be important inputs to the models developed by the graduate student. As a result, his/her leadership and teamwork skills are enhanced simultaneously. Close collaboration with the graduate student will also enhance the student's learning on subjects that are not taught through his/her engineering curriculum but are very important for his/her future careers. These subjects include, but not limited to, learning the fundamentals of two-phase flow, two different modeling approaches (Computational Fluid Mechanics and Pore Network Modeling), basics of surface science, and porous sample fabrication. The student involved in this project is expected to conduct a thorough literature review to find the most effective way to solve the problems encountered in the course of the project. This expectation and the laboratory environment nourish the student's problem-solving skills and encourage innovative actions during trouble shooting in experiments. Also, planning and facilitating the meetings with Shell and working closely with Shell researchers will develop the student's planning and management skills.

3. Provide opportunities to explore potential career paths:

The student involved in this project have an opportunity to spend two weeks (one week in December and the other in April) in Shell Canada to enhance his/her background knowledge regarding oil recovery. During this time, he/she will attend the meetings and be familiarized with the oil extraction sector of the company. Shell only hires employees who have collaborated with them in the past. Therefore, the proposed job will create an opportunity for the student to be hired by Shell after his/her graduation. During their work at UBC and Shell, the student will be involved with different personnel ranging from research personnel (e.g., interns, co-op students and researchers in Shell, and faculty members and graduate students at UBC) to technical (machine shop staff at UBC) and administration staff (Human Resources at Shell). This wide exposure will develop the student's interpersonal skills and prepare them for his/her future career. Also, the respond to the comments received on the publications and presentations will prepare the student for the professional science world and teach him/her how to accept and reply to criticisms.

4. Provide work experiences that complement academic and/or experiential learning:

The experience in the laboratory and repetition of many of the skills will allow the student to become masters in measurement techniques as opposed to brief exposure received in an academic curricular setting. For instance, the undergraduate students learn about the two-phase flow (in ENGR 385), but do not get exposed to any real two-phase systems. The student working in the proposed project, on the other hand, will work with a real two-phase system, oil and gas in the reservoir. In the course of the proposed project, undergraduate student's interaction with the supervisor, other graduate students, undergraduate students, researchers at Shell, technicians and staff will enhance his/her interpersonal skills. To enhance his/her leadership skills, the student will be assigned to lead specific tasks including updating our inventory, organizing and planning the meetings with Shell, updating our activities on the Lab webpage, and updating the results.

5. Evidence of ongoing support and mentorship:

I have the open-door policy. In addition to one-to-one and group meetings occurring every week, the student can talk to me at any time. I am also accessible through emails any time of the day to answer the student's questions and concerns. From the beginning of the job, the objectives, weekly milestones, the final goals and expectations are clearly explained to the student. We will have extensive workshop and training in the first two weeks. However, the student will have more training when he/she attends Shell's workshop. The student is also encouraged to interact with other graduate and undergraduate students and gets comments from his/her peers. With the help of the students, we usually organize bi-monthly events (such outdoor barbecue, skiing, bowling, hiking, etc.) to spend time outside laboratory, to celebrate the students' success (regarding successful publications or results) and to know each other better. These fun events not only teach the students how to keep the balance between life and work but also make them more engaged with their colleagues and coworkers.