Deciding among the Research and Lab Options by Prasad Dhurjati

Below is an outline of some items that you need to consider in deciding between the various research and senior lab option. Currently (in 2008), you have a choice of the following options:

(1) CHEG 473-474 Senior Research Option in Fall 2008
(2) UNIV 401-402 Senior Research Option in F08 (Degree with Distinction)
(3) CHEG 445 Senior Lab at Delaware in Fall 2008
(4) CHEG 445 Senior Lab in Melbourne, Australia, in Winter Session 09

I have outlined below a few factors to consider in making the decision.

RESEARCH OPTION: CHEG 473-474 versus UNIV 401-402

You can do undergraduate research during your senior year in two ways. You can either register for six credits of CHEG 473/CHEG 474 in Fall/Spring or for six credits of UNIV 401/402 in Fall/Spring. In both cases, you will be doing a research project for a chemical engineering advisor.

The University administers UNIV 401-402. UNIV 401-402 requires you to write a formal "senior thesis" at the end. There is also a formal "thesis defense" that is evaluated by a thesis committee. The Chemical Engineering Department administers CHEG 473-474. The requirements of CHEG 473-474 are less formal than UNIV 401. However, you are required to submit several reports and give an oral presentation during the Fall semester. Admission to CHEG 474 in the Spring semester is contingent on good progress in CHEG 473.

"Students must select senior research projects and advisors BEFORE the close of spring registration period. Application for admission to CHEG 473 requires a one page document consisting of (1) Project Title (2) Name of Research Advisor (s) (3) Brief Objectives (4) Brief outline of research tasks to achieve objectives." This document must be approved by the advisor as well as the Instructor for CHEG 473.
Students who do UNIV 401-402 get a degree with distinction. Information on the degree with distinction and UNIV 401/402 is available at the following url: [www.udel.edu/UR/srthesnd.html](http://www.udel.edu/UR/srthesnd.html) CHEG 473-474 also requires a thesis at the end but there is no formal defense with a thesis committee. UNIV 401-402 requires a minimum overall of GPA of 3.0 and a GPA in the major of 3.5. The GPA average in the major is computed from the grades of all CHEG courses and co-listed CHEG courses such as CHEG/MATH 305. The prerequisite for CHEG 473-474 is a minimum grade of B in CHEG 345 Junior Lab and prior approval of research advisor and CHEG 473 course instructor.

Satisfying Departmental Requirements: Both CHEG 473-474 and UNIV 401-402 earn you six credits towards your degree. These six credits are considered equivalent to three credits of Senior Lab plus three credits of a chemical engineering elective.

Selecting a Research Advisor: Many of the students start their research early in the summer of the sophomore year. For those of you who have not yet selected a research advisor, it is important to figure out what your interests are and then match them to those of the faculty. Do you like experimental work or do you prefer math and computation? Is there a particular course that you took that you found more interesting? Are you interested in biotechnology or catalysis or materials or thermodynamics or fluid mechanics, (etc.) or a combination of these? Once you have some idea of what you may like, it is recommended that you go to the Department web pages ([www.che.udel.edu](http://www.che.udel.edu)) and look at the research interests of the faculty. Send an email to the faculty member expressing your interest and set up an appointment to meet in person. You have to find a research advisor who is willing to accept you. If you have difficulty finding a research advisor, meet with Professor Lobo or your undergraduate advisor. In special cases, you may also select a research advisor outside the chemical engineering department. In such cases, you also need to have a co-advisor in the chemical engineering department. The role of the co-advisor is to make sure that there is chemical engineering content in the research and to ensure that the departmental standards are met.

Pros of Research Option: You get a chance to work closely with a faculty member and go deep into a single research problem in a topic of current interest. It is certainly very strongly recommended if you intend to go to graduate school or are even considering it. But it can also be a useful
experience if you are going to industry. You get a chance to do independent research in an unstructured environment that is very different from structured and traditional coursework. Research opens up new horizons in subject areas that may not be covered in regular coursework. In several cases, it may be the only way as an undergraduate to find out in-depth about the state-of-the-art in an area such as electronic materials, composites, biotechnology, nanotechnology, catalysis, colloids, fuel cells, etc.

If you do not want to do the six-credit senior research thesis option, you can also do three credits of senior research by taking CHEG 468 “Independent Research”. This course only counts as a three-credit CHEG course and does not substitute for the senior lab degree requirement.

**SENIOR LAB OPTION:**

This option consists of registering for three credits of CHEG 445 either in Fall at Delaware or in the Winter Session in Australia. Senior Lab (also known as CHEG Lab II) is largely a more rigorous extension of the Junior Lab experience and in some ways it is more of the same. The Senior Lab at Delaware is structured very similar to the Junior Lab. There is emphasis on teamwork and report writing. You work in groups of three rather than independently as in senior research. The experiments tend to be more traditional and well defined compared to the research option. You have a lot less flexibility and much more structure in the senior lab ....... but this may be a positive or negative depending on your personal style! For students who prefer the comfortable structured environment of a regular course, senior lab may be a preferable alternative to senior research. CHEG 445 satisfies the senior lab requirement for your degree.

CHEG 445 in Australia is different from the CHEG 445 experience at Delaware. You should talk to the faculty (Dr. Short and Dr. Sandler) who have already been to Australia to find out more about the differences between the Lab experience at Delaware and the Lab experience abroad. The key difference is, of course, that you are in another country, and that you are doing the senior lab in one month rather than over an entire Fall semester. The lab experiments are different too. You also get the opportunity to take three extra credits of a chemical engineering elective (e.g. Product Engineering) in Australia thus reducing your course load during the regular semesters at Delaware. If one can afford it, CHEG 445 in
Australia certainly appears to be a very attractive option. It also appears to have been highly appreciated by the students in previous years.

There are pros and cons of each of the options. The final decision depends on your own interests and personal situation. If you need help in making this decision, please feel free to contact your faculty advisor.