**M382D, Differential Topology**
**Termpaper information**

One of the course requirements is to write a term paper, either alone or in collaboration with others. You are expected to pick a subject, learn it thoroughly (this presumably will involve some time in the library), and write something interesting about it. The paper should be between $3+n$ and $4+2n$ TEX pages, magnification \ magstep1, where $n$ is the number of people in the collaboration. The term paper is due one week *before* the end of classes.

Some people write best alone, while others work best in collaboration. Either way is fine with me. However, if you do collaborate, I suggest that you work in teams of 2 or 3. Getting 4 or more people to agree on a joint manuscript is extremely difficult.

So what makes for a good topic? And what in blazes does "write something interesting" mean? Here are some suggestions. You don't have to do all of these things, or even any of these things. They're just suggestions that I hope will guide you to a topic.

1 . You can pick a theorem of differential topology, and discuss is at a higher level than we have covered it. For example, you might explain how the inverse function theorem works in infinite dimensions, how it gets used in functional analysis, and so on.

2 . You can pick a theorem and discuss it at a *lower* level than we have covered it. Albert Einstein used to say that any correctly understood physical theory should be explainable to a barmaid. I claim that (almost) any theorem, properly understood, can be explained to a (good) freshman calculus student. Boil the theorem down to its essential content, and explain it as clearly as possible. You'll probably have to skip some steps in the proof, but when you're done the naive reader should have a good sense of what the theorem says, why it's true, and why he should care.

3 . You can discuss the interplay of differential topology and some other area of math or science. For example, you could report on applications of differential topology to dynamical systems.

4 . You can discuss the history of a certain theorem, formula or technique. In many cases there's quite a story, with one person having one idea, another person inventing something different, a third person proving that the first two were really equivalent, a fourth person generalizing, a fifth applying the result in a new way, and so on.

These are just a few ideas. I'm sure you'll have more. If you have an idea but aren't sure if it's appropriate, come to my office and we can discuss it. There's a good chance that something very close to it IS OK.

Finally, a good question to ask yourself when considering a topic is "Would I like to read a paper on this topic?". If so, it's probably a good topic. But if you can't even interest yourself, you're going to have a hard time interesting anybody else.