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Application for JPL Planetary Science Summer School 1999

In the 1980s very few planetary missions progressed from the drawing board to launch. In the 1990s, Goldinπs ≥faster,better, cheaper≤ paradigm and advances in technology have led to dozens of planetary missions being proposed, and later launched, to explore our Solar System. This accelerated pace of exploration will continue, due to likely decreases in the cost of launch vehicles, further advances in technology, and the successes of the Discovery class missions to date. More and more planetary scientists are becoming involved in missions at all stages including conception, proposal, and data acquisition. It is common for young planetary scientists to gain experience with a mission once it is in flight, but input into the conception and proposal process is rare. Nevertheless, this experience has to be gained at some stage, or the young scientist will never be successful in such activity later in his/her career. This summer school provides a lucky few young planetary scientists with the chance to learn skills that will be invaluable later in their careers.

I am currently working with my advisor, Steve Bougher, studying the martian upper atmosphere using data from Mars Global Surveyorπs aerobraking. Aerobraking, rather than rocket braking, a spacecraft for orbit insertion is one of the ways in which the cost of a mission can be drastically reduced. In addition to ≥cheaper≤, the returns for atmospheric science make this orbit insertion technique ≥better≤, at the cost of a few months on the mission time. Many proposed martian and venusian missions intend to use aerobraking, potentially returning a wealth of atmospheric science data to Earth. If this data is to be useful to scientists, the intent to use it scientifically, rather than just for orbit insertion, must be clear in the original proposal. I hope this summer school will teach me how to become involved in future mission proposals to ensure that the aerobraking data is scientifically useful. At the time of writing, it is being debated whether to use the Mars Climate Orbiter aerobraking data in this way, providing me with a real motivation for learning these skills.

The broader goals of the summer school are also important to me. Scientific data does not just magically appear on my computer for me to study. To become a well-rounded planetary scientist I should understand the processes by which NASA decides:
1) What scientific questions are most important,
2) What instrumentation is required to answer these questions,
3) How a focused mission can balance time, financial, and scientific constraints to actually search for the answers, and hence pose new questions.

Some less tangible aspects of the summer school are also important. The opportunity to meet and get to know the young planetary scientists I will be working with in the near future, the lecturers I will be working for in the near future, and the JPL technical staff who turn tentative proposals into successful spacecraft is not one to be missed.