Additional discussion of the role of statisticians can be found in the following references:

Anon. (1988), "The Statistician's Role in Quality Management," *Quality Progress*, January 1988, 28-33.

Hoerl, R. W., Hooper, J. H., Jacobs, P. J., and Lucas, J. M. (1993), "Skills for Industrial Statisticians to Survive and Prosper in the Emerging Quality Environment," *The American Statistician*, 47, 280-292.

Hunter, W. G., (1981), "The Practice of Statistics: The Real World is an Idea Whose Time has Come," *The American Statistician*, 35, 72-76.

Snee, R. D., (1991), "Can Statisticans Meet the Challenge of Total Quality?" *Quality Progress*, January 1991, 60-64.

Tips for Beginning Consultants

Richard Browne
Director of Research
Texas Scottish Rite Hospital for Children
2222 Welborn Street
Dallas, TX 75219

- You don't have to be the *best*, just *good enough*. While you may not be the brightest or most knowledgable statistician you ever knew, that should not dissuade you from talking to potential clients. Consulting is not an awards ceremony, but a request by someone in need to get answers to certain questions. Often, the level of skill needed to solve the problems you will see is much less than you might imagine. Sometimes, you'll want to say, "Is that the whole problem??", but that may be a big problem to them. So, the issue is not whether you are the best, but whether you are good enough to do what is needed.

- Don't put yourself down when interviewing with a potential client. The client *wants* to believe that you can solve his problem, not that you are a modest and nice person. Conversely, don't exaggerate your talents to the extent that you can't make good on your claims. But it is far more common for new consultants to minimize their abilities, for whatever reason.

- Be *sure* you know what is needed and expected from you and from client before a meeting comes to an end. It is far better to sound a little dumb and get the facts nailed down than to act like you understand, when you don't. Confusion on the issues of who is doing what and by when can make for a quick disaster, despite all your hard work. They will more quickly forget that you asked a lot of questions and got very specific than that you spent valuable time and money coming up with excellent answers to the wrong questions.

- When talking to potential clients, look for the MAD (Money, Authority, Desire) person. If the person lacks any one of the three, you are likely wasting your time.

- When you are thinking about going into consulting full time, people will tell you that they would love to have you consult with them. Be aware that talk is cheap and some (most) will not pan out in the end (see the item above about the need to be talking with the MAD person). Incidentally, I have been in full-time consulting twice and this happened both times.

- You will get most of your clients by word-of-mouth recommendations, not slick advertising. If you need car repair, what do you do? You ask a friend who he/she thinks could do the best job of fixing the problem with your car. The same holds true even in the highest levels of business with regards to finding a consultant. You need to make yourself known by doing work, and doing it well. You would be better off to take a bunch of small jobs at first and do them well (and even lose money on them!) to just get your name out there as a can-do person.

- As a new consultant, you will be tempted to use the most sophisticated, high-sounding methods you can to impress your client. You may want to do that as part of your own closet analysis of the data. But before you present your report, find out what the level of statistical sophistication of your client *really* is. Be aware that many people have difficulty with anything more sophisticated than averages and percentages. You are so used to working with people in your field who are familiar with ridge regression, bootstrap methods, posterior distributions, etc., that you may forget how *little* the average person knows. In a class action employment discrimination suit, we used a very sophisticated linear model to prove our case. The opponent used averages and percentages. The judge said, "I understand what the other fellow said, but I don't understand what you said." As a result, the judge found for the other side. While the opponent's analysis might not have thrilled your major professor, it did the trick because it was pitched at the level of the person for whom it was intended. Be aware that you may need to illustrate percent and percent change in simple terms in your report so that you can be assured that you and the client mean the same thing when you use those terms. In other words, never assume any level of statistical sophistication in your client; check it out and be aware that vanity may cause them to pretend they understand, when they really don't.

- What your client says s/he wants and what s/he really wants are most often two different things. Clue: the reason a study was run (or is being suggested) is to make a decision or formulate a new strategy. The real goal or purpose may be veiled in the act of gathering a mound of statistics. For example, the client may say, "We want to tabulate some statistics (age, eduation level, etc.) on our customers, so we want to send out a survey." After talking at length with the client, it becomes apparent that the real question is whether the customers would react favorably or unfavorably to the future introduction of a new line of merchandise. Your recommendation then might be to scrap the proposed survey and send out a simple postcard-response survey asking what their reaction would be (never be afraid to ask the question point-blank; it saves a lot of second-guessing). The moral is to direct your investigation to *directly* answer the burning question of the day for your client.

- When you write up your report, include an Executive Summary (ES) as the first page. The ES should include a brief recap of the major problem, the primary findings of the study, and *most importantly* your recommendations as a result of those findings. What clients really want is a succint take-home message, one or two lines that give them the bottom line for the whole study. Quite often, clients aren't sure what to make of a large, complex study and, because they are not expert at data analysis, are looking for someone to pull it all together in a simple conclusion and recommendation. Even if they ultimately disagree with your recommendation, they will appreciate the fact that you didn't just leave them hanging with a bunch of numbers on endless pages. Remember, they are faced with a daunting problem and are looking for someone to lead the way. Otherwise, why did they hire you? Diplomacy is important, but wishy-washyness impresses no one.

- The ES should be less than a page, though a two-page ES is permissible. Most executives are very busy people and don't have time to read a 30-page report. In fact, most will ignore much of the report and just turn to the conclusions anyway. They presume you knew how to do the analyses and are not there to grade your report. The ES is highly desired as something quick and simple to refer to, rather than wading through 5 or 10 pages of conclusions. If you don't bother with an ES, don't be surprised if they ask for one, or ask, "So, what does it all mean, anyway?" You will look more professional by including an ES in the first place. In writing one, pretend you are on the elevator with the company president and s/he asks, "So, what did the study tell us of value, anyway?" You have 60 seconds or less to say it. What would you say? In academia, we tend to be verbose, whereas in industry brevity is much more appreciated.

The Business of Consulting

Richard Jarrett
Department of Statistics
University of Adelaide
Adelaide 5005 Australia

I have now run consulting units in two different Universities. From 1987-90, I ran the Statistical Consulting Centre at the University of Melbourne and, since 1991, I have run a group at the University of Adelaide. The comments below apply to my experience in Australia, and I would be interested to see whether they are similar to people's experience elsewhere.

In each case, the work has been a balance between external work and work within the University. My experience with a number of staff is that if you work a 35 hour week, then the work directly attributable to clients averages at about 25 hours a week. The rest "disappears" into various overheads — meetings, learning new computer software, refereeing papers, etc. Of those 25 hours, about 22 would generally be "chargeable," since some time is lost talking to potential clients who decline the offer of our services, or preparing tenders that are unsuccessful. The result is that, after allowing for holidays, conferences etc., there are about 1000 hours per year that can be billed to clients. As a rough rule of thumb, many organisations use an hourly charging rate that is the person's total cost for the year (i.e. salary plus other costs like superannuation, insurance etc.) divided by 500. Thus, if a staff member costs $50,000 per year, you would charge $100/hour or $700/day.

While this may appear excessive at first sight, the costs of office space, secretarial support, computing equipment, the non-chargeable time spent managing and promoting the service, all eat into that margin. (I recently heard the story that in legal firms, the rule often used is that each person has to earn three times their salary — one for themselves, one to run the office and one for the partners.) Many Universities take a percentage of the moneys earned externally, as a contribution towards their expenses in terms of professional indemnity, providing space, hiring staff, and managing payroll and other financial aspects of the service.

There are two points I would make here: (i) I believe it is unethical for Universities, or staff at those Universities, to use their situation to offer cheaper rates than bona fide statisticians who are working as private consultants. (ii) It is clearly untenable to charge these rates within Universities, since the capacity to pay is just not there. In a number of Australian