

Research, be it radiation therapy or imaging, requires manpower. In the past, clinical resources were relatively generous and significant research could be conducted using clinical funds. Decreased clinical resources means that research groups will need to develop funding strategies that involve extramural funding, generally divided in to corporate, foundation, and governmental funding.

Corporate funding can provide significant resources for research. The scope of such grants will span fundamental research to product development and evaluation. In most cases, corporate grants are closely tied to the company's profit goals and a good fit is essential to securing and maintaining funding. There is often a "marketing" component to the grant, in that the company benefits by keeping the grantee happy. However, this should not be construed as a rationale for the grant, nor should it be considered when determining the scope of work. Only the highest quality research and development will lead to a long-term grant relationship. Unlike governmental grants, a good personal relationship between the researchers and the company representatives is essential. Effective and regular communication will keep the projects on track and flexibility will often be required as technology develops and the company strategy changes. Corporate funding also tends to be less stable than governmental funding, first because it relies heavily on personal relationships, and second because the corporate environment can change rapidly. While it is less stable than governmental funding, it is often much easier to acquire. Corporate applications are typically much shorter than for governmental grants and a rigorous scientific approach and stellar scientific track record are not as important as for governmental grants.

Governmental grants, including from the National Institutes of Health, the National Science Foundation, and the Department of Defense, can provide a stable source of research support, but they typically require long, detailed applications as well as the development of a team of experts to meet the specific aims. These grants are very competitive and are peer-reviewed, so obtaining one of these grants is very valuable to a CV, and many universities have written or unwritten tenure guidelines that require the faculty member to be the principal investigator on a major government grant. While there are many sources of governmental funding, I will concentrate on the National Institutes of Health. The major investigator-initiated grant is called the R01, which has no specific limit on funding per year (although the rules change as the amounts increase), but typically has a maximum funding period of 5 years (with a 1-year extension if some funds remain uncommitted). The methods for submission, review, and funding of an R01 will be presented. Guidance for developing a plan to successfully submit a major grant, such as an R01 will be described.

This forum will allow aspiring researchers the ability to discuss these issues with Dr. Daniel Low, Director of Medical Physics and a Professor in the Department of Radiation Oncology at Washington University.

Dr. Low earned his Ph.D. in 1988 in the field of experimental Nuclear Physics from Indiana University and spent two years as a postdoctoral fellow at M.D. Anderson Cancer Center. In 1991, Dr. Low joined the faculty at Washington University in radiation

oncology physics at what was then the Mallinckrodt Institute of Radiology. Dr. Low spent the next 10 years developing his medical physics research skills before getting his first NIH R01. Since then, Dr. Low has been the PI on two additional R01s and an R21 and has coauthored more than 90 peer-reviewed publications. Dr. Low was instrumental in the clinical development of IMRT and is now engaged in research into modeling human breathing motion for purposes of radiation therapy treatment planning, imaging, and delivery, and the development of a small-animal experimental conformal irradiator, called microRT. Dr. Low is a member and fellow of the AAPM.

Educational Objectives:

- 1) Understand corporate grants, including pros and cons of corporate funding
- 2) Understand governmental grant submission, review, and funding processes
- 3) Be able to generate a plan for developing a funded research program