Approved by the Regents
May 15, 2008

PROMOTION RECOMMENDATION
UNIVERSITY OF MICHIGAN MEDICAL SCHOOL
DEPARTMENT OF RADIATION ONCOLOGY

James M. Balter, Ph.D., Associate Professor of Radiation Oncology, with tenure, Department of Radiation Oncology, Medical School, is recommended for promotion to Professor of Radiation Oncology, with tenure, Department of Radiation Oncology, Medical School.

Academic Degrees:

Ph.D.	1992	University of Chicago
B.S.	1986	Belmont Abbey College

Professional Record:

2002–Present	Associate Professor of Radiation Oncology, University of Michigan
1995-2002	Assistant Professor of Radiation Oncology, University of Michigan
1993-1995	Research Investigator, Department of Radiation Oncology, University of Michigan

Summary of Evaluation:

Teaching: Dr. Balter is well known to be an excellent teacher at both the departmental and national levels. His lectures and one-on-one teaching activities are very highly rated by medical and physics residents and graduate students. He was responsible for initiating the Clinical Physics Residency Program, one of only a few in the country. He has directed both the physics portion of the Radiation Oncology Residency Program and the Radiation Therapist physics course (through UM Flint). Dr. Balter has also been a major factor in the radiation physics graduate teaching program. He has been Ph.D. thesis advisor and/or thesis committee member for numerous Ph.D. students from the Nuclear Engineering and Radiological Sciences, and Electrical Engineering and Computer Science Departments, as well as supervising both undergraduate and graduate student research projects and fellowships. On the international scene, Dr. Balter is a very well regarded speaker at international meetings, workshops, and summer schools; he has organized programs at international scientific meetings and workshops, and has served as external examiner for Ph.D. candidates in Australia and Canada. He has also actively participated in committees involving education and training for both the American Society of Therapeutic Radiology and Oncology (ASTRO) and the American Association of Physicists in Medicine (AAPM). Dr. Balter is routinely invited to lecture at meetings and institutions throughout the world as a visiting professor.

Research: Since Dr. Balter's publication of his Ph.D. thesis research, his work has been at the forefront of radiation therapy research on patient positioning and patient motion, an effort which has now led to his current focus on developing an accurate model of the patient undergoing a course of radiation. Dr. Balter's early work helped make possible the routine clinical use of megavoltage imagers, which have totally replaced the use of portal films for positioning patients for radiotherapy. Careful study of these imaging results led Dr. Balter and his collaborators to the realization that patient motion during imaging and treatment can have a crucial impact on

treatment accuracy, and these studies have led to the recent development of Image-Guided Radiation Therapy (IGRT) techniques which are now being implemented throughout the country. In recent years, Dr. Balter has pioneered methods of building 4D models (including time) that incorporate motion and changes that occur during a course of treatment, replacing the static way radiation was planned on a single (static) CT image set taken before treatment started. Throughout all this time, Dr. Balter has been a crucial part of many externally funded projects, as principal investigator of several projects, and co-investigator of grants in portal imaging, and breast, liver, and pancreatic cancer. He has been a major part of the department's NCI program project grant (now in year 12) as co-investigator on various projects, as Core Leader, and currently as principal investigator of one of the two physics projects in the PPG.

Recent and Significant Publications:

Zeng R, Fessler J, and Balter J: 3D respiratory motion estimation from slowly rotating 2D-Xray projection Views. *Med Phys* 32:2095, 2005.

Balter JM, Wright JN, Newell LJ, Friemel B, Dimmer S, Cheng Y, Wong J, Vertatschitsch E, Mate TP: Accuracy of a wireless localization system for radiotherapy. *Int J Radiat Oncol Biol Phys.* 61(3):933-937, 2005.

Brock KK, McShan DL, Ten Haken RK, Hollister SJ, Dawson LA, Balter JM: Inclusion of organ deformation in dose calculations. *Med Phys* 30(3):290-295, 2003.

Brock KK, Hollister SJ, Dawson LA, Balter JM: Creating a 4D model of the liver using finite element analysis. *Med Phys* 29(7):1403-1405, 2002.

Litzenberg DW, Dawson L, Sandler H, Sanda M, McShan D, ten Haken R, Lam K, Brock K, Balter J: Daily prostate targeting using implanted radiopaque markers. *Int J Radiat Oncol Biol Phys* 51(Suppl 1):93, 2001.

Service: Dr. Balter has served on a number of departmental committees including resident and faculty selection committees. He created and then directed the Clinical Physics Residency Program for several years, and served on the UM Radiation Policy Committee for six years. Dr. Balter has served in numerous capacities for all the major national organizations of his specialty, including the American College of Medical Physics, AAPM, and ASTRO, where he is now head of the Physics committee.

Professional Work: Dr. Balter is a highly respected and effective clinical physicist. He is a highly sought after collaborator who has supported the academic productivity of many junior faculty members. He initiated and leads the technical part of the stereotactic radiation program, and has now expanded that to body stereotactic treatment. He has been responsible for many years for treatment imaging, CT imaging, and other clinical functional imaging and is a major strength to the clinical physics program.

External Review:

Reviewer A: "I would place James among the top 10% of his peers....He is one of the major leading figures in areas of research critical to the development of image-guided

radiotherapy, currently our most exciting area of research....James has also been a very active leader in clinical support and development, having initiated or implemented a wide variety of clinical advancements."

Reviewer B: "Dr. Balter is recognized internationally as an expert in the study of organ motion/deformation and the development of tools to control/account for these issues....He is certainly one of the best medical physicists in this country. I was in charge of the search for a new chief of medical physics at [my institution] several years ago. I tried, unsuccessfully, to recruit James..."

Reviewer C: "James is a very intelligent and highly motivated individual who is continuously interested in adding to his knowledge and learning new things. He is internationally recognized for his pioneering work and depth of knowledge in image-guidance in radiation therapy and is frequently invited to give scientific presentations on this topic....In summary, I strongly believe that Dr. Balter is fully deserving of the promotion to the rank of Professor based upon a level of accomplishment in science, teaching, and clinical contributions that is matched by few others in our field."

Reviewer D: "Dr. Balter has an excellent record of original contributions to image-guided radiation therapy (IGRT), quantitative analysis of medical images, and analysis of treatment deliver uncertainties. He is emerging at the national level as one of our leading researchers in the rapidly developing area of IGRT....In addition to his distinguished career as an extramurally-supported research scientist, he is an effective teacher, clinical physicist, and national leader."

Reviewer E: "Dr. Balter has an impressive academic record and is a well respected medical physicist.....over the past 15 years the advent of Intensity Modulated Radiation Therapy and more recently Image Guided Radiation Therapy have significantly change the clinical practice of radiation therapy. The University of Michigan has been an important leader in the development of these technologies, and Dr. Balter has been a major contributor to that success."

Summary of Recommendation:

Dr. Balter is a well known, highly regarded scientist and teacher. He plays a critical role in our growing clinical program in stereotactic radiation. He has been actively recruited to become the chief of radiation physics at a number of prestigious medical schools. By helping him develop a vision for Radiation Oncology Imaging here, we hope he can continue to develop his career and field within the Department of Radiation Oncology at the University of Michigan, rather than at another institution. I am pleased to recommend Dr. Balter for promotion to Professor of Radiation Oncology.

James O. Woolliscroft, M.D.
Dean
Lyle C. Roll Professor of Medicine

May 2008