

PROMOTION RECOMMENDATION  
UNIVERSITY OF MICHIGAN  
MEDICAL SCHOOL  
DEPARTMENT OF RADIATION ONCOLOGY  
DEPARTMENT OF RADIOLOGY

Yue Cao, Ph.D., associate professor of radiation oncology, with tenure, Department of Radiation Oncology, and associate professor of radiology, without tenure, Department of Radiology, Medical School, is recommended for promotion to professor of radiation oncology, with tenure, Department of Radiation Oncology, and professor of radiology, without tenure, Department of Radiology, Medical School.

Academic Degrees:

Ph.D.	1987	The Ohio State University
M.S.	1985	The Ohio State University
B.S.	1982	Peking University, Beijing China

Professional Record:

2008–present	Associate Professor of Radiation Oncology, University of Michigan
2003–present	Associate Professor of Radiology, University of Michigan
2003-2008	Associate Professor of Radiation Oncology (50% Instructional Track/ 50% Research Track), University of Michigan
1999-2003	Associate Professor of Radiology, Michigan State University
1994-1999	Assistant Professor of Medical Physics, Oakland University
1994-1999	Assistant Professor of Neurology, Case Western Reserve University
1993-1994	Assistant Professor of Radiology, University of Chicago
1991-1992	Instructor, Department of Radiology, University of Chicago

Summary of Evaluation:

Teaching: Dr. Cao is heavily involved in teaching at local, national and international venues. Her local teaching has primarily focused on training of students, residents, and postdoctoral fellows in imaging research. She has directly supervised the research of two Ph.D. students and served on the dissertation committee of a third, directed two master's dissertations, trained three postdoctoral fellows (with a fourth currently being supervised), directed the undergraduate research training for five students, and has directed clinically oriented research training for three physician residents and clinical fellows. She has taught in the imaging section of the radiation oncology residents' annual physics class. She has served as teaching faculty at a number of national and international venues. She has a unique area of expertise (functional imaging as a biomarker for radiation oncology, inclusive of specialized imaging and analysis techniques) that makes her a highly sought expert for teaching in her field, and as such, she has repeated her teaching courses for the American Association of Physicists in Medicine, Radiological Society

of North America, American Society of Radiation Oncology, and European Society of Radiation Oncology. Her typical time spent teaching encompasses approximately 15% of her effort in a year, and can be broken down into nine hours teaching residents MRI physics, three days teaching at national/international meetings, and one to two hours per day directly training students in research.

Research: Dr. Cao has been an extremely productive scientist during her tenure at the University of Michigan. She took a significant risk in accepting this position, as she had an established career in MRI research of stroke and migraine, with very highly cited contributions in both fields. Despite the orthogonal redirection of her research, she has rapidly gained significant prominence as a pioneering scientist in the area of imaging as a biomarker for cancer therapy. She has 65 peer reviewed publications, and approximately 15 review articles and book chapters. She has had a continuous record of extramurally funded research going back to 1994 as a principal investigator, and currently is the principal investigator/core leader on two NIH R01s, one R21 near completion, and a core on a program project grant, as well as co-investigator on projects of two program project grants and an additional R01. She has served on NDS-A study section of NIH as a permanent reviewer 2002-2007, and as ad hoc reviewer for NIH, DOD, Wellcome Trust (UK), Medical Research Council (UK), and Austrian Science Fund. She reviews manuscripts for 15 leading journals and has served as guest associate editor for *Medical Physics*. She has given invited symposia on her work at 13 national and international symposia and workshops in the past seven years, and has been invited as visiting professor to seven major institutions over this time.

#### Recent and Significant Publications:

Cao Y, Tsien CI, Sundgren P, Nagesh V, Normolle D, Buchtel H, Junck L, and Lawrence TS: DCE MRI as a biomarker for delayed radiation-induced neurocognitive dysfunctions. *Clinical Cancer Research* 15:1747-1754, 2009.

Cao Y, Pan C, Balter JM, Platt JF, Francis IR, Knol JA, Normolle D, Ben-Josef E, Ten Haken RK, and Lawrence TS: Liver function after irradiation based upon CT portal vein perfusion imaging. *Int J Rad Onc Biol Phys* 70:154-160, 2008.

Cao Y, Popovtzer A, Li D, Chepeha DB, Moyer JS, Prince ME, Worden F, Teknos T, Bradford C, and Eisbruch A: Early prediction of outcome in advanced head and neck cancer by tumor blood volume alteration during radiation therapy. *Int J Rad Onc Biol Phys* 72:1287-1290, 2008.

Cao Y, Tsien CI, Nagesh V, Junck L, Ten Haken R, Ross BD, Chenevert TL, and Lawrence TS: Survival prediction in high-grade gliomas by perfusion MRI prior to and during early stage of RT. *Int J Rad Onc Biol Phys* 64:876-885, 2006.

Cao Y, Nagesh V, Hamstra D, Tsien CI, Junck L, Ross BD, Chenevert TL, and Lawrence TS: The extent and severity of vascular leakage as evidence of tumor aggressiveness in high-grade gliomas. *Cancer Research* 66:8912-8917, 2006.

Service: Dr. Cao has directed her service efforts primarily at helping enhance the usefulness of imaging to cancer patients undergoing radiotherapy. In addition to her leadership of the imaging protocol committee and publication costs committees at the University of Michigan and significant effort directing the pioneering clinical MRI simulation project at Michigan, she has paved a new path through service efforts in national societies. Most notably, she founded, chaired, and continues to serve on the working group on imaging for treatment assessment of the American Association of Physicists in Medicine. Within this same society, she served on the therapy imaging subcommittee (three years), has recently (2009) created a task group on validation of software tools for quantitative DCE MRI, and has joined the ad hoc committee on quantitative imaging. She has extensively volunteered in the Sino-American network for Therapeutic Radiation Oncology (a major effort at US-China partnership with strong roots at the University of Michigan), serving as a founding board member and treasurer, with continuing board service. She actively participates in an alliance for quantitative imaging as a biomarker, a joint industry, academic, and professional society effort aimed at advancing imaging to test therapeutic effectiveness. She dedicates approximately 10% of her effort on service-related activities.

#### External Review:

Reviewer A: “She is a true example of what an academic medical physicist should be with research, teaching and service activities to the society....Dr. Yue Cao is a talented and productive scientist. It is likely that in the coming years, many more papers will come out of press as the result of her research activities.”

Reviewer B: “She is a true academic, constantly seeking clarity and assuring understanding before moving on to the next step....She is seen as an expert around the world on functional imaging, and quantitative imaging of response using MR imaging methods. She is arguably the leading response-assessment imaging physicist in the field of Radiation Oncology and her depth in imaging physics provides her with a unique capacity to push the field forward.”


Reviewer C: “Our field needs more scientists like Dr. Cao who can make bridges between advances in imaging and clinical care. Dr. Cao is certainly one of the nation’s leaders in this area of study. She’s certainly in the top 5% and 10% of scientists involved in using imaging to understand the effects of radiation on tumors and normal tissues.”

Reviewer D: “She has achieved national and international prominence for her research in developing imaging as a biomarker for early assessment and prediction of tumor response to radiation and adjuvant therapies. Other researchers frequently use her work and methodology.”

Reviewer E: “Yue has also been most generous in contributing to the local, regional, national and international scientific communities. She is active as a research mentor to many students and post-doctoral fellows. She has served tirelessly on numerous editorial and peer-review efforts on scientific manuscripts and grants. I note particularly that Yue has been instrumental in getting the Sino-American Network of Therapeutic Radiation Oncology (SANTRO) off the ground.”

Summary of Recommendation:

Dr. Cao is widely regarded as a leader in radiation oncology and radiological physics. I enthusiastically support her promotion to professor, with tenure, in the Department of Radiation Oncology, and professor, without tenure, in the Department of Radiology.



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James O. Woolliscroft, M.D.

Dean

*Lyle C. Roll Professor of Medicine*

May 2011