PROMOTION RECOMMENDATION

The University of Michigan
School of Public Health
Department of Biostatistics

Thomas Nichols, assistant professor of biostatistics, Department of Biostatistics, School of Public Health, is recommended for promotion to associate professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health.

Academic Degrees:

1992	B.S. in Mathematics and Statistics, Carnegie Mellon University
1997	M.S. in Statistics, Carnegie Mellon University
1999	Certificate of Completion, Center for the Neural Basis of Cognition Graduate Training Program, Center for the Neural Basis of Cognition, Pittsburgh
2001	Ph.D. in Statistics, Carnegie Mellon University

Professional Record:

2000	Assistant Professor of Biostatistics, School of Public Health
1999	NSF VIGRE Teaching Fellow, "Introduction to Statistical Reasoning", CMU Statistics
1996	Consultant Advisor on statistical and methodological problems in Positron Emission Tomography (PET) and Functional Magnetic Resonance Imaging (fMRI)
1992–1996	Applications Programmer and Statistician University of Pittsburgh Medical Center PET Facility

Summary of Evaluation:

Teaching - Professor Nichols is an excellent and versatile teacher. For the past three years, he has taken the main leadership role in the development of the introductory course Biostatistics 503 in the School of Public Health. This course has a very large and diverse student audience and strong leadership in development was urgently needed. Under Professor Nichols' leadership, rankings of the overall quality of the course have increased very substantially in recent years. He has also taught in our OJ/OC program, a core course to our residential masters students and also team teaches a course every other year on "Introduction to fMRI" where he has developed a statistical module. In all of these, Professor Nichols has received excellent student evaluations. He has also been very active and successful in graduate supervision. Two Ph.D. students have graduated under his supervision and he is currently supervising three others.

Research - Professor Nichols has a very focused research agenda in the very key area of statistical analysis of functional neuroimaging data. He has made major and internationally known contributions to statistical methods in the analysis of functional magnetic resonance images (fMRIs) and in Positron Emission Tomography (PET). He has also been very active as a speaker and organizer at international conferences in brain imaging where he has rapidly become a leader in the field. He has immersed himself in the science and he has worked as an integral member of research teams in the area. Professor Nichols publishes regularly in the neuroimaging literature in excellent journals including *IEEE Transaction on Medical Imaging*, *NeuroImage*, *Journal of Neuroscience Research*, and the *Journal of the American Medical Association*. Included in his publications are several articles that are joint with his Ph.D. students. The referees all comment quite specifically on the strength and the impact of his methodological work. He has also been very involved in developing software to implement the methods he has developed and this software is in wide use by researchers in the area.

In addition to a strong methodological record, Professor Nichols has also been very active in collaborative research with colleagues in the University of Michigan departments of psychology, biomedical engineering, radiology, psychiatry and nuclear medicine. In addition, he has ongoing collaborations with individuals at many other universities and research centers inside the U.S. and elsewhere. He has a very long list of collaborative papers that have arisen out of his scientific activities. Professor Nichols has been

very successful in obtaining research funding for his work. He holds a RO1 grant in support of his methodological work and he is an active collaborator in many other projects where he devotes effort and supervises GSRAs

Recent and Significant Publications:

KM Petersson, **TE Nichols**, J-B Poline and AP Holmes. Statistical limitations in functional neuroimaging II. Signal detection and statistical inference. *Philosophical Transactions of the Royal Society: Biological Sciences*, 354:1261–1281, 1999.

TE Nichols and AP Holmes. Nonparametric permutation tests for functional neuroimaging: A primer with examples. *Human Brain Mapping*, 15:1-25, 2002.

TE Nichols, J Qi, E Asma and RL Leahy. Spatiotemporal reconstruction of list mode PET data. *IEEE Transactions on Medical Imaging*, 21:396–404, 2002.

RL Albin, **TE Nichols** and KA Frey. Brain imaging to assess the effects of dopamine agonists on progression of Parkinson's disease. Letter to the editor. *Journal of the American Medical Association*, 288:311-312, 2002.

TD Wager and **TE Nichols**. Optimization of experimental sesign in fMRI: A general framework using a genetic algorithm. *NeuroImage*, 18:293–309, 2003.

WL Luo and **TE Nichols**. Diagnosis and exploration of massively univariate neuroimaging models. *NeuroImage*, 19:1014–1032, 2003.

TE Nichols and S Hayasaka. Controlling the family-wise error rate in functional neuroimaging: A comparative review. *Statistical Methods in Medical Research*, 12:419–446, 2003.

S Hayasaka and **TE Nichols**. Validating cluster size inference: Random field and permutation methods. *NeuroImage*, 20:2343–2356, 2003.

TA Leil, A Ossadtchi, **TE Nichols**, RM Leahy and DJ Smith. Genes regulated by learning in the hippocamupus. *Journal of Neuroscience Research*, 71 (6): 763-768, 2003.

S Hayasaka and **TE Nichols**. Combining voxel intensity and cluster extent with permutation test framework. *NeuroImage*, 23:54–63, 2004.

D Pantazis, **TE Nichols**, S Baillet and RM Leahy. A comparison of random field theory and permutation methods for the statistical analysis of MEG data. *NeuroImage*, 25:3830-394, 2005.

TE Nichols, M Brett, J Andersson, T Wager and J-B Poline. Valid conjunction inference with the minimum statistic. *NeuroImage*, 25:653–660, 2005.

Service - Professor Nichols has chaired the department's computing committee for the past four years and in this context has overseen the development of the department's computing facilities. He has also played a key role in the development of the department's web site. He has served as a member of an ad hoc committee to review the department's service course offerings (the 500 series of courses) and has done much to develop the introductory courses (Biostatistics 503 and 553). He also serves as a member of the admissions committee. Professor Nichols has served as the representative from biostatistics to the SPH computing committee for the past four years where his broad knowledge of computing issues has been very valuable. He also serves as a member on the OVPR's Operations Committee of the fMRI lab. Externally, Professor Nichols has served as Vice President and now President of the Ann Arbor Chapter of the American Statistical Association. He is a member of many national and international societies including American Statistical Association (ASA), Institute of Mathematical Statistics (IMS), International Biometric Society (ENAR), Organization for Human Brain Mapping, International Society for Magnetic Resonance in Medicine, and Sigma Xi. He has organized and participated in several workshops and short courses for various organizations and currently serves as the Chair of the Education Committee for the Organization for Human Brain Mapping.

External Reviewers:

Reviewer (A): "In my view, Dr. Nichols is one of the leading statisticians now working in the field of functional neuroimaging....He is well recognized in the field internationally and, despite his [generation], I would say he is already widely regarded as a leading authority on how statistics should be done in relation to fMRI." "A more senior post will further encourage and support him in his efforts to create a superb training and research center for imaging and genomic data analysis at the University of Michigan."

Reviewer (B): "I reiterate his national standing is unquestionable. Indeed, he has a clear international standing. He is widely liked by his peers and colleagues and commands great respect. It is of no surprise to see that he is chair of the Organisation of Human Brain Mappings Educational Sub Committee. The Organisation is very lucky to have him in this role."

Reviewer (C): "I believe that Dr. Nichols has shown himself to be an extremely effective scientist, educator, mentor, grantee, and institutional employee. Certainly a person with Dr. Nichols credentials and international reputation would be taken very seriously [at my institution] for consideration of tenure, and will be a significant asset to any university that rewards him as such."

Reviewer (D): "[Dr. Nichols] is an international figure of growing importance and his contributions thus far would be commensurate with a positive tenure decision at any institution in the world." "You should work hard to keep him."

Reviewer (E): "He has received widespread international recognition for his seminal work on the case for permutation resampling techniques applied to PET, fMRI & MEG (Nichols & Holmes, 2002, 2003,: Nichols & Hayasaka, 2003; Hayasaka & Nichols, 2003, 2004...). " "If his local institutional impact is anything like his impact within the field of functional neuroimaging, and I suspect it is, the University of Michigan is lucky to have him."

Reviewer (F): "I think you can see from my comments that Tom has an outstanding national and international reputation within his area of research. He is one of the trusted "gurus" of statistics in neuroimaging. He is always prominent at the annual Human Brain Mapping conferences, where he is often called on to organize, chair or present in sessions (he is a wonderful expositor)." "He is a huge asset to the neuroimaging community, to which he brings the expertise of a theoretical statistician combined with the gift of a great presenter."

Summary of Recommendation:

Since joining the department in 2000, Professor Nichols has been outstanding in all aspects of his work. He has a superb record as teacher and student mentor and is a contributor in many ways to the department, the profession and the University. We are very fortunate to have him as a member of the faculty as is noted by the external reviewers. His many abilities and rising reputation, especially in the high demand area of functional Magnetic Resonance Imaging, are attracting attention and make this promotion most appropriate. Given these achievements, it is with the support of the Department of Biostatistics, the Advisory Committee on Academic Rank and the Executive Committee of the School of Public Health that I recommend Thomas Nichols for promotion to associate professor of biostatistics, with tenure.

Kenneth E. Warner, Ph.D.
Dean, School of Public Health

May 2006