

PROMOTION RECOMMENDATION  
UNIVERSITY OF MICHIGAN MEDICAL SCHOOL  
DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY

Denise E. Kirschner, Ph.D., Associate Professor of Microbiology and Immunology, with tenure, Department of Microbiology and Immunology, Medical School, is recommended for promotion to Professor of Microbiology and Immunology, with tenure, Department of Microbiology and Immunology, Medical School.

Academic Degrees:

Ph.D.	1991	Tulane University
M.S.	1988	Tulane University
B.S.	1985	Tulane University

Professional Record:

2001-present	Associate Professor of Microbiology and Immunology, University of Michigan
2004-2007	Associate Professor of Biomedical Engineering, University of Michigan
1997-2001	Assistant Professor of Microbiology and Immunology, University of Michigan
1994-1997	Assistant Professor of Mathematics, Texas A&M University

Summary of Evaluation:

Teaching: Dr. Kirschner taught in and directed Microbiology and Immunology 301 for four years (1998-2001), a broad course in microbiology and immunology for undergraduate and some bachelor's level professional students. As well as presenting ten hours of lecture each year, she oversaw the organization and grading of the course. Under her direction, the number of students in the class increased steadily, reaching more than 50. At the same time, Dr. Kirschner developed course materials and taught graduate students in "Bacterial Pathogenesis." More recently, she has participated in the Infectious Disease small group sessions for M1 students for four years. This is a heavy commitment to teaching that involves about 30 hours meeting with groups of 30 M1 students over a five-week period. Additionally, she has developed a reading course for graduate students in "Mathematical Modeling of Infectious Diseases" and has contributed numerous individual lectures to multiple courses within the University. Dr. Kirschner has made great contributions in training graduate students and fellows in her own laboratory and in the greater community. Since her promotion to Associate Professor, she has had seven postdoctoral fellows in her laboratory. Four graduate students under her direction have received their Ph.D. degrees, and four more graduate students continue their training with Dr. Kirschner. Since her last promotion, Dr. Kirschner has served on nine dissertation committees.

Research: The work in Dr. Kirschner's laboratory concerns the relationship between infectious pathogens (*Helicobacter pylori*, *Mycobacterium tuberculosis*, or HIV) and the human host, focusing in part on persistent infections. Mathematical modeling is used to understand the

complex dynamic involved in host-pathogen interactions, together with how perturbations to this interaction (via treatment with chemotherapies or immunotherapies) can lead to prolonged or permanent health of the patient. The pathogen-host relationships are studied at multiple spatial and time scales, using both deterministic and more discrete, stochastic mathematical models. The results from these studies potentially have an impact on our understanding of the different disease trajectories seen in patients infected with persistent pathogens. This work has resulted in 29 senior-author publications, and six co-authored publications, in peer-reviewed journals since her last promotion. Her excellence in research is recognized nationally and internationally: Dr. Kirschner serves as Editor-in-Chief of the top journal in her field (*The Journal of Theoretical Biology*). She has received numerous invitations to serve as a reviewer of manuscripts and of grant applications (about 20 since 2001). Dr. Kirschner presented 22 lectures at meetings or other institutions in 2004-2007. She was invited to contribute a "Hypothesis" paper with Martin Blaser in *Nature* (in press). Her work has received abundant support from the NIH.

#### Recent and Significant Publications:

Marino S, Sud D, Flynn J, Kirschner D: Differences in reactivation of tuberculosis induced from anti-TNF treatments are based on bioavailability in granulomatous tissue (in press for *PLoS Computational Biology* 2007).

Sud D, Bigbee C, Flynn JL, Kirschner D: Contribution of CD8+ T cells to control of *Mycobacterium tuberculosis* infection. *Journal of Immunology* 176(7):4296-4314, 2006.

Chang S, Linderman J and Kirschner D: A role for multiple mechanisms in the inhibition of MHC class II- mediated antigen presentation by *Mycobacterium tuberculosis*. *PNAS, USA*. 102(12):4530-4535, 2005.

Segovia-Juarez J, Ganguli S and Kirschner D: Identifying control mechanisms of granuloma formation during M. tuberculosis infection using an agent based model. *Journal of Theoretical Biology* 231(3):357-376, 2004.

Sullivan AD, Wigginton JE, Kirschner D: The co-receptor mutation CCR5 $\Delta$ 32 influences the dynamics of HIV epidemics and is selected for by HIV. *PNAS, USA* 98:10214-10219, 2001.

Service: Dr. Kirschner has a strong record of service within and outside the University. At the departmental level, Dr. Kirschner has served on several committees, notably for two years on the Appointments, Promotions, and Awards Committee (Chair, 2007) and on two faculty search committees. She has served on four fellowship/grant/awards review committees within the University, and has participated in several multi-faculty grant applications. Nationally, since 2004 Dr. Kirschner organized more than thirteen meetings or workshops in her research area. She has provided extensive service nationally in manuscript and grant review and has mentored several junior faculty both within and outside the University of Michigan.

#### External Review:

Reviewer A: "Dr. Kirschner has an exemplary service record on professional societies...a huge track record of mentoring of young trainees, and presence as a positive force

on many committees, locally, nationally, and internationally. She is a sought-after speaker at many venues.”

Reviewer B: “Dr. Kirschner is an enormously important scientist in the field of microbial pathogenesis and immunology because she is bringing new approaches to established problems that lead to new insights....By tirelessly promoting the value of mathematical modeling Dr. Kirschner is having a tremendous impact in many fields. I can only hope that there will be more like her since we need investigators with mathematical expertise in all fields. Hence, her mentoring efforts are particularly important at this time in helping to recruit and populate this field.”

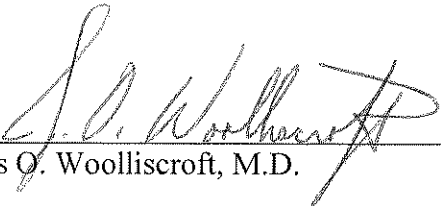
Reviewer C: “Denise is clearly the fount of modelling expertise for the TB community, and simultaneously the fount of TB expertise for the modelling community. The ability to earn such respect from two communities is a formidable achievement and marks Denise out as a leading player in systems biology.”

Reviewer D: “Denise is an excellent scientist and an outstanding colleague....I support Denise’s promotion with a great deal of enthusiasm. Her research program produces quality papers in excellent journals and addresses problems that are actively pursued by many different labs, so she is working right at the cutting edge of the field.”

Reviewer E: “Her trainees, both pre- and postdoctoral admire her tremendously and remain extremely loyal, a fact that signifies to me the care, effort and skill she exerts on their behalf. I know many of these trainees well and can vouch for the quality of their training and preparation for lives of scientific research.”

Summary of Recommendation:

Dr. Denise Kirschner is a highly recognized scholar both within and outside the University. She has been a consistent and conscientious contributor to the University in both teaching and service. She has an extensive list of publications and holds multiple leadership roles nationally and internationally. Dr. Kirschner’s excellence in teaching and research was recognized by the University in 2003, when she received the Henry Russel Award. I believe that she is very deserving of promotion to Professor of Microbiology and Immunology.



James Q. Woolliscroft, M.D.  
Dean

*Lyle C. Roll Professor of Medicine*

May 2008