

PROMOTION RECOMMENDATION
UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF MOLECULAR AND INTEGRATIVE PHYSIOLOGY

Santiago Schnell, Ph.D., associate professor of molecular and integrative physiology, without tenure, Department of Molecular and Integrative Physiology, Medical School, is recommended for the granting of tenure to be held with his title of associate professor of molecular and integrative physiology, Department of Molecular and Integrative Physiology, Medical School.

Academic Degrees:

D. Phil.	2003	University of Oxford, UK
License in Biology	1996	Universidad Simón Bolívar, Venezuela

Professional Record:

2008-present	Associate Professor of Molecular and Integrative Physiology, and Research Associate Professor of Computational Medicine and Bioinformatics, University of Michigan
2004-2008	Assistant Professor of Informatics, Indiana University

Summary of Evaluation:

Teaching: At the University of Michigan, Dr. Schnell developed and teaches the Computational Systems Biology for Physiologists (Physiology/Bioinformatics 520). The course is co-listed in the Molecular and Integrative Physiology Program and the Bioinformatics Program, and is offered to all graduate students on campus. This is a major teaching responsibility for which he has received excellent reviews from students. Students rate his teaching as excellent or outstanding; they also find his teaching style entertaining and a welcome break from the traditional style of graduate student teaching. Dr. Schnell also has lectured regularly in the Cellular Physiology (Physiology 577) and Organogenesis of Complex Tissues (CMB 681), where he has covered modeling approaches in cell physiology and developmental biology. He has also served as faculty in the Molecular and Integrative Physiology Student Seminar (Physiology 606). In addition to his computational systems biology course, Dr. Schnell has played a critical role introducing systems biology in the university campus by organizing the Systems Biology Journal Club and Systems Biology Symposium Series. He is co-directing the Physiology Undergraduate Summer Fellowship Program, which he partially supports through an educational NIH/NIDDK R25 grant. In his laboratory Dr. Schnell is supervising thesis research for four Ph.D. students, co-mentoring two MSTP students and one junior clinical scientist. He has also supervised several additional recent PIBS rotations and a medical student conducting summer research. In addition, he has served on two preliminary exam committees and six other thesis committees. Before coming to Michigan he successfully directed the thesis of three doctoral and five master students as well as mentored six postdoctoral researchers, the large majority have continued independent research careers within academia.

Research: Dr. Schnell's research deals with cellular physiology and biochemistry systems comprising many interacting components, where modeling and theory may aid in the identification of the key mechanisms underlying the behavior of the system as a whole. He currently focuses on discovering the mechanism of triggering protein misassembly in conformational diseases and the role of endoplasmic reticulum in the progression of diabetes. He is also using his model to identify key metabolic intermediates of cancer progression and key factors down regulating pattern formation in the villus and teeth development. In his early work he developed models of complex enzyme catalyzed reactions to measure kinetic parameters under diverse physiological conditions. He has been a pioneer in the development of computational and mathematical methods for modeling reaction inside the cells, which is a reaction environments characterized by a high macromolecular content. Subsequently, he turned his attention to investigate the protein misassembly reaction mechanism and ER stress signaling pathways, which occur in ER - an organelle with a high macromolecular content in the reaction environment. He has collaborations with multiple laboratories at the University of Michigan and elsewhere. His recently work on the threshold phenomenon observed during protein misassembly in conformation diseases was published as a cover article in the *Biophysical Journal* (20 April 2011) and has attracted considerable media attention. To this date, Dr. Schnell's research has led to 49 original research publications and 15 book chapters and reviews. He has been successful at competing for research grants and has held multiple grants from the NIH and NSF as well as grants from the Wellcome Trust. Currently he holds one NIH R25 grant, a James S. McDonnell 21st Century Fellowship Grant, and is a co-investigator on three faculty member's NIH grants. He holds two internal pilot grants and is mentor on a NIH 31 fellowship and on K23 Career Award. As evidence of his expertise and scientific stature he has been asked to serve on several NIH and NSF grant panels. Since 2002 he has been invited to give 26 presentations at international conferences and 25 seminar presentations on his research at other institutions.

Recent and Significant Publications:

Wyn ML, Kulesa P and Schnell S: Computational modeling of collective cell migration reveals mechanisms that sustain follow-the-leader chain behavior. *Journal of the Royal Society Interface*, in press 2012.

Sandefur CI, Schnell S: A model of threshold behaviour reveals rescue mechanisms of bystander proteins in conformational diseases. *Biophysical Journal* 100:1864-1873, 2011 (cover article).

Mourão MA, Srividhya McSharry JPE, Crampin EJ and Schnell S: MIKANA: Method for Inferring Kinetics and Network Architecture. *PLoS ONE* 6, e27534, 2011.

Srividhya J, Mourão MA, Crampin, EJ, Schnell S: Enzyme kinetics: from experiments to computational mechanism reconstruction. *Computational Biology & Chemistry* 34:11-18, 2010.

Schnell S: A model of the unfolded protein response: Pancreatic beta-cell as a case study. *Cellular Physiology and Biochemistry* 23:233-244, 2009.

Service: In the Department of Molecular and Integrative Physiology, Dr. Schnell has served on the Graduate Committee, Master Program Development Committee and Lecturer Search Committee. He represents the Department of Molecular and Integrative Physiology in the Faculty Allies Committee at the university. He has also been a significant contributor to the Department of Computational Medicine and Bioinformatics (Bioinformatics Program) and Center for Organogenesis. In the Bioinformatics Program, he has served on Curriculum and Graduate Affairs Committees. Outside the university he has provided service on NIH and NSF grant reviews and has reviewed grants for several international funding agencies. He is a member of the editorial board of four computational and mathematical biology journals. He also reviews manuscripts for a number of scientific journals. Dr. Schnell has organized or participated in the organization of 16 scientific conferences. Among the scientific conferences, Dr. Schnell is organizing the University of Michigan Systems Biology Symposium series. He has served in the Board of Scientific Counselors (Computational Toxicology Subcommittee) of the Environmental Protection Agency. He is currently serving on the board of directors of the Society for Mathematical Biology.

External Reviewers:

Reviewer A: "...Dr. Schnell is a rare scientist with expertise and a solid track record in physical and biological sciences, as well as mathematics and computing. This expertise allows him to contribute to, and in some cases lead, research programs in many different application areas. The national and international recognition that his work has received is apparent in his service as a member on several research funding review panels and as a reviewer for several highly regarded journals. In the past two years alone, he has published or submitted 10 research articles and several grant proposals. His publication record, federal research funding, and the attention his work has received at national meetings attest to the fact that Dr. Schnell has established himself as a recognized leader in his field."

Reviewer B: "Dr. Schnell has a high profile in his area of research and is internationally recognized....I have heard Dr. Schnell on several occasions at international conferences and workshops and can personally testify that his research presentations are excellent – clearly presented and of course based on first-rate science."

Reviewer C: "In terms of his number of publications, seminar talks, and, especially, conferences organized, Santiago's track recording [sic] is extraordinarily strong."

Reviewer D: "...he has been highly productive in a number of areas, with a number of publications in good journals and a quite impressive grant funding record."

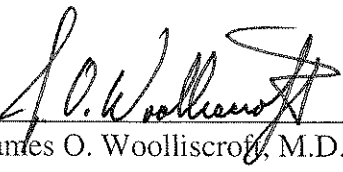
Reviewer E: "Dr. Schnell's contributions to the field are not limited to highly original research. One of his great and unique strengths is his ability to communicate between the working biologists and mathematicians. Schnell has written more than [a] dozen highly cited papers which provide comprehensive summaries, novel perspectives, and thought-provoking insights. I cannot emphasize more how important such scholarship is for the progress of an interdisciplinary

field. Too often and too many researchers are only working their narrow niches. Dr. Schnell shows true leadership and global perspective of biomedical science.”

Reviewer F: “I am impressed by the breadth of science and mathematics covered by his work, and by his energy and flexibility to collaborate with such a broad range of people....Santiago Schnell has the credentials to be a tenured professor at any major research university in the world. Michigan is fortunate to have him on its faculty...”

Summary of Recommendation:

Dr. Schnell exceeds on all fronts including teaching, research, and service. He is an outstanding citizen of the university and an essential collaborator. I enthusiastically support the granting of tenure to Santiago Schnell, Ph.D. to be held with his title of associate professor of Molecular and Integrative Physiology, Department of Molecular and Integrative Physiology, Medical School.



James O. Woolliscroft, M.D.

Dean

Lyle C. Roll Professor of Medicine

May 2012