

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Pharmacy

Anna A.S. Schwendeman, assistant professor of pharmaceutical sciences, Department of Pharmaceutical Sciences, College of Pharmacy, is recommended for promotion to associate professor of pharmaceutical sciences, with tenure, Department of Pharmaceutical Sciences, College of Pharmacy.

Academic Degrees:

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| PhD | 2000 | The Ohio State University, Columbus, OH                    |
| BS  | 1994 | Moscow Institute of Physics and Technology, Moscow, Russia |

Professional Record:

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| 2015 – present | Assistant Professor, Department of Pharmaceutical Sciences, College of Pharmacy, University of Michigan      |
| 2012 – 2015    | Research Assistant Professor, Department of Medicinal Chemistry, College of Pharmacy, University of Michigan |
| 2009 – 2011    | Head of Protein Manufacturing, Cerenis Therapeutics, Ann Arbor, MI   |
| 2006 – 2011    | Senior Director, Pharmaceutical Sciences, Cerenis Therapeutics, Ann Arbor, MI                                |
| 2004 – 2005    | Associate Research Fellow, Pfizer Global Research and Development, Ann Arbor, MI                             |
| 2003 – 2004    | Director, Pharmaceutical Sciences, Esperion Therapeutics, Ann Arbor, MI                                      |
| 2002 – 2003    | Research Investigator, Pharmaceutical Sciences, Esperion Therapeutics, Ann Arbor, MI                         |
| 2000 – 2002    | Scientist, Formulations, Esperion Therapeutics, Ann Arbor, MI  |

Summary of Evaluation:

Teaching: Professor Schwendeman is a very committed teacher and an outstanding mentor. She teaches classes for PharmD students as well as graduate students, bringing innovative teaching methods that engage students in learning the science that drives biopharmaceutical product formulation, development, and approval. Her scientific inquiry and innovation translates into the classroom where she has also given guest lectures on biopharmaceutical manufacturing, biosimilar analysis, and regulatory requirements for clinical drug development and approval in the Departments of Chemical Engineering, Biophysics, Chemistry, Pharmaceutical Sciences, and Medicinal Chemistry. Professor Schwendeman has received excellent student ratings averaging 4.64 on a 5-point scale. Professor Schwendeman also contributes to our teaching mission through her participation in establishing and implementing a new curriculum for the college's revised BS in pharmaceutical sciences program. Professor Schwendeman has been both an advisor and a mentor to at least 35 undergraduate, graduate, and post-doctoral students in her research group. Not only does she direct their research projects, but she has implemented a rich publishing and grant writing culture with a writing club for members of her group. This activity has led to improved research productivity and to the many awards and grants that her students have received.

Research: Professor Schwendeman is an outstanding scientist and has established a vigorous research program to develop and understand the pharmaceutical properties of synthetic high-density lipoproteins (HDL) products, and translate them to the clinic. She has made key contributions to the field of nanomedicine with application to atherosclerosis/cardiovascular disease, cancer, lupus, and infectious disease. Her ability to develop collaborations with medical school faculty is impressive and makes possible the translational aspects of her research. Professor Schwendeman has been successful in obtaining extramural funding--\$3.6 million in direct funds since 2012 from NIH, the American Heart Association (AHA), FDA, and other sponsors. She has published 34 articles in high impact journals (25 total articles with 12 as corresponding author since starting at UM in 2012). She has 755 citations (Google Scholar) with an h-index of 13. In addition, she has filed 18 patents and co-authored 16 regulatory submissions. She has given numerous invited lectures, co-organized conferences, and chaired sessions at national and international meetings. She received the AHA Scientist Development Grant and is the winner of a translational science competition (Biomedical Innovation Shark Tank).

Recent and Significant Publications:

- Schwendeman A, Sviridov DO, Guo Y, Yuan W, Morin EE, Yuan Y, Stonik J, Freeman L, Ossoli A, Thacker S, Pryor M, Killion S, Chen YE, Turner S, Remaley AT. The effect of phospholipid composition of reconstituted HDL on its cholesterol efflux and anti-inflammatory properties, *J. Lipid Res*, 56 (9), 1727-1737 (2015).
- Tang J, Li D, Yuan W, Drake L, Morin EE, Deschaine S, Ackermann R, Olsen K, Smith DE, Schwendeman A. Influence of apolipoprotein A-I peptide lipidation and administration route on pharmacokinetics and ability to mobilize cholesterol, *J. Lipid Res*, 58(1):124-136 (2017).
- Tang J, Kuai R, Yuan W, Moon JJ, Schwendeman A. Effect of size and pegylation of liposomes and peptide-based synthetic lipoproteins on tumor targeting, *Nanomedicine: NBM*, 13(6), 1869-1878, (2017).
- Kuai R, Ochyl LJ, Bahjat KS, Schwendeman A, Moon JJ. Designer vaccine nanodiscs for personalized cancer immunotherapy. *Nature Materials*, (2016).
- Pisupati K, Tian Y, Okbazghi S, Benet A, Ackermann R, Ford M, Saveliev S, Hosfield CM, Urh M, Carson E, Becker C, Tolbert TJ, Schwendeman SP, Ruotolo BT, Schwendeman A. A multidimensional analytical comparison of Remicade and the biosimilar Remsima, *Anal Chem*, 89(9), 4838-4846 (2017).

Service: Professor Schwendeman is an outstanding citizen of the College of Pharmacy and her profession. In addition to serving on several committees, she serves as a faculty diversity ally for Pharmaceutical Sciences, helping to increase program diversity. Professor Schwendeman is currently a member of six professional societies. She is recognized as a leader in her field, serving as an associate editor for *Nanomedicine: nanotechnology biology and medicine* (since 2016) and as an editorial board member for the *Journal of Pharmaceutical Sciences*. She is a reviewer for grant proposals (NIH, AHA) and student applications to the Cellular Biotechnology Training Program and Post-Baccalaureate Research Education for underrepresented minorities programs. She also reviews manuscripts for several prestigious journals. Professor Schwendeman co-organized sessions on biosimilars at the FDA Product Quality Research Institute Conference in 2015 and the NanoDDS 2017 Conference held in Ann Arbor, which was very well received by over 300 participants.

### External Reviewers:

Reviewer A: “The breadth and depth of Dr. Schwendeman’s research is impressive and it is clear that she has a strong ability to establish collaborations with experts having complementary expertise...Academic scientists that are able to communicate and collaborate effectively with industry are needed as a means to bridge the often wide gap between academia and industry. In this way, Anna’s laboratory also provides an excellent environment for the training of our next generation of scientists, whether they be interested in academia or industry...”

Reviewer B: “Dr. Schwendeman made key contributions to this literature and furthered our understanding...Dr. Schwendeman’s expertise and accomplishments have been well-recognized in the field as evidenced by her invitation to present her research at a number of national and international conferences...Dr. Schwendeman has trained an impressive number of graduate students, postdoctoral fellows and visiting scholars...Dr. Schwendeman’s willingness to devote time and resources to the training of these early career scientists is a testament to her dedication to science education...Dr. Schwendeman has been a highly productive academician, excelling at research and education.”

Reviewer C: “The description of her course PharmSc 706 ‘Biopharmaceutical Products’ sounds like a class I would like to see my own students take—the idea of a research project where students carry out diligence like a venture capital firm reviewing an investment opportunity sounds like an excellent approach to both stimulate students’ interest and teach them a variety of important scientific and practical concepts...Her efforts are reflected in a number of awards to her trainees...Dr. Schwendeman’s research program has been greatly influenced by her extensive industry experience and desire to see academic research moved to clinical translation and patient impact...Her research program resides in an important and impactful niche.”

Reviewer D: “...her performance is nothing short of spectacular...it is clear to me that Prof. Schwendeman is one, if not the leading experts in the world on the production and application of reconstituted HDL particles... her publication in the flagship journal *Nature Materials* is a true breakthrough...her peers as well as experts in her field appreciate her innovative and creative research...her outreach effort with the Detroit Pre-College Engineering Program...struck me as an indication for a true commitment to both diversity and service...She is a natural leader with strong motivation and drive...”

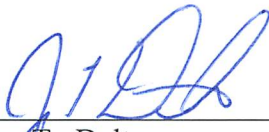
Reviewer E: “Professor Schwendeman has contributed significantly to the field of drug delivery and pharmaceuticals through her innovative formulations that are specifically designed for translation for therapeutic applications...By any measure, this is a highly productive career...I rate Professor Anna Schwendeman at the very top of the drug delivery scientists.”

Reviewer F: “She has been very productive in developing collaborations with other scientists in several different fields to advance her research ideas as well as contributing to other people’s ideas...Dr. Schwendeman’s service activities are in outstanding category...She is actively reviewing manuscripts for various prestigious journals...She provided her students with not only research training but also assistance in how to write manuscripts, poster presentations, and grant proposals. Because of her excellent method of training students, many of her students received

fellowships from training grants and foundations as well as internships in pharmaceutical and biotechnology companies...Dr. Schwendeman has been very productive with an upward trajectory to success.”

Summary of Recommendation:

Professor Schwendeman is an outstanding scientist and dedicated teacher, mentor, and citizen of his profession. It is with the support of the College of Pharmacy Executive Committee that I recommend Anna A.S. Schwendeman for promotion to associate professor of pharmaceutical sciences, with tenure, Department of Pharmaceutical Sciences, College of Pharmacy.



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James T. Dalton  
Dean, College of Pharmacy

May 2018