

Approved by the  
Regents  
May 21, 2015

PROMOTION RECOMMENDATION  
THE UNIVERSITY OF MICHIGAN  
MEDICAL SCHOOL  
DEPARTMENT OF BIOLOGICAL CHEMISTRY

Aaron C. Goldstrohm, Ph.D., assistant professor of biological chemistry, Department of Biological Chemistry, Medical School, is recommended for promotion to associate professor of biological chemistry, with tenure, Department of Biological Chemistry, Medical School.

Academic Degrees:

Ph.D.	2001	Duke University
B.S.	1995	Pennsylvania State University

Professional Record:

2008-present	Assistant Professor of Biological Chemistry, University of Michigan
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Summary of Evaluation:

Teaching: Dr. Goldstrohm has excelled in teaching as well as research. During the past six years, he has taught in the Biological Chemistry Critical Analysis 597 course for first and second year Biological Chemistry Ph.D. students. From 2010-present, he has taught in Biological Chemistry 415/515, Introductory Biochemistry. He has also taught in BiolChem 650, Mechanisms of Eukaryotic Gene Expression. In 2011, Dr. Goldstrohm was the course director for Cell and Molecular Biology 630, and in 2014 has become the course director for BiolChem 415/515. Dr. Goldstrohm has received well above average teaching evaluations in all of his teaching roles demonstrating that he is an effective teacher in the department. In addition to classroom teaching, Dr. Goldstrohm does a superb job of mentoring. He has mentored seven graduate students and one post-doctoral fellow, as well as four undergraduate students doing a rotation in his lab. Dr. Goldstrohm has served on 25 thesis dissertation committees. Dr. Goldstrohm is always available to fellow scientists for advice, help in operating equipment and taking care of shared equipment. In short, he is a model departmental citizen.

Research: Dr. Goldstrohm's overall goal is to identify the mRNAs that PUF proteins regulate and determine the molecular mechanism of repression. His research is employing a combination of biochemistry, genetics, and high throughput assays in multiple model organisms including yeast, Drosophila and human cells. Importantly, the repertoire of deadenylases is greatly expanded in higher eukaryotes. Dr. Goldstrohm is exploring the function of deadenylase, Nocturnin, which is involved in control of metabolism and obesity. His work uses innovative assays to study how Nocturnin's activity is controlled and identify the mRNA's that it targets for regulation. This important work promises to provide significant insight into how gene expression is regulated post-transcriptionally to control metabolism. The results of this basic

research are anticipated to better human health and may make possible therapies that can treat the growing obesity epidemic. Dr. Goldstrohm's post-doctoral studies at the University of Wisconsin focused on PUF proteins that bind 3'UTR instability elements. It was known at the time, primarily from genetic studies, that PUFs regulate the stability of about 10-20% of all mRNA transcripts including those involved in development, stem cell proliferation and neurological functions. However, beyond their binding to 3'UTRs, it was not understood how PUFs functioned. To address this question, Dr. Goldstrohm developed high throughput yeast genetic and biochemical techniques that led to the discovery of a family of PUF interacting proteins that included deadenylases and decapping enzymes that process and degrade mRNAs. He then performed detailed biochemical work to characterize rather precisely how these PUF interacting proteins regulate the stability of specific model mRNAs. He found that a protein called Pop2p in yeast enables PUF to recruit a deadenylase to cleave poly A sequences, an RNA helicase to repress translation and a decapping factor that initiates the decay of specific mRNA targets. In short, the functions of deadenylation, decay and repression could be explained as being encapsulated in a single multi-protein complex. This model of PUF action has become the paradigm for explaining the functioning of many other regulatory proteins that operate by binding to various sequences in the 3'UTRs. Thus, it is important to note that this mechanistic understanding of how PUFs function has broad implications in biology and medicine. Between 2000 and 2014, Dr. Goldstrohm published 17 peer-reviewed articles in well-refereed scientific journals including the *Journal of Biological Chemistry*, *Molecular Cell Biology*, and *Genetics*. Six of those papers represent work wholly conducted at Michigan and on which he is the corresponding author. These scholarly contributions to the gene expression field are being recognized by an increasing number of speaking invitations. Most recently, in July 2014, Dr. Goldstrohm presented an invited talk at the FASEB conference on Post-Transcriptional Control of Gene Expression in Big Sky, Montana. In May 2013, he spoke at the University of Texas. Dr. Goldstrohm has given multiple international talks as well, including one in Spain in 2009 and another in Singapore in 2012.

#### Recent and Significant Publications:

Blewett N, Collier J, Goldstrohm A: A quantitative assay for measuring mRNA decapping by splinted ligation reverse transcription polymerase chain reaction: qSL-RT-PCR. *RNA* 17:535-543, 2011.

Weidmann C, Goldstrohm A: Drosophila Pumilio protein contains multiple autonomous repression domains that regulate mRNAs independently of nanos and brain tumor. *Molecular and Cellular Biology* 32:527-540, 2012.

Nathan Blewett N, Goldstrohm A: An eIF4E binding protein promotes mRNA decapping and is required for PUF repression. *Molecular and Cellular Biology*. 32: 4181-4194, 2012.

Van Etten J, Schagat T, Hrit J, Weidmann C, Goldstrohm A: Human Pumilio proteins recruit the Ccr4-Not deadenylase to efficiently repress mRNAs. *Journal of Biological Chemistry* 287:36370-36383, 2012.

Weidmann C, Raynard N, Blewett N, Van Etten J, Goldstrohm A: RNA binding domain of Pumilio antagonizes poly-adenosine binding protein and accelerates deadenylation. RNA. In Press. June Epub, 2014.

Service: With respect to departmental service, Dr. Goldstrohm currently serves on the University of Michigan RNA Supergroup, the Biological Chemistry Seminar Series Committee, the Cellular and Molecular Biology Training Program, as organizer for the Department of Biological Chemistry Annual Retreat Committee and as a member of the Genetics Training Program Committee. He also has served on the Department's Chair Advisory Committee from 2010 to 2012.

External Reviewers:

Reviewer A: "I have many superlatives to describe Aaron below but I believe that his accomplishments are what truly demonstrate his intelligence, creativity, motivation, and ability to utilize these attributes toward discovery. The bottom line is that he is a major asset to the department and the institution."

Reviewer B: "The biochemistry and molecular biology in his papers is of excellent quality and suggest that his results will stand the test of time. As a result of this, he has clearly gained significant national recognition and has been asked to speak at conferences and university departments...I am impressed by the number of courses in which Dr. Goldstrohm has been involved, and his high level of research productivity is even more impressive in light of this!"

Reviewer C: "...I just heard him give a talk on his latest work at the recent FASEB meeting in Montana and thought it was one of the highlights of the meeting. In short, Aaron appears to be a rising star in the field of post-transcriptional regulation and I wholeheartedly support this promotion. I predict that you will be very pleased to have him as a 'permanent' colleague."

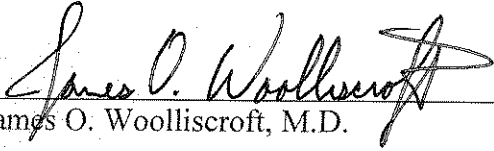
Reviewer D: "Dr. Goldstrohm is clearly a highly respected member of the RNA biology community, which is exemplified by his list of domestic and international invitations for oral presentations. In particular his invitations to present at two international meetings, the 2012 RiboClub Meeting and the 2014 FASEB Summer Conference on Post-transcriptional Control of Gene Expression are noteworthy and clearly demonstrate that Dr. Goldstrohm is regarded as a leader in the RNA biology field."

Reviewer E: "Aaron has demonstrated what to me has always been the major consideration when conferring tenure. Has he established an independent research program that has opened up new scientific directions and that promises to continue to be successful in the future? In Aaron's case there is no doubt the question is yes."

Reviewer F: "Dr. Goldstrohm's ability, and willingness, to find new and important areas for research give me confidence he has the creativity, and practicality, to continue to do innovative and significant work over a long career."

Summary of Recommendation:

Dr. Goldstrohm has made excellent progress as an independent investigator and is a superb academic citizen. He has performed well in research, teaching, and service. Accordingly, I am pleased to recommend Aaron C. Goldstrohm, Ph.D. for promotion to associate professor of biological chemistry, with tenure, Department of Biological Chemistry, Medical School.



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James O. Woolliscroft, M.D.

Dean

*Lyle C. Roll Professor of Medicine*

May 2015