

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF HUMAN GENETICS

Sundeep Kalantry, Ph.D., assistant professor of human genetics, Department of Human Genetics, Medical School, is recommended for promotion to associate professor of human genetics, with tenure, Department of Human Genetics, Medical School.

Academic Degrees:

Ph.D.	2001	Cornell University
B.A.	1993	Cornell University

Professional Record:

2009-present	Assistant Professor of Human Genetics, University of Michigan
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Summary of Evaluation:

Teaching: Dr. Kalantry has been a creative designer of novel didactic lectures, an inspirational leader of educational research seminar courses, and an energetic advocate for increasing the diversity of our trainee pipeline. He has taught lectures in graduate courses in molecular genetics and human genetics, HG541 and HG542, respectively. These are popular courses for graduate students in the Program in Biomedical Sciences (PIBS), as well as students in the School of Public Health, College of Engineering, and College of Literature, Science, and the Arts. He developed novel lectures based on the role of RNA as a regulator of transcription and the epigenetic regulation of transcription by histone modification, two very exciting areas of emerging biomedical science. He has participated in teaching HG803, which combines lecture and discussion designed to increase critical evaluation of the scientific literature in human genetics and genomics. Dr. Kalantry consistently scores in the excellent range. He taught PIBS 503, a discussion based course on research ethics, and he has been an inspirational leader in organizing and leading the Friday afternoon Seminar for Trainees (FAST). Post-doctoral fellows, graduate students post candidacy, and advanced undergraduates present their research in this forum. Under his leadership, attendance is higher than ever and the questions and answers are professional and scholarly. Dr. Kalantry is associate director of the Reproductive Sciences Pre-doctoral Training Program. This interdisciplinary program crosses schools and colleges and bridges fundamental discovery science with applied biomedical engineering and clinical research. The engagement of new faculty was critical for renewal of this NIH funded program. Finally, Dr. Kalantry is engaged in outreach activities with University of Michigan Flint, as part of our effort to increase the diversity of our student applicants.

Dr. Kalantry is a spectacular research mentor. He puts in a great deal of time and effort to nurture and guide the students. He has high standards for productivity and intellectual engagement. His 16 undergraduate, two graduate and four post-doctoral trainees have

impressive publication records and have easily landed placements in top tier programs for the next stages of their careers. His two Ph.D. students are expected to graduate this year. In addition, he has served on eight Ph.D. thesis committees for other graduate students and mentored eight additional rotation students. Evaluations by his current and former trainees are strongly enthusiastic.

Research: Dr. Kalantry's research focuses on epigenetic regulation of gene expression, a fundamental process that is critical for dosage compensation, i.e. silencing of one X chromosome in female mammals, and normal development of the embryo and extra-embryonic membranes. Dosage compensation was discovered nearly 60 years ago, and the paradigm for regulation of this process by long non-coding RNA molecules began to emerge nearly 15 years ago. This has been, and continues to be, a highly competitive field. Dr. Kalantry's work has shifted the established paradigm in a manner that will require textbooks to be rewritten. He demonstrated that neither of the two accepted RNA regulators are necessary for initiating the silencing of gene expression on an individual chromosome, and he has discovered a novel noncoding RNA that appears to play this role. Because his work has overturned prevailing views, there was a very high bar for proof. He has been productive, with 24 peer-reviewed publications, 13 of which have been completed since his appointment as assistant professor. His work is high impact. His h-index is 13, and it will rise as time permits citation of the innovative and important studies published in 2014 and 2015.

In addition to his productivity as an individual investigator, Dr. Kalantry has been an exemplary member of interdisciplinary scientific teams involving both internal and external collaborators. The mechanism whereby a noncoding RNA regulates selective expression from either a maternally or paternally inherited chromosome applies to other important biological processes such as selective expression of a single functional T-cell receptor in T lymphocytes, which are key players in the innate immune system. The RNA imaging techniques, embryonic tissue cell lines, and mouse strains that Dr. Kalantry has developed are invaluable for many research projects, and he has been generous in sharing the reagents and teaching individuals in their use, including temporarily hosting post-doctoral fellows in his lab for hands-on learning.

Dr. Kalantry has an impressive track record of continuous, external funding. He came with an NIH K99-R00 award, received prestigious awards from the Ellison Medical Foundation, March of Dimes Birth Defects Foundation, American Cancer Society, and NIH Director's Innovator Award (DP2). In addition, he has been successful in obtaining funding for a Ph.D. candidate through the NIH F31 individual NRSA mechanism. Additionally, he has competed successfully for internal pilot awards.

Evidence of broad recognition for Dr. Kalantry's work comes from invitations to speak at national and international venues, service on national (NIH, NSF, NIEHS) and international grant review panels (France, Netherlands, Canada), and extensive peer review, including for high profile journals such as *Nature*, *PLoS Genetics*, and *Human Molecular Genetics*. Of particular note are invitations to speak in the UK, Canada, India, the Burnham Institute in San Diego, and the Greenwald Symposium Keynote lecture at Kansas University Medical Center.

Recent and Significant Publications:

Maclary E, Buttigieg E, Hinten M, Gayen S, Harris C, Sarkar MK, Purushothaman S, Kalantry S: Differentiation-dependent requirement of *Tsix* long non-coding RNA in imprinted X-chromosome inactivation. *Nat Commun* 5:4209, 2014.

Cao Q, Wang X, Zhao M, Yang R, Malik R, Qiao Y, Poliakov A, Yocum AK, Li Y, Chen W, Cao X, Jiang X, Dahiya A, Harris C, Feng FY, Kalantry S, Qin ZS, Dhanasekaran SM, and Arul M. Chinnaiyan. The Central Role of EED in the Orchestration of Polycomb Group Complexes. *Nat Commun* 5:3127, 2014.

Gayen S, Maclary E, Buttigieg E, Hinten M, Kalantry S: A primary role for the *Tsix* lncRNA in maintaining random X-chromosome inactivation. *Cell Rep* 11:1251-1265, 2015.

Kang J, Lienhard M, Pastor WA, Chawla A, Novotny M, Tsagaratou A, Lasken RS, Thompson EC, Surani MA, Korolov SB, Kalantry S, Chavez L, and Rao A: Simultaneous deletion of Tet1 and Tet3 increases transcriptional variability in early embryogenesis. *Proceedings of the National Academy of Sciences of the United States of America*. 2015. PMID: 26199412.

Sarkar MK, Kumar S, Buttigieg E, Gayen S, Maclary E, Hinten M, Kumari A, Harris C, Sado T, and Kalantry S: XistAR, an Xist Activating Antisense RNA Required for X-chromosome Inactivation. *Nat Communications* Accepted Sept. 7, 2015. In press.

Service: Dr. Kalantry has been an exemplary citizen in the Department of Human Genetics and institutionally. Within the department, he has been an integral player in Ph.D. student recruiting and preliminary examination committees. He has chaired the computer advisory committee and contributed to improvements in the departmental website. He has served interdisciplinary Ph.D. training programs as well, including the preliminary exams for the Cellular and Molecular Biology Training Program. He serves as an associate director of the Reproductive Sciences Career Training program as well, which supports and trains students in several different schools and colleges institutionally.

External Reviewers:

Reviewer A: “Dr. Kalantry has published studies of the very highest quality and his findings are seminal advances for his field. Dr. Kalantry has provided extensive service to the scientific community in terms of international and national grant review panels, journal manuscript reviews, and institutional committees. He has also made very strong contributions to education, including the training of undergraduate students, graduate students, and postdoctoral fellows, serving on exam and dissertation committees and classroom teaching.”

Reviewer B: “Sundeep has been quite successful in getting support for his research from the NIH and from foundations including the American Cancer Society, the March of Dimes, the Ellison Medical Foundation, and the John Templeton Foundation. He obtained a prestigious ‘New Innovator’ award from the NIH. As indicated in the long list of invited presentations and seminars Sundeep is sought after as a speaker both in national and international

conferences...Based on his past accomplishments I trust that he will continue to be an innovative researcher and an inspiration to students.”

Reviewer C: “Dr. Kalantry’s research is of the absolute highest quality...His work has really set the standard of defining X-inactivation processes in early embryos and the insights garnered from his experiments are rigorous and compelling.”

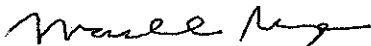
Reviewer D: “I am convinced that he will continue to open new avenues in our understanding of transcriptional regulation of the mammalian X-chromosome....It is clear, that even at an early stage of his career, Sundeep is making seminal contributions to his field and is emerging as one of the national leaders.”

Reviewer E: “Dr. Kalantry has quickly established himself as a leader in the field of X-inactivation...Dr. Kalantry’s work is attracting national and international attention as indicated by a growing number of invited seminars and platform talks and invitations to serve on national grant panes during the last few years.”

Reviewer F: “...his research is excellent in quantity and exemplary in quality. His recent publications provide clear directions for future work and thus a continued upward trajectory seems very likely. Dr. Kalantry would without doubt be promoted with tenure at my institution and I would recommend that you do the same. I will look forward to following his future work.”

Summary of Recommendation:

Dr. Kalantry is a productive scientist producing high impact, paradigm-shifting work in the field of epigenetic control of gene expression. He is an excellent teacher, and his track record for training undergraduates, graduate students and post-doctoral fellows is exemplary. I am pleased to recommend Sundeep Kalantry, Ph.D. for promotion to associate professor of human genetics, with tenure, Department of Human Genetics, Medical School.



Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

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