Approved by the Regents
May 21, 2020

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Biomedical Engineering

Deepak Nagrath, associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering and Medical School, is recommended for the granting of tenure to be held with his title of associate professor of biomedical engineering, Department of Biomedical Engineering, College of Engineering and Medical School [also associate professor of chemical engineering, without tenure, Department of Chemical Engineering, College of Engineering].

Academic Degrees:

Ph.D.	2003	Rensselaer Polytechnic Institute, Chemical Engineering, Troy, NY
M.S.	2000	Rensselaer Polytechnic Institute, Applied Mathematics, Troy, NY
B.E.	1992	Indian Institute of Technology Roorkee, Chemical Engineering, Roorkee, India

Professional Record:

2017 – present	Associate Professor (without tenure), Department of Biomedical Engineering, University of Michigan
2017 – present	Associate Professor (without tenure), Department of Chemical Engineering, University of Michigan
2009 – 2016	Assistant Professor, Department of Bioengineering, Rice University, Houston, TX
2009 – 2016	Assistant Professor, Department of Chemical & Biomolecular Engineering, Rice University, Houston, TX
2007 – 2009	Research Associate, Center for Engineering in Medicine, Harvard Medical School, Boston, MA
2003 – 2006	Post-doctoral Research Fellow, Center for Engineering in Medicine, Harvard Medical School, Boston, MA

Summary of Evaluation:

Teaching: Professor Nagrath is a committed instructor. Since joining Michigan in 2017, he has taught several different courses, and has made valuable contributions to both the undergraduate and graduate curricula. Most notably, he has introduced a new graduate course (Systems Biology of Human Disease) that is proving to be popular with senior undergraduate students and graduate students alike. He graduated six Ph.D. students in his previous position at Rice, and is currently advising four at Michigan. He has also mentored eleven post-doctoral researchers and numerous undergraduate and master's students in his laboratory. Student letters received describe Professor Nagrath as a caring and thoughtful teacher and mentor.

Research: Professor Nagrath works in the areas of systems biology and metabolic engineering, with primary focus in the metabolomics applied to both cancer and liver diseases. He has developed several novel analysis techniques allowing him to quantify how metabolic pathways in different parts of the tumor or tumor microenvironment interact with each other. His work on

ovarian cancer and the dysregulation of glutamine has impacted how we think about both cancer and cancer treatment. Professor Nagrath has over 45 publications with eleven of these appearing since joining the University of Michigan. Notably, he has steadily published a number of papers in high profile journals, including *Nature*, *Cell Metabolism*, *Nature Communications*, *eLife*, and *Cancer Research*. Because of the collaborative nature of this work, many of these manuscripts feature fairly large author lists, but Professor Nagrath has typically been senior or co-senior author. Professor Nagrath has been successful in raising research funds at Michigan. Currently, he has eight grants, three of which are R01s where he is the PI or MPI, and another R01 where he is a co-investigator. Professor Nagrath enjoys the respect and admiration of his peers and he is viewed as a leader in his field.

Recent and Significant Publications:

Alexandra Collin de l'Hortet, Kazuki Takeishi, Jorge Guzman-Lepe, Kazutoyo Morita, Abhinav Achreja, Branimir Popovic, Yang Wang, Kan Handa, Anjali Mittal, Noah Meurs, Ziwen Zhu, Frank Weinberg, Michael Salomon, Ira J Fox, Chu-Xia Deng, Deepak Nagrath, Alejandro Soto-Gutierrez, "Generation of human fatty liver using custom- engineered induced pluripotent stem cells with modifiable SIRT1 Metabolism,". *Cell Metabolism*, 2019, in press.

Han C., Lu X., Nagrath D., 'Regulation of protein metabolism in cancer," *Molecular and Cellular Oncology*, 2018; 5(5).

Zhen-dong Xiao, Leng Han, Hyemin Lee, Li Zhuang, Yilei Zhang, Joelle Baddour, Deepak Nagrath, Christopher Wood, Jian Gu, Xifeng Wu, Han Liang, Boyi Gan, "FILNC1, an energy stress-induced long non-coding RNA, inhibits Myc-mediated energy metabolism and renal tumor development," *Nature Communications*, 10/2017; 8(1).

Prasenjit Dey, Joelle Baddour, Florean Muller, Chia Chin Wu, Huamin Wang, Wen-Ting Liao, Zangdao Lan, Nikunj Satani, Andrea Viale, Haoqiang Ying, Di Zhao, Abhinav Achreja, Lifeng Yang, Edward Chang, Giannicola Genovese, Gulio Draetta, Anirban Maitra, Y. Alan Wang, Deepak Nagrath, Ronald RePhino, "Genomic deletion of malic enzyme 2 confers collateral lethality in pancreas cancer," *Nature*, 02/2017.

Ju HQ, Ying H, Tian T, Ling J, Fu J, Lu Y, Wu M, Yang L, Achreja A, Chen G, Zhuang Z, Wang H, Nagrath D, Yao J, Hung MC, DePinho RA, Huang P, Xu RH, Chiao PJ, "Mutant Kras-and p16-regulated NOX4 activation overcomes metabolic checkpoints in development of pancreatic ductal adenocarcinoma," *Nature Communications*, 02/2017.

Service: Professor Nagrath has a strong and sustained record of contributing to the broader research community. He is a reviewer for a large number of journals and he is frequently sought after as a grant reviewer by funding agencies. He is an editorial board member of *Cell Stress* and the associate editor in chief of *Cancers*. Additionally, he has served as a guest editor of several special issues, including one on Metabolic Flux Analysis in Methods in Molecular Biology. Lastly, he has been engaged in organizing conferences by serving as scientific advisory board members of national and international conferences and chairing sessions at the American Institute of Chemical Engineers (AIChE) annual meetings. In his relatively short time at Michigan, Professor Nagrath has provided service to BME as a member of the Faculty Search Committee, Graduate Education Committee, and ABET Certification Committee. He is also advisor for the Systems Biology and Biotechnology Corporation.

External Reviewers:
Reviewer A: "Dr. Nagrath has demonstrated clearly that he is an asset to the academic research community, with a solid record of publication and external funding. His research has been, and will continue to be, a valuable contribution to the biomedical engineering community."

Reviewer B: "He has developed a program that operates at the leading edge of the field. I am confident that he will continue to further expand his reputation as a leader in 'systems biology of cancer metabolism', be an exceptional researcher, colleague, mentor, and teacher and effectively contribute to the overall mission of your department and institution!"

Reviewer C: "I believe Deepak is already a leader in systems biology of human disease and with the increased appreciation of the complex networks that drive much of human biology he will be in a position to continue to lead in the field."

Reviewer D: "I strongly support Deepak's promotion to Associate Professor with tenure. He does rigorous and impactful work, publishes in high-profile journals, and is extremely well funded. He's clearly a rising star in the field and a true scholar."

Reviewer E: "We need more innovative researchers like Dr. Nagrath to be ready for the next generation of medicine, including precision and data-driven medicine."

Summary of Recommendation: Professor Nagrath is a passionate teacher, advisor, and mentor, who is making significant impact with his research. It is with the support of the College of Engineering Executive Committee that I recommend Deepak Nagrath for the granting of tenure to be held with his title of associate professor of Biomedical Engineering, Department of Biomedical Engineering, College of Engineering and Medical School.

Alec Gallimore

Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

Marschall S. Runge

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

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