

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF INTERNAL MEDICINE
DEPARTMENT OF CELL AND DEVELOPMENTAL BIOLOGY
MEDICAL SCHOOL AND COLLEGE OF ENGINEERING
DEPARTMENT OF BIOMEDICAL ENGINEERING

Jason R. Spence, Ph.D., associate professor of internal medicine, with tenure, Department of Internal Medicine, associate professor of cell and developmental biology, without tenure, Department of Cell and Developmental Biology, Medical School, and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering, is recommended for promotion to professor of internal medicine, with tenure, Department of Internal Medicine, professor of cell and developmental biology, without tenure, Department of Cell and Developmental Biology, Medical School, and professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering.

Academic Degrees:

Ph.D.	2006	Miami University, Oxford, OH
B.S.	2001	Canisius College, Buffalo, NY

Professional Record:

2017-present	Associate Professor of Biomedical Engineering, without tenure, University of Michigan
2016-present	Associate Professor of Internal Medicine, with tenure, University of Michigan
2016-present	Associate Professor of Cell and Developmental Biology, without tenure, University of Michigan
2012-2016	Assistant Professor of Cell and Developmental Biology, University of Michigan
2011-2016	Assistant Professor of Internal Medicine, University of Michigan
2011	Assistant Professor of Gastroenterology, Hepatology and Nutrition, Cincinnati Children's Hospital

Summary of Evaluation:

Teaching: Dr. Spence is extremely active in teaching and mentoring. He has provided a number of didactic lectures in Stem Cells in Organogenesis and Regenerative Medicine courses and through the Center for Organogenesis. He also participates in graduate class lectures for BIOMEDE 504: Cellular Biotechnology and BIOMEDE 584: Tissue Engineering and Regenerative Medicine. In 2019, he became the director of the NIH T32 training grant Training Program in Organogenesis T32-HD007505. In this role, Dr. Spence is responsible for ensuring that appointed graduate students and post-doctoral fellows obtain an appropriate training environment and career development. He considers his role as the director in the Training Program in Organogenesis and his textbook titled Human Pluripotent Stem Cell Derived Organoid Models, to be his most important teaching contributions. As the sole editor of this volume, it is geared towards scientists with expertise in cell culture and pluripotent stem cell culture that wish to implement advanced organoid methods, and for graduate students and post-doctoral fellows that want to gain an understanding and experience with organoid models. Additionally, Dr. Spence provides extensive laboratory based research mentoring for Ph.D. students, graduate students, visiting scholars and post-doctoral fellows. His trainees have been highly successful in obtaining fellowship funding, travel awards, publishing their work, and presenting at national and

international meetings. Dr. Spence also serves on several dissertation committees, and interviews prospective graduate students for the PIBS Program. He is committed to the training of future generations of scientists, and is a faculty member for the Program in Cellular and Molecular Biology. He also serves as a faculty mentor for the NIH training grants Training in Basic and Translational Digestive Sciences, and Tissue Engineering at Michigan.

Research: Dr. Spence's research focuses on stem cell regulation, formation of complex tissues, and human development. His studies have led to new fundamental knowledge of how pluripotent stem cells make decisions to become lung tissue, and have resulted in the development of lung and kidney organoids from aggregates of human pluripotent stem cells. Since his last promotion in 2016, he has authored over 40 peer reviewed publications which have been published in top-tier journals, including *eLife*, *Nature Cell Biology* and *Developmental Cell*. Dr. Spence has an extraordinary track record of obtaining extramural funding. He is currently the principal investigator of two major NIH grants as well as the lead co-principal investigator of the Chan Zuckerberg Human Atlas funding. He is also a co-investigator of ten additional NIH grants. Dr. Spence has been granted five patents in the last two years. Evidence of his international recognition can be seen in his extensive peer-review service for numerous journals and study sections, including National Institutes of Health Center for Scientific Review Lung Injury Repair and Remodeling section, and numerous invitations for extramural presentations. In 2018, he was awarded the University of Michigan Medical School Deans Award in Basic Science Research and he also became the H. Marvin Pollard Collegiate Professor of Gastroenterology.

Recent and Significant Publications:

Miller AJ, Yu Q, Czerwinski M, Tsai YH, Conway RF, Wu A, Holloway EM, Walker T, Glass IA, Treutlein B, Camp JG, Spence JR: In Vitro and In Vivo Development of the Human Airway at Single-Cell Resolution. *Dev Cell*. Apr 6;53(1):117-128, 2020.e6. Epub 2020 Feb 27.

Cruz-Acuña R, Quirós M, Huang S, Siuda D, Spence JR, Nusrat A, García AJ. PEG-4MAL hydrogels for human organoid generation, culture, and in vivo delivery. *Nat Protoc*. Sep;13(9):2102-2119, 2018.

Menon R, Otto EA, Kokoruda A, Zhou J, Zhang Z, Yoon E, Chen YC, Troyanskaya O, Spence JR, Kretzler M, Cebrián C. Single-cell analysis of progenitor cell dynamics and lineage specification in the human fetal kidney. *Development*. Aug 30;145(16), 2018.

Miller AJ, Hill DR, Nagy MS, Aoki Y, Dye BR, Chin AM, Huang S, Zhu F, White ES, Lama V, Spence JR: In Vitro Induction and In Vivo Engraftment of Lung Bud Tip Progenitor Cells Derived from Human Pluripotent Stem Cells. *Stem Cell Reports*. Jan 9;10(1):101-119, 2018. Epub Dec 14, 2017.

Hill DR, Huang S, Nagy MS, Yadagiri VK, Fields C, Mukherjee D, Bons B, Dedhia PH, Chin AM, Tsai YH, Thodla S, Schmidt TM, Walk S, Young VB, Spence JR: Bacterial colonization stimulates a complex physiological response in the immature human intestinal epithelium. *Elife*. Nov 7;6, 2017. pii: e29132.

Service: Dr. Spence serves as the director of the University of Michigan Translational Tissue Modeling Laboratory, which promotes research using human tissue models. He serves as the chair for the Center of Cellular Plasticity and Organ Engineering 2020 Symposium Committee and co-chair of the University of Michigan Human Pluripotent Stem Cell Research Oversight Committee. He is also a member of the University of Michigan O'Brien Kidney Center and the University of Michigan Center

for Organogenesis Steering Committee. Nationally, Dr. Spence is a member of the NIH Lung Injury, Repair and Remodeling study section and co-chair of an NIH-NIDDK steering committee. He is a co-organizer lead of the 2021 Organoids as Tools for Fundamental Discovery and Translation Keystone Symposium, and co-organizer for the 2020 AGA James W. Freston Conference: Gastrointestinal Organoids and Engineered Organ Systems. Dr. Spence has been invited to present 57 extramural lectures. He is also extremely active both nationally and internationally in peer-review service and is currently an associate editor for *Cellular and Molecular Gastroenterology and Hepatology* and *Molecular Biology of the Cell*.

External Reviewers:

Reviewer A: “Dr. Spence has an outstanding reputation in his field and is internationally recognized for his rigorous analyses of embryonic development and the generation of lung and GI derivatives from human induced pluripotent stem cells and the culture of organoids from biopsies. In this latter case, Jason has pioneered many of approaches that are currently followed by labs around the world. He has a set of skills that are not commonly evident and generates work of the highest quality...I believe the quality of the work he produces is exemplary and he is rigorous and self-critical in his analyses of the data generated from his lab. I believe this view is supported by the fact that he has been extremely successful in obtaining and maintaining funding throughout his career, including many recent successes...I believe that Dr. Spence meets the requirements for promotion to Professor with tenure at the University of Michigan.”

Reviewer B: “I am confident Dr. Spence is and will continue to contribute significantly to many missions at the University of Michigan as well as to the global developmental biology and human disease modeling communities...I am fully supportive of Dr. Spence’s promotion. His track record of both basic and translational research accomplishments and his collegiality make him a rising star in gastroenterology and other epithelial biology research. I am confident he will continue to make high impact discoveries and will be an asset to The University of Michigan and the global challenge to treat people with many diseases.”

Reviewer C: “Dr. Spence is one of the [junior] leaders in the organoid research field with a strong international reputation. One of his greatest assets, in my view, is his ability to cross disciplines. He singlehandedly devised novel ways to generate the intestine, lung and kidney organoids from aggregates of human pluripotent stem cells and, using these human *in vitro* model systems, has been studying the mechanisms underlying human organogenesis...His academic accomplishments, teaching and service are illustrative of a burgeoning academic star. I enthusiastically support his promotion to the rank of Full Professor and look forward to watching as he further distinguishes himself in our field.”

Reviewer D: “Jason is among the top 5 innovators in organoid technology and organoid technology as a core service in the world, so he clearly has achieved a critical metric for promotion to full professor, which is unequivocal international renown for his work...As an outsider, I have been envious of how lucky Michigan is to have Jason as a Core leader and a colleague! As for whether he would be likely to achieve equivalent rank here at [my institution], I would fully expect he would. We would happily take him! I am delighted to support Jason’s promotion.”

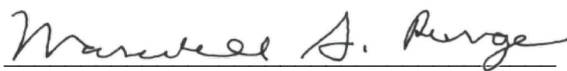
Reviewer E: “Jason is a highly innovative stem cell researcher and has made multiple seminal contributions to the intestinal stem cell field. I would certainly put him in the top 5% of all stem cell researchers and feel that he has emerged as a leader in stem cell biology as well as in the lung and GI cell biology fields...Jason has always been a highly collaborative researcher and is a real pleasure to interact with. His work has both broadened and deepened over the last 4-5 years...I have always

appreciated his rigor and thoroughness and have found him to be both a humble as well as insightful researcher. I am also impressed on how well funded Jason's lab is at this time...I believe that Jason truly deserves the promotion to Full Professor at the University of Michigan...He is selfless, committed, rigorous, and insightful and he brings an important facet of basic developmental biology to organ development and stem cell biology."

Reviewer F: "I regard [Dr. Spence] as one of the most talented and productive scientists in the field. In my opinion, he has continued to make impressive progress in publication, funding, teaching and service. I believe that he is most deserving of this promotion. Dr. Spence leads the field in the generation of human lung cells and intestine cells from hESCs and iPSCs...Dr. Spence continues to be exceptionally successful at obtaining funding. Indeed, the long list of his grants is unmatched in any funding climate. I expect that this is reflective of the strengths of his past work, the significance of his proposed research and his recognition in the field... I enthusiastic support of [sic] Dr. Spence's promotion to full professorship at University Michigan."

Summary of Recommendation:

Dr. Spence is internationally recognized as an expert in the area of the use of human pluripotent stem cells to generate novel human organoid models. He is a committed teacher and mentor, and is active in service at both the institutional and extramural levels. I am pleased to recommend Jason R. Spence, Ph.D. for promotion to professor of internal medicine, with tenure, professor of cell and developmental biology, without tenure, Medical School, and professor of biomedical engineering, without tenure, Medical School and College of Engineering.



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



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

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