

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

**Approved by the
Regents
May 21, 2015**

Andrew J. Putnam, associate professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering and Medical School, is recommended for promotion to professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering and Medical School.

Academic Degrees:

Ph.D.	2001	University of Michigan, Chemical Engineering, Ann Arbor, MI
M.S.	1996	University of Michigan, Chemical Engineering, Ann Arbor, MI
B.S.	1994	University of California, Chemical Engineering, Los Angeles, CA

Professional Record:

2014 – present	Director, Cellular Biotechnology Training Program, University of Michigan
2014 – present	Associate Chair for Graduate Studies, Department of Biomedical Engineering, University of Michigan
2009 – present	Associate Professor (with tenure), Department of Biomedical Engineering, University of Michigan
2009 – 2010	Adjunct Associate Professor, Department of Biomedical Engineering, Department of Chemical Engineering & Materials Science, University of California, Irvine, CA
2008 – 2009	Associate Professor (with tenure) Department of Biomedical Engineering, Department of Chemical Engineering & Materials Science, University of California, Irvine, CA
2003 – 2008	Assistant Professor, Department of Biomedical Engineering, Department of Chemical Engineering & Materials Science, University of California, Irvine, CA
2001 – 2002	Post-doctoral Fellow, Van Andel Institute, Grand Rapids, MI

Summary of Evaluation:

Teaching: Professor Putnam has made substantial contributions in teaching through the development of important new courses, strong didactic teaching, and the development of a sizeable research group that is producing well-trained graduate and post-doctoral fellows. At Michigan, Professor Putnam has taught four different courses, spanning larger introductory undergraduate courses to smaller, specialized graduate-level courses. In addition, he has mentored 12 Ph.D. students to completion, as well as 30 undergraduate research projects directed.

A major contribution by Professor Putnam to the undergraduate curriculum was his development BIOMEDE 350, Introduction to Biomedical Engineering Design. Professor Putnam also has taught the “Biotechnology and Human Values” section of the freshman-level ENGIN 100 Introduction. In terms of specialized classes, Professor Putnam has taught the undergraduate BIOMEDE 474 Tissue Engineering class and he developed and taught a new class at the graduate level: BIOMEDE 599 Mechanobiology. Instructor evaluations for all of these classes were high (4.3-4.9). It is clear that Professor Putnam has made a positive impact on the education of biomedical engineers at the University of Michigan.

Research: Professor Putnam has established a robust research program and he has advanced biomedical engineering in the sub-areas of mechanobiology and tissue engineering. Professor Putnam's research program has been highly productive in terms of publications and securing research funding. In the last six years, since his appointment, he has over 30 publications in high-quality, peer-reviewed journals, including the major journals in his sub-field, as well as more general scientific and engineering journals. Professor Putnam is currently the PI of two major NIH R01 grants, as well as the PI of the prestigious NIH Cellular Biotechnology Training Grant at Michigan, in addition to being a co-investigator on two additional NIH awards. The total current research funding in Professor Putnam's laboratory exceeds \$2.1M, excluding the training grant; his career total exceeds \$10M.

The overall focus of Professor Putnam's laboratory is to conduct both fundamental and applied research in the areas of cell and tissue engineering. Professor Putnam's group has made significant advances in several key areas, including identifying mechanisms by which matrix rigidity and mechanical strain regulate capillary morphogenesis; synthesis of an artificial extracellular matrix that can promote vascularization; and the engineering of functional capillary networks. He has more than 50 invited talks at universities in the U.S. and abroad, Gordon Conferences and other national and international meetings. Professor Putnam and his group have also consistently presented their research at the major conferences in their research area and have 80 abstracts and presentations.

Recent and Significant Publications:

- Y. P. Kong, B. Carrion, R.K. Singh and A. J. Putnam, "Matrix identity and tractional forces influence indirect cardiac reprogramming." *Scientific Reports*, 3, 3474 (2013).
- R. K. Singh, D. Seliktar and A. J. Putnam, "Capillary Morphogenesis in PEG-Collagen Hydrogels." *Biomaterials*, 34(37), 9331-40 (2013).
- S. J. Grainger, B. Carrion, J. Ceccarelli and A. J. Putnam, "Stromal Cell Identity Influences the *In Vivo* Functionality of Engineered Capillary Networks Formed by Co-Delivery of Endothelial Cells and Stromal Cells," *Tissue Engineering Part A*, 19(9-10), 1209-22 (2013).
- S. Kachgal, B. Carrion, I.A. Janson and A. J. Putnam, "Bone marrow stromal cells stimulate an angiogenic program that requires endothelial MT1-MMP," *Journal of Cellular Physiology*, 227(11), 3546-55 (2012).
- C. B. Khatiwala, P.D. Kim, S. R. Peyton and A. J. Putnam, "ECM compliance regulates osteogenesis via MAPK signaling downstream of RhoA and ROCK," *Journal of Bone and Mineral Research*, 24(5), 886-98 (2009).

Service: Professor Putnam has a significant record of academic, professional and community service. On the local level, Professor Putnam has served with distinction on all of the major service committees in his department. These committees range from undergraduate education and curriculum committees to graduate admissions and education committees. Professor Putnam has demonstrated his leadership skills in many of these committees where he often served as committee chair and recently headed the Graduate Admissions Committee. In response to his effectiveness in mentoring students and his willingness to serve, Professor Putnam has recently been chosen to lead the graduate studies program of the department as associate chair for graduate studies. At the university level, Professor Putnam has long participated in the Cellular Biotechnology Training Program (CBTP) Committee and is now the director of the CBTP. For his profession, Professor Putnam has been very active in the peer-review process and he is consistently requested to review original manuscripts from about 30 of the top journals in his field. Professor Putman also serves several professional societies and associations as a meeting planner and member of expert panels for the NSF and NIH.

External Reviewers:

Reviewer A: "I consider Andy to be a world leader in this research area, particularly related to mechanotransduction and vasculogenesis...I know from several of his previous trainees that Andy is a great advisor and mentor...I see him as continuing to be a leader in areas such as cellular microenvironments and vasculogenesis..."

Reviewer B: "I strongly believe that Dr. Putnam is doing research with superb quality and a high level of productivity. He has been able to select important problems and make strong scholarly impact."

Reviewer C: "Dr. Putnam has made significant, impactful, and creative scholarly contributions in his research field, particularly as they relate to [sic] role of matrix compliance...and matrix remodeling during vascularization, osteogenesis, and cellular reprogramming. Dr. Putnam is an international leader in the interplay of extracellular matrices and mechanobiology...In addition to his excellent scholarship, teaching and service record, Dr. Putnam is a wonderful colleague and an outstanding mentor."

Reviewer D: "...Dr. Andrew Putnam has established himself both nationally and internationally as one of the outstanding personalities [of his cohort] in the field of biomaterials and Tissue Engineering. He is highly respected, not only on account of his work on fundamental aspects of biology, such as extracellular matrix control of cellular functions and vascularization, but also for the application of his life science expertise to materials science and bioengineering, as well as the development of new biomaterial constructs, especially hydrogels, for tissue engineering."

Reviewer E: "Prof. Putnam has solidified a leading position in the experimental assessment of vasculogenesis in vitro...Prof. Putnam continues to be very productive in research and a substantial contributor to teaching and service. He has established himself as a leader in 'vasculogenesis in vitro' and every indication is he will maintain this position for many years."

Summary of Recommendation: Professor Putnam is clearly a valued member of our faculty. He excels in all areas – research, teaching, mentoring and service, and his efforts are recognized and valued both inside and outside of the University of Michigan. It is with the support of the College of Engineering Executive Committee that I recommend Andrew J. Putnam for promotion to professor of biomedical engineering, with tenure, Department of Biomedical Engineering, College of Engineering and Medical School.



David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering



James O. Woolliscroft, M.D.
Dean, Medical School
Lyle C. Roll Professor of Medicine

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