



Mariah Hahn

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**“Bioactive Materials
for Transitioning Cell
Phenotypes with
Chronic Vocal Fold
Scar.”**

Wednesday, Feb 18
312 EII Hall
11:45am – 1:00pm

*Refreshments will be
served*

ABSTRACT Success in tissue engineering of the vocal fold lamina propria extracellular matrix (ECM) for treatment of chronic vocal fold scarring demands an understanding of how cells integrate the signals presented from the scar microenvironment, in combination with the signals from the biomaterial scaffold, to alter their response. To date, approaches to biomaterial development for scarred lamina propria treatment have examined the response of “normal” (non-scar) vocal fold fibroblasts (VFFs) to the biomaterial. As a result, they have failed to capture cellular responses, from activated macrophages and from resident scar-tissue VFFs (also known as myofibroblasts), from the *in vivo* implant environment which critically impact the quality and rate of VFF ECM production. In the present work, we conjugate cytokines, previously identified as anti-fibrotic and/or immunomodulatory, to biocompatible poly(ethylene glycol) [PEGDA] hydrogel formulations shown to have mechanical properties which preserve mucosal wave activity with low average phonation threshold pressures. We demonstrate these biomaterials influence macrophage polarization – shifting activated macrophages from a pro-inflammatory phenotype to a phenotype that is anti-inflammatory and pro-healing—and shift myofibroblasts to a “normal” or anti-fibrotic VFF phenotype.

BIOGRAPHY Dr. Mariah Hahn is an Associate Professor of Biomedical Engineering at Rensselaer Polytechnic Institute (RPI). She received her B.S. in Chemical Engineering in 1998 from the University of Texas at Austin, from which she graduated with highest honors. She subsequently received her M.S. in Electrical Engineering in 2001 from Stanford University, and her Ph.D. in Electrical Engineering in 2004 from MIT. During her doctoral studies, Dr. Hahn performed research in vocal fold regeneration under Dr. Robert Langer, after which she conducted post-doctoral research in vascular tissue engineering under Dr. Jennifer West. Her current research program focuses on the development of scaffolds which promote bone, vocal fold, and vascular regeneration in the context of diseased or fibrotic environments. Dr. Hahn has received several awards in recognition of scientific achievement and mentoring. In particular, she was awarded the NSF CAREER Award for research in tissue regeneration and the American Heart Association National Scientist Development Award for coronary artery bypass graft research. She was also an invited participant at the 2010 National Academy of Engineering *Frontiers in Engineering* Symposium. Her work has been supported by NIH, NSF, American Heart Association (AHA), and institutional sources. With her students, postdoctoral fellows, and collaborators, Dr. Hahn has published approximately 47 peer-reviewed manuscripts since she began her faculty position in 2005.