

Biomedical Engineering

[Home](#)[About Us](#)[Research](#)[Prospective Students](#)[Current Students](#)[Faculty & Staff](#)[Calendar](#)[Employment](#)[McCormick Home](#)[Study Abroad](#)[MS in Biomedical & Environmental Engineering](#)[Home](#) > [Faculty & Staff](#) > [Core Faculty](#) > Core Faculty Profile

Core Faculty Profile

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Shu Q. Liu

Research Interests

- Cardiovascular regenerative engineering
- Formation of alpha actin filaments in smooth muscle progenitor cells
- Pattern formation of vascular smooth muscle cells

Selected Publications

Liu SQ. Bioregenerative Engineering: Principles and Applications. John Wiley & Sons, New York, March 2007.

"- A book introducing an emerging scientific discipline, addressing the engineering aspects of regenerative medicine, and covering the foundations, principles, and applications of molecular, cell, and tissue regenerative engineering in major organ systems."

1. Liu S. Q. **Focal activation of angiotensin II type 1 receptor and smooth muscle cell proliferation in the neointima of experimental vein grafts: relation to eddy blood flow.** *Arteriosclerosis, Thrombosis and Vascular Biology* 19: 2630-2639, 1999
2. Moore M. M., Goldman J., Patel A., Chien S., and Liu S. Q. **Role of mechanical stretch in the induction of vascular cell death.** *Journal of Biomechanics* 34:289-297, 2001.
3. Liu S. Q., and Goldman J. **Regulation of vascular smooth muscle cell migration by blood shear stress.** *IEEE Transactions on Biomedical Engineering* 48:474-483, 2001.
4. Liu S. Q., L. Zhong, and J. Goldman. **Control of the shape of a neointima-like structure by blood shear stress.** *Journal of Biomechanical Engineering* 124:30-36, 2002.
5. Li Y. C., Wei M., Kong J., Chen Z. F., Liu S. Q., and Cao L. P. **1,25-Dihydroxyvitamin D3 is a negative endocrine regulator of the renin-angiotensin system.** *Journal of Clinical Investigation* 110: 229-238, 2002.
6. Yang C., D. Tang, S. Q. Liu. **A multi-physics model with fluid-structure interactions for blood flow and restenosis in rat vein grafts.** *Computers and Structures* 81:1041-1058, 2003.
7. Goldman J., L. Zhong, S. Q. Liu. **Degradation of alpha actin filaments in vascular smooth muscle cells in response to mechanical stretch.** *American Journal of Physiology* 284:H1839-H1847, 2003
8. Liu S. Q., Tieche C., Tang D., and Alkema P. **Pattern formation of vascular smooth muscle cells subject to non-uniform fluid shear stress: Role of platelet-derived growth factor beta receptor and Src.** *American Journal of Physiology* 285:H1081-H1090, 2003.
9. Wei H. H., Waters S. L., Liu S. Q., and Grotberg J. B. **Flow in a wavy-walled**

- channel lined with a poroelastic layer. *Journal of Fluid Mechanics* 492: 23-45, 2003.
10. Liu S.Q., Tieche C., and Alkema P.K. **Neointima formation on elastic lamina and collagen matrix scaffolds implanted in the rat aorta.** *Biomaterials* 25:1869-1882, 2004.
 11. Tieche C., Alkema P.K., and Liu S.Q. **Arterial elastic laminae: Anti-inflammatory effects and potential application to arterial reconstruction.** *Frontiers in Bioscience* 9:2205-2217, 2004.
 12. Liu S. Q., Alkema P. K., Tieche C., Teft B. J., Liu D. Z., Sumpio B. E., Caprini J. A., Li Y. C., and Paniagua M. **Negative regulation of monocyte adhesion to arterial elastic laminae by signal-regulatory protein alpha and SH2 domain-containing protein tyrosine phosphatase-1.** *Journal of Biological Chemistry* 2005, 280:39294 - 39301, 2005
 13. Liu S. Q. **Molecular, cellular, and tissue engineering.** In *Encyclopedia of Disability*, edited by Gary Albrecht, Sage Publications, 2006.
 14. Goldman J., Zhong L., and Liu S. Q. **Negative regulation of vascular smooth muscle cell migration by blood shear stress.** *American Journal of Physiology* 292:H928-938, 2007.

Honors

- 1993, Best journal paper award, American Society of Mechanical Engineers
- 1994, Melville Medal, American Society of Mechanical Engineers
- 1998, Established investigator Award, American Heart Association
- 2000, Richard Skalak Best Paper Award, *the American Society of Mechanical Engineers*
- 2003, Featured articles (2), Association for Eradication of Heart Attack



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