

EDUCATION

Ph.D., Biomedical Sciences	Texas A&M University	2008
<i>Dissertation: Finding Simplicity in the Complex Systemic Arterial System: Basis of Increased Pulse Pressure.</i>		
M.S., Mechanical Engineering	Texas A&M University	2002
<i>Thesis: Design of high temperature high speed electromagnetic axial thrust bearing</i>		
B.S., Mechanical Engineering	Bangladesh University of Eng. & Technology	1998

RESEARCH INTERESTS

Biomedical Devices, Finite Element Application in Cardiovascular Physiology, Systemic and pulmonary Hemodynamics, Heart-Vascular interaction, Single Ventricle Physiology.

PROFESSIONAL EXPERIENCES

Associate Research Scientist 2008-Present
Physiology and Pharmacology, Texas A&M University

- Adjustable Pediatric Systemic-Pulmonary Artery (SPA) Shunt: Developing a device to balance cardiac output between pulmonary and systemic circulations, for patients with single ventricle physiology. Animal models and computational tools (distributed network and localized CFD) have been being developed to understand the hemodynamics. (Funded by AHA)
- Cardiovascular Biomechanics: Utilizing linear time-invariant computational tools of arterial and pulmonary system network to understand their interaction with heart, and cardiovascular devices. These tools predict hemodynamic parameters at different locations of the system.

Pre-doctoral Research Fellow 2003-2008
Michael E. DeBakey Institute, Texas A&M University

- Mechanics of heart-arterial system: Development of mathematical model of human cardiovascular system, successfully use to understand degeneration and adaptation of arterial system under different patho-physiological condition. The model results are verified with experimental data.
- LVAD-Arterial System simulation: Study of interaction of cardiac assist devices with the arterial system. Above mentioned model is used to understand system's adaptation to different abnormal situations, simulate patient-specific disease conditions, and determine patient selection criteria.
- Experimental microvascular rheology and reactivity: Role of pulse propagation in the micro-vessel hemodynamics is being studied with a unique unanesthetized bat-wing model in a non-invasive manner.

Michael E. DeBakey Undergraduate Mentor and Section Leader 2004-2007
Michael E. DeBakey Institute, Texas A&M University

- Involved in founding the Michael E. DeBakey Undergraduate Research Program to provide multidisciplinary research experience to undergraduate students.
- Led the cardiovascular modeling section of the undergraduate research program. Also, taught mathematical modeling and its application in arterial and microcirculation physiology.
- Assisted in development, and actively participated in four summer research programs (NSF-REU, NSF-RET, NSF-BBSI, and NIH-R25 for undergraduate students and teachers and mentored over 25 graduate and undergraduate students. The outcome led to seven (7) abstracts at national conferences and two (2) manuscripts in reputed peer-reviewed journals.

Graduate Research Assistant

2000 – 2002

Mechanical Engineering, Texas A&M University

- Designed, and prototyped a novel electromagnetic axial thrust bearing as a part of “Smart Structural Components for Increased Flight Speed, Safety and Capacity Using Magnetic Bearing and Active Vibration/Noise Control”. (Funded by NASA).

Graduate Teaching Assistant

2002 – 2003

Office of Dean of Engineering, Texas A&M University

- Graded assignments, homework, and recitation classes for Foundation of Engineering I and II

Instructor (Mathematical Modeling)

2006 – 2007

Michael E. DeBakey Institute, Texas A&M University

- Taught cardiovascular physiology basics and mathematical modeling of human arterial system and its coupling with ventricles of heart using MATLAB, Simulink and STELLA.

PROFESSIONAL CERTIFICATION

Recognized as an “Engineer-in-training”(EIT No. 36587) by the Texas Board of Professional Engineers, valid till 2014.

EXTRAMURAL GRANT

Preclinical development of the adjustable pediatric systemic-pulmonary artery shunt. *American Heart Association Post-doctoral Award. \$78,000. 2008-2010.*

INVITED PRESENTATION

Finding Simplicity in the Complex Systemic Arterial System: Basis of Increased Pulse Pressure. University of Illinois, Chicago, 01/2008.

HONORS & AWARDS

3rd position, Ideas Challenge Contest, Mays Business School, Texas A&M University. (2008)

International Education Award, International Students Services, Texas A&M University. (2006-07)

Graduate Merit Award, Dept. of Physiology and Pharmacology, Texas A&M University. (2005-07)

Honorable Mention, CVM Research Symposium, Texas A&M University. (2005)

Graduate Merit Scholarship, Mechanical Engineering, Texas A&M University. (2001)

PROFESSIONAL & OTHER ACTIVITIES

Session Judge, Student Research Week, Texas A&M University. (2004, 2006)

President, Bangladesh Students Association, Texas A&M University (2004-05)

Treasurer (2000-02), Bangladesh Students Association, Texas A&M University. (2000-02)

PUBLICATIONS (Undergraduate mentees are indicated by *)

Journal Articles

1. Quick CM, Mohiuddin MW, Laine GA, and Noordergraaf A. The arterial system pressure-volume loop. *Physiol Meas.* 2005 Dec; 26(6): N29-N35.
2. Mohiuddin MW, Laine GA, and Quick CM. Increase in pulse wavelength causes the systemic arterial tree to degenerate into a classical windkessel. *Am J Physiol Heart Circ Physiol*, vol. 293(2), H1164-H1171, Aug 2007
3. Widmer RJ, Laurinec JE*, Young MF, Mohiuddin MW, Laine GA, and Quick CM. The origin of the biphasic flow response to local heat in Skin. *Microcirculation*, 15(4): 349-357, May 2008.

4. Mohiuddin MW, Nguyen T*, Than NB*, and Quick CM. Interaction of the left ventricle and the systemic arterial system with an axial-flow LVAD. *IEEE Trans Biomed*, 2008. (In review)
5. Mohiuddin MW, and Quick CM. Re-evaluating the Augmentation Index. *Am J Physiol Heart Circ Physiol*. 2008 (In review)
6. Mohiuddin MW, Quick CM, Laine GA, Douglas WI. The Adjustable Systemic Pulmonary-Artery Shunt Provides Precise 2-Day Control of Pulmonary Blood Flow. (In preparation)

Conference Proceedings and Abstracts

1. Mohiuddin MW, Guyton B, Smith A, Lugo V, Shroder S, Quick CM. Pulse pressure as cause and effect of arterial compliance. 21st Annual Houston Conference on Biomedical Engineering Research, Houston, TX, February 12-13, 2004. *HSEMB* 21:150, 2004.
2. Mohiuddin MW, Quick CM, Desai KV, Rajagopalan S, Laine GA, Stewart RH. Collapsible behavior in non-collapsing vessels: implications for lymph flow. Experimental Biology 2004, Washington, DC, April 17-21, 2004. *FASEB J* 18: A657, 2004.
3. Mohiuddin MW, Quick CM. Concomitant increases in pressure, heart rate and arterial stiffness maintain pulsatile arterial load. Annual Fall Meeting Biomedical Engineering Society, Philadelphia, PA, October 13-16, 2004. *Proceedings*, Abstract #643, 2004.
4. Mohiuddin MW, Gilbert D*, Brown T*, Guevara N*, Browning J*, Stewart RH, Quick CM. The myogenic response regulates both shear stress and pulse wave transmission at arteriolar bifurcations. 22nd Annual Houston Conference on Biomedical Engineering Research, Houston, TX, February 10-11, 2005. *HSEMB* 22: 68-69, 2005.
5. Mohiuddin MW, Gilbert DR*, Meisner JK*, Quick CM. Novel means to characterizing microvascular biomechanics in vivo. Experimental Biology 2005, San Diego, CA, April 2-6, 2005. *FASEB J* 19: A729, 2005.
6. Mohiuddin MW, Quick CM. Pulsatile load of the heart is maintained despite simultaneous increase in heart rate and mild hypertension. Third Annual TAMUS Pathways Research Symposium, Kingsville, TX, November 4-5, 2005. *TAMUS* 3: 35-36, 2005.
7. Brown T*, Mohiuddin MW, Gilbert D, Guevara N, Browning J, Quick CM. Energy transmission during blood flow through arteries to capillaries is optimized by myogenic response. Third Annual TAMUS Pathways Research Symposium, Kingsville, TX, November 4-5, 2005. *TAMUS* 3: 40, 2005.
8. Zebda MA, Desai KV, Mohiuddin MW, Rohe SA*, Burlone MR*, Ranallo NL, Quick CM. Bridging strategies for modeling complex microvascular beds. Third Annual TAMUS Pathways Research Symposium, Kingsville, TX, November 4-5, 2005. *TAMUS* 3: 46, 2005.
9. Gilbert D*, Mohiuddin MW, Meisner JK*, Quick CM. In vivo characterization of biomechanical properties of microvasculature. Third Annual TAMUS Pathways Research Symposium, Kingsville, TX, November 4-5, 2005. *TAMUS* 3: 61, 2005.
10. Browning J*, Mohiuddin MW, Quick CM. An adaptive arterial system model integrating pulsatile hemodynamics and vascular remodeling. TAMU Student Research Week, College Station, TX, March 28, 2005. *TAMU SRW* 212, 2005. (1st Prize winner)
11. Mohiuddin MW, Nguyen T*, Quick CM. Model of axial-flow LVAD with pulsatile cardiovascular system. 23rd Annual Houston Conference in Biomedical Research, Houston, TX, February 9-10. *HSEMB* 23: 217, 2006.
12. Mohiuddin MW, Quick CM. Discovering Windkesselness in systemic arterial tree. 2006 Annual Fall meeting of the Biomedical Engineering Society, Chicago, IL, October 11-14, 2006. *Proceedings*, Abstract #1259, 2006.
13. Mohiuddin MW, Quick CM. Degeneration of systemic arterial tree. 24th Annual Houston Conference in Biomedical Research, February 8-9, 2007. *HSEMB* 24: 65, 2007.

14. Mohiuddin MW, Quick CM. Transformation of an arterial system into a Windkessel results in isolated systolic hypertension. Experimental Biology 2007, Washington, DC, April 28-May 2, 2007. *FASEB J* 21: 955.18, 2007.
15. Shaw DK*, Coverley CR*, Hakun E*, Jennings B*, Quick CM, Mohiuddin MW. Microvascular network structure minimizes energy dissipation and maximizes pulse transmission. Experimental Biology 2007, Washington, DC, April 28-May 2, 2007. *FASEB J* 21: 587.3, 2007.
16. Mohiuddin MW, Quick CM. Apparent and True Augmentation Index. 25th Annual Houston Conference in Biomedical Research, Houston, TX, February 9-10. *HSEMB* 25: 217, 2008.
17. Mohiuddin MW, Laine GA, Quick CM, Douglas WI. Novel Adjustable Systemic-to-Pulmonary Shunt for Single Ventricle Palliation during Delayed Sternal Closure. *HSEMB 2009 (Submitted)*
18. Mohiuddin MW, Quick CM. Can Augmentation Index Quantify Impact of Pulse Wave Reflection in Isolated Systolic Hypertension? *FASEB J, 2009 (Submitted)*

REFERENCES

Available upon request