

- Christopher P. Cheng, Ph.D. -
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Summary

- Executive management, R&D, business development, preclinical/clinical studies, regulatory strategy, sales training
- Expertise in biomechanics, medical imaging, FEA, geometric modeling, statistics, epidemiology, anatomy/physiology
- Implant design, delivery system design, Nitinol, manufacturing & processing techniques, V&V evaluations
- Extensive experience with FDA regarding mechanical testing, simulation, animal testing, and MRI safety
- Directly involved in 10+ medical device regulatory approvals
- Author of 25+ patents, patent applications, and invention disclosures
- Advising of undergraduates, doctoral, and post-doctoral students; grant writing, teaching
- Author of 31 journal, 1 book chapter, and 46 conference publications; Seasoned podium presenter and invited speaker
- Involved with raising \$15.43M funding, with \$2.74M funding as Principal Investigator

Education

Stanford University	Stanford, CA	Ph.D. , 2002 Mechanical Engineering (Biomechanical Engineering Division)
Stanford University	Stanford, CA	M.S. , 2000 Mechanical Engineering (Biomechanical Engineering Division)
Duke University	Durham, NC	B.S.E. , 1998 Biomedical Engineering and Electrical & Computer Engineering
University of Oxford	Oxford, England	Study in Economics and International Markets, 1996

Professional History

- 2012 – Present** • **Kōli, Inc.**
Co-Founder and CEO
- Minimally-invasive treatment for gallstone disease
 - Principal Investigator for NSF SBIR Phase I and IB, and Phase II, II-REU, II-CAP, and II-TECP awards
- 2006 – Present** • **Stanford University, Department of Surgery**
Consulting Professor (2016 – Present)
Consulting Associate Professor (2012 – 2015)
Consulting Assistant Professor (2006 – 2011)
- Director of Vascular Interventional Biomechanics & Engineering (VIBE) Lab – biomechanical interactions between cardiovascular system and vascular devices using medical imaging, geometric modeling, and computational methods
 - Doctoral and Post-doctoral advisees: Phillip DiGiacomo (2016-), Kelsey Hirotsu (2014-16), David Zhu (2015-16), Ga-Young Suh, Ph.D. (2011-14), Brian Liu, M.D. (2012-2014), Adam Tenforde, M.D. (2006-2010), Gilwoo Choi, Ph.D. (2005-2009)
- 2002 – Present** • **Biomedical Consulting**
Consultant
- Consulting for medical imaging, anatomy/physiology, biomechanics, engineering testing, device design, regulatory
- 2011 – 2012** • **Nitinol Devices & Components**
Entrepreneur in Residence
- Emerging opportunities
- 2011** • **Tendyne Medical, Inc.**
General Manager
- Minimally-invasive treatment for mitral regurgitation
- 2007 – 2010** • **NovoStent Corporation**
Director of Technology
- Directed end-to-end R&D for peripheral vascular stent platform
 - Led stent R&D efforts to achieve clinical trial approval, CE-Mark, and establish FDA pre-IDE requirements
- 2005 – 2007** • **Johnson & Johnson, Nitinol Devices & Components and Cordis Corporation**
Principal Engineer/Program Manager

- Founder and director of Cordis Biomechanics Group
- Cardiovascular device design for Advanced Device Concepts Group

2002 – 2005 • **Stanford University, Departments of Mechanical Engineering, Pediatrics, and Radiology**
Research Associate

- Hemodynamic quantification at rest and during exercise for peripheral vascular disease and congenital heart disease
- RESISStent Program: Consortium with medical device industry to describe the superficial femoral artery environment

1998 – 2002 • **Stanford Cardiovascular Biomechanics Lab**
Ph.D. Student

- Quantification of hemodynamic conditions in the human abdominal aorta at rest and during exercise

1995 – 1998 • **Internships and Academic Research**

- Neural network software development for Global Science & Technology, Inc.
- Mechanism design for 2nd and 3rd Servicing Missions of the Hubble Space Telescope for Swales Aerospace/NASA
- Orthopedic biomechanics research for Duke Orthopedics Biomechanics Lab

Board Memberships

- Corporate Boards: Kōli, Tendyne Medical, The Power Rank
- Scientific Advisory Boards: 480 Biomedical
- Non-Profit Boards: East Palo Alto Boxing Club

Awards and Honors

- NSF SBIR review panelist (2015)
- Fannie Mitchell Expert-In-Residence, Duke University (2015)
- Standards of Leadership Award, Johnson & Johnson (2006)
- Whitaker Fellow, The Whitaker Foundation (1998-2002)
- First Place of Ph.D. competition at ASME Summer Bioengineering Conference (2001)

Other Accomplishments & Skills

- *Boy Scouts of America* – Eagle Scout with Gold Palm; Order of the Arrow
- *Martial Arts* – Black Belt in Tang Soo Do; Kung-fu training at The Shaolin Temple of China; Boxing at Oxford
- *Foreign Language* – Fluent in Mandarin Chinese
- *Wine/Enology* – Certified Specialist of Wine (CSW) through the Society of Wine Educators; Wine producer, lecturer, consultant, buyer, and judge; Founder and lecturer of Stanford Viticulture Course and Stanford Wine Club

Journal Publications

In Preparation

- Ullery, B.W., Suh, G., Kim, J.J., Lee, J.T., Dalman, R.L., **Cheng, C.P.** (2016) “Geometric Changes of Complex EVAR Reconstruction from Pre-Op to Follow-up”
- **Cheng, C.P.**, Zhu, Y.D., Suh, G. (2016) “Optimization of 3D Geometric Modeling Parameters for Geometric Precision and Modeling Efficiency for Healthy and Diseased Aortas”
- Suh, G., Fleischmann, D., Beygui, R.E., **Cheng, C.P.** (2016) “Cardiac and Respiratory-Induced Thoracic Aorta After Ascending Aortic Repair”

Published

- 1) Suh, G., Hirotsu, K., Beygui, R., Dake, M.D., Fleischmann, D., **Cheng, C.P.** (2016) “Volumetric Analysis Demonstrates True and False Lumen Remodeling Persists for 12 Months after TEVAR,” *Journal of Vascular Surgery Cases*, in press.
- 2) Suh, G., Choi, G., Herfkens, R.J., Dalman, R.L., **Cheng, C.P.** (2016) “Respiration-Induced Motion of the Visceral Arteries and Kidneys in Patients with Abdominal Aortic Aneurysms”, *Annals of Vascular Surgery*, in press.
- 3) Ullery, B.W., Suh, G., Lee, J.T., Liu, B., Stineman R., Dalman, R.L., **Cheng, C.P.** (2016) “Comparative Geometric Analysis of Renal Artery Anatomy Before and After Fenestrated or Snorkel/Chimney EVAR,” *Journal of Vascular Surgery*, 63(4): 922-929.
- 4) Choi, G., **Cheng, C.P.** (2016) “Quantification of the *In Vivo* Kinematics of the Superficial Femoral Artery due to Hip and Knee Flexion using Magnetic Resonance Imaging,” *Journal of Medical and Biological Engineering*, 36(1): 80-86.
- 5) **Cheng, C.P.**, Taylor, C.A., Dalman, R.L. (2015) “Abdominal Aortic Hemodynamics in Intermittent Claudication Patients at Rest and During Dynamic Pedaling Exercise,” *Annals of Vascular Surgery*, 29(8): 1516-1523.
- 6) Ullery, B.W., Suh, G., Lee, J.T., Liu, B., Stineman R., Dalman, R.L., **Cheng, C.P.** (2015) “Geometry and Respiratory-Induced Deformation of Abdominal Branch Vessels and Stents After Complex Endovascular Aneurysm Repair,” *Journal of Vascular Surgery*, 61(4): 875-885.
- 7) Suh G., Beygui, R.E., Fleischmann, D., **Cheng, C.P.** (2014) “Aortic Arch Vessel Geometries and Deformations in Patients with Thoracic Aortic Aneurysms and Dissections,” *Journal of Vascular and Interventional Radiology*, 25(12): 1903-1911.
- 8) Choi, G., Xiong, G., **Cheng, C.P.**, Taylor, C.A. (2014) “Methods for Characterizing Human Coronary Artery Deformation from Cardiac-Gated Computed Tomography Data,” *Transactions on Biomedical Engineering*, 61(10): 2582-2592.
- 9) Suh, G., Choi, G., Herfkens, R.J., Dalman, R.L., **Cheng, C.P.** (2013) “Respiration-Induced Deformation of the Superior Mesenteric and Renal Arteries in Patients with Abdominal Aortic Aneurysms,” *Journal of Vascular and Interventional Radiology*, 24(7): 1035-1042.
- 10) Suh, G., Choi, G., Draney, M.T., Herfkens, R.J., Dalman, R.L., **Cheng, C.P.** (2013) “Respiratory-Induced 3D Deformations of the Renal Arteries Quantified with Geometric Modeling During Inspiration and Expiration Breath-holds of Magnetic Resonance Angiography,” *Journal of Magnetic Resonance Imaging*, 38(6): 1325-1332.
- 11) Suh, G., Les, A.S., Tenforde, A.S., Shadden, S.C., Spilker, R.L., Yeung, J.J., **Cheng, C.P.**, Herfkens, R.J., Dalman, R.L., Taylor, C.A. (2011) “Hemodynamic Changes Quantified in Abdominal Aortic Aneurysms With Increasing Exercise Intensity Using MR Exercise Imaging and Image-Based Computational Fluid Dynamics,” *Annals of Biomedical Engineering*, 39(8): 2186-2202.
- 12) Zeller, T., Braunlich, S., Waldo, M., **Cheng, C.P.**, Macharzina, R., Scheinert, D., Rastan, A. (2011) “The NovoStent® SAMBA® stent: A novel alternating helix self-expanding nitinol stent design,” *Interventional Cardiology*, 3(2): 247-261.
- 13) Suh, G., Les, A.S., Tenforde, A.S., Shadden, S.C., Spilker, R.L., Yeung, J.J., **Cheng, C.P.**, Herfkens, R.J., Dalman, R.L., Taylor, C.A. (2011) “Quantification of Particle Residence Time in Abdominal Aortic Aneurysms Using Magnetic Resonance Imaging and Computational Fluid Dynamics,” *Annals of Biomedical Engineering*, 39(2): 864-883.
- 14) Tenforde, A.S., **Cheng, C.P.**, Suh, G., Herfkens, R.J., Dalman, R.L., Taylor, C.A. (2010) “Quantifying *In Vivo* Hemodynamic Response to Exercise in Patients with Intermittent Claudication and Abdominal Aortic Aneurysms Using Cine Phase-Contrast MRI,” *Journal of Magnetic Resonance Imaging*, 31(2): 425-429.
- 15) **Cheng, C.P.**, Choi, G., Herfkens, R.J., Taylor, C.A. (2010) “The Effect of Aging on Deformations of the Superficial Femoral Artery Due to Hip and Knee Flexion: Potential Clinical Implications,” *Journal of Vascular and Interventional Radiology*, 21(2): 195-202.
- 16) Choi, G., Suh, G., Shin, L.K., Taylor, C.A., **Cheng, C.P.** (2009) “*In Vivo* Deformation of the Human Abdominal Aorta and Common Iliac Arteries With Hip and Knee Flexion: Implications for the Design of Stent-Grafts,” *Journal of Endovascular Therapy*, 16(5): 531-538.

- 17) Choi, G., **Cheng, C.P.**, Wilson, N.M., Taylor, C.A. (2009) "Methods for Quantifying Three-Dimensional Deformation of Arteries Due to Pulsatile and Nonpulsatile Forces: Implications for the Design of Stents and Stent Grafts," *Annals of Biomedical Engineering*, 37(1): 14-33.
- 18) **Cheng, C.P.** (2008) "A Review of Peripheral Vascular Deformations Due to Respiration and Musculoskeletal Influences," *Journal of ASTM International (Symposium on Fatigue and Fracture of Medical Metallic Materials and Devices)*, 5(10): Paper ID JAI102074.
- 19) Robertson, S.W., **Cheng, C.P.**, Razavi, M.K. (2008) "Biomechanical Response of Stented Carotid Arteries to Swallowing and Neck Motion," *Journal of Endovascular Therapy*, 15: 663-671.
- 20) Robertson, S.W., Jessup, D.B., Boero, I.J., **Cheng, C.P.** (2008) "Right Renal Artery *In Vivo* Stent Fracture," *Journal of Vascular and Interventional Radiology*, 19: 439-442.
- 21) **Cheng, C.P.**, Taur, A.S., Lee, G.S., Goris, M.L., Feinstein, J.A. (2006) "Relative Lung Perfusion Distribution in Normal Subjects: Observations and Clinical Implications," *Congenital Heart Disease*, 1: 210-216.
- 22) **Cheng, C.P.**, Wilson, N.M., Hallett, R.L., Herfkens, R.J., Taylor, C.A. (2006) "*In Vivo* MR Angiographic Quantification of Axial and Twisting Deformations of the Superficial Femoral Artery Resulting from Maximum Hip and Knee Flexion," *Journal of Vascular and Interventional Radiology*, 17: 979-987.
- 23) Tang, B.T., **Cheng, C.P.**, Draney, M.T., Wilson, N.M., Tsao, P.S., Herfkens, R.J., Taylor, C.A. (2006) "Abdominal Aortic Hemodynamics in Young Healthy Adults at Rest and during Lower Limb Exercise: Quantification using Image-Based Computer Modeling," *American Journal of Physiology – Heart and Circulatory Physiology*, 291: H668-H676.
- 24) **Cheng, C.P.**, Herfkens, R.J., Taylor, C.A., Feinstein, J.A. (2005) "Proximal Pulmonary Artery Blood Flow Characteristics in Healthy Subjects Measured in an Upright Posture Using MRI: The Effects of Exercise and Age," *Journal of Magnetic Resonance Imaging*, 21: 752-758.
- 25) **Cheng, C.P.**, Herfkens, R.J., Lightner, A.L., Taylor, C.A., Feinstein, J.A. (2004) "Blood Flow Conditions in the Proximal Pulmonary Arteries and Vena Cavae in Healthy Children During Upright Seated Rest and Cycling Exercise, Quantified with MRI," *American Journal of Physiology – Heart and Circulatory Physiology*, 287(2): H921-926.
- 26) **Cheng, C.P.**, Herfkens, R.J., Taylor, C.A. (2003) "Abdominal Aortic Hemodynamic Conditions in Healthy Subjects Aged 50-70 at Rest and During Lower Limb Exercise: *In Vivo* Quantification Using MRI," *Atherosclerosis*, 168: 323-331.
- 27) **Cheng, C.P.**, Herfkens, R.J., Taylor, C.A. (2003) "Inferior Vena Caval Hemodynamics Quantified *In Vivo* at Rest and During Lower Limb Exercise Using Magnetic Resonance Imaging," *American Journal of Physiology – Heart and Circulatory Physiology*, 284(4): H1161-1167.
- 28) **Cheng, C.P.**, Herfkens, R.J., Taylor, C.A. (2003) "Dynamic Exercise Imaging With an MR-Compatible Stationary Cycle Within the General Electric Open Magnet," *Magnetic Resonance in Medicine*, 49(3): 581-585.
- 29) **Cheng, C.P.**, Herfkens, R.J., Taylor, C.A. (2003) "Comparison of Abdominal Aortic Hemodynamics Between Men and Women at Rest and During Lower Limb Exercise," *Journal of Vascular Surgery*, 37(1): 118-123.
- 30) **Cheng, C.P.**, Parker, D., Taylor, C.A. (2002) "Quantification of Wall Shear Stress in Large Blood Vessels Using Lagrangian Interpolation Functions with Cine PC-MRI," *Annals of Biomedical Engineering*, 30: 1020-1032.
- 31) Taylor, C.A., **Cheng, C.P.**, Espinosa, L.A., Tang, B.T., Parker, D., Herfkens, R.J. (2002) "*In Vivo* Quantification of Blood Flow and Wall Shear Stress in the Human Abdominal Aorta During Lower Limb Exercise," *Annals of Biomedical Engineering*, 30: 402-408.

Book Chapter

Suh, G.Y., **Cheng, C.P.**, Lee J.T., Dalman R.L. (2015) "Renal and Superior Mesenteric Arteries Motion during Respiration in Patients with Aortic Aneurysms," European Symposium on Vascular Biomaterials, pp. 25–33.

Conference Publications

- 1) Suh, G., Zhu, Y.D., Hirotsu, K., Lee, J.T., Dake, M.D., Fleischmann, D., **Cheng, C.P.** (2016) "Cardiac- and Respiratory-Induced Deformation of Thoracic Aorta after TEVAR", *2016 International Symposium of Endovascular Therapy*, Poster ID #
- 2) Suh, G., Ullery, B.W., Kim, J.J., Lee J.T., Dalman, R.L., **Cheng, C.P.** (2016) "Geometric Changes of Renal Arteries and Abdominal Aorta with Complex EVAR from Preop to Follow-up Stage," *2016 International Symposium of Endovascular Therapy*, Poster ID #
- 3) Suh, G., Hirotsu, K., Zhu, Y.D., Lee, J.T., Dake, M.D., Fleischmann, D., **Cheng, C.P.** (2015) "Geometric Analysis of Thoracic Aorta and Arch Branches Before and After TEVAR," *2015 Transcatheter Therapeutics Conference*, Abstract #323.
- 4) **Cheng, C.P.** (2015) "Motion of the Aortic Arch: What we think we know," *2015 Stent Summit at the Cleveland Clinic*, Invited Faculty.

- 5) Ullery, B.W., Suh, G., Lee, J.T., Liu, B., Stineman R., Dalman, R.L., **Cheng, C.P.** (2015) "Comparative Geometric Analysis of Renal Artery Anatomy Before and After Fenestrated or Snorkel/Chimney EVAR," *2015 Vascular Annual Meeting (Society of Vascular Surgery) Conference*.
- 6) **Cheng, C.P.** (2014) "Motion of the Branch Vessels: What is happening, and should we be concerned?" *2014 Stent Summit at the Cleveland Clinic*, Invited Faculty.
- 7) Choi, G., Koo, B.K., **Cheng, C.P.** (2014) "Quantification of Coronary Artery and Myocardial Deformation Due to Cardiac Motion Using Cardiac-gated Computed Tomography Data," *2014 Transcatheter Therapeutics Conference*, Abstract #305.
- 8) Ullery, B.W., Suh, G., Lee, J.T., Liu, B., Stineman R., Dalman, R.L., **Cheng, C.P.** (2014) "Geometry and Respiratory-Induced Deformation of Abdominal Branch Vessels Following Complex EVAR," *2014 Western Vascular Society Annual Meeting (First Place in Best Trainee Award Competition)*.
- 9) Suh, G., Beygui, R., Fleischmann, D., **Cheng, C.P.** (2014) "Respiratory- and Cardiac-Induced Motion of the Thoracic Aorta in Patients with Thoracic Aortic Disease," *2014 Society of Interventional Radiology Annual Scientific Meeting*, Abstract #18 (Podium Presentation).
- 10) Suh, G., Beygui, R., Marangi, R., Fleischmann, D., **Cheng, C.P.** (2013) "Respiratory- and Cardiac-Induced Branch Deformation of the Aortic Arch Vessels in Patients with Thoracic Aortic Disease," *2013 International Symposium of Endovascular Therapy*, Poster ID #20.
- 11) Suh, G., **Cheng, C.P.** (2012) "Respiration-induced Deformation of the Abdominal Arteries in Patients with Abdominal Aortic Aneurysms," *2012 US-Korea Conference*.
- 12) Suh, G., Choi, G., Draney, M.T., Herfkens, R.J., Dalman, R.L., **Cheng, C.P.** (2012) "Respiratory Deformation of the Superior Mesenteric Artery and Renal Arteries in Patients with Abdominal Aortic Aneurysms," *2012 Society of Interventional Radiology Annual Scientific Meeting*, Abstract #422 (Poster Award Winner).
- 13) Suh, G., Choi, G., Draney, M.T., Herfkens, R.J., Dalman, R.L., **Cheng, C.P.** (2012) "Respiratory Deformation of the Renal Arteries in Healthy Subjects and Patients with Abdominal Aortic Aneurysms," *2012 International Symposium of Endovascular Therapy*, Abstract #750042.
- 14) **Cheng, C.P.**, Suh, G., Choi, G. (2010) "Renal Artery and Abdominal Aortic Biomechanics," *2010 Stent Summit at the Cleveland Clinic*, Invited Faculty.
- 15) Zeller, T., Johnson, A., **Cheng, C.P.**, Martin, G.R. (2009) "Evaluation of NovoStent's SAMBA Stent," *2009 Transcatheter Therapeutics Conference*, Abstract #597.
- 16) Zeller, T., Johnson, A., **Cheng, C.P.**, Martin, G.R. (2009) "Animal Evaluation of a Novel Alternating Helical Stent," *EuroPCR, EuroIntervention*, Volume 5, Supplement E, p. E41.
- 17) Choi, G., Dusch, M.N., Xiong, G., Xiao, N., **Cheng, C.P.**, Taylor, C.A. (2009) "In Vivo Quantification of Human Coronary Artery Deformation from Cardiac-Gated Computed Tomography Data," *2009 ASME Summer Bioengineering Conference*.
- 18) Suh, G.K., Tenforde, A., Shadden, S., Spilker, R., **Cheng, C.P.**, Herfkens, R.J., Dalman, R.L., Taylor, C.A. (2009) "Hemodynamics in Abdominal Aortic Aneurysms at Rest and Graded Levels of Exercise," *2009 ASME Summer Bioengineering Conference (3rd Place Podium Competition)*.
- 19) **Cheng, C.P.**, Choi, G., Cukur, T. (2008) "Tibial Artery Biomechanics," *2008 Stent Summit at the Cleveland Clinic*, Invited Faculty.
- 20) Choi, G., Shin, L.K., Taylor, C.A., **Cheng, C.P.** (2008) "Quantification of the Deformation of the Human Iliac Arteries with Hip and Knee Flexion: Implications for Stent-Graft Design," *2008 ASME Summer Bioengineering Conference*.
- 21) **Cheng, C.P.** (2008) "Carotid Artery Deformations Due to Musculoskeletal Motion and Comparisons with Other Anatomies," *2008 ASTM Fatigue and Fracture of Medical Metallic Materials and Devices*, Invited Faculty.
- 22) **Cheng, C.P.** (2008) "The Dynamic Environment of the SFA," *2008 Society of Interventional Radiology Annual Scientific Meeting*, Invited Faculty.
- 23) Choi, G., Wilson, N.M., **Cheng, C.P.**, Herfkens, R.J., Taylor, C.A. (2008) "Quantification of the In Vivo Kinematics of the Superficial Femoral Artery Due to Hip and Knee Flexion Using Magnetic Resonance Imaging," *16th International Society for Magnetic Resonance in Medicine*, Abstract #2062.
- 24) Tenforde, A., **Cheng, C.P.**, Suh, K.Y., Les, A.S., Dalman, R.L., Herfkens, R.J., Taylor, C.A. (2008) "Hemodynamic Response to Exercise in Small Aortic Aneurysms," *16th International Society for Magnetic Resonance in Medicine*, Abstract #1970.
- 25) **Cheng, C.P.**, Robertson, S.W. (2007) "Non-Pulsatile Carotid Artery Biomechanics," *2007 Stent Summit at the Cleveland Clinic*, Invited Faculty.
- 26) Cao, E., **Cheng, C.P.** (2007) "In Vivo 3D Deformations of the Human Iliac Artery Due to Hip Flexion," *2007 Transcatheter Therapeutics Conference*, Abstract #587
- 27) Choi, G., **Cheng, C.P.**, Wilson, N.M., Taylor, C.A. (2007) "Methods for Quantifying Vessel Deformation Due to Pulsatile and Non-Pulsatile Forces," *2007 ASME Summer Bioengineering Conference (3rd Poster Competition)*.

Role: PI	\$736,000	2014-2017
Commercialization Assistance Program	+\$10,000 Supplement	2014
Research Experiences for Undergraduates	+\$16,000 Supplement	2015
Technology Enhancement for Commercial Partnerships	+\$147,000 Supplement	2015
Research Experiences for Undergraduates	+\$16,000 Supplement	2016
Partnership with Community Colleges	+\$40,000 Supplement	2016-2017
Diversity Post-doctoral Fellowship	+\$200,000 Supplement	2016-2017
• Research grant from <i>Medical Device Manufacturer</i> , “Biomechanical Analysis of ... Endovascular Aortic Repair”		
Role: PI	\$48,000	2015
• Research grant from <i>Medical Device Manufacturer</i> , “Biomechanical Influences of ... on the Thoracic Aorta”		
Role: PI	\$300,000	2013-2015
• NSF SBIR Phase I #1248295, “A Medical Device to Treat Gallstone Disease”		
Role: PI	\$150,000	2013
SBIR IB, Outside Investment and NSF Match	+\$90,000 Supplement	2013
• Research grant from Medtronic Vascular, “Geometric Deformations of the Thoracic Aorta and Arch Branches Due to Respiration and Cardiac Pulsatility”		
Role: PI	\$297,000	2011-2013
• Research grant from W.L. Gore & Associates, “Visceral Artery Motion Due to Respiration”		
Role: PI	\$150,000	2012
• Research grant from Medtronic Vascular, “Quantification of Renal, Super Mesenteric, and Celiac Artery Geometry and Respiratory-Induced Deformation in Healthy Subjects and Patients with AAA”		
Role: PI	\$189,000	2010-2011
• NIH # P50 HL083800, “AAA: STOP, Abdominal Aortic Aneurysms: Simple Treatment or Prevention”		
Role: Co-Investigator	\$12,000,000	2005-2009
• Research grant from Cordis Corporation, “Abdominal Aortic Deformations Due to Musculoskeletal Motion”		
Role: PI	\$200,000	2005-2007
• RESISStent SRI/Stanford Consortium on Stent Fracture in the Superficial Femoral Artery		
Role: Co-Investigator	\$690,000	2003-2005