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Education

- **Ph.D. in Mechanical Engineering.** Stanford University, Stanford, CA (Jan 2001 - Mar 2006).
- **M.S. in Mechanical Engineering.** Stanford University, Stanford, CA (Sep 1999 - Dec 2000).
- **B.S. & M.S. in Civil Engineering.** ETS de Ingenieros de Caminos, Canales y Puertos, La Coruña, Spain (Sep 1993 - Sep 1998).

Professional Experience

- **Professor.** University of Michigan, Departments of Biomedical Engineering & Surgery (Sep 2018 – present).
- **Founder.** CRIMSON Technologies, LLC.
- **Founder and Chief Science Officer.** AngioInsight, Inc.
- **Associate Professor.** University of Michigan, Departments of Biomedical Engineering & Surgery (Aug 2014 – Aug 2018).
- **Associate Editor.** “Fluids” (Jan 2021 – present), “International Journal for Numerical Methods in Biomedical Engineering” (Oct 2018 – present), “Journal of Biomechanical Engineering” (Jun 2015 – present), “Frontiers in Pediatric Cardiology” (Oct 2012 – present), “Journal of Endovascular Therapy” (Jan 2011 - present).
- **Honorary Senior Lecturer.** King's College London. Biomedical Engineering Dept. (Jun 2014 – Aug 2019).
- **Board of Directors:** “Virtual Physiological Human Institute” (Sep 2013 – Jun 2015).
- **Summer School Instructor.** CEMRACS 2015 Summer Mathematical Research Center on Scientific Computing and Its Applications. *Image-based modeling of the cardiovascular system.* Summer school organized by the SMAI: French Society of Applied and Industrial Mathematics. (Jul 20-21 2015).
- **Guest Editor.** “International Journal Numerical Methods in Biomedical Engineering” (Jun 2012 – Jan 2014)
- **Senior Lecturer.** King's College London. Department of Biomedical Engineering (Sep 2011 – May 2014).
- **Senior Research Engineer.** Stanford University. Dept. of Bioengineering (Mar 2011 – Aug 2011).
- **Engineering Research Associate.** Stanford University. Dept. of Bioengineering (Apr 2006 – Feb 2011).
- **Consultant.** Cardiovascular Simulation, Inc., Mountain View, CA (Jul 2009 – Feb 2010); AGA Medical, Plymouth, MN (May 2011 – Jan 2012); Bolton Medical Sunrise, FL (Apr 2011 – Aug 2016); PeriTec BioSciences LTD, Cleveland, OH (Oct 2012 – Dec 2013), Endologix, Inc., Irvine, CA (Aug 2013 – Dec 2014), AneuMed, Inc. Los Altos, CA (Jun 2016 – Jan 2017), AngioInsight, Inc. (Jan 2020 – present).
- **Instructor.** *Finite Element Analysis of Cardiovascular Devices.* Short Course taught at the FDA. (Mar 2009).
- **Teaching. University of Michigan:** BIOMEDE 350: *Intro to Biomed Eng Design* (Winter 2016, Winter 2017, Fall 2017, Winter 2018, Fall 2018, Winter 2019, Fall 2019, Winter 2020, Fall 2021). BIOMEDE450: *Biomed Eng Design* (Winter 2016). BIOMEDE/PHYSIOLOGY 419/519: *Quantitative Physiology.* (Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2021). **KCL:** *Computational Methods.* (2 semesters, 2013-14); **Stanford University:** BIOE484/ME484: *Computational Methods in Cardiovascular Bioengineering.* (Spring 2007, 2008). **Universidad da Coruna:** *Calculus I and Numerical Methods* (1998 – 99).
- **Research Assistant.** Stanford University. Mechanical Engineering Department. (Jan 2001 - Mar 2006).
- **Acting Assistant Professor.** ETS de Ingenieros de Caminos, Canales y Puertos, La Coruña, Spain. Dept. of Applied Math. Courses: Calculus I, Numerical Methods. (Dec 1998 - Sep 1999).
- **Grant Reviewer:**
Standing Member: NIH Respiratory Integrative Biology and Translational (RIBT) Research Study Section. Jul 2020 – Jun 2026

¹Updated on April 4, 2022

Ad-hoc Member: NASA Human Research Program (Feb 2021); NIH Panel ZHL1 CSR-P (F1) – Novel Bioengineering Methods/Approaches for Heart, Lung, Blood, and Sleep Disorders and Diseases (Oct 2017); NIH/NHLBI ad hoc reviewer SEP (BST-T [03]) (Nov 2017); MABS ad-hoc reviewer (2018, 2019); RIBT ad-hoc reviewer (2020); Heart Research UK (United Kingdom); Technology Strategy Board/Medical Research Council (United Kingdom); Engineering and Physical Sciences Research Council – EPSRC (United Kingdom); Agence Nationale de la Recherche (France); Science Foundation Ireland (Republic of Ireland); “Discovery Fund”, “McKay Cardiovascular Research Grants”, and “Falk Medical Research Trust Program” at the University of Michigan.

- **Journal Reviewer (33).** "Computer Methods in Applied Mechanics and Engineering", "Journal of Biomechanics", "Journal of Biomechanical Engineering", "Biomechanics and Modeling in Mechanobiology", "Journal of Computational Physics", "Computer Methods in Biomechanics and Biomedical Engineering", "Circulation", "Mathematical Biosciences and Engineering", "Annals of Biomedical Engineering", "Interface Focus", "Philosophical Transactions of the Royal Society A", "Computers and Fluids", "ASME Journal of Medical Devices", "International Journal for Numerical Methods in Biomedical Engineering", "Mathematical Modelling and Numerical Analysis", "International Journal of Computer Assisted Radiology and Surgery", "Atherosclerosis", "Medical & Biological Engineering & Computing", "Cardiovascular Engineering and Technology", "Studies in Mechanobiology, Tissue Engineering and Biomaterials", "PLOS One", "Circulation: Cardiovascular Imaging", "Medical Engineering & Physics", "Biotechnology and Bioengineering", "Journal of Engineering in Medicine", "Engineering with Computers", "IEEE Transactions on Biomedical Engineering", "International Journal for Numerical Methods in Fluids", "Annals of Vascular Surgery", "Integrative Biology", "PLOS Computational Biology", "Journal of the American College of Cardiology", "JACC: Basic to Translational Science".
- **Symposium Chair.**
 1. "Biofluids and Coupled Problems in Biomechanics": 9th US National Congress on Computational Mechanics. San Francisco, CA (Jul 2007); 8th World Congress on Computational Mechanics. Venice, Italy (Jul 2008); 10th US National Congress on Computational Mechanics. Columbus, OH (Jul 2009); 9th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering. Valencia, Spain (Feb 2010); 9th World Congress on Computational Mechanics. Sydney, Australia (Jul 2010).
 2. "Direct and Inverse Methods for Cardiovascular and Pulmonary Biomechanics": 16th Inter. Conference on Finite Elements in Flow Problems. Munich, Germany (Mar 2011); 11th US National Congress on Computational Mechanics. Minneapolis, MN (Jul 2011); 12th US National Congress on Computational Mechanics. Raleigh, NC (Jul 2013), 11th World Congress on Computational Mechanics. Barcelona, Spain (Jul 2014), 13th US National Congress on Computational Mechanics. San Diego, CA (Jul 2015), 7th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2016). Crete, Greece (Jun 2016), 12th World Congress on Computational Mechanics. Seoul, Korea (Jul 2016), 7th International Conference on Coupled Problems in Science and Engineering (ECCOMAS Thematic Conference). Rhodes Island, Greece (Jun 2017). 14th US National Congress on Computational Mechanics. Montreal, Canada (Jul 2017), 13th World Congress on Computational Mechanics. New York City, USA (Jul 2018), 15th US National Congress on Computational Mechanics. Austin, TX (Jul 2019).
 3. "Fluid-structure Interactions in Biological Systems": 23rd International Congress of Theoretical and Applied Mechanics ICTAM 2012. Beijing, China (August 2012).
 4. "Numerical methods and applications of multi-physics in biomechanical modeling": 6th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2012). Vienna, Austria (Sep 2012).
 5. "Biomechanics and Biofluids": Bioengineering12 meeting. Oxford, UK (Sep 2012).
 6. "Computational Fluid Dynamics Challenge: Aortic Coarctation": 15th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI). Nice, France (Oct 2012).
 7. "Multi-physics Modeling and Applications of the Cardiovascular System" and "Towards Clinically Relevant Computational Vascular Mechanics", 3rd International Conference on Mathematical and Computational Biomedical Engineering (CMBE2013), Hong-Kong (Dec 2013).
 8. "Vascular Growth and Remodelling" and "Cardiovascular Fluid Mechanics", 7th World Congress of Biomechanics, Boston (Jul 2014).

9. "Growth, Remodeling and Repair": Theme Leader, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Snowbird, Utah (Jun 2015), National Harbor, Maryland (2016), Tucson, Arizona (2017).
10. "Challenges of working across scales in patient- and animal-specific cardiovascular modelling", 8th World Congress of Biomechanics, Dublin (Jul 2018).
11. "Predictive Computational Vascular Mechanics", 4th International Conference on Computational and Mathematical Biomedical Engineering (CMBE2015), Paris (Jun 2015).
12. "CRIMSON workshop: Simple Prototyping of Material and Boundary Conditions in 1D and 3D Blood Flow Simulations", 5th International Conference on Computational and Mathematical Biomedical Engineering (CMBE2017), Pittsburgh, PA (April 2017).
13. "Data-driven Paradigms and Uncertainty Quantification in Computational Mechanics", 14th US National Congress on Computational Mechanics. Montreal, Canada (Jul 2017), 13th World Congress on Computational Mechanics, New York City, NY (Jul 2018), 15th US National Congress on Computational Mechanics. Austin, TX (Jul 2019), 16th US National Congress on Computational Mechanics (Jul 2021) (online)
14. "Vascular Modeling Session", Virtual Physiological Human VPH2020 "When models, methods and experiments meet the clinic". Paris, France (Aug 2020) (online).
15. "Interpretative and Predictive Modeling in Cardiovascular Medicine", 16th US National Congress on Computational Mechanics (Jul 2021) (online).

Peer-reviewed Journal Publications

1. **C.A. Figueroa**, I.E. Vignon-Clementel, K.E. Jansen, T.J.R. Hughes, C.A. Taylor (2006). *"A Coupled Momentum Method for Modeling Blood Flow in Three-Dimensional Deformable Arteries,"* Comput. Methods Appl. Mech. Engrg. Vol. 195, Issues 41-43, pp. 5685-5706.
2. I.E. Vignon-Clementel, **C.A. Figueroa**, K.E. Jansen, C.A. Taylor (2006). *"Outflow Boundary Conditions for Three-dimensional Finite Element Modeling of Blood Flow and Pressure in Arteries,"* Comput. Methods Appl. Mech. Engrg. Vol. 195, pp. 3776-3796.
3. **C.A. Figueroa***, S Baek*, CA Taylor, J.D. Humphrey (2009). *"A Computational Framework for Coupled Fluid-Solid Growth in Cardiovascular Simulations,"* Comput. Methods Appl. Mech. Engrg. Vol. 198, pp. 3583-3602.
4. H.J. Kim, **C.A. Figueroa**, T.J.R. Hughes, K.E. Jansen, C.A. Taylor (2009). *"Augmented Lagrangian Method for Constraining the Shape of Velocity Profiles at Outlet Boundaries for Three-dimensional Finite Element Simulations of Blood Flow,"* Comp. Methods in Applied Mechanics and Engineering Vol. 198, pp. 3551-3566.
5. **C.A. Figueroa**, CA Taylor, V Yeh, AJ Chiou, CK Zarins (2009). *"Effect of Curvature on Displacement Forces Acting on Aortic Endografts: a 3-dimensional computational analysis,"* J. Endovasc. Ther. Vol. 16, p. 284-94.
6. **C.A. Figueroa**, C.A. Taylor, A.J. Chiou, V. Yeh, C.K. Zarins (2009). *"Magnitude and Direction of Pulsatile Displacement Forces Acting on Thoracic Aortic Endografts,"* J. Endovascular Therapy Vol. 16, pp. 350-358.
7. H.J. Kim, I.E. Vignon-Clementel, **C.A. Figueroa**, J.F. LaDisa, K.E. Jansen, J.A. Feinstein, C.A. Taylor (2009). *"On Coupling a Lumped Parameter Heart Model and a Three-Dimensional Finite Element Aorta Model,"* Annals of Biomedical Engineering Vol. 37 (11), pp. 2153-2169.
8. C.A. Taylor, **C.A. Figueroa** (2009). *"Patient-specific Modeling of Cardiovascular Mechanics,"* Annual Review of Biomedical Engineering Vol. 11, pp. 109-134.
9. I.E. Vignon-Clementel, **C.A. Figueroa**, K.E. Jansen, C.A. Taylor (2010). *"Outflow Boundary Conditions for Three-Dimensional Simulations of Non-Periodic Blood Flow and Pressure Fields in Deformable Arteries,"* Computer Methods in Biomechanics and Biomedical Engineering Vol. 13(5), pp. 625-640.
10. A.S. Les, S.C. Shadden, **C.A. Figueroa**, J.M. Park, M.M. Tedesco, R.J. Herfkens, R.L. Dalman, C.A. Taylor (2010). *"Quantification of Hemodynamics in Abdominal Aortic Aneurysms during Rest and During Exercise Using Magnetic Resonance Imaging and Computational Fluid Dynamics,"* Annals of Biomedical Engineering Vol. 38 (4), pp. 1288-1313.
11. **C.A. Figueroa**, C.A. Taylor, V. Yeh, A.J. Chiou, M.L. Gorrepati, C.K. Zarins (2010). *"Preliminary 3D Computational Analysis of the Relationship between Aortic Displacement Force and Direction of Endograft Movement,"* Journal of Vascular Surgery Vol. 51 (6), pp. 1488-1497.
12. M. Zhou, O. Sahni, H.J. Kim, **C.A. Figueroa**, C.A. Taylor, M.S. Shephard, K.E. Jansen (2010). *"Cardiovascular Flow Simulation at Extreme Scale,"* Computational Mechanics Vol. 46, pp. 71-82.

13. H.J. Kim, I.E. Vignon-Clementel, **C.A. Figueroa**, K.E. Jansen, C.A. Taylor (2010). "Developing Computational Methods for Three-Dimensional Finite Element Simulations of Coronary Blood Flow." *Finite Elements in Analysis and Design* Vol. 46, pp. 514-525.
14. H.J. Kim, I.E. Vignon-Clementel, J.S. Coogan, **C.A. Figueroa**, K.E. Jansen, C.A. Taylor (2010). "Patient-specific Modeling of Blood Flow and Pressure in Human Coronary Arteries," *Annals of Biomedical Engineering* Vol. 38(10), pp. 3195-3209.
15. G. Xiong, **C.A. Figueroa**, N. Xiao, C.A. Taylor (2010). "Simulation of blood flow in deformable vessels using subject-specific geometry and assigned variable mechanical wall properties," *International Journal for Numerical Methods in Biomedical Engineering*, Vol. 27(7), pp. 1000–1016.
16. E.O. Kung, A.S. Les, **C.A. Figueroa**, F. Medina, R.B. Wicker, M.V. McConnell, C.A. Taylor (2011). "In Vitro Validation of Finite Element Analysis of Blood Flow in Deformable Models." *Annals of Biomedical Engineering* Vol. 39(7), pp. 1947-1960.
17. A. Prasad, L.K. To, M.L. Gorrepati, C.K. Zarins, **C.A. Figueroa** (2011). "Computational Analysis of Stresses Acting on Inter-modular Junctions in Thoracic Aortic Endografts." *J. Endovasc. Therapy* Vol.18, pp. 559-568.
18. JF LaDisa, RJ Dholakia, **C.A. Figueroa**, IE Vignon-Clementel, FP Chan, et al. (2011). "Computational Simulations Demonstrate Altered Wall Shear Stress in Aortic Coarctation Patients Treated by Resection with End-to-end Anastomosis." *Congenit. Heart Dis.* Vol. 6, pp. 432-43.
19. R. Raghu, I.E. Vignon-Clementel, **C.A. Figueroa**, C.A. Taylor (2011). "Comparative Study of Viscoelastic Arterial Wall Models in Nonlinear One-dimensional Finite Element Simulations of Blood Flow." *Journal of Biomechanical Engineering* Vol. 133(8), pp. 081003-1:11.
20. J.F. LaDisa*, **C.A. Figueroa***, I.E. Vignon-Clementel, H.J. Kim, N. Xiao, L.M. Ellwein, F.P. Chan, J.A. Feinstein, C.A. Taylor (2011). "Computational Simulations of Aortic Coarctation: Representative Results from a Sampling of Patients," *Journal of Biomechanical Engineering* Vol. 133(9), pp. 091008-1:9.
21. P. Moireau, N. Xiao, M. Astorino, **C.A. Figueroa**, et al. (2012). "External Tissue Support and Fluid-Structure Simulation in Blood Flows," *Biomech. Model. Mechanobiol.* Vol. 11(1), pp. 1-18.
22. J.S. Coogan, J.D. Humphrey, **C.A. Figueroa** (2013). "Computational Simulations of Hemodynamic Changes within Thoracic, Coronary, and Cerebral Arteries Following Early Wall Remodeling in Response to Distal Aortic Coarctation." *Biomech. Model. Mechanobiol.* Vol. 12(1), pp. 79-93.
23. P. Moireau, C. Bertoglio, N. Xiao, **C.A. Figueroa**, C.A. Taylor, D. Chapelle, J.F. Gerbeau (2013). "Sequential Identification of boundary support parameters in a fluid-structure vascular model using patient image data." *Biomech. Model. Mechanobiol.* Vol. 12(3), pp. 475-496.
24. N. Xiao, J.D. Humphrey, **C.A. Figueroa** (2013). "Multi-Scale Computational Model of Three-Dimensional Hemodynamics within a Deformable Full-Body Arterial Network." *J. Comp. Physics.* Vol. 244, pp. 22-40.
25. A Prasad, N Xiao, XY Gong, CK Zarins, **C.A. Figueroa** (2013). "A Computational Framework for Investigating the Positional Stability of Aortic Endografts." *Biomech. Model. Mechanobiol.* Vol. 12(5), pp. 869-887.
26. S. Roccabianca, **C.A. Figueroa**, G. Tellides, J.D. Humphrey (2014). "Quantification of Regional Differences in Aortic Stiffness in the Aging Human." *J. Mech. Behavior of Biomedical Materials.* Vol. 29, pp. 618-634.
27. N. Xiao, J. Alastruey, **C.A. Figueroa** (2014). "A systematic comparison between 1-D and 3-D Hemodynamics in Compliant Arterial Models". *Int. J. Numerical Methods in Biomedical Engineering.* Vol. 30(2), pp. 204-231.
28. P. Di Achille, G. Tellides, **C.A. Figueroa**, J.D. Humphrey (2014). "A Hemodynamic Predictor of Intraluminal Thrombus Formation in Abdominal Aortic Aneurysms". *Proc. Royal Society A.* Vol. 470(2172) 20140163.
29. K.D. Lau, **C.A. Figueroa** (2015). "Simulation of Short-Term Pressure Regulation during the Tilt Test in a Coupled 3D-0D Closed-Loop Model of the Circulation." *Biomech. Model. Mechanobiol.* Vol. 14, pp. 915-929.
30. F. Cuomo, J. Ferruzzi, J.D. Humphrey, **C.A. Figueroa** (2015). "An Experimental-Computational Study of Catheter-Induced Alterations in Pulse Wave Velocity in Anesthetized Mice." *Annals of Biomedical Engineering.* Vol 43(7), pp. 1555-1570.
31. F. Donati, **C.A. Figueroa**, N. Smith, P. Lamata, D.A. Nordsletten (2015). "Non-invasive Pressure Difference Estimation from PC-MRI Using the Work Energy Equation". *Medical Image Analysis.* Vol 26(1), pp. 159-172.
32. F.J.H. Nauta, M. Conti, A.V. Kamman, G.H.W. van Bogerijen, J.L. Tolenaar, F. Auricchio, **C.A. Figueroa**, J.A. Herwaarden, F.L. Moll, S. Trimarchi (2015). "Biomechanical Changes after Thoracic Endovascular Aortic Repair in Type B Dissection: A Systematic Review". *J. Endovascular Therapy.* Vol. 22(6), pp. 918-933.
33. M.S. Vieira, M. Hussain, **C.A. Figueroa** (2015). "Patient-specific imaged-based computational modeling in congenital heart disease: a clinician perspective". *Journal of Cardiology and Therapy.* Vol. 2(6), pp. 436-448.
34. J.D. Humphrey, D.G. Harrison, **C.A. Figueroa**, P. Lacolley, S. Laurent (2016). "Central Artery Stiffness in Hypertension and Aging: A Problem with Cause and Consequence". *Circ. Research.* Vol 118, pp. 379-381.

35. D. Dillon-Murphy, A. Noorani, D.A. Nordsletten, **C.A. Figueroa** (2016). "Multi-Modality Image-Based Analysis of Hemodynamics of Aortic Dissection". *Biomech. and Modeling in Mechanobiology*. Vol 15, pp. 857-876.
36. C.J. Arthurs, K.D. Lau, K. Asress, S.R. Redwood, **C.A. Figueroa** (2016). "A Mathematical Model of Coronary Blood Flow Control: Simulation of Patient-Specific Three-Dimensional Haemodynamics during Exercise". *American Journal of Physiology - Heart and Circulatory Physiology*. 310: H1242 – H1258.
37. F.J.H. Nauta, S. Trimarchi, A.V. Kamman, F.L. Moll, J.A. Herwaarden, H.J. Patel, **C.A. Figueroa**, K.A. Eagle, J.B. Froehlich (2016). "Update in the Management of Type B Aortic Dissection". *Journal of Vascular Medicine*. Vol 21(3), pp. 251-263.
38. J. Alastruey, N. Xiao, H. Fok, T. Schaeffter, **C.A. Figueroa** (2016). "On the Impact of Modeling Assumptions in Multi-Scale Subject-Specific Models of Aortic Hemodynamics". *J. Royal Soc. Interface*. DOI: 10.1098/rsif.2016.0073.
39. F.J.H. Nauta, A.V. Kamman, E.H. Ibrahim, P.P. Agarwal, B. Yang, K. Kim, D.M. Williams, J.A. Herwaarden, F.L. Moll, K.A. Eagle, S. Trimarchi, H.J. Patel, **C.A. Figueroa** (2016). "Assessment of Cardiovascular Remodelling following Endovascular aortic repair through imaging and computation: the CORE prospective observational cohort study protocol". *British Medical Journal Open*. Vol 6(11): e012270.
40. S. Ben Ahmed, D. Dillon-Murphy, **C.A. Figueroa** (2017). "Computational Study of Anatomical Risk Factors in Idealized Models of Type B Aortic Dissection". *Eur. J. Vasc. Endov. Surgery*. Vol 52(6), pp. 736-745.
41. P. Youssefi, A. Gomez, T. He, L. Anderson, N. Bunce, R. Sharma, **C.A. Figueroa**, M. Jahangiri (2016). "Patient-specific Computational Fluid Dynamics - Assessment of Aortic Hemodynamics in a Spectrum of Aortic Valve Pathologies". *J. Thorac. Cardiovasc. Surg*. Vol 153(1), pp. 8 - 20.e3.
42. F.J.H. Nauta, K.D. Lau, C.J. Arthurs, K.A. Eagle, D.M. Williams, S. Trimarchi, H.J. Patel, **C.A. Figueroa** (2017). "Computational Fluid Dynamic Assessment of Aortic Thrombus following Thoracic Endovascular Aortic Repair". *The Annals of Thoracic Surgery*. Vol. 103(6), pp. 1914–21.
43. P. Youssefi, R. Sharma, **C.A. Figueroa**, M. Jahangiri (2017). "Functional Assessment of Thoracic Aortic Aneurysms – The Future of Risk Prediction?" *British Medical Bulletin*. Vol 121(1) pp. 61–71.
44. H.W.L. de Beaufort, F.J.H. Nauta, M. Conti, E. Cellitti, C. Trentin, E. Faggiano, G.H.W. van Bogerijen, **C.A. Figueroa**, F.L. Moll, J.A. Herwaarden, F. Auricchio, S. Trimarchi (2017). "Extensibility and Distensibility of the Thoracic Aorta in Patients with Aneurysm". *J. Vasc. Endov. Surgery*. Vol 53(2), pp. 199–205.
45. A. van Engelen, M.S. Vieira, I. Rafiq, M. Cecelja, T. Scheider, H. de Bliet, **C.A. Figueroa**, T. Hussain, R. Botnar, J. Alastruey (2017). "Aortic Length Measurements for Pulse Wave Velocity Calculation: Manual 2D vs Semi-automated 3D centerline extraction". *J. Cardiovasc. Magnetic Resonance*. 19:32.
46. F. Cuomo, S. Roccabianca, N. Xiao, D. Dillon-Murphy, J.D. Humphrey, **C.A. Figueroa** (2017). "Effects of Age-Associated Regional Changes in Central Artery Stiffness on Human Systemic Hemodynamics Revealed by Computational Modeling". *PLOS ONE*. DOI: 10.1371/journal.pone.0173177.
47. C.J. Arthurs, P. Agarwal, A. John, A. Dorfman, R. Grifka, **C.A. Figueroa** (2017). "Reproducing patient-specific hemodynamics in the Blalock-Taussig circulation using a flexible multi-domain simulation framework: applications for optimal shunt design". *Frontiers in Pediatrics*. 5:78.
48. P. Youssefi, A. Gomez, C.J. Arthurs, R. Sharma, M. Jahangiri, **C.A. Figueroa** (2017). "Impact of Patient-specific Inflow Velocity Profiles on Haemodynamics of the Thoracic Aorta". *Journal of Biomechanical Engineering*. Vol 140(1), 011002.
49. Y.S. Oh, D.E. Berkowitz, R.A. Cohen, **C.A. Figueroa**, D.G. Harrison, J.D. Humphrey, D.F. Larson, J.A. Leopold, R.P. Mecham, N. Ruiz-Opazo, L. Santhanam, F. Seta, J.Y.J. Shyy, Z. Sun, P.S. Tsao, J. Wagenseil, Z. Galis (2017). "A Special Report on the NHLBI Initiative to Study Cellular and Molecular Mechanisms of Arterial Stiffness and its Association with Hypertension". *Circulation Research*. Vol 121:1216–18.
50. H.W.L. de Beaufort, A. Ferrara, M. Conti, F.L. Moll, J.A. Herwaarden, **C.A. Figueroa**, J. Bismuth, F. Auricchio, S. Trimarchi (2018). "Comparative Analysis of Porcine and Human Thoracic Aortic Stiffness". *European Journal of Vascular and Endovascular Surgery*. Vol 55(4), pp. 560 – 566.
51. B.A. Zambrano, N. McLean, X. Zhao, J.L. Tan, L. Zhong, **C.A. Figueroa**, L.C. Lee, S. Baek (2018). "Image-based computational assessment of vascular wall mechanics and hemodynamics in pulmonary arterial hypertension patients". *Journal of Biomechanics*. Vol 68, pp. 84–92.
52. T.M.J. van Bakel, K.D. Lau, J. Hirsch-Romano, S. Trimarchi, A.L. Dorfman, **C.A. Figueroa** (2018). "Patient-Specific Modeling of Hemodynamics: Supporting Surgical Planning in a Fontan Circulation Correction". *Journal of Cardiovascular Translational Research*. Vol 11(2), pp. 145-55.
53. M.S. Vieira, M. Henningson, N. Dedieu, R. Botnar, A. Bell, S. Mathur, K. Pushparajah, **C.A. Figueroa**, T. Hussain, G.F. Greil (2018). "Improved Coronary Magnetic Resonance Angiography using Gadobenate Dimeglumine in Pediatric Congenital Heart Disease". *Magnetic Resonance Imaging*. Vol 49, pp. 47-54.

54. T.M.J. van Bakel, C.J. Arthurs, J.A. Herwaarden, F.L. Moll, K.A. Eagle, H.J. Patel, S. Trimarchi, **C.A. Figueroa** (2018). “*A computational analysis of different endograft designs for Zone 0 aortic arch repair*”. European Journal of Cardio-Thoracic Surgery. Vol 54(2), pp. 389-96.
55. T.M.J. van Bakel, **C. Alberto Figueroa**, J.A. Herwaarden, S. Trimarchi (2018). “*Challenges of Thoracic Endovascular Aortic Repair for Type B Aortic Dissection*”. J. Endov. Therapy. Vol 25(5), pp. 578 – 580.
56. M.S. Vieira, C.J. Arthurs, T. Hussain, R. Razavi, **C.A. Figueroa** (2018). “*Patient-specific modelling of coronary vulnerability post-liver transplant in Alagille’s syndrome*”. PLOS One. Vol 13(11):e0205829.
57. A. Gomez, M. Marčan, C.J. Arthurs, R. Wright, P. Youssefi, M. Jahangiri, **C.A. Figueroa** (2018). “*Optimal B-Spline Mapping of Flow Imaging Data for Imposing Patient-Specific Velocity Profiles in Computational Haemodynamics*”. IEEE Transactions on Biomedical Engineering. DOI: 10.1109/TBME.2018.2880606.
58. J. Edlin, R. Bilkhu, P. Youssefi, **C.A. Figueroa**, R. Morgan, J. Nowell, M. Jahangiri (2019). “*Hemodynamic Assessment of Bicuspid Valve Aortopathy: A Review of Current Literature*”. Eur. J. Cardiothor. Surg. Vol 55(4), pp. 610-617.
59. F. Cuomo, J. Ferruzzi, P. Agarwal, C. Li, Z. Zhuang, J.D. Humphrey, **C.A. Figueroa** (2019). “*Sex-Dependent Differences in Central Artery Hemodynamics in Normal and Fibulin-5 Deficient Mice: Implications for Aging*”. Proc. Royal Society A. Vol 475(2221).
60. T.M.J. van Bakel, C.J. Arthurs, F.J.H. Nauta, K.A. Eagle, J.A. Herwaarden, F.L. Moll, S. Trimarchi, H.J. Patel, **C.A. Figueroa** (2019). “*Cardiac Remodeling following Thoracic Endovascular Aortic Repair for Descending Aortic Aneurysms*”. Eur. J. Cardiothorac. Surg. Vol 55(6), pp. 1061-70.
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73. S.R. Lynch, N. Nama, Z. Xu, C.J. Arthurs, O. Sahni, **C.A. Figueroa** (2020). "Numerical Considerations for Advection-Diffusion Problems in Cardiovascular Hemodynamics". *International Journal of Numerical Methods in Biomedical Engineering*. DOI: 10.1002/cnm.3378.
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83. L.M. Stevens, J.A. de Lemos, S.R. Das, C. Rutan, H. Alger, M.S.V. Elkind, J. Zhao, K. Iyer, **C. A. Figueroa**, J. L. Hall (2021). "American Heart Association Precision Medicine Platform Addresses Challenges in Data Sharing". *Circulation Quality Outcomes*. DOI: 10.1161/CIRCOUTCOMES.121.007949.
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91. V. Filonova, H. Gharahi, N. Nama, S. Baek, **C.A. Figueroa**. "*A Multiscale Framework for Defining Homeostasis in Distal Vascular Trees: Applications to the Pulmonary Circulation*". Submitted to Biomechanics and Modeling in Mechanobiology.
92. E. Ferdian, D. Marlevi, J. Schollenberger, M. Aristova, E.R. Edelman, S. Schnell, **C.A. Figueroa**, D. Nordsletten, A.A. Young. "*Cerebrovascular super-resolution 4D Flow MRI – using deep learning to non-invasively quantify velocity, flow, and relative pressure*". Submitted to Medical Image Analysis.
93. Y. Ahmed, S.R. Lynch, J.W. Haft, F.L. Moll, J. van Herwaarden, N.S. Burris, H.J. Patel, **C.A. Figueroa**. "*Patient-specific computational modelling of different cannulation strategies for extracorporeal membrane oxygenation*". Submitted to ASAIO.
94. I.B. Houben, A.K.Y. Chu, J.A. van Herwaarden, F.L. Moll, D.A. Nordsletten, **C.A. Figueroa**, H.J. Patel, N.S. Burris. "*Left Ventricular Remodeling Following Aortic Root and Ascending Aneurysm Repair*". Submitted to Frontiers: Cardiovascular Medicine.
95. S.R. Lynch, N. Nama, **C.A. Figueroa**. "*Effects of non-Newtonian Viscosity on Arterial and Venous Flows*". submitted to Scientific Reports.
96. N.R. Madamanchi, A. Lozhkin, A.E. Vendrov, R Ramos-Mondragón, C. Canugovi, M.D. Stevenson, T.J. Herron, S.L. Hummel, **C.A. Figueroa**, L.L. Isom, M.S. Runge. "*Mitochondrial oxidative stress contributes to diastolic dysfunction through impaired mitochondrial dynamics*". Submitted to Redox Biology.

Scopus statistics: 4,567 total citations; h-index: 36

Google Scholar statistics: 7,586 total citations; h-index: 39

Book Chapters

1. **C.A. Figueroa**, C.K. Zarins. "*Computational Analysis of Displacement Forces Acting on Endografts Used to Treat Aortic Aneurysms.*" In "Biomechanics and Mechanobiology of Aneurysms". Ed: T. McGloughlin. Publisher: Springer-Verlag. Series "Studies in Mechanobiology, Tissue Engineering and Biomaterials", Vol. 7. 1st Edition, **2011**. ISBN: 978-3-642-18094-1.
2. R.E. Clough, **C.A. Figueroa**, P.R. Taylor. "*Late Performance of EVAR - Four Dimensional (4D) Imaging Will Solve All This.*" Ed: R. Greenhalgh, Publisher: BIBA, London **2012**. ISBN: 978-0-9570419-0-5.
3. **C.A. Figueroa**, J.S. Coogan, J.D. Humphrey. "*Hemodynamic Alterations Associated with Coronary and Cerebral Arterial Remodeling Following a Surgically-Induced Aortic Coarctation.*" Ed: G.A. Holzapfel, E. Kuhl E. Publisher: Springer-Verlag. "Computer Models in Biomechanics: From Nano to Macro". **2013**. Part 3, 203-216, DOI: 10.1007/978-94-007-5464-5_15.
4. A. Noorani, **C.A. Figueroa**, P.R. Taylor, R.E. Clough. "*Additional Information from Functional Magnetic Resonance Imaging.*" Ed: R. Greenhalgh, Publisher: BIBA, London **2013**
5. A. Noorani, **C.A. Figueroa**, P.R. Taylor, R.E. Clough. "*4D MRI Useful Tool or New Gadget?*" Ed: J. P. Bequemin, Publisher: Minerva Medica Editions, Torino, Italy **2013**.
6. R. Khlebnikov, **C.A. Figueroa**. "*CRIMSON: Towards a software environment for patient-specific blood flow simulation for diagnosis and treatment*". In "Clinical Image-Based Procedures. Translational Research in Medical Imaging". Ed: C. Oyarzun Laura et al. Publisher: Springer. 4th International Workshop, CLIP 2015, Held in Conjunction with MICCAI 2015, Munich, Germany, October 5, 2015. DOI: 10.1007/978-3-319-31808-0_2. **2016**. ISBN: 978-3-319-31808-0.
7. C.J. Arthurs, **C.A. Figueroa**. "*Integration of an Electrophysiologically-Driven Heart Model into Three-Dimensional Haemodynamics Simulation using the CRIMSON Control Systems Framework*". In "Computational Biomechanics for Medicine: Imaging, Modeling, and Computing". Ed: G. Joldes et al. Publisher: Springer. MICCAI 2015, Munich, Germany, October 5, 2015. **2016**. ISBN: 978-3-319-28327-2.
8. **C.A. Figueroa**, C.A. Taylor, A.L. Marsden. "*Blood Flow*". Encyclopedia of Computational Mechanics Second Edition. Eds: E. Stein, R. de Borst, T.J.R. Hughes. Volume 3: Fluids. John Wiley & Sons, Ltd. ISBN: 978-1-119-00379-3. **2017**.

9. T.M.J. van Bakel, F.J.H. Nauta, M. Conti, R. Romarowski, S. Morganti, J.A. van Herwaarden, **C.A. Figueroa**, F. Auricchio, S. Trimarchi. “*Novel understanding on thoracic aortic diseases through bioengineering concepts*”. Surgical Management of Aortic Pathologies. Eds: O.H. Stanger, J.R. Pepper, L.G. Svensson. Springer. **2019**.
10. **C.A. Figueroa**. “*Arterial Hemodynamics*”. Rutherford’s Vascular Surgery and Endovascular Therapy, 10th Edition. Society for Vascular Surgery. Eds: A. Sidawy, B. Perler. Elsevier. **2022**.

Selected Talks

1. Invited speaker, Cardiovascular Implant Durability (CVID 2022). April 2022. “Computational Fluid Dynamics for Cardiovascular Applications”. Pacific Grove, CA.
2. Invited speaker, Department of Biomedical Engineering, University of California San Diego. January 2022. “Computational Modeling Tools for Subject-Specific Cardiovascular Simulation: Applications to Disease Research, Surgical Planning and Non-invasive Diagnostics “.
3. Invited speaker, Department of Biomedical Engineering, Texas A&M University. September 2021. “Computational Modeling Tools for Cardiovascular Disease Research, Surgical Planning and Diagnostics “.
4. Keynote speaker, Multiphysics and Data-driven Modeling for Cardiovascular Biomedicine Mini-Symposium. Jul 2021. USNCCM 16. “A Versatile Computational Framework for Scalar Transport In Cardiovascular Simulations”.
5. Invited speaker, SIAM Annual Meeting (AN21) July 2021. “Filtering Methods for Data Assimilation in Cardiovascular Simulation”.
6. Keynote speaker, Virtual Physiological Human Institute (VPHi) Keynote Webinar Series. May 2020. “Computational Modeling Tools for Cardiovascular Disease Research, Surgical Planning and Diagnostics”.
7. Keynote speaker, Integrating Machine Learning with Multiscale Modeling for Biomedical, Biological, and Behavioral Systems. ML-MSM 2019, Bethesda, Maryland November 2019. “Digital Twins, Data Assimilation, and Model Reduction for Surgical Planning and Vascular Diagnostics”.
8. Keynote speaker, Workshop on Advanced Computational Biomechanics in CardioVascular Surgery. Ecole des Mines de Saint-Etienne. November 2018. “Computational Methods for Patient-Specific Cardiovascular Simulation: Applications to Surgical Planning”.
9. Invited speaker, Department of Biomedical engineering, Purdue University. October 2018. “Advanced Computational Modeling Tools for Image-based Analysis of Hemodynamics”.
10. Invited speaker, Department of Mechanical Engineering. Washington University in St. Louis. September 2018. “Advanced Computational Modeling Tools for Cardiovascular Applications”.
11. Keynote Speaker - Thoracic Aortic Aneurysms and Aortic Dissection. World Congress of Biomechanics, Dublin. July 2018. “Computational Studies of Hemodynamic Performance of Thoracic Endografts”.
12. Invited speaker at the Symposium to Honor Professor Thomas JR Hughes on His 75th Birthday, World Congress of Computational Mechanics, New York City. July 2018. “Computational Methods for Subject-Specific Blood Flow Modeling”.
13. Invited Keynote Lecturer at the Osborne Reynolds Day, University of Manchester. July 2017. Manchester, UK. “Image-based Modelling of Hemodynamics: From Methods to Applications”.
14. Keynote speaker at the 7th Annual International Society for Neurovascular Disease: April 2017. Taormina, Italy. “Imaging and Computational Methods for Patient-specific Modeling of Cerebrovascular Perfusion”.
15. Invited speaker at the USACM Workshop: “Uncertainty Quantification and Data-Driven Modeling”. March 2017. Austin, Texas. “A Reduced-Order Kalman Filtering Approach for Data-driven Parameter Estimation in Arterial Hemodynamics”.
16. Invited faculty at the 2016 ISMRM Workshop: “Quantitative MR Flow: Innovation & Implementation for Clinical & Physiological Insights”. October 2016. San Francisco, California. “Surgical Planning of Fontan Repairs using Image-based Computational Fluid Dynamics”.
17. Invited faculty at the 2016 North American Society for Cardiovascular Imaging Annual Course. October 2016. Baltimore, Maryland. “Computational Fluid Dynamics in Congenital Heart Disease”.

18. Invited speaker at the Biomedical Engineering Seminar Series, Marquette University – Medical College of Wisconsin. Sept. 2016. Milwaukee, Wisconsin. “Advanced Modeling Tools for Cardiovascular Applications”.
19. Speaker at the Biomechanical and Clinical Studies in Endovascular Aortic Repair, UMC of Utrecht. Aug. 2016. Utrecht, The Netherlands. “Image-based Modeling of Hemodynamics: A Few Applications”.
20. Invited speaker at the Surgery Research Forum, University of Nebraska Medical Center. April 2016. Nebraska, Omaha. “Surgical Planning in Congenital Heart Disease using Computational Techniques: Procedure Optimization and Clinical Validation”.
21. Invited speaker at MICDE 2016 Symposium, organized by the Michigan Institute for Computational Discovery and Engineering. April 2016. Ann Arbor, Michigan. “Surgical Planning in Congenital Heart Disease using Computational Techniques: Procedure Optimization and Clinical Validation”.
22. Invited speaker at the Institute for Computational Engineering and Sciences, The University of Texas at Austin. “Computational Medicine Spring Seminar Series”. April 2016. Austin, Texas. “Subject-specific cardiovascular simulation: current applications, challenges, and opportunities”.
23. Invited speaker at the Policlinico San Donato. Nov 2015. Milan, Italy. “Planning complex vascular procedures using CFD: A glimpse into the Future”.
24. Invited speaker at Università degli Studi di Pavia. Nov 2015. Pavia, Italy. “CRIMSON: An integrated computer modelling framework for subject-specific cardiovascular simulation”.
25. Plenary lecture at the 4th International Conference on Computational & Mathematical Biomedical Engineering CMBE 2015. Jul 2015. Paris, France. “CRIMSON: An integrated computer modelling framework for subject-specific cardiovascular simulation”.
26. Invited speaker at the SVS Vascular Research Initiatives Conference. “Biomarkers for Vascular Disease Prediction and Therapeutic Screening” Session”. May 2015. San Francisco, CA. “Computational Modeling of Vascular Stiffness and Hemodynamics”.
27. Invited speaker at the Department of Mechanical Engineering, Michigan State. Feb 2015. East Lansing, MI. “New Computational Developments in Patient-specific Blood Flow Modeling”.
28. Invited speaker at the Department of Chemistry, Materials, and Chemical Engineering – Politecnico di Milano. Oct 2014. Milan, Italy. “Recent advances in predictive cardiovascular modeling: From automatic parameter estimation to simulation of transitional physiology”.
29. Invited speaker – Big Ten Biomedical Engineering Seminar Exchange Series University of Illinois at Chicago. Sep 2014. Chicago, IL. “Towards Predictive Cardiovascular Modeling: Simulation of Short-term Arterial Adaptations in 3D Subject-specific Models”.
30. Invited speaker at the 2nd Johns Hopkins Mini-Symposium on Vascular Stiffness. Sep 2014. Baltimore, MD. “Image-based Computer Modeling of Hemodynamics: Applications to Cardiovascular Disease Research”.
31. Semi-plenary lecture at the 11th World Congress on Computational Mechanics (WCCM 2014). Jul 2014 Barcelona, Spain. “Towards predictive cardiovascular modeling: Simulation of short-term arterial adaptations in 3D subject-specific models”.
32. Invited speaker at the 7th World Congress of Biomechanics. Jul 2014 Boston, MA. “Efficient Parameter Estimation in Cardiovascular Flows: from 1D Theory to Kalman Filtering Techniques”.
33. Keynote speaker at the “Molecular to Systems Physiology” workshop, Mathematical Biosciences Institute, Ohio State University. May 2014 Columbus, OH. “Recent Advances in 3D Blood Flow Simulation: From Parameter Estimation Methods to Clinical Applications”.
34. Invited speaker at the 17th Scientific Sessions of the Society of Cardiovascular Magnetic Resonance (SCMR 2014). Jan 2014 New Orleans, LA. “CMR-based Computational Fluid Dynamics of Coarctation of the Aorta”.
35. Invited speaker at the 3rd Munich Aortic & Carotid Conference (MAC2013). Nov 2013 Munich, Germany. “Three-dimensional Simulation of Short-term Pressure Regulation in the Systemic Circulation”.
36. Invited speaker at the “Seminario Proyecto Redes King’s College London – Centro de Imágenes Biomedicas”. Pontificia Universidad Católica de Chile. Oct 2013 Santiago, Chile. “Patient-Specific Cardiovascular Flow Modeling: Theory and Applications”.

37. 10th International Symposium on Endovascular Therapies (SITE 2013). May 2013 Barcelona, Spain. "Computational analysis of positional stability of aortic endografts: Combining actions and reactions".
38. Plenary Lecture at 1st UK National Conference on Patient-Specific Modelling & Translational Research. Jan 2013 Cardiff, UK. "Methods for Simulating Flow and Pressure in Large 3D Patient-Specific Models: Applications to Hypertension Research".
39. 6th European ECCOMAS 2012 Congress. Sep 2012 Vienna, Austria. "Three-dimensional fluid-structure interaction model of blood flow incorporating viscoelastic wall properties".
40. Invited Introductory Lecture at the 23rd International Congress of Theoretical and Applied Mechanics ICTAM 2012. Aug 2012 Beijing, China. "Pressure wave propagation in full-body arterial models: a gateway to exploring aging and hypertension".
41. 1st USACM Thematic Conference on Multiscale Methods and Validation in Medicine and Biology - Biomechanics and Mechanobiology. Feb 2012 San Francisco, CA. "Computer Simulations of Hemodynamic Alterations & Remodeling of the Upper Body Vascular Beds Following Distal Aortic Coarctation".
42. 11th U.S. National Congress on Computational Mechanics. Jul 2011 Minneapolis, MN. "Stability Analysis of Thoracic and Abdominal Aortic Endografts Using a Coupled CFD-CSM Finite Element Framework".
43. 4th Cardiac Physiome Workshop. Jul 2011 Oxford, United Kingdom. "Blood Flow and Pressure Wave Propagation in a Whole Body Scale Deformable Vascular Model".
44. Plenary speaker at the CMNE2011 - Congress on Numerical Methods in Engineering. Jun 2011 Coimbra, Portugal. "A Combined Computational & Clinical Framework for Investigating the Positional Stability of Aortic Endografts Used to Treat Aneurysm Disease".
45. 9th International Symposium on Endovascular Therapies (SITE 2011). May 2011 Barcelona, Spain. "Introduction to Computational Analysis for Fluid-Solid-Growth Modeling in Cardiovascular Simulations".
46. 16th International Conference on Finite Elements in Flow Problems. Mar 2011 Munich, Germany. "A Finite Element Framework for the Stability Analysis of Aortic Endografts".
47. 35th Annual Meeting Southern Association for Vascular Surgery. Jan 2011 Naples, FL. "A Longitudinal Study of the Positional Stability of TEVAR using Computational Fluid Dynamics".
48. Midwestern Vascular 2010. Sep 2010 Indianapolis, IN. "Torque Analysis and Bending Deformation of Aortic Endografts: Relationship to Long-term Positional Stability".
49. 9th World Congress on Computational Mechanics. Jul 2010 Sydney, Australia. "Computational Tools for the Analysis of Abdominal Aortic Endograft Migration."
50. Society of Vascular Surgery Annual Meeting. Jun 2010 Boston, MA. "The In-vivo Displacement Force (DF) is higher in Patients who Experience Aortic Endograft Migration: a 3D Computational Analysis."
51. FDA/NHLBI/NSF Workshop on Computer Methods for Cardiovascular Devices. Jun 2010 Rockville, MD. "Combining Computational and Medical Imaging Tools to Evaluate the Stability of Aortic Endografts."
52. Invited speaker at the 9th Hawaii Vascular Symposium. May 2010 Honolulu, HI. "Computational Tools to Predict Long-term Complications of Abdominal Endografts."
53. Plenary talk at the 9th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering. Feb 2010 Valencia, Spain. "Computational Tools for the Analysis of Long-term Stability of Abdominal Aortic Endografts."
54. Invited speaker at the IAMCS/KAUST Modeling Biological Materials Workshop. Jan 2010 Texas A&M University. "Patient-specific Blood Flow Simulation: a Gateway to Modeling Biomechanical Stimuli for Arterial Growth & Remodeling."
55. XXIV Annual Meeting of Western Vascular Society. Sep 2009 Tucson, AZ. "3D Computational Analysis of the Relationship between Aortic Displacement Force and Direction of Endograft Movement."
56. Keynote speaker at 10th U.S. National Congress on Computational Mechanics. Jul 2009 Columbus, OH. "Verification Study of the Coupled Momentum Method for Modeling Blood Flow in Compliant Arteries using Womersley's Deformable Wall Analytical Solution."
57. Plenary lecture at the FDA/NHLBI/NSF Cardiovascular Device Computational Modeling workshop. Jun 2009 Rockville, MD. "Patient-specific Computer Modeling of Migration Forces on Thoracic Aortic Stent-grafts."
58. 55th Annual Conference ASAIO. May 2009 Dallas, TX. "Computational Methods for Assessing Aortic Stent-Graft Migration."
59. 10th Annual ISES Endovascular Research Competition. Feb 2009 Phoenix, AZ. "Magnitude and Direction of Pulsatile Displacement Forces Acting on Thoracic Aortic Endografts."
60. 8th World Congress on Computational Mechanics. Jul 2008 Venice, Italy. "Multi-scale Modeling of Blood Vessels Using a Fluid-Solid-Growth Framework."

61. Invited Speaker at Blood and Air Flow Modeling in Complex Geometries Workshop. Mar 2008 INRIA Paris-Rocquencourt. "Using CFD to understand the cerebral circulation: Applications to the Design and Optimization of Endovascular Carotid Stenosis Repair Procedures."
62. 9th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering. Feb 2008 Porto, Portugal. "Computational Tools for the Study of Intracranial and Abdominal Aneurysms: an Introduction to the Fluid-Solid-Growth Framework."
63. Invited speaker at Workshop on Blood Modeling: From Cell to Network. Sep 2007 Aachen, Germany. "Patient-specific Modeling of Blood Flow in the Large Arteries."
64. Keynote speaker at 9th U.S. National Congress on Computational Mechanics. Jul 2007 San Francisco, CA. "Blood Flow in Compliant Vascular Models: Biomechanics of an Enlarging Aneurysm."
65. 14th International Conference on Finite Elements in Flow Problems. Mar 2007 Santa Fe, NM. "Fluid-Solid Interaction Simulations of Large-Scale Subject-Specific Models of the Cardiovascular System using a Coupled-Momentum Formulation."
66. 13th Annual Western Vascular Resident Forum. Sep 2006 San Diego, CA. "Degree-of-stenosis & Post-stenotic Arterial Dilation: Experimental and Computational Study."
67. 5th World Congress of Biomechanics. Aug 2006 Munich, Germany. "Large-scale Subject-specific Simulations of Blood Flow in Deformable Arteries using a Coupled-Momentum Formulation."
68. 7th World Congress on Computational Mechanics. Jul 2006 Los Angeles, CA. "The Coupled-Momentum Method for Fluid-Structure Interactions: Verification with Womersley Elastic Tube Theory and Applications to Large-Scale Subject Specific Models."

Grants

ACTIVE

1-R01-HL158723-01A1 (Figuroa, Beard, Tune) 03/15/22-02/28/26
 NIH/NHLBI \$2,619,981

Disentangling the Mechanisms of Coronary Blood Flow Regulation through Multi-scale Modeling

The major goals of this project are to develop and combine several animal models and computational models to explore the interplay between different mechanisms involved in coronary blood flow autoregulation, both in healthy and disease conditions. At the core of the project are the intricate interactions between metabolic and myogenic mechanisms in coronary blood flow.

Role: Contact MPI

CVC Micro-grant (Figuroa) 06/01/15-05/31/22
 University of Michigan \$5,000

Image-based Computational Assessment of False Lumen Hemodynamics in Chronic Type B Dissection

The goal of this study is to acquire MRI data in a small cohort of type B dissection patients (~8-10) and subsequently perform Computational Fluid Dynamics (CFD) analysis of aortic dissection hemodynamics.

Role: PI

U01HL135842 (Figuroa, Dorfman, Baek) 03/15/17-02/28/23
 NIH/NHLBI \$2,337,095

Image-based Multi-Scale Modeling Framework of the Cardiopulmonary System: Longitudinal Calibration and Assessment of Therapies in Pediatric Pulmonary Hypertension

The goal of this project is to develop and calibrate a multiscale model of the cardiopulmonary system that enables coupled high resolution simulations of the hemodynamics as well as cardiac and vascular mechanics.

Role: Contact MPI

UM Aikens (Figuroa) 06/01/16-05/31/22
 University of Michigan \$24,914.4

Adverse Cardiovascular Remodeling following TEVAR through Imaging and Computation

The goal of this study is to assess aortic stiffening and cardiac remodeling following thoracic endovascular repair.

Role: PI

ImBio, Inc (Prime: NIH) NIH/NHLBI	(Burris)	05/01/20-04/30/23 \$551,211
SBIR: Vascular Deformation Mapping (VMD) for Automated, 3D Assessment of Thoracic Aortic Aneurysm In this study we use image processing techniques for deformation analysis of thoracic aortic aneurysms. Role: co-I		
UM Mcubed University of Michigan	(Figueroa)	09/01/19-08/31/22 \$60,000
Unveiling the Impact of Flow on the Dynamics of Coagulation: A Microfluidics and Computational Approach The objective of this proposal is to combine expertise in microfluidics, rheology, and computational biology to create a novel model of coagulation which incorporates flow-dependent coagulation kinetics. Role: PI		
UM Aikens University of Michigan	(Figueroa)	06/01/20-05/31/22 \$33,062
Longitudinal Assessment of Renin Production and Aortorenal Hemodynamics in a Canine Model of Aortic Coarctation Repair. Role: PI		
S10OD026825 NIH/BRS Shared Instrumentation Grant	(Zhang)	07/01/20-06/30/22 \$600,000
High-Performance Computing Cluster for Biomedical Research. Purchase of equipment ongoing. Role: Co-I		

COMPLETED

AHA Post-doctoral Fellowship American Heart Association	(Figueroa)	01/01/20-12/31/21 \$131,356
Identification of hemodynamic risk factors for aortic dissection using modeling and multi-modality imaging. Role: PI		
AHA AI and ML Research Grant American Heart Association	(Figueroa)	07/01/19-06/31/21 \$200,000
A Cloud-computing Machine Learning and Computational Fluid Dynamics Framework for Assessment of Coronary Disease The goal of this project it to develop customized Neural Networks for automatic segmentation of coronary angiographic data and to reconstruct 3D computer models of coronary trees amenable for CFD analysis. Role: PI		
2R01HL105297-05A1 NIH	(Figueroa, Humphrey)	04/01/16-3/31/21 \$1,440,762
Mechanisms Underlying the Progression of Large Artery Stiffness in Hypertension The goal of this study is to use several animal models and computational modeling tools to investigate the progression of arterial stiffening and its relationship to hypertension. Role: Contact MPI		
NSF-US: 15-PAF04428 National Science Foundation	(Duraismy)	09/01/15-03/31/21 \$ 2,422,972
MRI: Development of a configuration for real time coupling of data and high-performance computing The goal of this study is to set up a hardware and software infrastructure to efficiently perform data-driven computations in several fields of engineering. Role: Co-PI		
AHA Pre-doctoral Fellowship American Heart Association	(Figueroa)	09/01/18-08/31/20 \$50,000
Early Initiation of Venous Thrombosis Examined Through a Photoacoustic Imaging Driven Computational Model The goal of this study is to describe the kinetics of venous coagulation using animal models, photoacoustic imaging, and computational modeling. Role: PI		

UM CV Imaging Collab. Fund. University of Michigan	(Figueroa)	03/01/18-02/28/19 \$24,969.57
Early Initiation of Venous Thrombosis Examined Through Photoacoustic Imaging and Image-Based Computational Models		
The goal of this study is to describe the kinetics of venous coagulation using animal models, photoacoustic imaging, and computational modeling.		
Role: PI		
307532 ERC INTEG-CV-SIM European Research Council	(Figueroa)	12/01/12-11/30/18 \$1,995,000
An Integrated Computer Modeling Framework for Subject-Specific Cardiovascular Simulation: Applications to Disease Research, Treatment Planning and Medical Device Design		
The goal of this study is to develop computer methods for material and boundary condition parameter estimation, and to implement arterial auto-regulation responses to represent alterations in baseline physiology.		
Role: PI		
NSF ENG170001 National Science Foundation	(Figueroa)	04/01/17-03/31/18 \$67,513
Turbulence modeling of transitional and mildly turbulent flow: Validation against experimental data and applications for cardiovascular flows.		
Role: PI		
UM Mcubed University of Michigan	(Figueroa)	12/01/15-04/30/18 \$60,000
Developing a Theory of Spatially Evolving Turbulence for Cardiovascular Flows		
The goal of this study is to develop a model that can accurately describe turbulence in cardiovascular flows.		
Role: PI		
Standard Research Grant EPSRC	(Schaeffter)	07/01/13 – 06/30/16 \$860,000
Uncovering Contributors to Hypertension through Experimental and Computational Simulation (CHECS)		
The goal of this project is to integrate different disciplines to improve hypertension clinical management by understanding its main hemodynamic contributors. We will develop experimental and numerical aortic models using medical measurements (e.g. imaging and pressure).		
Role: Co-I		
CR&D Competition Technology Strategy Board	(Schaeffter)	01/01/14-12/31/16 £612,492
Atherosclerosis stratification using advanced imaging and computer-based models		
The goal of the proposed project is to develop a novel tool for atherosclerosis risk stratification using multi-parametric MRI in combination with biophysical computer models.		
Role: Co-PI		
R01 HL105297 NIH	(Humphrey, Figueroa)	04/01/11-12/31/15 \$1,400,000
Cellular and Molecular Mechanisms of Arterial Stiffening and Its Relationship to Development of Hypertension		
The goal of this study is to use a number of animal models and computational modeling tools to investigate the progression of arterial stiffening and its relationship to hypertension.		
Role: MPI		
Vascular Surgery Fellowship Societe de Chirurgie Vasculaire	(Figueroa)	11/01/2014-10/31/2015 \$60,000
An Integrated Imaging and Modelling Approach for Treatment Planning in Aortic Dissection		
The goal is to validate image-based CFD against catheterization data in chronic type B dissection patients.		
Role: PI		

Trans. Res. Grant RG2629/13/14	(Figueroa)	01/01/14-12/31/14
Heart Research UK		\$145,000
An Integrated Approach for Individualized Treatment Planning in Aortic Dissection		
The goal of this study is to stratify aortic dissection patients by combining detailed 4D-MRI medical image data and advanced computer modeling tools.		
Role: PI		
RCS	(Figueroa)	01/01/13-12/31/13
Royal College of Surgeons of England		\$108,000
An Integrated Approach for Individualized Treatment Planning in Aortic Dissection		
The goal of this study is to stratify aortic dissection patients by combining detailed 4D-MRI medical image data and advanced computer modeling tools.		
Role: PI		
RC1 EB011443	(Zarins)	09/01/09-08/31/11
NIH		\$999,963
Resistance to Aortic Endograft Migration: Comparative Effectiveness of FDA Approved Devices		
The goal of this study is to compare the effectiveness of the FDA approved abdominal endografts using Computational Fluid Dynamics (CFD) and Computational Solid Mechanics (CSM) tools.		
Role: Co-PI		

Students, Post-docs and Clinical Fellows

- **PhD Students – Graduated (13):**

- **Main advisor - (7):**

- Nan Xiao (Jan 09 – Dec 13, Stanford University)

- Desmond Dillon-Murphy (Apr 12 – Aug 16, King's College London)

- Miguel Vieira (Jan 15 – Aug 19, King's College London)

- Diederik van Bakel (Nov 16 – Mar 19, University of Michigan / University Medical Center Utrecht)

- Federica Cuomo (Jun 14 – Dec 19, University of Michigan)

- Sabrina Lynch (Aug 15 – Dec 20, University of Michigan)

- Jonas Schollenberger (Sep 15 – May 21, University of Michigan)

- **Secondary Advisor - (6)**

- Hyun-Jin Kim (09, Stanford University, with Charles Taylor)

- Andrea S. Les (10, Stanford University, with Charles Taylor)

- Rashmi Raghu (10, Stanford University, with Charles Taylor)

- Jessica S. Coogan (10, Stanford University, with Charles Taylor)

- Foeke Nauta (Jul 15 – Jun 16, University of Michigan / University Medical Center Utrecht, with Frans Moll)

- Pouya Youssefi (Apr 14 – Nov 17, King's College London, with Marjan Jahangiri).

- **PhD Students – Current (8):**

- **Main advisor - (5):**

- Christopher Tossas-Betancourt (Aug 17 – present)

- Kritika Iyer (Sep 17 – present),

- Sara Hopper (Aug 19 – present)

- Taeouk Kim (Aug 20 – present)

- Shion Matsumoto (Sept 21 – present)

- **Secondary Advisor - (3)**

- Dr. Yunus Ahmed (Mar 19 – present, with Himanshu Patel)

- Liz Livingston (Sep 19 – present, with Krishna Garikipati)

- Pieter van Bakel (Jan 20 – present, with Nick Burris)

- **MSc students (8):**
 Federica Cuomo (Oct 12 – Jun 14, King’s College London)
 Pradyumn Agarwal (Jan 15 – Dec 16, University of Michigan)
 Anna John (Jan 15 – Dec 16, University of Michigan)
 Sabrina Lynch (Aug 15 – May 17, University of Michigan)
 Ashwin Iyengar (Jun 17 – May 18, University of Michigan)
 Christopher Tossas-Betancourt (Aug 17 – May 19, University of Michigan)
 Kritika Iyer (Sep 17 – May 19, University of Michigan)
 Jonathan Primeaux (Aug 18 – Jun 20) (MSc, University of Michigan)
- **Post-doctoral fellows (12):**
Stanford University Anamika Prasad (Sep 09 – Mar 12), Philippe Moireau (Jan 09 – Sep 09)
King’s College London: Kevin Lau (May 12 – Jun 14), Christopher Arthurs (Feb 13 – Nov 18), Nan Xiao (Mar 14 – Oct 14), Rostislav Khlebnikov (Oct 13 – May 16), Marija Marcan (Aug 16 – Nov 18).
University of Michigan: Kevin Lau (Jun 14 – Jun 16), Miquel Aguirre (Oct 14 – Dec 16), Vasilina Filonova (Nov 16 – May 21), Nitesh Nama (May 17 – Aug 21), Hamid Gharahi (May 19 – Aug 21), Abhilash Malipeddi (Oct 21 – present)
- **Clinical Fellows (5):**
Stanford University: Madhu Gorrepati (Jan 09 – Aug 11)
King’s College London: Alia Noorani (Nov 12 – Oct 16),
University of Michigan: Sabrina Ben Ahmed (Nov 14 – Dec 15), Ignas Houben (Sep 17 – present, with Dr. Himanshu Patel), Drew Braet (Aug 20 – present).
- **Software Engineers (1):**
University of Michigan: Alexander Melville (Jan 20 – May 21).
- **PhD Examination Committee Member (10).** Adelmo Cristiano Innocenza Malossi, École Polytechnique Fédérale de Lausanne (2012); Andreas Maier, Technischen Universität München (2012); Paula A. Rudenick, Universitat Autònoma de Barcelona (2014); Alessia Baretta, Politecnico di Milano (2014); Federica Cuomo, University of Michigan (2015); Jonas Schollenberger, University of Michigan (2016); Foeke Nauta, University Medical Center Utrecht (2016); Xianglong Wang, University of Michigan (2016); Sabrina Lynch, University of Michigan (2017), Sabrina Ben Ahmed, École des Mines de Saint-Étienne (2018).

Awards and Scholarships

- **Young Investigator’s Award: European Association of Cardiothoracic Surgery (EACTS) 2021.** Best paper award. “Patient-specific computational modelling of different cannulation strategies for extracorporeal membrane oxygenation”. Y. Ahmed, S. Lynch, J. Haft, F. Moll, J. van Herwaarden, N. Burris, H. Patel, C. Alberto Figueroa. Barcelona, Spain.
- **First Place: PhD student paper competition - Summer Biomechanics, Bioengineering, and Biotransport (SB3C) (2019).** “A Combined MRI Arterial Spin Labeling and Computational Modeling Strategy to Quantify Patient-Specific Blood Flow & Perfusion in Cerebrovascular Occlusive Disease”. J. Schollenberger, L. Hernandez-Garcia, N. Osborne, C. A. Figueroa.
- **First Place: PhD student paper competition - World Congress of Biomechanics, Dublin (2018).** “FSI models of mice hemodynamics in Wild Type and Fbln5-/- populations”. F. Cuomo, J. Ferruzzi, P. Agarwal, C. Li, Z. Zhuang, J.D. Humphrey, C.A. Figueroa.
- **BME Departmental Award 2016, College of Engineering, University of Michigan.** Award conferred for a high impact accomplishment in a meritorious area benefiting the Department and the College.
- **Walton Lillehei Young Investigator’s Award: European Association of Cardiothoracic Surgery (EACTS) 2015.** Best paper award. “Effect of Aortic Valve Morphology on Fluid Dynamics of the Thoracic Aorta – Indication for a New Modality of Valve Assessment?” P. Youssefi, A. Gomez, T. He, L. Anderson, N. Bunce, R. Sharma, **C. A. Figueroa**, Marjan Jahangiri. Amsterdam, The Netherlands.
- **Bronze Medal: American Association of Thoracic Surgeons 2015. Poster Competition.** “Fluid Dynamics of the Thoracic Aorta – An Insight into Aneurysm Formation? P. Youssefi, A. Gomez, R. Sharma, **C. A. Figueroa**, Marjan Jahangiri. Seattle, Washington.

- **First Place:** Medical Engineering Centre 2013. Student Competition. "Computational Analysis of Thoracic Aortic Dissection" D. Dillon-Murphy, A. Noorani, R. E. Clough, P. Taylor, **C. A. Figueroa**. Ascot, UK.
- **First Place:** 10th International Symposium on Endovascular Therapies (SITE 2013) Poster Competition. "Image-based Modeling in Aortic Dissection – Is False Lumen Pressure Related to Aortic Growth?" A. Noorani, R. Clough, D. Dillon-Murphy, P. Taylor, **C. A. Figueroa**. Barcelona, Spain.
- **First Place:** ICON2011 Endovascular Research Competition (2011). Paper: "Computational Analysis of Stresses Acting on Inter-Modular Junctions in Thoracic Aortic Endografts". A. Prasad, L.K. To, M.L. Gorrepati, C.K. Zarins, **C.A. Figueroa**. Scottsdale, Arizona.
- **First Place:** ISES Endovascular Research Competition (2009). Paper: "Magnitude and Direction of Pulsatile Displacement Forces Acting on Thoracic Aortic Endograft." Scottsdale, Arizona.
- **Second Place:** Undergraduate Student Paper Competition at the ASME Summer Bioengineering Conference (2009). Poster: "A Longitudinal Study of Migration Forces on Patient-Specific Abdominal Aortic Endograft Models". V. Yeh, A.J. Chiou, C.A. Taylor, C.K. Zarins, **C.A. Figueroa**. Lake Tahoe, California
- **Barrié de La Maza Foundation Fellowship.** Administered by the Institute of International Education (Sep 1999 - Dec 2000). Fully funded M.S. degree at Stanford University.
- **Dragados y Construcciones Award:** Best Technical Report 1998. "An application of the Finite Element Method to fluid mechanics problems: a study of stabilized algorithms applied to the transport equation."
- **Fundación de La Ingeniería Civil de Galicia Scholarship:** Exhibition "The port and the city of La Coruña" (1997 - 1998).
- **Finalist:** National Competition of the 24th Physics Olympiad. Oviedo, Spain (1993).

Patents

- S09-194/PROV "Endograft Migration Assessment." **C.A. Figueroa**, C.A. Taylor, C.K. Zarins (2009).
- U.S. Utility Application No. 17/101,550 (UMID 2019-464-02). PCT No. PCT/US20/61789 (UMID 2019-464-03). "Anatomical and Functional Assessment of CAD Using Machine Learning". **C.A. Figueroa**, C.J. Arthurs, K. Iyer, L. Livingston, R.R. Nadakuditi, K. Garikipati, B.K. Nallamothe (2019).

Professional Memberships

- ASME – American Society of Mechanical Engineers.
- ISES – International Society of Endovascular Specialists.
- SEMNI – Spanish Society of Numerical Methods in Engineering.
- NASCI – North American Society of Cardiovascular Imaging.
- SCMR – Society of Cardiovascular Magnetic Resonance.
- AHA – American Heart Association.
- AIMBE – American Institute for Medical and Biological Engineering
- MICCAI – The Medical Image Computing and Computer Assisted Intervention Society

Professional Development Activities

- University of Michigan Leadership Academy (Including 360-degree feedback – March 2019)
- University of Michigan Aikens Innovation Academy – Spring 2019
- Frankel Cardiovascular Center Transformational Leadership Program 2021-2022 class.